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THE INFLUENCE OF CHILDCARE ARRANGEMENTS ON CHILD WELL BEING FROM INFANCY TO MIDDLE CHILDHOOD

A Report for TUSLA: The Child and Family Agency

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IRISH RESEARCH COUNCIL
An Chomhairle um Thaighde in Éirinn

Growing Up in Ireland
National Longitudinal Study of Children

TUSLA
An Ghníomhaireacht um Leanaí agus an Teaghlach
Child and Family Agency

Notes on Contributors and Acknowledgements

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Executive Summary

Research Objectives

In 2012, the Family Support Agency (now Túsla, the Child and Family Agency) in collaboration with the Irish Research Council commissioned this study to investigate the wellbeing of children from families in which the parents are in employment and the children are minded by others.

The study set out to describe the uptake of non-parental care from infancy to middle childhood, and to determine how such uptake influences the wellbeing of children. This is the first national study of the well-being of children from infancy to middle childhood in the Irish context.

The key *research objectives* were:

1. To explore the relationship between childcare arrangements in early childhood and out-of-school care in middle childhood and children's physical, cognitive and socio-emotional outcomes; and,

2. To identify the key risk factors associated with children's well-being from infancy to middle childhood.

Sources of Data

This study drew on all publicly available cohorts of the national longitudinal study of children, Growing up in Ireland (GUI). This included Waves 1 and 2 of the infant cohort and Wave 1 of the child cohort. These are nationally representative samples of cohorts of children at infancy, early childhood and middle childhood. Each wave collects data on a range of individual, family and primary care-giver characteristics.

The cross-sectional data of each of the waves was examined separately for nine month olds, three year olds, and nine year olds. This data allowed us to examine the factors associated with the uptake of childcare, and the influences on children's physical, socio-emotional and cognitive outcomes at three distinct stages of childhood: at nine months, age 3 and age 9. The longitudinal data from the infant cohort was used to examine the impact of early childcare arrangements in infancy on outcomes for children as they progressed from nine months to age three from September 2008-April 2009 (wave 1) to December 2010-July 2011 (wave 2).

Main Findings

Patterns of Childcare Arrangements

- Prior to the introduction of the universal pre-school Early Childhood Care and Education (ECCE) scheme, full parental care was the dominant form of childcare over each of the stages of childhood examined in this report: from infancy to middle childhood. However, following the introduction of the ECCE there is now evidence of almost universal uptake of centre based childcare among pre-school children aged 3-4.

- Prior to the implementation of the ECCE, across the stages of childhood, there was variation in the uptake of non-parental care, with 39% of infants, 50% of three year olds, and 23% of 9 year olds in non-parental care. In contrast to the substantial growth of the use of non-parental care among pre-school children as a direct result of the ECCE, the uptake of non-parental out-of-school care among primary school children has remained stable (less than 25% of the cohort) between 2002 and 2010.

Main Findings

- Our analyses revealed a strong reliance on informal early childcare prior to the implementation of the ECCE, and an ongoing reliance on informal out-of-school care in middle childhood. Families in Ireland rely heavily on informal care, especially from grandparents, and this is particularly the case when children are in infancy and early childhood. In contrast, the uptake of centre based care was less prevalent at all stages of childhood. Just 3% of all nine year olds are included in the broad definition of centre-based afterschool care (which includes homework/afterschool clubs, activity camps and special needs groups).

- Patterns into non-parental childcare are socially stratified at all stages of childhood, from infancy to middle childhood. All else being equal, parents from semi-skilled and unskilled manual backgrounds are less likely to use non-parental childcare. We also report a general pattern whereby high income households, households in which the primary caregiver is in employment full-time and households in which all parents present are in employment are significantly more likely to have access to non-parental childcare at all stages of childhood.

- Household income not only influences the take-up of non-parental childcare across all stages of childhood, but also the number and type of childcare arrangements that are used.

Influence of Childcare Arrangements on Child Wellbeing

- Results showed that childcare arrangements in infancy have an impact on short-term developmental outcomes by age three. Our findings also highlight the positive, but limited role of centre based care in infancy for early child development with regard to the achievement of infant developmental milestones. Specifically, we report positive developmental outcomes by age three for infants who were in centre based care at nine months with regard to gross and fine motor skill development. However, such effects are limited and do not apply uniformly to all areas of fine and gross motor skill development.

- There was no significant impact of centre based care on early cognitive and socio-emotional outcomes. However, our findings highlight the positive effects of care in infancy by relatives on later outcomes in the area of language and communication. Clearly, relatives and grandparents are providing a vital service within families in Ireland.

- While broader exposure to structured educational and social activities during the pre-school years benefits certain aspects of child development, the absence of centre based effects on certain domains of child development may highlight the varied pedagogic orientations across the centre based childcare sector. We also report a negative effect of consistency in the type of childcare from infancy to early childhood, particularly with regard to some domains of fine motor skill development.

- In relation to child developmental outcomes at age nine, children in full-time parental out-of-school care fared better on measures of socio-emotional well-being and academic performance than those in other forms of out-of-school care, including after school clubs.

Key Risk Factors

- As well as identifying the effects of early childcare arrangements, our analyses revealed that as infants move through early childhood, developmental outcomes and socio-emotional outcomes are strongly influenced by earlier developmental indicators to include ASQ scores, cognitive scores, and health status but also gender.

- Household socio-economic profile, and parent/family characteristics including low education levels, less advantaged social class position, lone parenthood; maternal ill-health and depression were all associated with greater socio-emotional difficulties and poorer cognitive/academic/developmental outcomes consistently across all stages of childhood. However, infants growing up in less well-resourced households were more likely to achieve gross motor milestones by age 3.

- The wellbeing of the primary care giver has a consistent influence on child development from infancy to childhood. That is, the children of primary caregivers who had higher depression scores or parental stress scores were significantly less likely to do well in terms of developmental outcomes.

Conclusions

Our research points to the necessity of access to high quality childcare arrangements at all stages of childhood. We found robust childcare effects on child well-being outcomes, particularly from infancy to early childhood, even when controlling for selection into non-parental childcare. In infancy and early childhood, these effects pertained largely to centre based childcare but also to childcare provided by relatives/friends, rather than full parental care. In contrast, in middle childhood, more positive outcomes were evident for children in full parental afterschool care, even when controlling for selection into non-parental childcare.

Our findings represent the period prior to the implementation of the state supported ECCE and do not capture changes that have occurred since this landmark policy initiative. However, on balance, our findings suggest that the provision of early childhood care and education in this early stage of children's lives (from infancy to age 3) helps to promote child development. Further research using additional waves of the GUI longitudinal data is required to examine the extent of these effects.

Our research also highlights the existence and persistence of considerable social stratification in child well-being outcomes from infancy onwards, even when controlling for different types of childcare arrangements. What transpires within the home, and the socio-economic circumstances of the household (as well as the childcare situation) are very important in predicting child wellbeing.

In line with other international studies, we found the key risk factors in relation to child wellbeing to be low household income and low levels of household employment, low parental educational levels, family stress and maternal mental health. Each of these factors had an important influence on children's development from infancy to middle childhood. While it is unlikely that childcare arrangements can entirely mitigate the effects of social inequality throughout childhood, the evidence in this report indicates that access and participation go some way in levelling the playing field, particularly in early childhood.

Policy Recommendations

Access to Childcare

This study represents the first large-scale and systematic analysis of the wellbeing of infants and children and it has important implications for both policy and practice. The report highlights the effects of social stratification on access to childcare from infancy through middle childhood. Pathways into non-parental care are socially stratified from infancy to middle childhood, even with the availability of the ECCE scheme at early childhood. A lack of affordable childcare, while financially difficult for many middle income families with multiple children, is a significant barrier to employment for low income and single parent families.

1. *We recommend public investment in early years services to enable families to break out of cycles of poverty, reduce the costs of childcare, and place children on a more even playing field.*

Quality of Childcare

While the absence of strong measures of the quality of childcare settings is a key limitation of the GUI datasets and consequently of our study, it has been well-established in international research that quality is the most important variable in determining how childcare affects children's socio-emotional and cognitive outcomes. It is likely that access to quality settings is biased toward those with the most resources to access such care, with limited positive outcomes for children as a consequence. Raising quality standards across all childcare should be a priority for Government action.

2. *Consistent with other expert and advocacy groups (DCYA, 2013, Start Strong, 2014), we recommend that any public investment be instrumental in raising the quality of all early years' services.*

Out-of-school Childcare

Our study found that the provision and quality of out-of-school childcare in Ireland is inadequate, and this is consistent with the findings of a report by the European Commission (Plantenga and Remery, 2013). The conceptualisation of childhood and childcare needs in current policy is limited in that it is focused primarily on childcare for children not yet in primary school. Clearly childcare needs extend beyond early childhood. A conceptualisation that captures all stages of childhood may facilitate long-term approaches to the creation and sustainability of long-term access to the labour market for females. Previous reports have highlighted the steps required to develop and sustain an out-of-school infrastructure (e.g., DJELR, 2005) and we urge policy makers to support the co-ordinated development of such an infrastructure across school and community contexts.

3. *We recommend that steps are taken to provide a range of high quality regulated, community-based out-of-school care options that are tailored to and informed by the developmental stages of middle childhood and beyond.*

Access to Childcare and Health Services

This report highlights inequalities in access to childcare services and medical services when they are needed for children.

4. *We recommend the provision of universal supports in childhood that promote child wellbeing, particularly with regard to accessing quality childhood care and education, and universal access to health care for all infants and children.*

Family Support Services
Child wellbeing is socially stratified. Our study highlights the relative disadvantage faced by children in families with fewer economic, cultural and social resources. As a result, there are often less positive outcomes for the children of low income, low SES families and for families where a parent experiences significant stress or mental health difficulties. Additionally, these patterns are often gendered.

5. *We recommend the development of robust services to support children and families in order to bring about more positive outcomes and to level the playing field for children across all stages of childhood.*

Future Research

Our recommendations for future research advocate the continued consideration of the influence of childcare arrangements on child wellbeing at all stages of childhood from a longitudinal perspective, using consecutive waves of the *Growing up in Ireland* study.

Since the broadcast of the RTE Prime Time documentary, *A Breach of Trust* (May 2013), which exposed poor practices in Irish crèches, there has been increased attention on quality standards in childcare. While such attention is to be welcomed, much of the focus has been limited to the regulatory aspects of quality such as adult-child ratios, staff qualifications, and Garda vetting. There has been less attention paid to the more direct and dynamic aspects of quality, namely the quality of interactions between staff and children and the quality of the learning environment (for an exception see, Neylon 2014). Research which systematically explores these dynamic aspects of quality in the Irish Early Childhood Care and Education (ECCE) sector using standardised observational measures would be useful in addressing this issue.

This report highlights the fact that there is considerable reliance on relatives (most of whom are grandparents) to provide childcare for Irish families especially during infancy. Lower income families, in particular, are more likely to opt for relative care over other types of care. Two thirds of all relatives provide childcare free of charge. Clearly finance is a major consideration in choosing childcare options. Very little is known about the experiences of grandparents who provide this vital service. Research which explores the experience of grandparents/relatives who provide childcare is long overdue.

Finally, future research should also focus on child wellbeing outcomes beyond the definitions used in this report. Such outcomes could include the safety of children from accidental and intentional harm, security in the immediate and wider physical environment, and participation in positive networks of families, friends, neighbourhoods and the community, as well as inclusion and participation in society.

Chapter 1: Introduction and Policy Context

1.1 Introduction

To date, little is known in the Irish context about children's childcare arrangements and their influence on child wellbeing from infancy through to middle childhood. Furthermore, little is known about the effects of childcare in infancy (before the age of three) on later outcomes. Uniquely, this study draws on all existing publicly available cohorts of the *Growing up in Ireland* (GUI) surveys, (the national longitudinal study of children) to examine how household strategies with regard to employment and childcare arrangements influence child wellbeing from infancy and early childhood through to middle childhood. The key objectives of our research were

- To explore the relationship between childcare arrangements (in infancy and early childhood and out-of-school care in middle childhood) and children's physical, cognitive and socio-emotional outcomes; and,
- To identify the key risk factors associated with children's well-being from infancy to middle childhood.

Factors such as the well-being of the primary caregiver, the socio-economic circumstances of the family and the individual characteristics and developmental milestones of children were included in the analyses as the broader context within which children are placed (see for example Fahey, Keithly and Polek 2012; Hannan, Halpin and Coleman 2013).

1.2 Childhood Care and Education Policy

The past two decades have seen a number of landmark initiatives and the publication of influential reports in the area of early childhood care and education (ECCE). Such initiatives reflect something of a paradigm shift in Irish public policy towards a recognition of the critical importance of early childhood care and education as the foundation for achieving the goal of lifelong learning (NESF, 2005). However, although there is a growing commitment to early childhood care and education, childcare workers and researchers argue that there remains an absence of serious engagement with the task of improving and sustaining quality within the sector (e.g., Hayes, 2013).

A key objective of this study is to highlight the relative absence of childcare policy for school age children in the Irish context. Compared to the early childhood period, much less attention has been paid to the continuum of care for children through to middle and late childhood. Until recently, there has been little state support for afterschool childcare, and in general there is a scarcity of provision (Russell et al., 2009). Previously, the Central Statistics Office (CSO) had identified that for school age children there is an even higher reliance on informal childcare, with almost 60 per cent of non-parental care being informal[1] (CSO 2006). In December 2012, a new Budget initiative was introduced to provide for upwards of 6,000 additional afterschool places targeted at children in primary schools.

Cross-country comparisons on the state of out-of-school childcare show Ireland fairing extremely badly in this regard. A study by the European Commission compared 33

[1] Informal is defined in this context as an unpaid or paid relative or friend.

European countries in terms of their availability, affordability and quality of school-age childcare (Plantenga and Remery, 2013). The study noted there is considerable variability in access and provision of services, whereby most countries relied on a "complicated mixture of informal and part-time arrangements, with a (high) unmet demand for formal out-of-school care services". It was noted that provision in Ireland was even more limited than elsewhere. In relation to the quality of care being offered, the report rated Ireland second from bottom of a league-table with only Spain performing worse (Plantenga and Remery, 2013). Ireland's poor quality rating results from the lack of qualification requirements for staff working in school-age childcare, as well as the absence of regulation that would limit child-to-staff ratios and group sizes. However, with the passing of the Child and Family Support Agency Act (2013) there is now a legal basis for the regulation of school-age childcare in Ireland, although details of such regulations have yet to be finalised.

There are a number of key challenges facing the childcare sector. First, Ireland's investment in early childhood care and education continues to be low by international standards. The average spend among OECD countries is 0.7% of GDP (with Scandinavian countries spending over 1%), whereas Ireland's investment is only at 0.4% (Start Strong, 2013). There has been some progress in recent years particularly with the introduction of the free pre-school year in 2010, a scheme which provides one year of pre-school education for children aged between 3-4 years. However, as pre-school provision is available for just three hours per day and only during school term time, it is not a solution for children whose parents are in paid employment.

Second, unlike in other institutional contexts, childcare provision in Ireland developed mainly on a supply and demand basis. As a result, it is somewhat uncoordinated, is variable in quality and in short supply (National Childcare Strategy, 1999). Beyond preschool provision, childcare in Ireland is largely available only on the private market place or within informal extended family and community networks. While some publically funded childcare centres exist, these are in very short supply and only available in areas of socioeconomic disadvantage (Barry and Sherlock, 2008).

Third, given the lack of state or employer subsidies, childcare is extremely expensive in Ireland (OECD 2011). According to a study by the Organisation for Economic Co-operation and Development which looked at 32 industrialised countries, an Irish double income couple with two children could pay up to 45 per cent of their net income on childcare (OECD, 2004). A recent report by the Donegal County Childcare Committee (Indecon, 2013) found that typical full-time childcare costs range from €730 to €1,100 per month, with a two-child family likely to spend €16,500 annually. The report found that the prohibitively expensive cost of childcare was a barrier to employment, with 26 per cent of parents claiming they were prevented from returning to work or training because of childcare arrangements. That figure jumped to 56 per cent in lower income groups. There is increasing recognition that a lack of affordable childcare has enormous social consequences especially in terms of preventing children and their families from breaking out of poverty, and for gender equality (National Women's Council, 2005; O'Toole, 2013).

Fourth, despite the high cost of childcare, the quality of services is often below minimum acceptable standards. In 2008 UNICEF reported on an evaluation of early childhood services across 25 OECD countries. Their report proposed internationally applicable

benchmarks for early childhood care and education, which represent a set of minimum standards for protecting the rights of children in their most vulnerable and formative years. Of the 10 benchmarks proposed, Ireland achieved only one, and placed joint bottom of the league table (UNICEF 2008).

1.3 Childcare and Child Well-Being

The past two decades has seen a proliferation of international research on childcare arrangements emerging from national cross-sectional and longitudinal studies. As a result, research has moved away from simple comparisons of children who experience childcare with those who do not. Large scale studies of children allow researchers to control for a range of variables that may mediate the effects of early childcare on child wellbeing at a later age. Large-scale studies also allow researchers to disentangle various aspects of the childcare setting itself. A number of key aspects of the childcare setting have been identified in international studies including: (1) the quality of childcare, (2) the amount (quantity/intensity) of childcare, (3) the type of care, (4) the age at which childcare commenced, and (5) the stability of childcare arrangements.

It is well established that high quality preschool care and education (from around 3 years) has a positive and long-term impact on children's socio-emotional and cognitive outcomes. However, research on the impact of non-maternal childcare that is begun prior to age 3 is more mixed. Some studies have reported positive effects of early childcare (Andersson, 1989; Hansen and Hawkes, 2009; Sylva, et al., 2011), but many have reported negative effects of early maternal work (e.g., Baydar & Brooks-Gunn, 1991; Berger et al., 2008; Brooks-Gunn, Han and Waldfogel, 2002; Han, Waldfogel and Brooks-Gunn, 2001; Ruhm, 2004; Waldfogel, Han and Brooks-Gunn, 2002). In these studies, negative effects are usually detected in the first year postbirth and are more pronounced for full-time employment than part-time employment (Baydar and Brooks-Gunn, 1991; Brooks-Gunn et al., 2002; Waldfogel et al., 2002).

One of the most consistent messages from the international research is that it is the *quality* of care that matters most in determining whether childcare has a beneficial or detrimental impact on a child's development. Furthermore, the quality of care settings is associated with beneficial outcomes persisting 10-15 years after intervening experiences (NICHD ECCRN, 2002, Belsky et al., 2007; Harrison 2008; Vandell et al., 2010; Sylva et al., 2012).

It has also been suggested in the literature that formal centre-based childcare may be of better quality than informal care carried out by relatives or family friends, resulting in better outcomes for children (Gregg et al., 2005; Sylva et al., 2011). Providers of centre-based childcare often place a strong focus on providing a structured learning environment whereas informal care is usually family based and aimed at providing a "home-like" setting involving mostly free play (Cote et al., 2013). However, centre-based care may also be associated with greater discontinuity of caregivers due to staff turnover or rota designs. This is an important consideration since continuity and stability with caregivers is

associated with more sensitive care-giving and more positive child–caregiver interactions (Cummings, 1980; Elicker et al., 1999; Ritchie and Howes, 2003).

A number of studies have highlighted how the quantity of care matters for child wellbeing, with generally negative effects reported for longer periods of time spent in non-parental childcare (NICHD ECCRN, 2002, 2003; Harrison 2008; Vandell, et al, 2010). Other studies place emphasis on the stability (or instability) of childcare arrangements, the use of multiple, concurrent arrangements and /or discontinuity or change in child-care arrangements over time on child wellbeing (Morrisey, 2008, 2009). Families may make a concerted effort to secure enriching experiences for their children by combining the social and educational components of centre-based care with quieter home-based care (Capizzano and Adams, 2000, Morrissey, 2008, 2009). On the other hand, research suggests that families are constrained by employment arrangements (very long / irregular hours) or by the costs of childcare (Folk and Yi, 1994, Han, 2004, Morrissey, 2008, 2009)– particularly in low income and single parent families (Adams, et al., 2007) and so have to rely on multiple childcare arrangements for their children. It has been argued that the stability of caregivers is important for young children as they build relationships with their caregivers and peers. Morrissey (2009) suggests that experiencing frequent transitions may be stressful for children particularly if it means that children have inadequate time or opportunity to adapt to their new settings. While there is some evidence that exposure to a diverse range of settings, adult caregivers, and peer groups may promote children's social skills (Provost, 1994), the majority of research suggests that experiencing greater numbers of child-care arrangements has negative effects on children's behaviour (Bacharach and Baumeister, 2003; Youngblade, 2003), particularly among children with difficult temperaments (De Schipper et al., 2004).

Chapter 2: Methodology

2.1 Research Questions

The key objectives of this research were 1) to consider the relationship between childcare arrangements in early childhood and out-of-school care in middle childhood and children's physical, cognitive and socio-emotional outcomes, and, 2) to identify the key risk factors associated with children's well-being from infancy to middle childhood.

The key research questions were:

- What determines the type of childcare arrangement (full-time parental care, relative care, non-relative care, centre-based care) that infants and children experience?
- How does the type of childcare in infancy, early childhood and middle childhood impact on children's physical, cognitive and socio-emotional outcomes? Do the effects of childcare at 9 months persist when children are aged three?
- Does the length of time spent in non-parental childcare have any effect on children's physical, cognitive, and socio-emotional outcomes?
- Does the number of childcare arrangements influence children's physical, cognitive, and socio-emotional outcomes?

2.2 Data and Dependent Variables

Wave 1 and Wave 2 of the GUI Infant Cohort

This study is based on data from the GUI survey. A key advantage of the GUI is that it is designed as a longitudinal study, and wave 1 and wave 2 of the infant cohort were available for this study.

The 11,134 children representing the infant cohort were born between 1st December 2007 and the 30th June 2008 and data collection for the first wave at 9 months took place between September 2008 and April 2009. These children and their families constituted the target sample for the second wave of the GUI study. The second wave of interviews with the Infant Cohort took place between December 2010 and July 2011, when the children were three years of age. Questionnaires were successfully completed with 9,793 families, approximately 91 per cent of the target sample (Williams et al., 2013). Children were interviewed in the month following their third birthday (their 37th month).

The cross-sectional data is examined separately for nine month olds and the three year olds, given their usefulness as nationally representative samples of cohorts of children at infancy and early childhood. The longitudinal data captured by wave 1 and wave 2

allowed us to examine the relationship between early childcare arrangements in infancy and outcomes for the same children as they progressed from nine months and age three, over the period September 2008-April 2009 (wave 1) and December 2010-July 2011 (wave 2).

Wave 1 of the GUI Child Cohort

The Child Cohort Qualitative Study took place from April to July 2008 with 120 families selected from the original 8,500. The child cohort collects data on a range of individual, family characteristics, and primary care-giver characteristics that can be used in to describe out-of-school care, family employment and care dynamics and child wellbeing at age nine. While the GUI is designed as a longitudinal study, successive waves of the child cohort were not available at the time of writing. Thus, the first wave of data used here provides valuable information on these dimensions. The cross-sectional data is examined for nine year olds given its usefulness as a nationally representative sample of a cohort of children at middle childhood.

A summary of the dependent variables used in the report is presented in Table 2.1. These include uptake of non-parental childcare, physical outcomes, infant milestones, socio-emotional outcomes and cognitive outcomes from infancy to middle childhood.

QNHS

The Quarterly National Household Survey (QNHS) was used to document patterns of the uptake of the cohort of pre-school and school age children from 2002 onwards.

Table 2.1: Summary of the Dependent Variables Analysed in the Current Study

	Infants	3 Year Olds	9 Year Olds
Uptake of Non-Parental Childcare	Uptake of Non-Parental Childcare Type of Childcare Arrangement Number of Childcare Arrangements Duration of Childcare	Uptake of Non-Parental Childcare Type of Childcare Arrangement Number of Childcare Arrangements Duration of Childcare	Uptake of Non-Parental Childcare Type of Childcare Arrangement Number of Childcare Arrangements Duration of Childcare
Physical Outcomes	Parental Report of child's health	Parental Report of child's health	Parental Report of child's health
Infant Milestones	Gross Motor	Gross Motor	
	Fine Motor	Fine Motor	
Socio-Emotional Outcomes	Personal/Social Development	Strengths & Difficulties	Strengths & Difficulties
			Piers Harris
Cognitive Outcomes	Problem Solving Skills	Picture Similarities	Math
	Communication Skills	Naming Vocabulary	Reading

2.3 Analytic Strategy

For each of the chapters, descriptive analyses are provided with a particular focus on the outcome of interest and the relationship between the types of childcare arrangement/out-of-school arrangement. Missing data have at times (depending on their size) been included in the analyses as a dummy variable, or dropped from the dataset. Regression models are then employed to consider associations between each dependent variable (outcome of interest) and each of the individual, family and primary care giver characteristics. The selection of independent variables (covariates or control variables) in the regression models is based on their theoretical and empirical relevance, availability in the dataset, but also the presence of a significant association between each individual variable and the dependent variable at the bivariate level.

The interpretation of the relationship between independent and dependent models in the final multivariate models may differ, depending on whether the cross-sectional or longitudinal data is employed. A key strength of the longitudinal data is that it allows to establish a causal relationship between child wellbeing and influences from their contexts. In doing so, we can talk about the 'impact' of earlier experiences in infancy on later outcomes in early childhood. A key limitation of the data is that we do not have measures of the type of childcare arrangements used between the two time points of nine months and three years. In doing so, we can talk about the 'impact' of earlier experiences in infancy on later outcomes in early childhood. The cross-sectional data is more limited, given that the data relate to one point in time. As well as issues relating recall bias and the measurement of independent and dependent at the same point in time, causal inferences are generally not possible with this type of data. Thus, we report on the influence of variable x on variabley in such instances, rather than 'causal effects'.

2.4 Selection Bias

Selection issues which may bias the relationship between childcare and child well-being is considered through the adoption of propensity score matching techniques. As highlighted by McDonnell and Doyle (2014), the literature generally points to the likely influence of selection issues on the impact of childcare, but such effects vary depending on the type of econometric technique used. In this report OLS, ordinal regression, quantile regression and binary and multivariate logistic regression methods are used to examine the influence of childcare arrangements on physical, social and cognitive outcomes from infancy to childhood. To ensure the robustness and reliability of our results, we guard against the possibility of non-random assignment to the treatment group 'non-parental care'. Because assignment to non-parental childcare is in some way likely to be non-random, systematic failure to take account of such non-random assignment would upwardly (downwardly) bias the estimated impact of childcare on the outcomes examined in this study. Using a propensity score matching (PSM) approach; those who receive a treatment i.e. non-parental childcare, are matched with those that do not receive a treatment but have a similar probability of being treated based on observable characteristics.

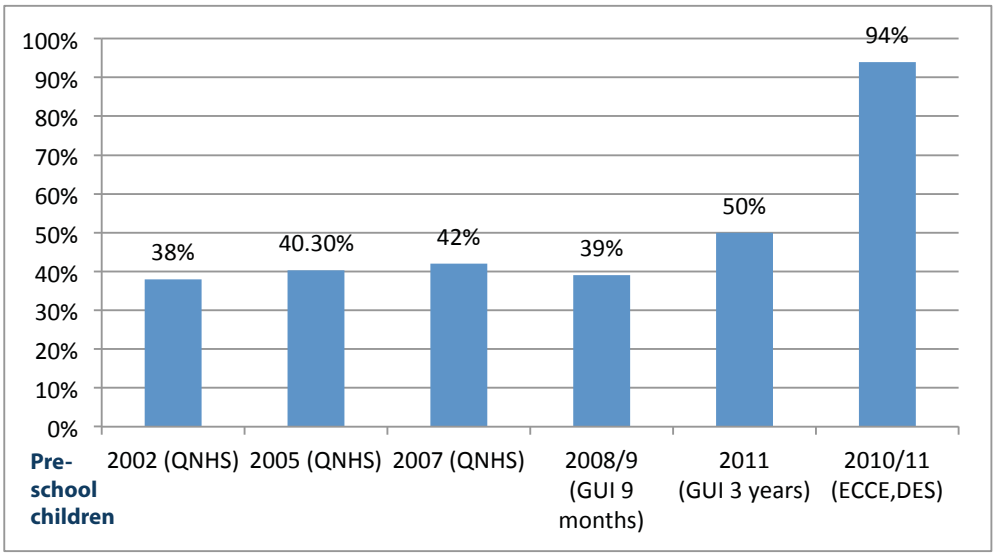
PSM involves a two stage process. In the first stage, the principal characteristics that influence the probability of receiving non-parental care are identified using a probit model, and individuals in both the treatment and control groups are then assigned a "propensity score" based on their estimated probability of receiving the treatment (i.e., non-parental childcare). In the second stage, individuals within the treatment group are "matched" with counterparts in the control group that have similar propensity scores and their actual outcomes are compared. In this instance, we employ a Nearest-Neighbour and a Kernel estimator, and ensure that the common support condition is fulfilled. It is important to note that this approach does not address selection on unobservable characteristics; therefore causal estimates may not be produced using PSM. Rather, such matching is used to ensure robustness in our results.

Chapter 3: The Uptake of Non-Parental Care for Children aged 9months to 9 years.

3.1 Introduction

The first research question we will examine is: What determines the type of childcare arrangement (full-time parental care, relative care, non-relative care, centre-based care) that infants and children experience? We draw on both the infant and child cohorts of the Growing up in Ireland data to empirically describe the national picture of the uptake of non-parental care from infancy to middle childhood (at nine months of age, at age 3 and at age 9). Using multivariate modelling, we also identify the characteristics of families who opt for childcare versus full parental care, and different configurations of childcare arrangements.

Figure3.1: The Uptake of Non Parental Childcare, pre-school cohorts, 2002-2011

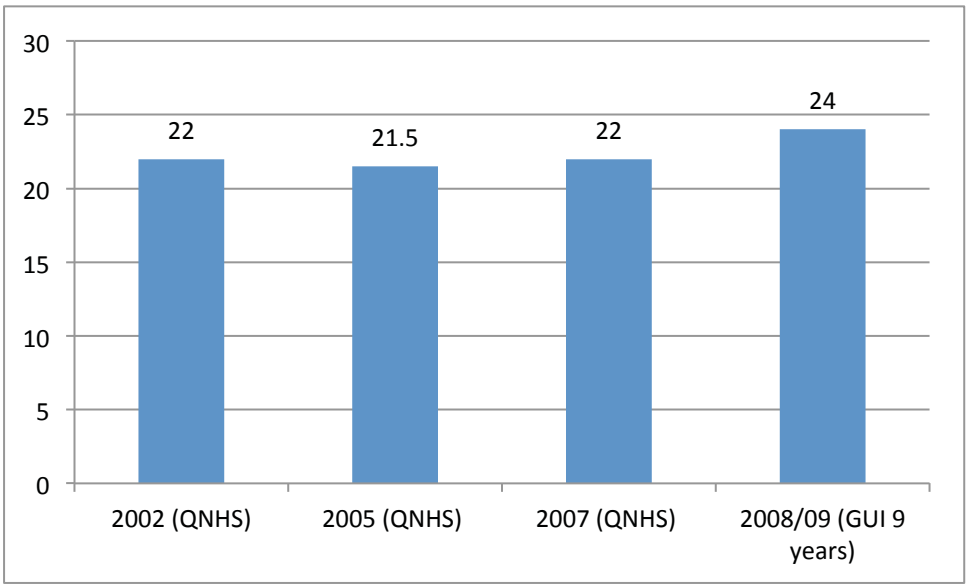


Note: QNHS data relate to the national population of pre-school children (0-age 5) while GUI data relate to specific age cohorts of pre-school children.

The data indicate a relatively stable uptake of non-parental childcare among all infants and pre-school children over the period 2002-2009. Wave 2 of the Growing up in Ireland study, conducted in 2011 (when the 9 month old children were age 3 years) indicates that 50 per cent of 3 year olds were in non-parental care for 8 or more hours per week by 2011. The date of commencement of the universal pre-school provision scheme[2] coincided with the start of the data-collection phase for the *Growing Up in Ireland* three-year survey (December 2010 – August 2011). As a result, Figure 3.1 illustrates that by 2010/11, 94 per cent of eligible children (63,000) were enrolled in Early Childhood Care and Education Scheme (ECCE) services in the 2010/11 school year (DES, 2011). As highlighted by Williams and colleagues (2013), the vast majority of parents reported that they had heard of and intended to avail of the scheme (92 per cent) or were currently availing of the scheme (three per cent). Only two per cent indicated that they would not be availing of the free pre-school year, most commonly because they wanted to keep the child in their current arrangements, and just one per cent said that they had never heard of the ECCE (Williams et al., 2013).

[2] In 2010 the Office of the Minister for Children and Youth Affairs implemented a universal pre-school provision scheme which provides for a state-funded pre-school year for all children aged between 3 years and 2 months and less than 4 years and 7 months in September of the relevant year.

Figure 3.2: The Uptake of Non-Parental Care, School Age Cohorts, 2002-2009



Note: QNHS data relate to the national population of school children (aged between 4 and 12 years) while GUI data relate to specific age cohorts of pre-school children.

Figure 3.2 then illustrates the uptake of non-parental afterschool care among *primary school children* over the period 2002-2008/09. In contrast to the uptake of non-parental childcare among pre-school children, uptake has remained remarkably stable over time.

Type of Childcare Setting

The nature of early childcare, both parental and non-parental is likely is to have an important impact on the child's development, and in this study, we highlight the influences of the type of childcare setting on a range of outcomes for infants. Non-parental childcare, whether provided by a relative, a childminder or a childcare centre, may be the child's first major contact with adults outside of his/her immediate family.

Table 3.1: Distribution of the type of childcare at 9 months, 3 years and 9 years

	% 9 Month Olds	% 3 Year Olds	% 9 Year Olds
% in Parental care	61.0	50.3	76.9
% in non-parental care	39.0	49.7	23.1
	100	100	100
A relative in your own home	6.0	3.2	
A relative in their home	9.8	8.2	
A non-relative in your own home	3.9	3.7	
A non-relative in their home	8.8	8.0	
Total relative and non-relative	*28.5*	*23.1*	*19.2*
Centre-based caregiver	11.0	26.6	3.3
Other		0.1	0.7
Full Time Parental Care	61.0	50.3	76.9
Total	100	100	100

Table 3.1 presents details on the different types of childcare used from infancy to middle childhood. As reported by Williams et al., (2010), the most common form of childcare used among infants at 9 months is parental care. That is, the majority of 9 month old infants in 2008/09 were cared for full-time by either one or both parents. The remaining 39 per cent of nine month olds were in non-parental care. The most common form of non-parental care was by a relative (16%) followed by non-relative care (13%). In 2008/09, 11 per cent of all nine month old infants were in centre-based care[3]. The most common provider of relative childcare was grandparents – 12 per cent of infants are minded by their grandparents[4]. With regard to non-relative care, the most common form of non-relative care was unregistered childminders[5].

Previous research has shown that parental childcare choices often vary by children's age (Leibowitz, Klerman and Waite, 1992). The GUI data show that by age three, half of all three year olds were in non-parental care for 8 hours or more per week, representing a significant uptake of non-parental care by age three. Much of this shift can be attributed to an increase in the uptake of centre-based care by age three (27% compared to 11% at nine months). This trend may be reflective of children's attendance in sessional pre-school services (e.g., Montessori, Naionra, etc.), which are often chosen by parents during the pre-school years to offer broader exposure to a range of educational and social activities (Leibowitz et al. 1992). Unfortunately however, the three-year-old GUI survey did not include questions on the type of centre-based care attended by children. Table 3.1 also highlights a decrease in the uptake of 'informal care' defined as relative and non-relative care among three year olds from almost 29 per cent of nine month old infants to just under a quarter of three year olds (23 per cent). This is largely driven by a decline in the use of relative care in the child's home.

By middle childhood, at age nine, a significantly greater proportion of the cohort are in parental care. That is, over three-quarters of nine year olds are either in parental care, or can be defined as 'latch-key' children[6]. There is also evidence of a slight reduction in the share of the cohort in the care of relatives and non-relatives (including paid and unpaid childminders, au-pairs) from 23 per cent of three year olds to 19 per cent of nine year olds. Just 3 per cent are included in a broad definition of centre-based care to include homework and after-school clubs and activity camps.

Weekly duration of non-parental childcare

The amount of time an infant spends in non-parental childcare can have an important influence on child outcomes, particularly behavioural outcomes (see for example NICHD ECCRN, 2003 in the US; Harrison 2008 in Australia). Table 3.2 illustrates the weekly duration of non-parental childcare for each of the cohorts. Just over one third (36 per cent) of nine month old infants are in non-parental care for eight hours or more per week. By age three, almost half of all three years olds are in non-parental childcare for eight hours or more. For those aged nine, just 20 per cent are in afterschool care for five hours or more per week.

[3] 1% work-based crèche/ 10% other
[4] 12% Grandparents, 3% aunt/uncle; 1% other relative
[5] 5% unregistered childminder, 2% registered childminder, 1% au pair/nanny; 1% neighbour; 2% friend
[6] The term latchkey child is typically used to refer to a child who returns from school to an empty home most often because his or her parent or parents are away at work.

Table 3.2: Distribution of Hours Spent Per Week in Non Parental Childcare, by age cohort

Hours of Use per week	% all 9 Month Olds	% all 3 Year Olds	Hours of Use	% 9 Year Olds
% in Full Parental Care	61.0	50.3	% in Full Parental Care	76.9
7 hours or less	3.2		9 hours or less	11.2
8-15 hours	6.9	14.7	10-14 hours	5.1
16-30 hours	13.0	21.7	15-34 hours	6.5
30+hours	15.9	12.8	35+ hours	0.9
	100.00	100.0		100.0
>8 hours	35.8	49.7	>5 hours	20.3

Table 3.2 further highlights the distribution of hours spent in non-parental childcare from infancy to middle childhood. 29 per cent of infants and 35 per cent of three year olds spend 16 hours or more in non-parental childcare. Because the majority of nine year olds attend primary school typically between the hours of 9am and 2.30pm[7], the amount of time spent in non-parental care is shorter. 16 per cent of nine year olds are in afterschool care for 14 hours or less per week (less than three hours per day) and just 7 per cent of all nine year olds are in afterschool care for 15 hours or greater per week (three hours or more per day).

Among infants and three year-olds, children attending childcare settings and those in the care of a non-relative (in the non-relative's home) spend the longest periods of time in childcare. Among nine year olds, those in the care of a non-relative spend on average greater amounts of time in afterschool care.

3.3 Multivariate Analyses of the Dynamic between Household Employment and Childcare Arrangements from Infancy to Middle Childhood

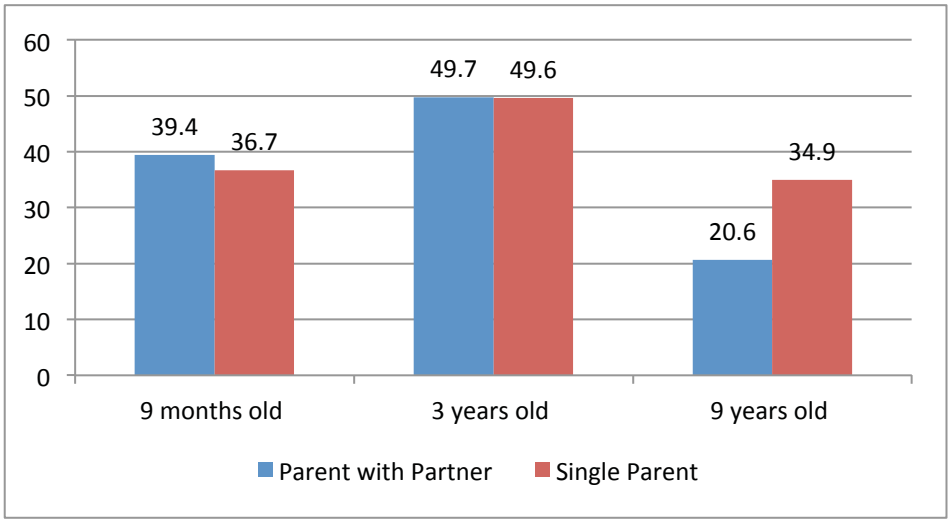
The descriptive analyses above highlight the considerable variation from infancy to middle childhood in the uptake of non-parent childcare and afterschool care. We now consider the characteristics of families that use regular non-parental care for their infants and children.

Table A1 in the Appendix highlights the characteristics of families that use regular non-parental childcare across the stages of childhood. Key factors considered are family structure, social class, household income, parental education, and household economic situation. What is particularly striking from the descriptive analyses shown in Table A1 is that there is a high degree of consistency in the characteristics of families that engage with regular non-parental care over the period from infancy to middle childhood. That is,

[7] The length of the school day is 5 hours and 40 minutes, and primary schools must be open for a minimum of 183 days in each school year.

while children from all types of families with varying levels of resources engage with non-parental care, some groups consistently have higher levels of participation than others.

Figure 3.3: Percentage of children in non-parental childcare by family structure, all cohorts



Previous CSO reports indicate that lone parent households rely to a lesser extent on non-parental childcare for their children than two parent households (31 per cent versus 42 per cent in 2005 (CSO 2006)). Drawing on the GUI data, we find that the use of non-parental childcare was marginally higher among infants living in dual parent families than lone parent families (Figure 3.3). There was no significant difference by family structure at age three, however, the use of non-parental childcare was significantly higher among single parents relative to those living with a partner at age nine (35 per cent relative to 21 per cent). With regard to family structure, infants and children without siblings have significantly higher rates of participation in non parental pre-school or after-school care.

Previous research in the Irish context has identified that the use of non-parental childcare at infancy is strongly related to the socio-demographic profile of the family, particularly in terms of social class, maternal education and mothers' employment status and working hours (Williams et al., 2010; McGinnity, Murray and McNally, 2013). Figure 3.4 illustrates the share of infants and children from each social class group that were in non-parental care at the time of the survey.

Figure 3.4: Percentage of Children in Non-Parental Childcare by Social Class, all cohorts

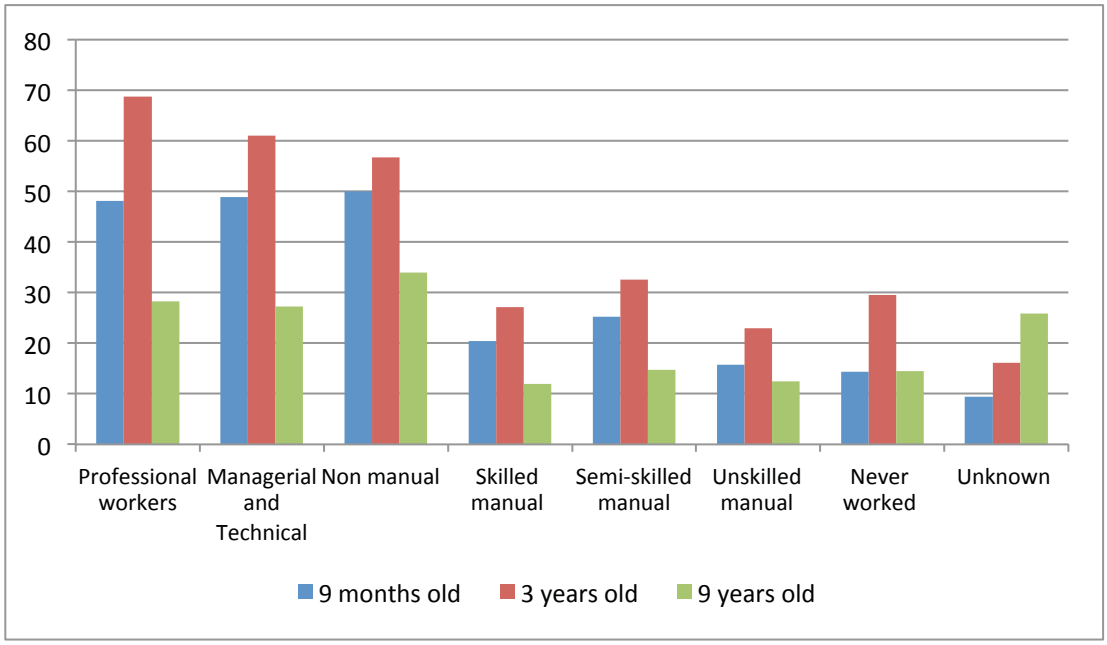


Figure 3.4 illustrates that from infancy to middle childhood, levels of uptake of non-parental care are highest among the professional, managerial and non manual groups, suggesting a degree of social stratification. That is, almost half of infants from these social class groups are in non-parental care at nine months, between 57 per cent and two-thirds of three year olds are in non-parental care, and between 27 per cent and one third of nine year olds. Interestingly, those from the other social class groups have lower levels of uptake. Such differentiation is also evident with regard to household income particularly for infants and children (see Figure 3.5). Infants and children living in high income households have significantly greater levels of participation in non-parental care than children living in low income households.

Figure 3.5: Percentage of Children in Non-Parental Childcare by Household Income Quartiles, all cohorts

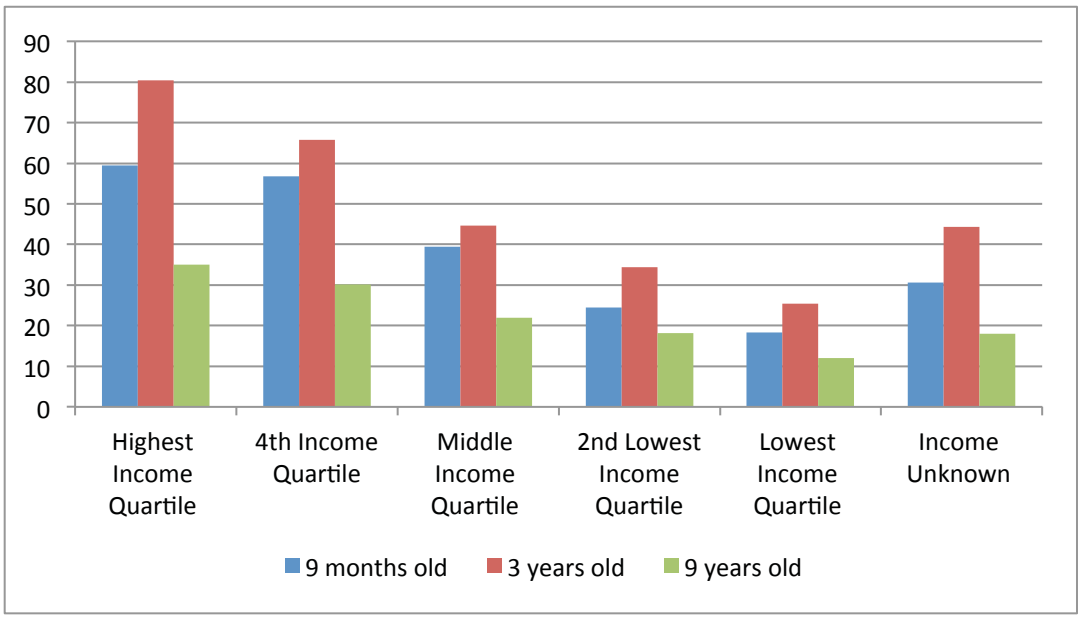


Figure 3.6 illustrates that among infants and children, the uptake of non parental care is highest among families where the primary care giver is in full time employment. Over three-quarters of infants and three-year olds and between 40-50 per cent of nine year olds in these families were in non-parental care. Levels of uptake are typically highest among families where the primary care giver works in excess of forty hours per week, and lowest among families where the primary care giver is not in employment.

Figure 3.6: Percentage of Children in Non-Parental Childcare by PCG Employment Status, all cohorts

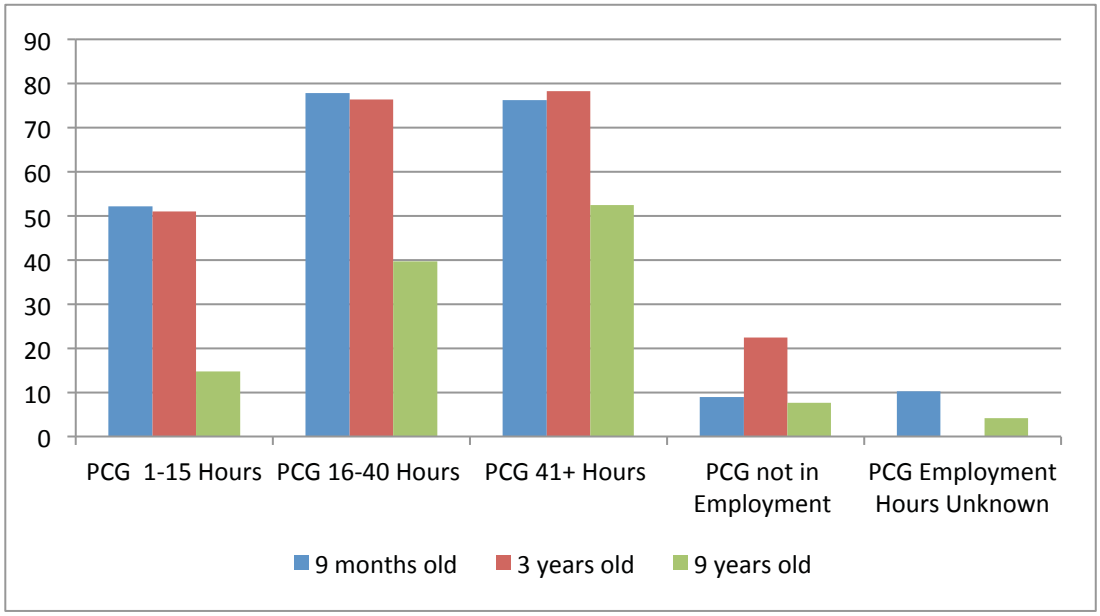
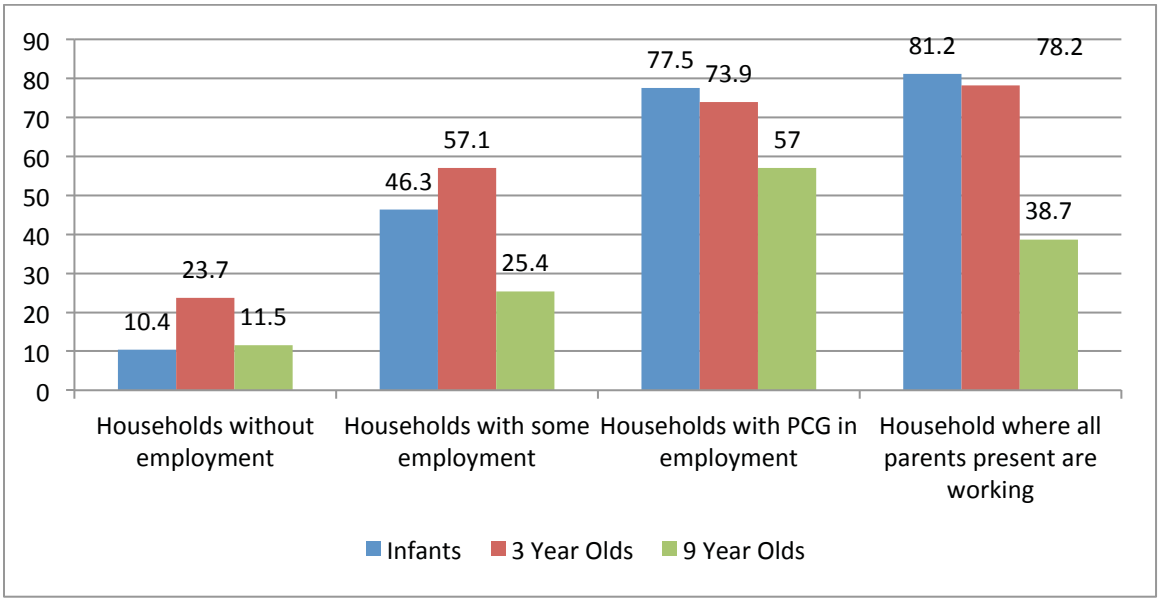


Figure 3.7: Percentage of Children in Non-Parental Childcare by Household Employment Status, all cohorts



Among infants and children, the uptake of non parental care is highest among families with some employment, where the primary care giver is in full time or part time employment, and in households were all parents present are working (Figure 3.7). Levels of uptake are lowest in 'workless' households: households without employment.

The level of education acquired in a household also has a bearing on the uptake of non-parental care. As the uptake of non-parental childcare increases, levels of education among primary care givers increase. That is, the infants and children of primary givers with primary education levels have the lowest levels of uptake, while the infants and children of primary care givers with higher education degrees and postgraduate degrees have the highest levels of uptake. This pattern is also replicated when the highest level of education within the household is taken into consideration (see Table A1).

Multivariate analyses of the uptake of Non Parental Childcare

We conclude the empirical analyses of the factors associated with the uptake of non parental childcare by constructing logistic regression models of the uptake of non-parental childcare among infants and children to investigate how uptake varies by family socio-economic factors (see Table A2). In doing so, we can analyse the influence of each factor, holding all other characteristics constant. Overall, we find a high degree of consistency in terms of the direction of effects that result from each of the determinants of non-parental childcare across the age cohorts. For example, in terms of family structure, dual families (families in which the primary care giver has a partner) are significantly less likely to have their infant, 3-year-old or 9-year-old in non-parental childcare than lone parent families. Further, infants and children who have siblings are significantly less likely to be in pre-school or after-school childcare, relative to infants and children who do not have siblings. These findings reflect the constraints with regard to the cost of childcare for multiple children for some families, as well as the likelihood that the number of children in a family is likely to impact on a mothers' decision to work. However, we also identify a

number of nuances across the cohorts, which reveal that the direction of the effects can be specific to the particular cohorts in question.

The findings from Table A2 highlight that access to childcare from infancy to middle childhood is socially stratified. We see a general pattern across the cohorts whereby those living in households other than high income households are significantly less likely to use non-parental childcare. Furthermore, as household income declines, the probability of using non-parental childcare decreases relative to the highest income group. The employment situation of the household can also distinguish those that use non-parental childcare from those who do not across the cohorts. When we examine the employment situation of mothers, we find that primary care givers who previously were in employment 16 hours or more per week before the arrival of the infant were significantly more likely to use non-parental childcare, than primary care givers who were not in employment before the infant was born; and primary care givers of 3-year-olds and 9-year-olds who are in employment are also more likely to use non-parental childcare than those not in employment. On average, working mothers are more likely to use non-parental childcare. Not only is the status of a working mother highly predictive of the use of non-parental childcare, the hours that a mother works has a particularly strong bearing on the probability of using non-parental childcare for 3-year-olds and 9-year-olds: those who work 41 hours or more per week are 4.8 times (3-year-olds) and 6.5 times (9-year-olds) more likely to use non-parental childcare than those who are not in employment.

As well as the employment situation of the primary care giver, the household employment situation at the time of the survey can distinguish households that use non-parental childcare from those who do not. Households in which all parents present are in employment '*working out households*' are significantly more likely to use non-parental childcare than households in which just one parent is in employment, or households that experience unemployment. The dynamic of full household employment has a particularly strong bearing on the uptake of non-parental childcare among infants (14 times more likely) and 9-year-olds (12 times more likely). A second measure of the dynamic of household employment seeks to distinguish 'workless' households from households in which there is some engagement with the labour market through employment, with disparate results across the age cohorts. Among infants, households with some employment are more likely to use non-parental childcare for their infants and children than those households which can be described as 'jobless' or 'workless', while for 3-year-olds such households are less likely to use non-parental childcare. The latter most likely reflects the costs associated with childcare, but also the availability of parents to care for the child. However, differentiating households in this way cannot distinguish those who use parental care from those who do not, among the families of 9-year-olds, all else being equal.

Maternal education effects also differ across cohorts. Primary care givers of infants who have obtained a primary or lower secondary education are 1.3 times more likely to use non-parental childcare than primary care givers who have completed higher education. This pattern is likely to reflect the necessity for some groups to return to work at an earlier stage than others. McGinnity et al. (2013), highlight that early returns to the labour market are more likely among self-employed mothers, young mothers or lone parent mothers. While they report that highly educated mothers are more likely to return to work than low-educated mothers, the return period begins largely when maternity leave has ended.

Among the 3-year-olds and 9-year-olds, mothers who have lower levels of education are less likely to use non-parental childcare than those who have secured a degree or higher at HE.

Further multivariate analyses

As well as drawing a differentiation between 'parental' and 'non-parental' childcare, we can also differentiate childcare arrangements in terms of the following:

- The *type of childcare arrangement* to include 'parental', 'relative or non-relative' and 'centre-based' childcare settings across the three cohorts. The first two columns of Table A3, Table A4, and Table A5 present the results of multinomial regression models of the uptake of different types of childcare among infants and children in order to investigate how uptake varies by socio-economic factors. The analyses highlight the nuances in terms of how parents choose different types of childcare settings.
- A further distinction can also be made in terms of *the number of childcare arrangements*. Tables A6 and A7 in the Appendix present the results of regression models of the factors associated with the use of multiple childcare arrangements in infancy and in early childhood (at age three).
- Finally, we also consider *the duration of non-parental childcare*: the amount of time that children spend in non-parental childcare on a weekly basis. Table A8 in the Appendix presents the results of an ordinal regression model of the factors associated with the duration of childcare, and the models are conditional on being in non-parental care.

Our analyses lead to the conclusions that household income not only influences the take-up of childcare across each cohort, but also the type of childcare that is used, and the number of childcare arrangements that are used in the care of children (three year olds in particular). Across each of the three cohorts, social class, household income and the levels of education of the PCG influence the type of childcare setting that is used.

While social stratification processes clearly have an influence on uptake, when we restrict our analyses to those who use non parental childcare, we find that the profile of families that opt for centre based care differ according to *age of the child*. Among infants, families that opt for centre based care at nine months tend to be two parent, professional/managerial, high income families, and families where the PCG has higher levels of education and where she/he previously worked very long hours before the infant was born[8]. Among three-year-olds, we see a reversal of this trend, despite an increase in the uptake of non-parental care, and centre based care in particular. Rather, families that opt for centre based care at age three tend to be lone parent families, families with multiple children, social class groups other than professional/managerial, families with incomes other than a high income, and families where the PCG has lower levels of education. However, in line with the infant cohort, families where the PCG has previously worked very long hours before the infant was born are more likely to use centre based care. By age three, changes in family employment and economic circumstances, as well as

[8] In contrast, the care of infants in relative or a non-relative (potentially 'familial' care settings) is more likely among lone parents, all social class groups other than professional groups, all income groups other than those in the highest income quartile and households with lower levels of education.

beliefs about different childcare settings, may account for a change in the profile of families that opt for centre based care compared to other forms of care. By age nine, centre based care is more common among professional families, high income and highly educated families, but also 'workless' households, reflecting the diversity of centre based care available at age nine, which includes private afterschool clubs and government supported afterschool clubs in disadvantaged contexts.

Research in other contexts has identified that the use of multiple childcare arrangements has a negative effect on children's behaviour (Morrissey 2009). In infancy and early childhood, family structure (the number of parents and number of siblings) and social class differentiates those who use multiple childcare arrangements from those who do not. At nine months and at age three, lone parent families and children with siblings are less likely to be in multiple arrangements, while professional/managerial and high income families are more likely to use arrangement multiplicity[9]. The effects of multiple childcare arrangements will be explored in the chapters that follow.

Finally, in terms of the duration of time spent in childcare, common across each of the three cohorts was the influence of the number of hours worked by the PCG. The infants and three-year olds of PCGs who spend longer amounts of time in employment (40+ hours per week) are more likely to spend longer durations in childcare, while the nine-year olds of PCGs who work part-time spend significantly shorter durations of time in afterschool care. There are some similarities among the infant and three-year old cohorts in the sense that household income, the education level of the PCG, the number of hours worked by the PCG, the employment situation of the household and sources of income all distinguish the amount of time that infants and three-year-olds spend in childcare.

To sum up, the uptake of non-parental childcare at all stages of childhood from infancy to middle childhood is socially stratified: we found a general pattern across the cohorts whereby families classified as professional households are more likely to use non-parental childcare than semi-skilled or unskilled manual households. Furthermore, we identified that high income households, households in which the PCG is in employment full-time and households in which all parents present are in employment, are more likely to use non-parental childcare. This was also the case for lone parent families, which may reflect the targeted provision of community childcare and subsidised after-school childcare places for such families.

Irrespective of existing government intervention in childcare, at all stages of childhood, there are clear persistent effects of household income, household social class and the employment circumstances of the family, as well as the hours worked by the PCG. These overall patterns reflect that family need for childcare and family resources as well as family structure are key drivers of the uptake of non-parental childcare in Ireland.

In terms of access to different types of childcare settings, social class, household income, and the education levels of the primary care giver each influenced access to centre based care, conditional on the use of non-parental childcare. Two particularly interesting patterns further emerged. First, while professional families and high income families were more likely to opt for centre based care at infancy and at age 9, such families were less

[9] Household income effects are evident only among the three-year-old cohort.

likely to opt for centre based care by age three. A second pattern indicated that families with higher PCG education levels were more likely to opt for centre based care at all stages of childhood. These patterns may reflect both the higher cost of centre based care, but also (potentially) the greater focus on educational curricula and structured learning opportunities that centres may provide and more economically and educationally successful parents may prioritise (Levine Coley et al., 2014; Grogan 2012; Peyton et al., 2001). These patterns are also likely to reflect the greater opportunity structure for well resourced parents to make choices about childcare for their children as they move from infancy to early childhood and into middle childhood.

Chapter 4: Childcare Arrangements and Parental Reports of Children's Health

4.1 Introduction

The aim of this chapter is to examine the influence of childcare arrangements on health outcomes, as measured by parental reports of children's health status, for each of the stages of childhood under investigation. We also explored the impact of childcare in infancy on ratings of health in early childhood by age three to understand how the type of childcare arrangement used in infancy impacts on children's short-term physical health outcomes. A second key objective of the analysis is to consider the risk factors associated with poor child health.

4.2 Prior Research on Health Outcomes

The Irish literature to date highlights a number of risk factors to children's health. According to McCrory and Layte (2011) a child's general health at birth is indicative of their parents' background and also captures larger social background differences at play. Research by Greene et al. (2010) found that a child's physical (and mental) health is (are) related to maternal education and the sex of the child. Differences in a child's diet and BMI have been related to mother's age and educational levels (Layte, Harrington et al., 2011), while pre-natal smoking is related both to childhood obesity (Merriman 2011) and increased risk of behavioural problems in childhood (McCrory and Layte 2011).

In the Irish context, in line with the international research, McGinnity et al., (2013) found that infants who attend childcare centres such as crèches have a higher risk of being rated as 'less healthy' than those with parental care only (in the order of almost three times more likely). Their study also found an association between child care placement and a range of common child acute illnesses including snuffles or colds, chest infections, ear infections, wheezing or asthma, persistent or severe vomiting and persistent or severe diarrhoea or constipation. These illnesses, which required medical attention, were significantly more likely for children attending centre-based childcare.

Among school-age children, childhood obesity and overweight issues have been examined extensively using the GUI (see McCrory and Layte 2011). Just over 25 per cent of 9 year olds were found to have a BMI outside the 'healthy' range, and being overweight as a child has been associated with significantly lower self-esteem around physical appearance, popularity, and accelerated emotional and behavioural problems (McCrory and Layte 2011). Research indicates that there is a need for improved recognition of obesity among parents in Ireland given that both caregivers and children are poor judges of children's weight status (Ward, Mahon and Layte, 2011).

Fahey et al., (2012) also examined children's physical well-being at age nine, as measured by the existence of a chronic illness. They report the influence of mother's education, non-Irish citizenship, family structure (number of children), and parent-child relationships each as robust predictors for children's chronic illness. Hannan et al., (2013) looked at the effect

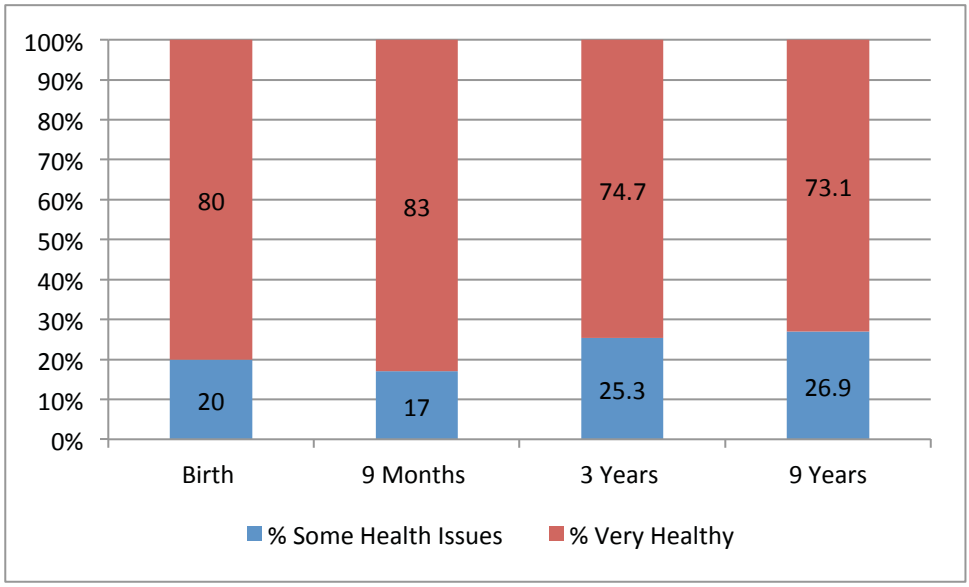
of family structure on child outcomes related to physical health, with regard to BMI (body mass index), diet (level of fresh fruit consumption)[10], and the use of healthcare (the extent to which parents seek medical advice, medical treatment including hospital visits and dental appointments). In general, smaller negative effects were found in relation to the physical (and emotional) health and wellbeing of children from non-traditional families when compared to the effects in the area of education. They found that children with co-habiting parents scored slightly higher on the BMI index, but concluded that the difference across family types was the result of pre-existing disadvantages. Furthermore, there was a weak correlation between income and measures of physical health. However, to date we know little about the influence of out-of-school arrangements on children's health.

We build on this literature to consider (i) how parental perceptions of a child's physical health varies in relation to childcare arrangements at each of the stages of childhood, (ii) how childcare arrangements in infancy influence health outcomes by age three, and (iii) we seek to identify key risk factors to children's health from infancy to middle childhood.

4.3 Analyses of Parental Reports of Children's Health

Figure 4.1 provides information on parental ratings of children's health (from the presence of 'some health issues' to 'very healthy'). 17 per cent of infants were described by their primary caregiver as currently/sometimes/always unwell by nine months old. This was the case of 25 per cent of 3 year olds, and 27 per cent of 9 year olds.

Figure 4.1: Parental Rating of Children's Health, all cohorts



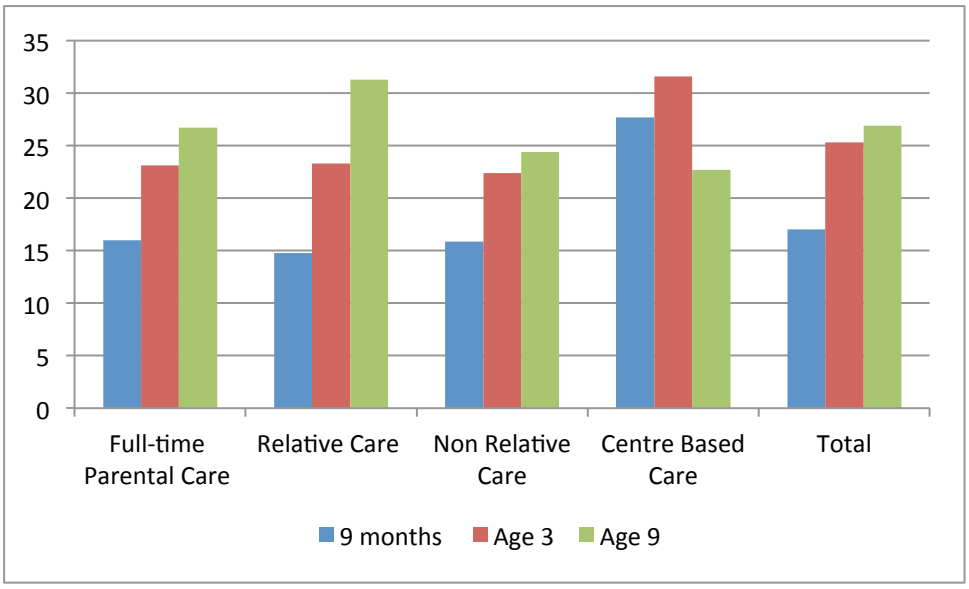
At a descriptive level, significant associations were evident between childcare arrangements and parental reports of health for each of the three cohorts. Figure 4.2 provides information on parental ratings of children's health (the presence of 'some problems' as opposed to 'very healthy') by childcare arrangements across the three

[10] Prior to the Hannan et al., (2013) report, considerable attention had been paid to the level of consumption of unhealthy snack foods (see for example Layte, Harrington et al., 2011; Layte, McCrory et al., 2011).

cohorts. We find that a greater proportion of infants and three year olds who attend centre based childcare settings are rated by their PCG as 'less healthy' than those in full-time parental care or any other care setting. However, at age 9, a greater proportion of children who are in the care of a relative are rated by their PCG as 'less healthy'.

At 9 years old, almost three quarters of children were reported as being 'very healthy'. Based on parental report, just over a quarter of nine year olds had some health issues in the past year. In all, 11 per cent reported an ongoing chronic illness that hampers daily life, and almost 5 per cent indicate that the child is hampered by a chronic ongoing illness on a daily basis. The descriptive analyses suggest that these children more likely to be in parental care out-of-school[11]. According to both parent and teacher reports 25 per cent of nine year olds were identified as having a special educational need (see also Banks and McCoy 2011). The descriptive analyses suggest that children with a special educational need are more likely to be in centre-based out-of-school care.

Figure 4.2: Percentage of Children Rated as 'Less Healthy' by Childcare Arrangement, all cohorts



Using multivariate analyses, we consider the profile of families that report good infant health status for each of the three cohorts, and the results are presented in Tables A9, A10 and A11 in the Appendix. As in previous chapters, we include characteristics associated with the individual child, variables relating to the family (family structure, household employment dynamic), measures of the childcare situation and variables relating to the primary caregiver (attachment scores, depression scores and parental stress scores).

The results highlight a degree of consistency in terms of the importance of the child's previous and current individual characteristics, maternal health characteristics and childcare arrangements from infancy to middle childhood on parental ratings of children's health. Childcare settings exert a clear influence, with centre based care being associated with a higher risk of being rated as 'less healthy' by parents in infancy and early childhood, and relative care being associated with a higher risk of being rated as 'less healthy' by

[11] A greater proportion of those in parental out-of-school care were rated as such, compared to other childcare settings.

parents in middle childhood. That is, illness is significantly more likely when young children are attending centre-based childcare, and when school-age children are in the care of a relative.

We also extend existing analyses of the relationship between childcare arrangements and children's health through a consideration of the use of multiple childcare arrangements. In infancy and early childhood, children in non-parental childcare, irrespective of the number of childcare arrangements that the child experiences during a typical week, are significantly more likely to be rated as 'less healthy' by their primary caregiver than those in full-time parental care only. Duration associations are evident only for the infant cohort, as the cross-sectional data indicate infants who spend a moderate amount of time (30-45 hours per week) in non-parental childcare are significantly less likely to be rated as 'very healthy' than those in parental care at nine months (model not shown here).

We then estimated a series of models that increased in methodological rigour and ability to adjust for (observed) selection factors. We used propensity score matching methods to construct treatment and control samples of children who were similar on all measured background characteristics and differed only in terms of their childcare arrangements. A re-estimation of our models using the matched sample confirmed the significant associations between parental ratings of children's health and the type of childcare arrangements from infancy to middle childhood: negative effects for centre based care for infants and 3 year olds, negative effects for relative care for 9 year olds. We also report significant effects of the time spent in childcare in infancy, confirming the earlier analyses above (see Table A37 in the Appendix).

In terms of children's previous health, 3 year olds who have an ongoing health illness, condition or disability are almost twelve times more likely to be reported as 'less healthy' by their PCG, compared to children without such conditions. 9 year olds with an ongoing chronic illness, those with a special educational need, and children who are under- or overweight are also more likely to be reported as 'less healthy' by their PCG. Independent associations are also evident for children who have experienced a traumatic life experience, and those who did not receive treatment from a doctor or a dentist when required. These children are more at risk of being rated as 'less healthy'. Diet is also important. Children who do not eat breakfast before going to school are at risk of being rated as 'less healthy' by their primary caregiver.

The socio-economic profile of the household and the household employment situation are not strong predictors of infant and 3-year-old health, all else being equal. In infancy, the type of medical cover that the family receives is associated with health outcomes. Infants with a medical or GP card are significantly less likely to be rated 'very healthy' than those without any medical cover or with private health insurance. However, an independent association relating to health cover is not evident for the 3 year old or the 9 year old cohorts.

The influence of the wellbeing of the PCG was also consistent across the three cohorts. The health of the primary care giver is significantly associated with children's health. Those with higher attachment scores are more likely to report their infant as 'very healthy', while those with higher depression scores are less likely to report their children across each of the three cohorts as 'very healthy'.

4.4 Impact of childcare arrangements in infancy on health outcomes in early childhood

We now turn to the longitudinal data to determine how the type of childcare arrangement used in infancy impacts on children's short-term physical outcomes by age three. Because information on the earlier childcare arrangement at 9 months is known, we can make some causal inference about the relationship between childcare arrangements in infancy and children's short-term physical outcomes at age three. As well as characteristics of the child and their development in infancy, we also include characteristics of family (family structure, family socio-economic profile) and characteristics of the primary care giver. (The results of the logistic regression model are presented in Table A12 in the Appendix).

The type of childcare arrangement used in infancy was significantly associated with later health ratings, all else being equal. When the unmatched sample was employed, the basic logistic regression model (Table A12) indicated that those in relative care and in centre based care at nine months were significantly more likely to be rated as 'very healthy' by their PCG by age three than children in other settings. Furthermore, stability in childcare type between these stages was associated with positive reports of children's health. However, estimates in matched samples models did not support these findings. Rather, while there was evidence to support the effect of stability in childcare type between the two periods, there was no effect of childcare type in infancy on parental ratings of children's health by age three. Results from the matched samples did provide evidence that the duration of time spent in childcare at nine months, and the number of childcare arrangements used in infancy have persistent effects by age three. Infants who spend moderate/high amounts of time in childcare during infancy (greater than 16 hours per week) were more likely to be rated as 'very healthy' than those in childcare for shorter durations, or those in full time parental care at that time[12]. Furthermore, children who had a single childcare arrangement in infancy were more likely to be rated as 'very healthy' by their PCG (see Table A37 in the Appendix).

Table A12 also reveals that health at birth, current health and the health of the primary care giver exert more direct influences on infant health than does the family employment dynamic (socio-economic profile).

In summary, we have demonstrated that at each stage of childhood, the type of childcare arrangement is significantly associated with parental ratings of children's health. The cross-sectional data revealed that centre based care is associated with a higher risk of being rated as 'less healthy' by parents in infancy and early childhood, and relative care is associated with a higher risk of being rated as 'less healthy' by parents in middle childhood. These results persist, even when we control for selection into childcare arrangements, However, there was no evidence of a long-term effect of the type of childcare arrangement used in infancy on parental ratings of their children's health by age three. Rather, the duration of time spent in childcare during infancy, and the number of childcare arrangements used in infancy had an effect on parental ratings.

[12] The tables of result pertaining to the number of childcare arrangements used and the duration of childcare is not presented in this report, but can be requested from the authors.

A key objective of the analysis was also to consider the risk factors associated with poor child health. Across all stages of childhood, socio-economic profile of the household and the household employment situation are not strong predictors of health ratings, all else being equal. While the presence of an ongoing/chronic illness or disability or special educational need in childhood was predictive of less positive health ratings by parents, the influence of maternal or PCG wellbeing was consistent across the three cohorts.

Chapter 5: Milestones in Early Childhood

5.1 Introduction

This chapter considers the influence of childcare arrangements on developmental outcomes, (in particular fine and gross motor skill development) in early childhood for the 9 month and three year olds. There are no standardised developmental measurements relating to fine and gross motor skill captured in the 9 year old data.

5.2 Research on Fine and Gross Motor Outcomes

The pace of a child's motor development is influenced by both genetic and environmental factors. During infancy and early childhood there is a steady improvement in children's fine and gross motor skills due to developments in brain and body capacities (Berk, 2008). The acquisition of fine motor skills are important for a range of self-care tasks (e.g., buttoning one's coat) and school related tasks (e.g., turning the pages of a book, holding a pencil). Thus, a child's proficiency in these skills has implications for school success – academically, socially and physically (Doherty and Hughes, 2009).

The type of childcare setting has an important influence on fine and gross motor skill development, particularly in terms of the provision of structured pedagogical activities. Barros and colleagues (2003) found that five-year old children who attended public child care centres lagged in the development of fine motor skills compared to those attending private schools. This was attributed to a lack of appropriate pedagogic orientation in the public child care centres. Similarly, Waelvelde and colleagues (2008) found that attending preschools with a formal curriculum was associated with higher scores on standardised fine motor tasks. Apparently it is not only the amount of fine motor activity but its type that results in higher performance. Thus access to and manipulation of wide range of materials is associated with more advanced skills (Rule and Stewart, 2002; Venetsanou and Kambas 2010).

Early childcare and education settings also impact on the development of gross motor skills. Giagazoglou and colleagues (2008) revealed that children who attend private pre-school settings which had plenty of open space for play and structured physical activity had higher gross motor scores than children who attended public pre-school settings. Thus, it appears that the quality of the childcare environment, both in terms of curriculum structure, and physical space, (including outdoor space), contributes to children's motor development.

5.3 Analyses of Gross Motor Skill Development

Using the Ages and Stages Questionnaire (ASQ-2; Squires, Potter and Bricker 1999), gross motor skill development in infancy was measured through parental report of the ability of the infant to stand up, sit up and move around with support. At the descriptive level, there was a significant bivariate association between the type of childcare setting at nine months and gross motor skill development scores at 12 months. Infants who were in relative care had the highest pass rate in reaching 12 month gross motor skill

developmental milestones; while those in centre based childcare settings had the lowest rates[13].

At 3 years of age, three indicators of current gross motor development were recorded at the three-year interview by the GUI team. First, the primary caregiver was asked to report whether or not the child was able to cycle a tricycle or similar vehicle, and a distinction was made between being able to use the pedals properly and the child sitting on a tricycle and pushing it along with their feet. Just two-thirds of children (66%) were reported to be able to pedal a tricycle. The other two indicators were observed by the interviewer. The child was asked to stand on one leg and (separately) to throw a ball overhand, with the interviewer recording whether or not the child was able to complete these tasks. 94% of children were able to throw a ball overhand and 86% were able to stand on one leg.

At the bivariate level, we found no significant association between the type of childcare arrangement used at age three and each of the three gross motor skill development outcomes. Tests of association were also conducted to examine associations with the duration and number of childcare arrangements at age three, but none of these resulted in significant associations, so childcare arrangements were omitted from the cross-sectional multivariate models for the three year old cohort. Variables pertaining to child and family characteristics appeared to be more influential in predicting gross motor outcomes.

Multivariate analyses on the cross-sectional data are presented in Tables A13 and A14 in the Appendix, for the 9 month olds and the three year olds respectively. All else being equal, we find no independent association between the type of childcare setting and gross motor skill developmental outcomes for both the infant and the 3 year old cohorts. Among the infants the child's temperament, previous and current health status, and family socio-economic circumstances are associated with gross motor skill development. Positive associations are evident with regard to being male, having good health status, being breastfed, and having a younger primary care giver. The multivariate analyses for the 3 year olds highlight in particular the positive associations between passing child development indicators (taking first steps at an earlier age, higher cognitive scores at age three) and the probability of passing gross motor skill tests at age three. The characteristics of the primary care giver also matter – the infants of primary care givers who are older, have higher depression scores and higher stress scores are less likely to have passed the gross motor skill test at age three.

The longitudinal data allow an examination of how the type of childcare arrangement used in infancy may impact on children's short term gross motor skill development. Because of the longitudinal nature of the data, information on the earlier childcare arrangement at nine months is known. Hence, some causal inference can be made about the relationship between earlier childcare arrangements and the development of gross motor skills by age three. The results of the three logistic regression models can be found in Tables A15, A16 and A17 in the Appendix.

[13] There was no significant association between gross motor skill development scores at 10 months and the type of childcare setting.

Allowing for a longer period of time to assess any potential effects revealed that the type of childcare setting at nine months emerged as significant in the longitudinal analyses. Specifically, infants who had attended centre-based care were significantly more likely to be able to throw a ball by age three, and this was also evident from the matched samples using the propensity score matching approach (see Table A38 in the Appendix). There were no such effects for the duration of childcare at nine months, or the number of childcare arrangements used. (There was however one exception. Infants in multiple childcare arrangements were more likely to be able to pedal a tricycle by age three). International research indicates that more access to open space for playing or curriculum structure may account for the positive effects of centre based care on gross motor skill development (Barros et al., 2003; Giagazoglou et al., 2008).

As before, the analyses highlight the role of early child development indicators (earlier development scores, cognitive scores, and health outcomes) in gross motor skill development between infancy and early childhood. In terms of the household socio-economic profile, we note a similar pattern of findings across the 9-month and 3-year cross-sectional analyses, as well as and the current longitudinal analyses. That is, children in households where the PCG giver had lower levels of education, where the child was living in a low income household, and where the PCG was not in full-time employment before the child was born were more likely to achieve gross motor milestones, perhaps reflecting the greater amount of time spent by such parents engaging in activities associated with measuring gross motor development.

5.4 Fine Motor Skill Development

Using the Ages and Stages Questionnaire, fine motor skill development in infancy was measured through parental report of the ability of the infant to use fingers and thumbs to manipulate small objects. Fine motor development at age three was assessed by determining children's performances on three tasks: manipulating jigsaw pieces, holding a pencil in a pincer grip, and copying a vertical line.

Descriptive analyses revealed that infants who were in centre based child care settings had the highest pass rate in reaching 12 month gross motor skill development milestones, while those in full-time parental care had the lowest rates[14]. There was also a significant association at the bivariate level between the type of childcare setting at age three and each of the fine motor skill outcomes, with a greater proportion of those who attend childcare centres typically reaching the milestones. The associations between the number of hours a child spent in childcare at age three, and the jigsaw and pincer grip were also statistically significant, with a higher proportion of those who spend 30 hours or more per week in non-parental childcare) passing each of the two milestones.

Using the cross-sectional data, multivariate analyses were again undertaken to examine the factors that influence fine motor skill development scores at 10 months and at age three (see Tables A18-A21 in the Appendix). As before, a range of variables were incorporated into the models. All else being equal, we find no significant association between the type of childcare setting at nine months and the development of fine motor

[14] However, there was no significant association between fine motor skill development scores at 10 months and the type of childcare setting.

skills at 10 or 12 months. However, the type of childcare setting at age three is associated with the development of fine motor skills, with a positive association evident for those in centre based care, particularly with regard to the jigsaw test and the pincer grip test. These findings were supported using the propensity score matching analyses (see Table A39 in the Appendix). Clearly, fine motor skill development at infancy is also influenced by gender, health status and the child's developmental stage as well as childcare arrangements. At this early stage of childhood, the development of fine motor skills is influenced by family structure, the socio-economic profile of the family and the well-being of the PCG, resulting in clear inequalities at infancy and early childhood.

We then examined the effect of childcare arrangements in infancy on fine motor skill development by age three using the longitudinal analyses (Tables A22-A24 in the Appendix). When the matched sample was employed, our results indicate that attending a centre based care setting at nine months has a positive effect on passing one of the fine motor skill development tests (vertical line test, Table A23) at age three. Furthermore, consistency in the type of childcare arrangement between infancy and early childhood results in a negative impact on fine motor skill development as measured through the vertical line test. There was no evidence of a positive or negative effect of using multiple childcare arrangements in infancy or of the duration of time spent in childcare. (There was one exception: infants who spent longer periods of time in childcare were more likely to be able to pass the jigsaw test by age three).

These multivariate analyses highlight the role of early childhood development indicators, particularly cognitive indicators, on the development of fine motor skill development by age three. Family structure per se does not influence fine motor skill development in infancy or early childhood. Even when controlling for childcare arrangements, it would seem that the socio-economic circumstances of the family in infancy is associated with higher fine motor skill development scores by age three. What is particularly striking is that the health of the PCG has a clear influence on the development of fine motor skills at age 3 which is evident in both the cross-sectional and longitudinal analyses. PCGs that had higher depression scores or parental stress scores were significantly less likely to pass the fine motor skill development tests. This was also the case for children whose PCG had lower attachment scores during infancy.

Not all variables which predicted early child development at nine months emerged as key influences on fine motor skill development by age three. However, gender featured strongly as a predictor of fine motor skill development (Tables A23 and A24); with males demonstrating significantly lower probabilities of passing the fine motor skill development tests than females. Furthermore, infants who were breastfed during infancy experienced greater fine motor skill development than those who were not (Tables A22, A23). However, consistent with earlier findings, cognitive capabilities at age three were predictive of all three fine motor skills; that is children with higher scores on the Naming vocabulary and Picture Similarities subtests were significantly more likely to master the jigsaw, vertical line, and pincer grip tests. In contrast, children with higher scores on the SDQ were less likely to master all three tests – jigsaw, vertical line and the pincer grip tests.

In summary, our findings highlight the positive, but limited role of centre based care in infancy for early child development relative to other childcare settings. While the longitudinal data indicate that there are clear positive effects of centre based care in

infancy for gross and fine motor skill development by age three, such effects are limited and to certain domains of skill development captured by the data. Rather, as infants move through early childhood, developmental outcomes are strongly structured by earlier developmental indicators.

Chapter 6 Socio-Emotional Outcomes from Infancy to Middle Childhood

6.1 Introduction

This aim of this chapter is to explore the association between childcare arrangements and socio-emotional outcomes among the two older cohorts, the three year olds and nine year olds, and to examine the risk factors associated with poor socio-emotional outcomes for children.

6.2 Previous Research

Few studies to date have focused on the effects of childcare arrangements in infancy (before the age of three) on later outcomes relating to socio-emotional wellbeing. However, a number of international studies have identified that the quality of pre-school centres from the age of three is directly related to social/behavioural development in children (Sylva, et al., 2004). High quality pre-school continued to show beneficial outcomes persisting to age 14 (Sylva, et al., 2012). Belsky and colleagues (2007) also found that children with more experience in centre-based care also showed more behavioural problems in kindergarten classrooms and these problems persisted through sixth grade into adolescence. Findings from a longitudinal study in the United States also reveal that after controlling for demographic and other aspects of the childcare context, that children who spend more time in non-maternal child care had more behaviour problems in childcare and in kindergarten classrooms than those who had experienced fewer hours (NICHD ECCRN, 2002, 2003). These effects also persisted into adolescence with more hours of non-relative care predicting greater risk taking and impulsivity at age 15, though these problems did not reach clinical levels (Vandell, et al, 2010). These findings are not dissimilar to those obtained elsewhere. For instance, using data from the Longitudinal Study of Australian Children, Harrison (2008) reported that as children spent more time in formal care settings (long day-care and family day-care), parents reported an increase in problems associated with deregulation, and externalising and internalising behaviours.

In the Irish context, Hennessy and Donnelly (2005) did not find statistical differences between teacher ratings of socio-emotional development and quality of homework for children attending afterschool clubs compared to children in other settings. Rather, among school-age children, previous research conducted on the factors associated with poor social-emotional adjustment among children in Ireland highlights the consistent pattern of associations between maternal characteristics (mother's education, experience of poverty at 16, and mother's age at first birth) and children's social-emotional adjustment. This also holds for family type: children of cohabitating parents, divorced or separated lone parents and never married lone parents are more likely to show behavioural and emotional problems (Fahey et al., 2012; McAuley and Layte 2012; Pratsche et al., 2011). Furthermore, children in larger families show a lower risk of poor social-emotional adjustment than children in one-child families. The level of mother-child conflict also impacts on a child's social-emotional adjustment. Where there is very high mother-child conflict, the child is more than nine times more likely to show poor social-emotional adjustment (Fahey et al., 2012).

Based on previous analyses using the GUI, the child's gender and family situation influences the attitudes and beliefs that a child holds about themselves (McAuley and Layte 2012; Pratsche et al., 2011). Furthermore, Russell and Thornton (2010) and Pratsche et al., (2011) highlight the role of maternal influences. They found that children display higher levels of emotional and behavioural problems if their mother has suffered from depression, but also vary according to maternal education levels, health and age. Hannan et al., (2013) also highlight the importance of the consideration of school effects in children's psychological development.

6.3 Impact of Childcare Arrangements in Infancy on Children's Socio-Emotional Outcomes

The GUI team adopted the Strengths and Difficulties questionnaire to measure children's psychological adjustment at age three. The scales include (i) emotional subscale, (ii) conduct subscale, (iii) hyperactivity subscale, (iv) peer problems subscale, (v) pro-social subscale. Together these subscales provide a Total Difficulties Score. Higher scores on this scale indicate greater levels of difficulty in socio-emotional competencies.

At a descriptive level, among the three year old cohort there was a significant association between the type of childcare setting used at age three and average scores on the emotional SDQ subscale. Those in full-time parental care and those in childcare centre settings display higher scores than those in other childcare settings. Furthermore, there was also a significant association between the type of childcare setting and average scores on the remaining SDQ subscales (with the exception of the prosocial subscale). Three year olds in full-time parental care display significantly greater difficulty scores on each of the domains than those in other childcare settings.

Multivariate analyses were conducted to determine the factors associated with greater total strengths and difficulties scores at age three, using the cross-sectional data. All else being equal, there was no independent association between childcare arrangements at age three and total strengths and difficulties scores (see Table A25). In terms of individual characteristics, we find that higher cognitive scores at age 3 and higher fine motor skill scores are associated with lower difficulty scores. The analysis also identifies the risk factors associated with lower/higher difficulty scores. Three year olds who experience an ongoing illness/condition or health difficulty have significantly greater difficulty scores than those without such conditions.

We also identify that difficulty scores are socially stratified: 3-year-olds growing up in semi and unskilled manual households, those growing up in middle income households, those growing up in households with lower levels of parental education and in households that receive welfare payments each are at a greater risk of displaying higher difficulty scores than children growing up households that can be characterised as professional/managerial, high income, and with high levels of parental education.

The household employment situation is also important. Growing up in households in which all parents present are working outside the home is associated with significantly lower difficulty scores than those in which not all parents are in employment. However, this is also true of those growing up in households in which the PCG is not in employment. The characteristics of the PCG are important too: children of older PCGs have significantly

lower difficulty scores than children of younger PCGs, but higher maternal/PCG depression and stress scores are associated with greater risks of higher difficulty scores.

Using the longitudinal data we can assess the potential impact of the different types of childcare arrangements used in infancy, and identify the effect of socio-economic disadvantage in infancy on later socio-emotional outcomes. Table A26 presents the results of the linear regression model of total strengths and difficulties score by age three. All else being equal, there was no significant independent effect of childcare arrangements in infancy on total strengths and difficulties score by age three. Rather, gender, health status, temperament at nine months and child development indicators, specifically personal/social development, each have an effect on socio-emotional outcomes by age three. Males were significantly more likely to have higher SDQ scores at age three. Unsurprisingly, those infants who reached their ASQ personal/social milestones at ten months had lower scores on the SDQ by age three. Consistent findings also emerged between the cross-sectional and longitudinal analyses with regard to health and cognitive abilities. Children rated as healthy at three years had lower SDQ scores (and those identified as having an illness tended to have higher scores). Children who had higher scores on each on the cognitive tests (both Naming Vocabulary and Picture Similarities) and those who passed the fine motor tests (jigsaw, vertical line and pincer grip) were significantly more likely to have lower SDQ scores. In contrast, associations between passing gross motor skill and the SDQ were not statistically significant.

The longitudinal analyses presented in Table A26 show that family characteristics in infancy continue to exert an influence on children's socio-emotional development as assessed at age 3. Compared to those in professional/managerial families; infants who grew up in households characterised as non-manual/skilled, manual and unskilled, or in households characterised as never employed during infancy were more likely to have higher SDQ scores, as were the children of primary care givers with lower levels of education at that time.

Consistent with previous analyses of child well-being in this study, PCG characteristics featured strongly. In the current analyses we found that infants of mothers/PCG who had higher depression and stress scores were likely to have higher SDQ scores. In contrast a higher Quality of Attachment score in infancy was associated with lower SDQ score at three years. Infants of older mothers also tended to have lower SDQ scores.

6.4 Inequalities in Children's Socio-Emotional Outcomes at Age 9

At age 9, the children in the GUI were asked to complete a detailed set of 35 questions known as the Piers Harris II Self-Concept Scale (Piers 1984). The instrument gathers information about how children perceive themselves across six domains to include (i) behavioural adjustment, (ii) intellectual and school status, (iii) physical appearance and attributes, (iv) freedom from anxiety, (v) popularity and (vi) happiness and satisfaction. The questions were answered by the children themselves. A second measure – the Strengths and Difficulties Questionnaire (SDQ) (Goodman 1997) – also explores children's social-emotional adjustment. This is a 25 validated measure of social and emotional development among children. It consists of five scales including (i) emotional symptoms;

(ii) conduct problems; (iii) hyperactivity/inattention, (iv) peer-relationship problems, and (iv) pro-social behaviour.

Among the 9 year olds, at the descriptive level, significant differences were evident according to childcare setting in the case of just three of the Piers Harris sub-scales:, 'physical appearance', 'freedom from anxiety' and 'popularity'. In terms of both the 'physical appearance' and 'popularity' domains, children in parental out-of-school care had the highest scores (indicating a more positive self-evaluation in that domain), while those in centre-based care and non-relative care had the lowest scores. With regard to 'freedom from anxiety', again those in parental out-of-school care had significantly higher than average scores, while those in non-relative care had significantly lower than average scores. We found no significant differences in self-concept scores between children who experienced different types of childcare arrangements.

Table 27 in the Appendix presents regression results of the determinants of having higher overall self-concept scores. With regard to self-concept, we find that all else being equal, children with an ongoing chronic illness and those with lower levels of childhood isolation with regard to contact with extended family have higher overall self-concept scores. In addition, the model identifies the characteristics associated with lower self-concept scores, and these include having a special educational need (SEN), being either over-weight or under-weight, and having experienced a traumatic life event. However, when the degree of parent-child conflict and measure of levels of childhood isolation are taken into account, the latter is no longer significant.

Household social class and household income also exert direct influences on overall self-concept: children living in non-manual/skilled manual or semi-skilled manual households are at a greater risk of having significantly lower self-concept scores than children living in professional/managerial households. Relative to middle income and high income households, children living in low income households run a higher risk of having lower self-concept scores. Socio-emotional difficulties and increasing levels of parent-child conflict were also negatively related to self-concept scores.

A second measure of socio-emotional outcome for 9 year olds was used – the Strengths and Difficulties domain. Figure 6.1 illustrates significant differences in the average scores for each of the Strengths and Difficulties domains (with the exception of the pro-social scale) by out-of-school care setting. With regard to the domain of 'Emotional', children in parental, relative and centre-based settings had higher than average scores. Children in centre-based settings had the highest scores in the conduct, peer and hyperactivity domains, as well as the overall score.

Figure 6.1: Summary of Mean Scores on the SDQ Domains by Childcare Arrangement, 9 year cohort

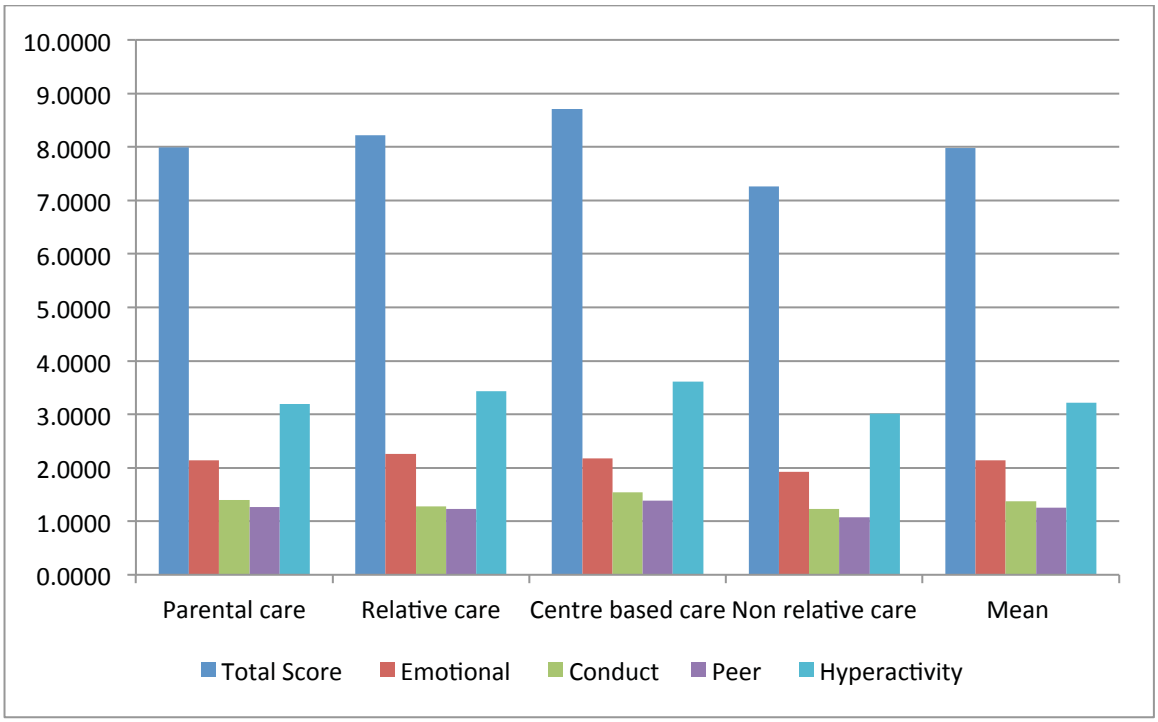


Table A28 in the Appendix presents regression results when the full (unmatched) sample was employed. With regard to this measure of socio-emotional outcomes, results pertaining to childcare were consistent with the patterns illustrated in Figure 6.1. Children attending centre-based care settings were at a greater risk of having higher average scores, representing greater levels of difficulties, all else being equal[15]. This pattern held in Table A40 in the Appendix, when estimated using the matched sample.

As well as an association with the type of out-of-school setting, children with a special educational need (SEN), those who are under-weight or over-weight, and those who have experienced a traumatic life experience were each at a greater risk of having higher average scores all else being equal. This was also true of males compared to females. On the other hand, children who were of a higher birth weight, those who were breastfed, and those who were deemed to be very healthy by their PCG each had lower average scores, all else being equal. This is also true of children living in households that can be classified as 'non-manual or skilled manual', children whose parents have lower levels of education, children whose PCG had higher depression scores, and children whose mother has 'poor or fair' self-rated health.

To sum up, the longitudinal data reveals that the type of childcare arrangement in infancy has little bearing on children's strengths and difficulties scores by age three. Among the school-aged children, using the cross sectional data, we find statistically significant associations between the type of childcare arrangement used and socio-emotional outcomes. To this end, we report a negative association between attendance at centre based after-school care and strength and difficulties scores.

[15] In a subsample of low income groups, no such significant association was found, it did however approach significance.

Chapter 7: Cognitive Outcomes

7.1 Introduction

This aim of this chapter is to consider the influence of childcare arrangements in infancy and middle childhood (out-of-school care) on cognitive outcomes and educational development. We also seek to identify key characteristics associated with poor outcomes for children from infancy to middle childhood.

7.2 Previous Research

Cognitive development in early childhood

While typically restricted to the effects of childcare from age three, international studies indicate that childcare arrangements clearly influence cognitive development in early childhood. Belsky and colleagues (2007) compared children who attended child care centres with those who experienced other types of non-maternal child care arrangements. They found that those in centre-based care had somewhat better cognitive and language development. In general, the literature suggests more positive cognitive outcomes for centre based care, but it should be noted that childcare ecologies vary considerably across countries.

Such studies also highlight that the quality of pre-school centres is directly related to better intellectual/cognitive development in children (Sylva et al., 2004). High quality pre-school settings also continue to show beneficial outcomes persisting after 10 years of intervening experiences from multiple influences. Specifically, Sylva and colleagues found that there were continuing effects of pre-school quality for later attainment in maths and science, but not in English (Sylva et al., 2012). Similarly in the United States, children in higher quality child care settings were found to have better language and cognitive development during the first 4½ years of life (NICHD ECCRN, 2002). They were also more cooperative than those who experienced lower quality care during the first 3 years of life. Importantly, these effects persisted into middle childhood and adolescence, as higher quality care in infancy predicted higher cognitive-academic achievement at age 15, with escalating positive effects at higher levels of quality.

In relation to childcare for the 0-3 year-old age group, studies have found that high quality childcare can produce benefits for cognitive, language and social development amongst disadvantaged children With regard to childcare from three years onwards, it is widely noted that all children benefit from high quality pre-school provision, but that disadvantaged children benefit most, particularly those who have experienced a poor home learning environment in the early years (Melhuish, 2003; Melhuish et al., 2004). In addition, studies have found that cognitive gains in areas of reading, math and science persist well into adolescence and such effects are again more notable for those from disadvantaged backgrounds (Sylva, et al., 2012; Vandell et al., 2010).

Educational Development in Middle Childhood

To date, two studies commissioned by the Family Support Agency (now TUSLA, Child and Family Agency) have examined educational development in middle childhood. Fahey et al., (2012) modelled the factors associated with the probability of being the bottom 20 per cent in reading and maths, and Hannan et al., (2013) examined cognitive development using three measures: math scores, reading scores and school attendance rates (teacher report). In line with previous findings which use the GUI (see Smyth et al., 2009), these studies indicate that parental educational levels influence the educational development of children, and absenteeism is higher among families with lower levels of education.

Previous research has found that the factors which are important in understanding educational differences among children include: age of mother at childbirth, child's nationality, child's gender, child's birth weight, the household social class level, the languages spoken in the home, the number of children's books in the home, the presence of special educational need, the mother's experience of financial difficulty at age 16 and children's extracurricular activities and engagement with school (Fahey et al., 2013; McCoy et al., 2012a, McCoy, Byrne and Banks 2011; Curry, Gilligan and Ward 2011; Smyth et al., 2009). Hannan et al., (2013) found that after adjusting for selection bias the variable most affected by growing up in a non-traditional family appears to be educational attainment.

Reading scores tend to be higher among 9 year olds as mother's educational levels rise (Smyth e al., 2009). In terms of reading performance at age nine, Fahey et al., (2012) report that influences of socio-demographics have the strongest effects, particularly with regard to mother's education, as well as household poverty and households in which English is not the main language. Key influences include mother's education, citizenship, English spoken in the home, poverty line, mother's age at birth, family type, grandparents in the house, mother-child conflict, and father's parenting style.

School context is also found to have a significant effect on child outcomes. Disadvantaged schools have an over-representation of children from never-married one-parent families and cohabitating families. Urban band 1 schools (the most deprived schools) tend have the most varied student intake, with high proportions of children from lone parent families. Less than half of all children in these schools live with married parents, 15% live with cohabitating parents and over a fifth live with a never-married lone-parent. This contrasts strikingly with non-disadvantaged schools where 80% of the students come from married two-parent families (Hannan et al., 2013). Migrant students are also over-represented in schools in areas of socio-economic disadvantage, larger schools, and schools in urban areas (Byrne et al., 2010). Furthermore, migrant students face a number of educational barriers in terms of access to schools, placement in classes, year groups and types of secondary school programmes (Darmody, Byrne and McGinnity 2012). These school factors and neighbourhood effects are important in understanding differences in the educational development of children, but they have not been addressed in the current study.

In terms of math performance, Fahey et al., (2012) report that mother's education, poverty line, mother's age at birth, family type, number of children, mother-child conflict, father parenting style are associated with math scores at age nine. Hannan et al., (2013) indicate that children from never-married one-parent families scored almost 11% less on the maths

test when compared to children with married parents. Much of this difference (52%) is the result of pre-existing disadvantages. McCoy, Byrne and Banks (2011) find that gender, social class, income, books in the home, SEN, region, travel time from school, structured and unstructured activities, time spent with friends, and engagement with school are all associated with math performance at age nine.

7.3 Impact of Childcare Arrangements on Cognitive Outcomes in Early Childhood

Cognitive development in infants was assessed through the Ages and Stages Questionnaire (ASQ-2; Squires, Potter and Bricker 1999)[16] when infants were ten months old. Such measures are used as a means of monitoring child development through parental report so that any indication of delay can be investigated promptly. Here, we focus on two measures: Communications – showing some understanding of basic commands from parents and making their first efforts to engage in communications, and Problem solving – showing curiosity in and some rudimentary understanding of how the world around them works.

Children in GUI at age 3 undertook two standardised tests, administered directly by the interviewer in their home. These tests were the Picture Similarities and Naming Vocabulary Scales from the British Abilities Scales, measuring reasoning/problem solving and vocabulary respectively. In the Pictures Similarities test, children were shown a page with four pictures and given a card with a fifth picture on it. The child was asked to match the card to one of the four pictures based on some shared characteristic or construct (e.g. a card showing a stamp was matched to the picture of an addressed envelope). In the Naming vocabulary test, the interviewer showed the child pictures of everyday objects (e.g. a shoe) and the child had to say the name of the object (in English). Only children whose Primary Caregiver judged them to have sufficient English attempted the vocabulary test.

The descriptive analyses revealed that infants who were in relative care had the highest pass rate in reaching 10 and 12 month communication milestones, while those in centre based childcare settings had the lowest rates. Tables A29 and A30 in the Appendix present regression results for the full (unmatched) sample, for both communication and personal/social development at 10 months. In infancy, with regard to communication development, the association between the type of childcare arrangement and communication development was consistent in the unmatched sample with the descriptive pattern described above. Infants in centre based care or in non-relative care had significantly lower communication development scores than children in parental or relative care. Table A41 in the Appendix presents results when estimated using the matched sample. These results are quite different and report no significant estimates relating to a negative association between non-relative care and communication development scores. However, the negative effect of centre based childcare in infancy on communication development remained.

[16] The ASQ-2 can be administered at two monthly intervals at the infant stage (i.e., at 6, 8, 10 and 12 months). The 10-month Questionnaire was used in ***Growing Up in Ireland***, as infants had already passed their nine-month birthday (Williams, Greene, McNally, Murray, & Quail, 2010).

With regard to problem solving, the descriptive analyses revealed that infants who were in centre based child care settings had the highest pass rate in reaching 10 and 12 problem solving development milestones, while those in full-time parental care had the lowest rates[17]. Table A29 in the Appendix presents regression results when the full (unmatched) sample was employed. We found no significant differences in reaching problem solving milestones between children in different types of childcare arrangements.

For the early childhood cohort, both cross-sectional and longitudinal analyses were available to consider differences in cognitive development across children in different childcare settings. Using the cross-sectional data (Table A31), all else being equal, there was an association between the type of childcare setting at age 3 and naming vocabulary scores: those in relative care at age 3 had higher naming vocabulary cognitive scores than those in full-time parental care. These findings were replicated using the matched sample (Table A41). Using the longitudinal data, we find that this association persists. That is, relative care at nine months was predictive of higher scores on the Vocabulary Naming scores at age three in both the unmatched and matched samples. While centre based care and non-relative care also predicted higher vocabulary scores, these effects were mitigated when family and PCG characteristics were included in the models. No other features of the childcare context were predictive of cognitive abilities, such as changes in childcare settings between nine months and age three. With regard to cognitive development as measured through the Picture Similarities test, using both the cross-sectional and longitudinal data, there was no significant association with childcare arrangements (Table A32 and Table A33).

Our analyses of cognitive development in infancy and early childhood highlight the persistence of gender inequalities in cognitive outcomes in early childhood. Males were at a greater risk of achieving lower scores than females in cognitive outcomes on all cognitive subtests. Clearly, passing developmental milestones at all stages of infancy and early childhood has an influence on cognitive outcomes by age three. Passing ASQ milestones in infancy (milestones relating to communication, problem solving, personal/social skills) and fine motor skills was also associated with higher scores on the Naming Vocabulary test. In contrast only the ASQ gross motor milestone was significantly associated with the Picture Similarities subtest. A three year olds' mastery of fine motor and gross motor skills at age three was also associated with higher cognitive outcomes. Infants who took their first steps at a later stage also tended to have lower scores on the Picture Naming subtest. Higher scores on the SDQ were associated with lower scores on both cognitive subtests.

Above, we showed that infants who had siblings were less likely to achieve communication and problem solving milestones; this was also true for cognitive development at age three. That is, nine month olds who had siblings tended to have lower scores particularly on the naming vocabulary cognitive subtest.

Importantly, family structure and socio-demographic variables were particularly noticeable for Vocabulary Naming, but less apparent for Picture Similarities. Specifically, compared to children from middle income families, infants from low income families

[17] While a significant association was evident between problem solving development scores at 12 months and type of childcare setting at nine months, no such relationship was evident with regard to the number of childcare arrangements used, the duration of childcare or the age at which childcare began.

tended to have lower scores on Vocabulary Naming, while those from high income families tended to have higher scores. Compared to infants from professional/managerial families, those from skills/manual or "never employed" families had lower vocabulary scores. Furthermore, older caregivers and the children of those with higher educational qualifications had higher scores on the vocabulary subtest. The role of social factors on the Vocabulary subtest relative to Picture Similarities is consistent with research on intelligence, particularly psychometric theories of intelligence. Picture Similarities taps into non-verbal problem-solving abilities (Elliott, Smith and McCulloch, 1996). It has been suggested that biological/hereditary factors play a stronger role in such non-verbal tasks than is the case for verbal skills such as those measured by the Vocabulary Naming task[18] (Horn and Cattell, 1966).

7.4 Inequalities in Educational Development among 9 year olds

From our descriptive analyses, there was evidence of a statistically significant association between average reading performance scores and the type of out-of-school care setting, with children attending non-relative care displaying the highest levels of reading performance. Tables A31 and A32 present the results of the unmatched models relating to Reading performance and Maths performance at age nine. The first model in each table (Model 1) employs a linear regression OLS methodology to consider the average characteristics associated with reading performance. The second model (Model 2) employs a quantile regression approach to consider the average characteristics of children and their families associated with reading performance at different points of the conditional distribution of reading/maths performance. This method allows for estimates which are robust to the outliers of the dependent variable and are more 'efficient' than the OLS method. The adoption of this methodology extends previous research on educational performance at age nine by moving beyond 'average influences' or seeking to consider low attainment only, allowing for a better understanding of the influences of low, average and high attainment in maths/reading performance at age nine.

Adopting the quantile approach provides evidence of heterogeneity, so that we can consider if a characteristic, such as afterschool care, influences reading performance differently for those who score higher on reading performance than for those who score lower on reading performance. For example, with regard to the childcare arrangement, Model 1 of Table A31 indicates that all else being equal, out-of-school childcare arrangements at age nine per se, are not associated with reading performance. However, Model 2 shows that the influence of out-of-school childcare arrangements, and in particular, centre based childcare, differs across the quantiles of the reading distribution. It is only in the 3rd quantile (highest attainment) that we see a significant (negative) influence of attending centre based out-of-school care settings. Hence, the influence of centre based out-of-school care has a negative association with reading performance

[18] According to Cattell (1987) non-verbal ability (also known as fluid intelligence) is predominantly biologically driven, whereas verbal abilities (also known as crystalised intelligence) is shaped by education and culture, as a person acquires knowledge in various domains.

among those who are allocated to higher quantiles of reading performance[19]. However these results were not supported using the matched sample[20].

We find that on average higher reading scores are associated with children who were breastfed, children with a significant ongoing illness, children with higher math performance scores, those who always like reading, those from lone parent households, and those who live in high income households. On the other hand, the quantile regression results indicate that lower reading scores are associated with males, children with a special educational need (SEN), children who read with their parent, children who never like reading, children who always or never like school, children from non-manual backgrounds, those whose parents have lower levels of education and those who have fewer children's books in the home (see Table A31 in the Appendix).

In general, the likelihood of obtaining higher scores is associated with being breastfed as a baby, having an ongoing illness (presumably greater times are spent reading by these children), having higher math scores, and a child's enjoyment of reading; while the risk of acquiring lower scores are associated with having a special educational need (SEN), not liking to read, not liking school or always liking school (as opposed to sometimes liking school), being from a non-manual background, having parents who have lower levels of education and having fewer children's books in the home.

Adopting both approaches lead us to conclude the following smaller number of variables are associated with having significantly higher or lower scores in reading. The effects of gender and maternal health are isolated to a negative association on the lower quantiles of reading performance only, while the effect of birth weight has a positive association on the lower quantiles of reading performance. On the other hand, we find that a constant dislike of school, having siblings, being in centre-based childcare and coming from a low income household, each have a negative association with reading performance among those in the 75th percentile. The OLS indicate that being from a lone parent family is associated with higher levels of reading performance. The quantile regression now indicates that a positive association between lone parenthood and reading performance is evident only at the higher quantiles of reading performance.

In terms of maths performance (Table A32), all else being equal, out-of-school care arrangements had no statistically significant association at any point in the distribution. The OLS model indicates that on average higher math scores are associated with being male, having higher reading scores, always liking maths, having siblings, having a moderate number of children's books in the home, and having higher levels of parent-child conflict. Characteristics associated with a higher risk of performing less well in maths include: having a special educational need (SEN), not having breakfast before leaving for school, lower parental perceptions of the child's math ability, never liking maths, always liking school, coming from a lone parent family and coming from a lower social class background. As before, adopting both approaches leads us to conclude that the likelihood of obtaining higher maths scores is associated with a child's attainment and engagement with subject content – having higher reading scores and always liking maths. We also find that the risk of obtaining lower scores is greater for those with lower parental perceptions

[19] There was no such result evident among the sub-sample of low income groups, however it did approach significance (P=.08).
[20] The results are not shown in the Appendix.

of the child's math ability, children who never like maths, children who always like school, and having higher levels of parental-child conflict.

The quantile regression results report that there is no significant association between math performance and being male, and having a moderate number of children's books in the home within the low attainment category. However, these variables have a significant positive association with math performance at the 50th and 75th percentile. This suggests that these gender and cultural capital measures positively influence the probability of moderate and high achievement in maths. On the other hand, the presence of a special educational need and maternal ill health each have a significant negative association with math performance at the 50th and 75th percentile, suggesting that these factors negatively influence the probability of moderate and high achievement in maths. The quantile regression results report that the variables that have the greatest negative influence at the lower quantiles of math performance include the presence of an ongoing chronic illness, being from a lone parent family or from a non-manual/skilled manual background.

To sum up, the cross-sectional data pertaining to infants revealed that infants in centre based settings by nine months had lower communication scores, but problem solving scores did not differ by childcare arrangement. At age three, children in relative care had significantly greater naming vocabulary scores than children in other care settings, and this association was found to persist into early childhood. The longitudinal data report positive effects for those who were in the care of a relative in infancy on naming vocabulary tests by age three. However, there was no association between the type of childcare arrangement in infancy and later cognitive development as measured through picture similarities tests. Among school age children, there was no significant association between out-of-school childcare arrangements and math performance at age 9. However, the influence of centre based childcare was found to differ across the quantiles of reading performance, as children who attend centre based out-of-school care were less likely to achieve higher scores in reading than children attending other out-of-school childcare settings.

Chapter 8: Summary, Conclusions and Policy Recommendations

8.1 Introduction

In 2012, TUSLA (the Child and Family Support Agency) in collaboration with the Irish Research Council commissioned this study to investigate the wellbeing of children from families in which children are being minded by others. The objectives of this study were twofold:

- To examine the relationship between childcare arrangements in early childhood and middle childhood (out-of-school care) and children's physical, cognitive and socio-emotional outcomes, and,
- To identify the key risk factors associated with children's well-being from infancy to middle childhood.

Drawing on all available cohorts of the GUI surveys, this study describes the uptake of non-parental care from infancy to middle childhood. By accessing children at three distinct developmental periods, this research provides unique evidence concerning the effects of childcare arrangements over time through childhood. It is the first such study in the Irish context.

8.2 Summary of Findings

Childcare Arrangements from Infancy to Middle Childhood

Prior to the introduction of the universal pre-school provision scheme implemented by the Office of the Minister for Children and Youth Affairs, the uptake of non-parental childcare among pre-school children remained relatively stable between 2002 and 2010. One pattern in childcare use was very clear: the proportion of children experiencing regular nonparental childcare naturally increased from infancy through to age three: 39 per cent of infants were in non-parental care and this increased to 50 per cent of three year olds. As a result of government intervention in the childcare market, there is now evidence of almost universal uptake of non-parental childcare among children aged 3-4, prompting a re-consideration of national conceptualisations about the role of non-parental childcare in promoting child wellbeing. It's interesting to remember that until this development; home based full parental care was the dominant form of childcare over all the stages of childhood. As a result, as in many other high income nations, centre-based programmes are now the most popular option for children in the year before they begin primary school.

In contrast, the uptake of non-parental out-of-school care among primary school children has remained remarkably stable at less than a quarter of the cohort between 2002 and 2009. These patterns reflect those of female participation in the Irish labour market and are likely to reflect traditional conceptualisations about the role of non-parental childcare in promoting child wellbeing. Lower participation rates among mothers is likely to reflect (some) women's preferences for reducing paid work when their children are young, but also constraints in the form of affordability of childcare, barriers to employment for

women with young children and the limited availability of flexible working arrangements (Russell et al., 2009).

Our research also highlights the use of multiple childcare arrangements at the early stages of infancy. By nine months of age, 6 per cent of all infants are in multiple childcare arrangements, while 34 per cent are in a single childcare arrangement. We also found that the duration of time spent in non-parental care was relatively stable from infancy to early childhood, with some increase as children become older. 29 per cent of infants and 35 per cent of three year olds spend 16 hours or more per week in non-parental childcare. Because nine year olds attend primary school, the amount of time they spend in afterschool care is shorter. Just 16 per cent of nine year olds are in afterschool care for 14 hours or less per week and just 7 per cent of all nine year olds are in afterschool care for 15 hours or more per week.

The analyses, which captured the period prior to the introduction of the universal free pre-school year, revealed a strong reliance on informal childcare in infancy and early childhood, and an ongoing reliance on informal out-of-school care for older children (29% of nine month old infants, 23% of three year olds, and 19% of nine year olds were in the care of a relative or a friend). The uptake of centre based care prior to the introduction of the pre-school year was less prevalent at all pre-school stages (11% of nine month old infants, 27% of three year olds) and particularly lower for older children (3% of 9 year olds). Among more recent cohorts of pre-school children, the mode of childcare will have changed considerably. Because playschools and day-care services can offer the ECCE, the majority of 3-4 year old children will have experience of centre based care as a result of government intervention. While inconclusive, the international literature suggests that formal centre-based childcare, particularly for those aged 2-5, may promote greater developmental skills than informal care carried out by relatives or family friends, both at infancy and early childhood but also in middle childhood.

In stark contrast to the uptake of childcare in infancy/early childhood and highlighting the lack of afterschool places, only 3 per cent of all nine year olds are included in the broad definition of centre-based afterschool care, (which includes a diversity of public and private arrangements to include homework/afterschool clubs, activity camps and special needs groups). Even though primary school children finish school by 2.30 pm, there are long school holidays throughout the year. In Ireland it has been well documented that there is little state support for out-of-school childcare, and a scarcity of provision. As a result, parents in Ireland have limited options in meeting the childcare needs of their school going children outside school hours. More recently, based on recommendations by the OECD (2008), there has been an increase in government expenditure on afterschool places which support low-income unemployed parents to return to work.

Inequality in Accessing Childcare from Infancy to Middle Childhood

The uptake of non-parental childcare at all stages of childhood from infancy to middle childhood is socially stratified: we found a general pattern across the cohorts whereby families classified as semi-skilled or unskilled manual social class households were less likely to use non-parental childcare. Furthermore, we identified that high income households, households in which the PCG is in employment full-time and households in

which all parents present are in employment, are more likely to use non-parental childcare. This was also the case for lone parent families, which may reflect the targeted provision of community childcare and subsidised after-school childcare places for such families.

Irrespective of such government intervention, at all stages of childhood, there are clear persistent effects of household income, household social class and the employment circumstances of the family, as well as the hours worked by the PCG. These overall patterns reflect that family need for childcare and family resources as well as family structure are key drivers of the uptake of non-parental childcare in Ireland. For each cohort, professional households are more likely to use non-parental childcare than semi-unskilled manual households, and among the three year-old and nine year-old cohorts' households with the highest levels of education are more likely to use non-parental childcare and out-of-school care than those with lower levels of education. Crucially, we also report that household income not only influences the take-up of childcare across each cohort, but also the type of childcare setting that is used, and the number of childcare arrangements. While lone parents were more likely to use non-parental childcare than two-parent families, they were also more likely to rely on multiple childcare arrangements for infants, and their children spend longer durations of time in non-parental childcare. As well as the factors above, maternal employment intensity and regularity, the presence of additional children in the family and the employment circumstances of the family were all significant predictors of the use of non-parental childcare from infancy to middle childhood.

We also considered whether factors affecting selection into childcare may shift over time, given that the literature has not generally considered whether the uptake of non parental childcare may shift systematically over time as children age. Social class effects were particularly evident among the three year old cohort, and coefficients for income effects were greater at age three suggesting stronger influences of these variables on the uptake of non-parental childcare at this age relative to others. The strength of the coefficients for maternal employment intensity and regularity also increased as children become older, suggesting increasing influences of maternal employment intensity as children grow older and mothers and primary care givers return to work. Overall, these patterns indicate that associations between family resource needs and the use of non-parental childcare were persistent but strongest at age three. In contrast, links between family needs (in terms of maternal employment) and the use of non-parental childcare are persistent and increase over the cohorts to become strongest among mothers and primary care givers of school age children. The receipt of at least one family social welfare payment was predictive of the use of non-parental care for the 9 year cohort only, perhaps reflecting welfare recipients' enhanced access to out-of-school care in an effort to increase access to out-of-school supports for the most disadvantaged children. However, the results reporting no significant differences in access to centre based after-school care between children from families in receipt of social welfare payments and those without suggest that such efforts are not complete.

In terms of access to different types of childcare settings, social class, household income, and the education levels of the primary care giver each influenced access to centre based care, conditional on the use of non-parental childcare. Two particularly interesting patterns further emerged. First, while professional families and high income families were

more likely to opt for centre based care at infancy and at age 9, such families were less likely to opt for centre based care by age three. A second pattern indicated that families with higher PCG education levels were more likely to opt for centre based care at all stages of childhood. These patterns may reflect both the higher cost of centre based care, but also (potentially) the greater focus on educational curricula and structured learning opportunities that centres may provide and more economically and educationally successful parents may prioritise (Levine Coley et al., 2014; Grogan 2012; Peyton et al., 2001). These patterns are also likely to reflect the greater opportunity structure for well resourced parents to make choices about childcare for their children as infants and children age.

Health Outcomes

The type of childcare placement was also significantly associated with parental reports of children's health for each of the three cross-sectional cohorts, all else being equal. Children in out-of-parental care were consistently at a greater risk of being rated as 'less healthy' by the parents of nine month old, 3 year old and 9 year old children. Specifically, the cross-sectional data revealed that centre based care was associated with a higher risk of being rated as 'less healthy' by parents in infancy and early childhood. Relative care was associated with a higher risk of being rated as 'less healthy' by parents in middle childhood.

An examination of the impact of childcare arrangements in infancy on parental reports of health by age three revealed interesting findings. Despite parental reports of less healthy outcomes, there was no evidence to suggest the existence of a short-term effect of the type of childcare arrangement *per se* used in infancy on physical health outcomes by age three, all else being equal. Rather, stability in childcare type between infancy and early childhood was associated with positive reports of children's health, while there were also positive effects of spending greater than 16 hours per week in non-parental childcare and a positive effect of the use of a single childcare arrangement in infancy.

Infant Milestones and Development

With regard to the achievement of infant milestones, our findings highlight the positive, but limited role of centre based care in infancy. While the longitudinal data indicate that there are clear positive short-term effects of centre based care in infancy for gross and fine motor skill development by age three, such effects are limited and do not apply consistently to all areas of development captured by the data. Furthermore, consistency in the type of childcare arrangement between infancy and early childhood results in a negative impact on fine motor skill development as measured through the vertical line test. It is at around the ages of 2-3 years that many parents begin to enrol children in centre-based ECCE programmes. Such programmes tend to offer structured learning activities and group interaction. Transitions through childcare arrangements between infancy and early childhood appear to have a positive impact on certain domains of development. Contrary to other institutional contexts, there was no evidence of an

association between socio-emotional adjustment and childcare settings. That is, the type of childcare arrangement in infancy has little bearing on children's strengths and difficulties scores or on reaching problem solving milestones by age three.

Our findings show that Irish families rely heavily on informal care (especially from grandparents), and this is particularly the case when children are in the 0-3 age-group. Within the cross-sectional datasets we report negative developmental outcomes for infants in centre based care, particularly in areas of language/communication development, but positive effects of relative care in infancy on later outcomes in the area of language by age three (naming vocabulary test). Clearly relatives and grandparents are providing a vital service for Irish families and, in general, children are faring well in their care. It would seem that the type of childcare arrangement in infancy does not have a bearing on later cognitive development as measured through picture similarities tests.

The absence of a more consistent short-term effect of centre based care on these infant milestones may highlight the varied pedagogic orientations across the centre based childcare sector. It is important to note that in drawing conclusions about the impact of childcare type from infancy to age three; we did not assess the quality of childcare as this information was unavailable to us. Our analyses should not be taken to imply that any particular type of childcare is 'better or worse' than any other.

Research consistently points to the importance of establishing a strong parent-child attachment (Egeland and Carlson, 2004; Sroufe, 2005), and indicates that long hours in substandard care contribute to insecure attachment (NICHD, 2000, 2002, 2006). Our findings cannot draw such conclusions, as we do not have a measure of quality in our data and we have limited measures of parent-child attachment[21]. Earlier analyses of the infant cross-sectional data (not presented in this study) found that infants in all forms of non-parental childcare have significantly lower attachment scores than children in parental care, all else being equal. The effects of greater parent-child attachment in infancy were evident using the longitudinal data. That is, higher parent-child attachment scores in infancy result in lower difficulty scores and a lower fine motor skill development score by age three. It may be that some effects of early childhood experience may not manifest themselves until a later stage of development (so-called "sleeper effects"). Consequently, it may be important to monitor the impact of lower attachment scores on outcomes at the third wave of GUI data collection, that is, when these children are aged five.

Child Development: School-Age-Children

The cross-sectional data captured by wave 1 of the child cohort allowed us to examine associations between developmental outcomes (socio-emotional adjustment, educational development) and the use of out-of-school care at age nine. Among the school-aged children, we find statistically significant associations between the type of childcare arrangement used and socio-emotional outcomes. To this end, we report a negative association between attendance at centre based after-school care and strength and difficulties scores. The type of out-of-school care setting also mattered for educational development, but only on the higher quantiles of reading performance, and not for maths

[21] Attachment measures are available only for wave 1 of the infant cohort.

performance. That is, centre-based care had a negative influence among high achievers in reading. These findings suggest more positive outcomes for children in fulltime parental care or relative/non-relative care compared with those in centre based out-of-school care. However, because the data were collected at one point in time, we cannot infer that these are causal effects of out-of-school care on such developmental outcomes at age 9.

Risk Factors to Child Well-Being

In relation to child well-being, we identified a number of key risk factors to the physical wellbeing of children across all stages of childhood. It is clear that the wellbeing of the primary care giver is strongly associated with the health of children consistently from infancy to middle childhood. Males, children in households where the secondary caregiver is not in employment, children of younger primary caregivers, and children whose primary caregiver display higher stress scores are all less likely to be rated as 'very healthy' at all stages of childhood, even when we control for the child's health history and current health status.

Importantly our analyses revealed that as infants move through early childhood, developmental outcomes and socio-emotional outcomes are strongly influenced by earlier developmental indicators (to include ASQ scores, cognitive scores, and health outcomes). This was also the case for the 9 year old cohort when such earlier indicators were available.

By way of identifying risk factors in terms of the household socio-economic profile, parent/family characteristics (lower education levels, lower social class position, lone parenthood, maternal ill-health and depression) were associated with greater socio-emotional difficulties and poorer cognitive/academic/developmental outcomes consistently across all stages of childhood. There was one exception with regard to the development of gross motor skills in infancy. That is, children in households where the PCG giver had lower levels of education, where the child was living in a low income household, and where the PCG was previously not in full-time employment before the child was born were more likely to achieve gross motor milestones. These findings may reflect the greater amount of time spent by such parents engaging in activities associated with measuring gross motor development, or alternatively differentiation across families of different means in terms of what activities are accessible, valued and promoted (e.g. cognitive/educational skills versus physicality). There is some evidence in the literature of associations between low socio-economic status and better performance on preschool motor tasks, perhaps due to parenting practices (Lejarraga et al., 2002). However in the majority of studies children of lower social classes seem to perform less well compared to the children of middle class families (Venetsanou and Kambas, 2010).

Finally, the wellbeing of the primary care giver has a persistent influence on child development from infancy to childhood. That is, the children of primary caregivers who had higher depression scores or parental stress scores were significantly less likely to do well in terms of developmental outcomes relative to the children of primary care givers with greater levels of well-being, all else being equal.

8.3 Policy Recommendations

There are a number of policy recommendations that arise from this research:

- The report highlights the effects of social stratification on access to childcare from infancy to middle childhood. Pathways into non-parental childcare arrangements are socially stratified from infancy through to middle childhood. While government intervention has the potential to mitigate such unequal access, such intervention is limited in availability. A lack of affordable childcare, while financially difficult for many middle income families with multiple children, is a significant barrier to employment for low income and single parent families. Government intervention in the childcare market is important on equity grounds, but also in terms of providing parents with opportunities to return into the workplace and to buffer potential market failures in the provision of childcare, as in other institutional contexts.

We recommend increased public investment in early years services to enable families to break out of cycles of poverty, reduce the cost of childcare and place children on a more even playing field.

- While the absence of strong measures of the quality of childcare settings is a key limitation of the GUI datasets and consequently of our study, it has been well-established in the international research that quality, and particularly 'process quality' is the most important variable in determining how childcare affects children's socio-emotional and cognitive outcomes. Based on our analyses, it is likely that access to quality childcare settings is biased toward those with the most resources to access such care, creating barriers to positive outcomes for children and society as a consequence. Raising quality standards across all childcare should be a priority for Government action.

Consistent with other expert and advocacy groups (DCYA, 2013, Start Strong, 2014); we recommend that any public investment be instrumental in raising the quality of early years' services.

- The conceptualisation of childcare in current policy rhetoric is rather limited. A conceptualisation of childhood that captures all the stages of childhood, beyond an over-riding focus on early childhood, is likely to facilitate positive outcomes for children. Consistent with the findings of a report by the European Commission (Plantenga and Remery, 2013), our study shows, on average, that the provision and quality of out-of-school childcare in Ireland is inadequate. This study highlights the need for recognition that childcare need extends beyond early childhood. Previous reports have outlined the steps required to develop and sustain an out-of-school infrastructure (e.g., DJELR, 2005) and we urge policy makers to support the co-ordinated development of such an infrastructure across school and community contexts.

We recommend that steps are taken to provide a range of regulated, community-based out-of-school care options that are tailored to and informed by the developmental stages of middle childhood and beyond.

- This report highlights inequalities in access to childcare services and medical services when they are needed for children.

We recommend the provision of universal supports in childhood that promote child wellbeing, particularly with regard to accessing quality childhood care and education, and universal access to health care for all infants and children.

- Child wellbeing is socially stratified. Our study highlights the relative disadvantage faced by children in families with fewer economic, cultural and social resources. As a result, there are often less positive outcomes for the children of low income, low social class families and for families where parents experience significant stress or mental health difficulties. Furthermore, these patterns are often gendered.

We also recommend the development of robust services to support children and extended families in order to bring about more positive outcomes and to level the playing field for children across all stages of childhood.

8.4 Future Research

Our recommendations for future research advocate the continued consideration of the influence of childcare arrangements on child wellbeing at all stages of childhood using consecutive waves of the Growing Up in Ireland data. Compared to other institutional contexts, the Irish evidence base is lacking in this regard. Additional rigorous research is required on the effects of all types of childcare and early intervention programmes on children. Future research should focus on the different types of provision of after-school care for school going children, particularly given the limited but increasing public expenditure on afterschool childcare and the relatively large numbers of children in such arrangements. This can be achieved using subsequent waves of the child cohort of the Growing up in Ireland study.

Since the broadcast of the RTE Prime Time documentary, *A Breach of Trust* (May 2013), which exposed poor practices in Irish crèches, there has been increased attention on quality standards in childcare. While such attention is to be welcomed, much of the focus has been limited to the 'structural processes' or regulatory aspects of quality such as adult-child ratios, staff qualifications, and Garda vetting. Despite increasing government activity in the area of early childhood care and education, there has been little or no attention paid to the more direct and dynamic aspects of 'process quality', namely the quality of interactions between staff and children and the quality of the learning environment (for an exception see Neylon 2014). Research which systematically explores these dynamic aspects of quality in Irish ECCE sector (using standardised observational measures) would be useful in addressing this issue.

This report highlights the reliance on relatives (most of whom are grandparents) to provide childcare for Irish families especially during infancy 0-3. We found that lower income families are more likely to opt for relative care over other types of care. Two thirds of all relatives provide childcare free of charge. Clearly economics is a huge consideration in relation to choosing childcare options. Very little is known about the experiences of

grandparents who provide this vital service. Research which explores the experience of grandparents who provide childcare is long overdue.

Future research should also focus on child wellbeing outcomes beyond the definitions that are used in this report. Such outcomes could include the safety of children from accidental and intentional harm/secure in the immediate and wider physical environment, and participation in positive networks of families, friends, neighbourhoods and the community / included and participating in society.

Bibliography

Adams, G., Tout, K., and Zaslow, M. 2007. Early care and education for children in low-income families' pattern of use, quality and potential policy implications. Washington, DC: The Urban Institute.

Andersson, B. E. 1989. 'Effects of public day-care—A longitudinal-study'. *Child Development, 60,* 857–866.

Bacharach, V. R., and Baumeister, A, A. 2003. 'Child care and severe externalizing behaviour in kindergarten children'. *Journal of Applied Developmental Psychology, 23*, 527 – 537.

Banks, J., and McCoy, S. 2011. *A Study on the Prevalence of Special Educational Needs* Dublin: National Council for Special Educational Needs.

Barros, K. M., Fragoso, A. G., Oliveira, A. L., Cabral –Filho, J. E., and Castro, R. M. 2003. 'Do environmental influences alter motor abilities acquisition? A comparison among children from day-care centers and private schools'. *Arquivos de Neuropsiquiatria, 61*(2-A), 170–175.

Barry, U. and Sherlock, L. 2008. 'The provision of childcare services in Ireland'. *UCD School of Social Justice Working Papers; 8(1)*:1-31

Baydar, N., and Brooks-Gunn, J. 1991. 'Effects of maternal employment and child-care arrangements on preschoolers' cognitive and behavioural outcomes: Evidence from the Children of the National Longitudinal Survey of Youth'. *Developmental Psychology, 27*, 932–945.

Berger, L., Brooks-Gunn, J., Paxson, C., and Waldfogel, J. 2008.' First-year maternal employment and child outcomes: Differences across racial and ethnic groups'. *Children and Youth Services Review, 30,* 365–387.

Berk, L. 2008. *Infants, Children and Adolescents*. Boston MA: Pearson

Belsky, J. and Rovine, M.J. 1988. 'Nonmaternal care in the first year of life and the security of infant-parent attachment'. *Child Development, 59*, 157-167.

Belsky, J., Vandell, D., Burchinal, M., Clarke-Stewart, K. A., McCartney, K., Owen, M. and NICHD Early Child Care Research Network 2007. 'Are there long-term effects of early child care? *Child Development, 78,* 681-701.

Brooks-Gunn, J., Han, W.J., and Waldfogel, J. 2002. 'Maternal Employment and Child Cognitive Outcomes in the First Three Years of Life: The NICHD Study of Early Child Care', *Child Development* 73(4): 1052-1072.

Byrne, D., McGinnity, F., Smyth, E., and Darmody, M. 2010. 'Immigration and School Composition in Ireland', *Irish Educational Studies* 271-288.

Capizzano, J., and Adams, G. 2000. *Children in Low-Income Families Are Less Likely to Be in Centre-Based Child Care*. Washington, DC: The Urban Institute Snapshots of America's Families No 16.

Central Statistics Office. 2006. *Quarterly National Household Survey. Childcare, Quarter 1 2005*. Dublin: CSO.

Cote, S. M. Doyle, O., Petitclerc, A. and Timmons, L. 2013. 'Child care in infancy and cognitive performance until middle childhood in the millennium cohort study' *Child Development, 84(4),* 1191–1208.

Curry, P., Gilligan, R., and Ward, M. 2011. 'The Wellbeing of Migrant Children', GUI Conference 2011.

Cummings, E. M. 1980. 'Caregiver stability and child care'. *Developmental Psychology, 16*, 31 – 37.

Darmody, M., Byrne, D., and McGinnity, F. 2012. 'Cumulative Disadvantage? Educational Careers of migrant students in Irish secondary schools', *Race, Ethnicity and Education* 1-23.

De Schipper, J. C., Tavecchio, L.W. C., van Ijzendoorn, M. H., and van Zeijl, J. 2004. 'Goodness of fit in day care: Relations of temperament, stability, and quality of care with child's adjustment'. *Early Childhood Research Quarterly, 19*, 257 – 272.

Doherty, J., and Hughes, M. 2009. *Child Development: Theory and Practice 0-11* Essex: Pearson

Egeland, B., and Carlson, E. 2004. 'Attachment and psychopathology'. In L. Atkinson (Ed.), *Clinical applications of attachment* (pp.27-48). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Elicker, J., Fortner-Wood, C., and Noppe, I. C. 1999. 'The context of infant attachment in family child care'. *Journal of Applied Developmental Psychology, 20*, 319 – 336.

Elliott, C.D., Smith, P., and McCulloch, K. 1996. British Ability Scales second edition (BAS II): administration and scoring manual

Fahey, T., Keilthy, P., and Polek, E. 2012. *Family Relationships and Family Well-Being: A Study of the Families of Nine Year-Olds in Ireland* Dublin: University College Dublin and The Family Support Agency

Folk, K.F. , and Yi, Y. 1994. 'Piecing together child care with multiple arrangements: Crazy quilt or preferred pattern for employed parents of preschool children', *Journal of Marriage and the Family 56,* 669-680.

Giagazoglou, P., Karagianni, O., Sidiropoulou, M., and Salonikidis, K. 2008. 'Effects of the characteristics of two different preschool-type setting on children's gross motor development'. *European Psychomotricity Journal, 1*(2), 54–60.

Green, S., et al., 2010. 'Growing up in Ireland National Longitudinal Study of Children Background and Conceptual Framework',

Gregg, P., Washbrook, E., Propper, C., and Burgess, S. 2005. 'The effects of a mother's return to work decision on child development in the UK' *Economic Journal, 115*, 48–80.

Grogan, K.E. 2012. 'Parents' choice of pre-kindergarten: the interaction of parent, child and contextual factors', *Early Child Development and Care* 182(10): 1265-1287

Han, W.J. 2004. 'Nonstandard work schedules and child care choices: Evidence from the NICHD Study of Early Child Care', *Early Childhood Research Quarterly* 19: 231-256.

Han, W., Waldfogel, J., and Brooks-Gunn, J. 2001. 'The effects of early maternal employment on later cognitive and behaviour outcomes', *The Journal of Marriage and the Family* 63: 336-354.

Hannan, C., Halpin, B., and Coleman, C. 2013. *Growing up in a One-Parent Family: Family Structure and Child Outcomes* Dublin: Family Support Agency

Hansen, K., and Hawkes, D. 2009. 'Early childcare and child development'. *Journal of Social Policy, 38,* 211–239.

Hayes, N. 2013. Positive change – so why am I disheartened? *Education Matters Yearbook* http://www.educationmatters.ie/yearbook/positive-change-so-why-am-i-disheartened/

Harrison, L.J. 2008. Does Childcare quality matter? Associations between socio-emotional development and non-parental child care in a representative sample of Australian children. *Family Matters No. 79:* Australian Institute of Family Studies.

Hennessy, E., and M. Donnelly. 2005. *After-School Care in Disadvantaged Areas: the perspectives of children, parents and experts* Combat Poverty Agency Working Paper Series 05/01.

Horn, J.L. and Cattell, R.B. 1967. 'Refinement and test of the theory of fluid and crystallized general intelligences', *Journal of Educational Psychology 57*(5):253-270.

Indecon 2013. *Supporting working families: Releasing a brake on economic growth*. Donegal County Childcare Committee.

Layte, R., Harrington, J., Sexton, E., Perry, I.J., Cullinan, J., and Lyons, S. 2011. 'Irish Exceptionalism? Local Food Environments and Dietary Quality', *Journal Epidemiology & Community Health* 65(10): 881-8.

Lejarraga, H., Pascucci,L. C., Krupitzky, S., Kelmansky, D., Bianco, A., Martinez, E. 2002. 'Psychomotor development in Argentina children aged 0-5 years'. *Paediatric and Perinatal Epidemiology*, 16, 47-60.

Leibowitz, A., Klerman J. A., and Waite, L. J. 1992. 'Employment of new mothers and child care choice' *The Journal of Human Resources Special Issue on Child Care, 27*, 112-133.

Levine Coley, R., Votruba-Drzal, E., Collins, M.A., and Miller, P. 2014. 'Selection into early education and care settings: Differences by developmental period', *Early Childhood Research Quarterly* 29: 319-332.

McAuley, C., and Layte, R. 2012. 'Exploring the Relative Influence of Family Stressors and Socio Economic Context on Children's Happiness and Well Being', *Child Indicators Research* 5(3): 523-45.
McCoy, S., Byrne, D., and Banks, J. 2011. 'Too Much of a Good Thing? Gender, Concerted Cultivation and Unequal Achievement in Primary Education', *Child Indicators Research*

McCrory, C., and Layte, R. 2011. 'The Effect of Breastfeeding on Children's Educational Test Scores at Nine Years of Age: Results of an Irish Cohort Study', *Social Science and Medicine* 72(9): 1515-21.

McDonnell, T., and Doyle, O. 2014. 'Maternal employment, childcare and childhood overweight during infancy'. UCD Geary Institute Discussion Paper Series, WP2014/11

McGinnity, F., Murray, A., and McNally, S. 2013. *Mother's Return to Work and Childcare Choices for Infants in Ireland* Dublin: The Stationery Office/Office of the Minister for Children and Youth Affairs.

Melhuish, E.C. 2003. *A Literature Review of the Impact of Early Years Provision on Young Children, with Emphasis Given to Children from Disadvantaged Backgrounds*. London, UK: National Audit Office.

Melhuish, E., B. Taggart, L. Quinn, P. Sammons, I. Siraj-Blatchford, and K. Sylva. 2004. *The Effective Provision of Pre-school Education (EPPE) Project: Final Report. A Longitudinal Study Funded by the FfES 1997–2004*. London: The Institute of Education.

Merriman, B. 2011. 'Not too fat and not too thin': A mixed methods analysis of the physical health and well-being of nine-year olds, GUI Annual Conference 2011.

Morrissey, T. W. 2008. 'Familial factors associated with the use of multiple child-care arrangements'. *Journal of Marriage and Family, 70(2*), 549–563.

Morrissey, T. W. 2009. 'Multiple child-care arrangements and young children's behavioural outcomes'. *Child Development, 80(1),* 59-76.

National Childcare Strategy 1999. *Report of the Partnership 2000 Expert Working Group on Childcare*. Dublin : Stationery Office.

National Women's Council of Ireland 2005. *An Accessible Childcare Model*. Dublin: NWCI.

NESF 2005. *Early Childhood Care and Education*, Forum Report No. 31, Dublin: Stationery Office.

Neylon, G. 2014. 'An analysis of Irish pre-school practice and pedagogy using the early childhood environmental four curricular subscales', *Irish Educational Studies* 33(1): 99-116.

NICHD Early Child Care Research Network. 2000b. 'The relation of child care to cognitive and language development'. *Child Development, 71*, 960–980.

NICHD Early Child Care Research Network. 2002. 'Direct and indirect influences of child care quality on young children's development'. *Psychological Science, 13*, 199 – 206.

NICHD Early Child Care Research Network. 2003. 'Does amount of time spent in child care predict socio-emotional adjustment during the transition to kindergarten? *Child Development, 74*, 976-1005.

NICHD. Early Child Care Research Network 2006. 'Child-care effect sizes for the NICHD Study of Early Child Care and Youth Development', *American Psychologist, 61*, 99–116.

OECD. 2004 *OECD Thematic Review of Early Childhood Education and Care Policy in Ireland*, Paris: OECD.

OECD. 2011. *Doing Better for Families,* Paris: OECD.

O'Toole, C. (May 29th 2013). Poor investment in Early Years care will cost us dear. *The Irish Times p15*.

Peyton, V., Jacobs, A., O'Brien, M., and Roy, C. 2001. 'Reasons for choosing childcare: associations with family factors, quality and satisfaction', *Early Childhood Research Quarterly* 16: 191-208.

Piers, E.V. 1984. *Piers-Harris Children's Self-Concept Scale: Revised Manual* Western Psychological Services

Plantenga J and Remery, C. 2013. *Childcare services for school age children: A comparative review of 33 countries*. European Commission – Directorate-General for Justice: Luxembourg

Posner, J.K., and Vandell, D.L. 1994. 'Low-Income Children's After-School Care: Are There Beneficial Effects of After-School Programs?' *Child Development* 65(2): 440-456

Pratschke, J., Haase, T., and McKeown, K. 2011. 'Well-Being and the Family System'.

Provost, M. 1994. 'Day care and social competence in preschoolers: Continuity and discontinuity among family, teachers, and peer contributions'. In A. Vyt, H. Bloch, & M. H. Bornstein (Eds.), *Early child development in the French tradition* (pp. 287 – 299). Hillsdale, NJ: Erlbaum

Ritchie, S., and Howes, C. 2003. 'Program practices, caregiver stability, and child-caregiver relationships'. *Journal of Applied Developmental Psychology, 24*, 497 – 516.

Ruhm, C. J. 2004. 'Parental employment and child cognitive development'. *Journal of Human Resources, 39,* 155–192.

Rule, A. C., and Stewart, R. A. 2002.' Effects of practical life materials on kindergartners' fine motor skills'. *Early Childhood Education Journal*, 30(1), 9-13.

Russell, H., McGinnity, F., Callan, T., and Keane, C. 2009 *A Woman's Place: Female Participation in the Irish Labour Market,* Dublin: The Equality Authority and The Economic and Social Research Institute.

Russell, H., and Thornton, M. 2010. 'Parental Employment and Child Outcomes at 9 Years', Paper presented at 2010 annual Growing Up in Ireland Conference, Dublin.

Smyth, E., Whelan, C.T., McCoy, S., Quail, A., and Doyle, E. 2009. 'Understanding Parental Influence on Educational Outcomes Among 9 Year Olds in Ireland: The Mediating Role of Resources, Attitudes and Children's Own Perspectives', *Child Indicators Research* 3(1): 85-104.

Squires, J., Potter, L., and Bricker, D. 1999. *The ASQ User's Guide* (2nd ed.). Baltimore: Paul H. Brookes Publishing Co.

Sroufe, L.A. 2005. 'Attachment and development: A prospective, longitudinal study from birth to adulthood', *Attachment and Human Development 7(4): 349-367.*

Start Strong 2013. Right from the Start: Key Messages. Start Strong Policy brief:

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., and Taggart, B. 2004. *The Effective Provision of Pre-school Education (EPPE) Project: Findings from the Early Primary Years*. London: DfES.

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., and Taggart. B. 2012. *Effective pre-school, primary and secondary education 3-14 project (EPPSE 3- 14) – Final report from the key stage 3 phase: Influences on students' development form age 11-14*. London: DfES.

Sylva, K.; Stein, A.; Leach, P.; Barnes, J.; Malmberg, L.-E. 2011. 'Effects of early child-care on cognition, language, and task-related behaviours at 18 months: an English study British' *Journal of Developmental Psychology 29(1),* pp. 18-45.

UNICEF 2008. *Report Card 8: The Child Care Transition – A League Table of Early Childhood Education and Care in Economically Advanced Countries.* Florence: UNICEF Innocenti Research Centre.

Vandell, D. L., Belskey, J. Burchinal, M., Vandergrift, N. and Steinberg, L. 2010. 'Do Effects of Early Child Care Extend to Age 15 Years? Results From the NICHD Study of Early Child Care and Youth Development'. *Child Development, 81(3):* 737–756.

Venetsanou, F. and Kambas, A. 2010.' Environmental Factors Affecting Preschoolers' Motor Development'. *Early Childhood Education Journal* 37:319-327

Waelvelde, H., Peersman, W., Lenoir, M., Smits Engelsman, B., and Henderson, S. 2008. The movement assessment battery for children: Similarities and differences between 4-and 5-year-old children from Flanders

Waldfogel, J., Han, W. J., & Brooks-Gunn, J. 2002. 'The effects of early maternal employment on child cognitive development'. *Demography, 39*, 369–392.

Ward, M., Mahon, E., and Layte, R. 2011. 'Caregiver and child perception of overweight and obesity'. GUI Annual Conference 2011

Williams, J., Greene, S., McNally, S., Murray, A. and Quail, A. 2010. The Infants and their Families, Infant Cohort. GUI Report 1

Williams, J., Murray, A., McCrory, C., McNally, S. 2013. Development from Birth to Three Years, Report 5 Dublin: The Stationery Office.

Williams, J., and Collins, C. 1998. 'Child-care arrangements in Ireland – A Report to the Commission on the Family' in *Strengthening Families for Life, Final Report of the Commission on the Family to the Minister for Social, Community and Family Affairs,* Dublin: Stationery Office

Youngblade, L. M. 2003. 'Peer and teacher ratings of third and fourth-grade children's social behaviour as a function of early maternal employment'. *Journal of Child Psychology and Psychiatry, 44,* 477 – 488.

Appendix

Table A1: Summary of Variables Associated with the Uptake of Non Parental Childcare

	Infants 39.0	3 years old 49.7	9 years old 23.1
Parent with Partner	39.4	49.7	20.6
Single Parent	36.7	49.6	34.9
Siblings	28.9	40.6	21.3
No other siblings	39.3	50.0	37.1
Professional workers	48.2	68.7	28.3
Managerial and Technical	48.9	61.0	27.2
Non manual	50.0	56.8	34.0
Skilled manual	20.4	27.1	12.0
Semi-skilled manual	25.2	32.6	14.8
Unskilled manual	15.7	22.9	12.4
Never worked	14.3	29.6	14.5
Unknown	9.4	16.1	25.9
Highest Income Quartile	59.4	80.4	35.1
4th Income Quartile	56.7	65.7	30.2
Middle Income Quartile	39.5	44.7	22.0
2nd Lowest Income Quartile	24.4	34.4	18.2
Lowest Income Quartile	18.3	25.4	12.0
Income Unknown	30.6	44.3	18.0
PCG 1-15 Hours	52.2	51.0	14.8
PCG 16-40 Hours	77.9	76.4	39.7
PCG 41+ Hours	76.3	78.3	52.4
PCG not in Employment	8.9	22.4	7.6
PCG Employment Hours Unknown	10.3	N/A	4.2
PCG Primary Education or Less	10.7	20.9	8.7
PCG Lower Secondary	24.6	31.1	14.6
PCG Upper Secondary	31.6	38.4	24.4
PCG Third Level	40.3	49.5	28.0
PCG Higher Education	49.4	65.5	33.2
PCG Education Level Unknown	10.0	33.6	N/A
HH Primary or Less	10.2	18.9	10.9
HH Lower Secondary	23.9	30.5	14.5
HH Upper Secondary	30.2	38.5	24.3
HH Third Level	39.0	46.7	24.5
HH Higher Education	47.2	61.3	28.6
HH Education Level Unknown	14.3	5.6	
Working out households	81.2	78.2	38.7
Other households	13.9	28.3	9.0
Working households	46.3	57.2	25.4
Workless households	10.4	23.8	11.5
Social welfare payments	22.2	34.5	17.1
No social welfare payments	43.5	59.2	25.5

Table A2: Coefficients from Logistic Regression Models of the Uptake of Non Parental Childcare, all cohorts

	Infants	3 Year Olds	9 Year Olds
PCG lives with partner	-1.02***	-0.68***	-0.86***
Ref: Lone Parent	(0.13)	(0.10)	(0.10)
Siblings	-0.20***	-0.45***	-0.36***
Ref: Only child	(0.06)	(0.06)	(0.09)
Managerial/Technical	0.09	-0.28***	-0.18*
	(0.07)	(0.08)	(0.08)
Non manual	0.26**	-0.22*	0.10
	(0.09)	(0.09)	(0.10)
Skilled manual	-0.34**	-0.62***	-0.24
	(0.11)	(0.10)	(0.13)
Semi-unskilled manual	-0.51***	-0.66***	-0.31*
	(0.13)	(0.11)	(0.15)
Never worked	0.21	-0.32*	0.03
Ref: Professional	(0.18)	(0.15)	(0.28)
2nd highest income quartile	-0.13	-0.59***	-0.24**
	(0.08)	(0.09)	(0.08)
Mid income quartile	-0.48***	-1.06***	-0.56***
	(0.09)	(0.09)	(0.09)
2nd lowest income quartile	-0.85***	-1.15***	-0.60***
	(0.10)	(0.10)	(0.10)
Lowest income quartile	-0.73***	-1.31***	-0.60***
	(0.11)	(0.11)	(0.13)
Income unknown	-0.42***	-0.78***	-0.31*
Ref: Highest income quartile	(0.12)	(0.12)	(0.13)
Primary/Lower Secondary	0.27*	-0.11	-0.66**
	(0.11)	(0.11)	(0.25)
Upper Secondary/FE	-0.03	-0.30***	-0.25*
	(0.08)	(0.08)	(0.11)
Third Level	0.01	-0.03	-0.04
Ref: Higher Education	(0.06)	(0.06)	(0.08)
PCG 1-15 hours	-0.14	0.52***	-0.02
	(0.15)	(0.12)	(0.08)
PCG 16-40 hours	0.42***	1.37***	0.53**
	(0.08)	(0.09)	(0.18)

PCG 41+hours	0.56***	1.57***	1.87***
Ref: PCG not in employment	(0.12)	(0.09)	(0.14)
Working out households	2.63***	0.84***	2.48***
Ref: All other households	(0.06)	(0.08)	(0.18)
Working households	1.00***	-0.20*	-0.13
Ref: Workless households	(0.13)	(0.10)	(0.24)
Household social welfare	-0.06	-0.07	0.46***
Ref: No social welfare payments	(0.07)	(0.06)	(0.12)
Constant	-1.26***	1.26***	-0.23*
	(0.19)	(0.16)	(0.09)
N	11,078	9717	8568

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: Coefficients from Regression Models of the Type of Childcare Arrangement Used at nine months

	Multinomial Regression Model		Conditional Logistic Regression Model
	Relative or Non-Relative versus Parental	**Centre based versus Parental**	**Centre based versus Relative or Non-Relative**
Male	0.10	0.15*	0.05
Ref: Female	(0.06)	(0.07)	(0.07)
Lone Parent	1.08***	0.69***	-0.38*
Ref: Partner	(0.14)	(0.19)	(0.18)
Siblings	-0.24***	-0.12	0.09
Ref: Only child	(0.06)	(0.08)	(0.07)
Managerial/Technical	0.17*	-0.06	-0.24**
	(0.08)	(0.09)	(0.09)
Non manual	0.38***	0.03	-0.36**
	(0.10)	(0.13)	(0.12)
Skilled manual	-0.15	-0.90***	-0.74***
	(0.12)	(0.18)	(0.19)
Semi-unskilled manual	-0.36**	-1.08***	-0.75***
	(0.13)	(0.22)	(0.23)
Never worked	0.20	0.44	0.17
Ref: Professional	(0.20)	(0.31)	(0.34)
2nd highest income quartile	0.06	-0.50***	-0.56***
	(0.09)	(0.10)	(0.09)
Mid income quartile	-0.26**	-0.93***	-0.68***
	(0.10)	(0.12)	(0.11)
2nd lowest income quartile	-0.65***	-1.25***	-0.63***
	(0.11)	(0.15)	(0.15)
Lowest income quartile	-0.52***	-1.23***	-0.70***
	(0.12)	(0.17)	(0.17)
Income unknown	-0.19	-0.84***	-0.67***
Ref: Highest income quartile	(0.12)	(0.17)	(0.16)
Primary/Lower Secondary	0.36**	0.09	-0.25
	(0.12)	(0.18)	(0.18)
Upper Secondary/FE	0.11	-0.39**	-0.49***
	(0.09)	(0.13)	(0.12)
Third Level	0.09	-0.18*	-0.26**
Ref: Higher Education	(0.07)	(0.09)	(0.09)
PCG 1-15 hours	-0.01	-0.49	-0.46
	(0.16)	(0.29)	(0.30)

PCG 16-40 hours	0.42***	0.57***	0.22
	(0.09)	(0.16)	(0.20)
PCG 41+hours	0.42**	1.01***	0.62**
Ref: PCG not in employment	(0.13)	(0.19)	(0.22)
Working out households	2.63***	2.61***	-0.12
Ref: All other households	(0.07)	(0.09)	(0.10)
Working households	1.05***	0.84***	-0.30
Ref: Workless households	(0.15)	(0.24)	(0.28)
Household social welfare	-0.10	-0.03	0.06
Ref: No social welfare payments	(0.08)	(0.12)	(0.13)
Constant	-2.98***	-3.14***	-0.03
	(0.18)	(0.28)	(0.30)
N			4375

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: Coefficients from Regression Models of Type of Childcare Arrangement, 3 year old cohort

	Multinomial Regression Model		Conditional Logistic Regression Model
	Relative or Non-Relative versus Parental	**Centre based versus Parental**	**Centre based versus Relative or Non-Relative**
Lone Parent	0.92***	0.55***	0.28*
Ref: Partner	(0.13)	(0.11)	(0.13)
Siblings	-0.33***	-0.51***	0.20**
Ref: Only child	(0.08)	(0.07)	(0.07)
Managerial/Technical	-0.12	-0.38***	0.30***
	(0.09)	(0.08)	(0.08)
Non manual	-0.01	-0.37***	0.40***
	(0.11)	(0.10)	(0.11)
Skilled manual	-0.25	-0.85***	0.72***
	(0.14)	(0.12)	(0.15)
Semi-unskilled manual	-0.49**	-0.80***	0.41*
	(0.15)	(0.13)	(0.17)
Never worked	0.01	-0.44**	0.58*
Ref: Professional	(0.28)	(0.16)	(0.29)
2nd highest income quartile	-0.35***	-0.77***	0.38***
	(0.10)	(0.09)	(0.08)
Mid income quartile	-0.78***	-1.26***	0.52***
	(0.11)	(0.10)	(0.10)
2nd lowest income quartile	-0.93***	-1.29***	0.42***
	(0.12)	(0.11)	(0.12)
Lowest income quartile	-1.20***	-1.41***	0.21
	(0.14)	(0.12)	(0.15)
Income unknown	-0.63***	-0.91***	0.28
Ref: Highest income quartile	(0.16)	(0.14)	(0.16)
Primary/Lower Secondary	-0.01	-0.18	-0.01
	(0.16)	(0.12)	(0.18)
Upper Secondary/FE	-0.07	-0.45***	0.33**
	(0.11)	(0.09)	(0.12)
Third Level	0.11	-0.12	0.18*
Ref: Higher Education	(0.07)	(0.07)	(0.07)
PCG 1-15 hours	1.45***	0.13	1.28***
	(0.17)	(0.14)	(0.19)
PCG 16-40 hours	2.53***	0.72***	1.75***
	(0.14)	(0.11)	(0.15)

PCG 41+hours	2.69***	0.98***	1.67***
Ref: PCG not in employment	(0.14)	(0.10)	(0.15)
Working out households	0.84***	0.78***	0.16
Ref: All other households	(0.09)	(0.09)	(0.10)
Working households	0.04	-0.23*	0.33
Ref: Workless households	(0.22)	(0.11)	(0.23)
Household social welfare	-0.39***	0.12	-0.36***
Ref: No social welfare payments	(0.08)	(0.07)	(0.09)
Constant	-1.82***	0.72***	-2.69***
	(0.22)	(0.14)	(0.23)
N	9710		4,989

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: Coefficients from Regression Models of the Type of Childcare Arrangement, 9 year old cohort

	Multinomial Regression Model		Conditional Logistic Regression Model
	Relative or Non-Relative versus Parental	**Centre based versus Parental**	**Centre based versus Relative or Non-Relative**
Male	-0.05	-0.07	-0.03
Ref: Female	(0.06)	(0.12)	(0.13)
Partner	-0.85***	-0.86***	-0.08
Ref: Lone Parent	(0.11)	(0.20)	(0.20)
Siblings	-0.33***	-0.58***	-0.21
Ref: Only child	(0.09)	(0.17)	(0.18)
Managerial/Technical	-0.14	-0.40*	-0.28
	(0.09)	(0.16)	(0.17)
Non manual	0.18	-0.36	-0.61**
	(0.11)	(0.21)	(0.22)
Skilled manual	-0.25	-0.48	-0.40
	(0.15)	(0.28)	(0.32)
Semi-unskilled manual	-0.22	-0.81*	-0.85*
	(0.17)	(0.34)	(0.40)
Never worked	0.24	-0.77	-1.45*
Ref: Professional	(0.33)	(0.48)	(0.66)
2nd highest income quartile	-0.22**	-0.50**	-0.28
	(0.08)	(0.17)	(0.17)
Mid income quartile	-0.51***	-0.97***	-0.48*
	(0.09)	(0.21)	(0.23)
2nd lowest income quartile	-0.62***	-0.65**	-0.16
	(0.11)	(0.22)	(0.24)
Lowest income quartile	-0.66***	-0.44	-0.02
	(0.15)	(0.26)	(0.29)
Income unknown	-0.31*	-0.61*	-0.30
Ref: Highest income quartile	(0.14)	(0.28)	(0.30)
Primary or Less	-0.60*	-0.77	-0.10
	(0.28)	(0.49)	(0.57)
Lower Secondary	-0.21	-0.57*	-0.30
	(0.12)	(0.25)	(0.27)
Upper Secondary	0.03	-0.40*	-0.40*
	(0.08)	(0.17)	(0.19)
Third Level	0.02	-0.23	-0.23
Ref: Higher Education	(0.08)	(0.16)	(0.17)

PCG 1-15 hours	0.67**	0.31	-0.41
	(0.20)	(0.40)	(0.43)
PCG 16-40 hours	2.04***	1.46***	-0.59
	(0.16)	(0.29)	(0.32)
PCG 41+hours	2.65***	2.06***	-0.64
Ref: PCG not in employment	(0.20)	(0.36)	(0.39)
Working out households	0.05	-0.63	-1.03
Ref: All other households	(0.31)	(0.39)	(0.55)
Working households	0.56***	0.03	-0.60*
Ref: Workless households	(0.13)	(0.25)	(0.27)
Household social welfare	-0.30**	0.06	0.32
Ref: No social welfare payments	(0.10)	(0.18)	(0.20)
Constant	-1.67***	-1.06*	1.13
	(0.33)	(0.45)	(0.61)
N	8,515		2,070

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6: Coefficients from the Regression Models of the Number of Childcare Arrangements Used, 9 month cohort

	Single Childcare Arrangement versus Parental Childcare		Multiple Childcare Arrangement versus Parental Childcare		Conditional on childcare Multiple Childcare Arrangement versus Single Arrangement
	Multinomial Regression				Logistic Regression
Constant	-2.476	0.000	-3.778	0.000	-1.35***
Male	0.098	0.068	0.180	0.046	0.08
Ref: Female					
Lone Parent	0.955	0.000	1.607	0.000	0.67***
Ref: Dual Parent					
Siblings	-0.135	0.018	-0.576	0.000	-0.43***
Ref: No Siblings					
Non Manual/Skilled Manual	0.039	0.579	-0.196	0.103	-0.25*
Semi-Unskilled Manual	-0.492	0.000	-0.936	0.000	-0.43
Never Worked	0.245	0.192	-0.024	0.944	-0.38
Ref: Professional/Managerial					
2nd income quartile	-0.139	0.097	-0.007	0.958	0.12
Middle income quartile	-0.481	0.000	-0.460	0.002	0.03
4th income quartile	-0.876	0.000	-0.791	0.000	0.09
Lowest income quartile	-0.719	0.000	-1.061	0.000	-0.34
Missing income	-0.396	0.001	-0.547	0.009	-0.18
Ref: Highest income quartile					
Upper Secondary	-0.167	0.139	-0.135	0.519	0.03
Third Level	-0.136	0.208	-0.080	0.691	0.08
Higher Education	-0.115	0.312	-0.187	0.372	-0.07
Ref: Lower Secondary or Less					
PCG 1-15 hours	-0.094	0.548	0.087	0.765	0.39
PCG 16-40 hours	0.527	0.000	0.309	0.125	0.00
PCG 41+ hours	0.594	0.000	0.762	0.001	0.40
Ref: PCG not in employment					
Working out household	2.645	0.000	2.694	0.000	-0.00
Ref: All parents not working out					
Working household	1.023	0.000	0.866	0.003	-0.29
Ref: Workless household					
Social welfare household	-0.081	0.293	-0.123	0.392	-0.06
Ref: no social welfare					
					4375

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7: Coefficients from Regression Models of the Number of Childcare Arrangements Used, 3 year old cohort

	Single Childcare Arrangement versus Parental Childcare		Multiple Childcare Arrangement versus Parental Childcare		Conditional on Childcare Multiple Childcare Arrangement versus Single Arrangement
	Multinomial Regression				Logistic Regression
	Coef.	P>0	Coef.	P>0	
Constant	0.103	0.518	-2.596	0.000	5.82***
Lone Parent	0.614	0.000	1.200	0.000	-0.60**
Ref: Dual Parent					
Siblings	-0.397	0.000	-0.783	0.000	-0.48**
Ref: No Siblings					
Non Manual/Skilled Manual	-0.146	0.029	-0.201	0.090	-0.49**
Semi-Unskilled Manual	-0.370	0.000	-0.699	0.001	-0.61*
Never Worked	0.003	0.984	0.168	0.663	-0.68
Ref: Professional/Managerial					
2nd income quartile	-0.641	0.000	-0.446	0.001	-0.51*
Middle income quartile	-1.095	0.000	-1.082	0.000	-0.44
4th income quartile	-1.187	0.000	-1.322	0.000	-0.83***
Lowest income quartile	-1.348	0.000	-1.548	0.000	-1.05***
Missing income	-0.834	0.000	-0.721	0.001	-0.96**
Ref: Highest income quartile					
Upper Secondary	-0.175	0.117	0.190	0.469	-0.03
Third Level	0.123	0.218	0.283	0.251	0.05
Higher Education	0.224	0.035	0.242	0.339	0.12
Ref: Lower Secondary or Less					
PCG 1-15 hours	0.495	0.000	1.153	0.000	-0.23
PCG 16-40 hours	1.295	0.000	2.237	0.000	-0.53
PCG 41+ hours	1.493	0.000	2.392	0.000	-0.46
Ref: PCG not in employment					
Working out household	0.831	0.000	0.860	0.000	-0.37
Ref: All parents not working out					
Working household	-0.174	0.084	0.020	0.954	-1.19*
Ref: Workless household					
Social welfare household	-0.078	0.216	-0.093	0.451	-0.11
Ref: no social welfare					
N=	9,694				4989
LR chi²(38)	3701.50***				
Log likelihood =	-6865.5629				
Pseudo R^2	0.2123				

Table A8: Coefficients from Ordinal Regression Model of the Factors Associated with the Duration of Childcare, all cross-sectional cohorts

	Infants	3 Year Olds	9 Year Olds
Lone parent *Ref: Dual Parent*	-0.05 (0.12)	0.33** (0.11)	0.62*** (0.14)
Siblings *Ref: Only Child*	-0.10 (0.06)	-0.23*** (0.07)	-0.04 (0.13)
Non manual/Skilled Manual	-0.08 (0.08)	-0.08 (0.08)	0.02 (0.12)
Semi/Unskilled Manual	-0.36* (0.15)	0.24 (0.14)	-0.13 (0.25)
Economically Inactive *Ref: Professional/Managerial*	0.85*** (0.26)	0.41* (0.21)	-0.03 (0.54)
2nd Highest Income Quartile	-0.26** (0.08)	-0.43*** (0.08)	-0.02 (0.13)
Middle Income Quartile	-0.60*** (0.09)	-0.55*** (0.09)	-0.03 (0.15)
2nd Lowest Income Quartile	-0.84*** (0.12)	-0.64*** (0.11)	0.03 (0.18)
Lowest Income Quartile	-0.87*** (0.14)	-0.45*** (0.13)	-0.21 (0.24)
Income Unknown *Ref: Highest Income Quartile*	-0.51*** (0.13)	-0.41** (0.14)	0.11 (0.21)
PCG Upper Secondary Education	-0.05 (0.14)	0.22 (0.16)	0.09 (0.20)
PCG Third Level Education	-0.08 (0.13)	0.23 (0.14)	-0.07 (0.21)
PCG Higher Education *Ref: PCG Lower Secondary or Less*	0.31* (0.14)	0.55*** (0.15)	-0.10 (0.21)
PCG 1-15 Hours	-1.50*** (0.24)	-0.26 (0.17)	-1.21** (0.39)
PCG 15-40 Hours	0.14 (0.16)	1.03*** (0.12)	-0.44 (0.26)
PCG 40+ Hours *Ref: PCG Not in Employment*	0.85*** (0.18)	2.42*** (0.13)	0.51 (0.30)
Working Out Household *Ref: All Parents not working out*	0.46*** (0.08)	0.38*** (0.09)	0.99 (0.52)
Working Household *Ref: Workless Household*	0.30 (0.22)	-0.42* (0.17)	-0.60** (0.21)

Social Welfare	-0.23*	-0.18*	-0.04
	(0.10)	(0.08)	(0.15)
cut1			
_cons	-0.86***	-0.14	0.87
	(0.26)	(0.22)	(0.55)
cut2			
_cons	0.72**	2.33***	2.67***
	(0.26)	(0.22)	(0.55)
N	4347	4975	2124

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A9: Coefficients from Logistic Regression Model of the Probability of Being Rated 'Very Healthy' by Parents, 9 month cohort

	Child Characteristics	Family Structure	Family Employment	Child Care	Family SES	PCG Measures
Temperament Fussy	-0.05***	-0.05***	-0.05***	-0.05***	-0.05***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Temperament Dull	-0.03**	-0.03**	-0.03**	-0.03**	-0.03**	-0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Temperament Un-predictable	-0.06***	-0.06***	-0.06***	-0.06***	-0.06***	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Male	-0.22***	-0.22***	-0.22***	-0.22***	-0.22***	-0.20***
Ref: Female	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Infant very healthy at birth	-0.16*	-0.16*	-0.16*	-0.16**	-0.16**	-0.09
Ref: Infant less healthy	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Lone Parent		-0.10	-0.19*	-0.17	-0.07	-0.03
Ref: PCG lives with partner		(0.08)	(0.09)	(0.10)	(0.11)	(0.12)
Infant has siblings		-0.06	-0.08	-0.09	-0.08	-0.11*
Ref: Single child		(0.05)	(0.05)	(0.05)	(0.06)	(0.06)
PCG in FT Employment			-0.19**	0.07	0.05	0.05
			(0.07)	(0.09)	(0.09)	(0.09)
PCG in PT Employment			-0.04	0.11	0.11	0.09
Ref: PCG other status			(0.08)	(0.09)	(0.09)	(0.09)
Cared for by Relative				0.01	-0.01	0.01
				(0.09)	(0.09)	(0.09)
Cared for by non-relative				-0.12	-0.16	-0.15
				(0.10)	(0.10)	(0.10)
Centre Based Care				-0.77***	-0.80***	-0.77***
Ref: Full parental care				(0.09)	(0.09)	(0.09)
Private Health Insurance					0.10	0.07
					(0.08)	(0.08)
Medical Card					-0.14^	-0.18*
Ref: No Health Cover					(0.08)	(0.09)
PCG Quality of Attachment						0.07***
						(0.01)
PCG Depression Score						-0.03***
						(0.01)
Constant	3.16***	3.20***	3.30***	3.31***	3.33***	0.17
	(0.13)	(0.13)	(0.15)	(0.15)	(0.18)	(0.50)
N	10983	10983	10983	10983	10983	10788

Note: Model also includes variables relating to the temperament of the child at nine months (unadaptive), highest household education level, household social class, ethnicity, Father's employment status and

Household employment situation.
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A10: Coefficients from Logistic Regression Model of the Probability of Being Rated 'Very Healthy' by Parents, 3 year old cohort

	Child Characteristics	Family Structure	Family Employment	Child Care	Family Socio-Economic	PCG Measures
Ongoing Illness/Disability	-2.56***	-2.56***	-2.56***	-2.55***	-2.55***	-2.53***
Ref: No such illness/disability	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Lone Parent		-0.27**	-0.32***	-0.30**	-0.30**	-0.19
Ref: PCG lives with partner		(0.08)	(0.09)	(0.09)	(0.11)	(0.11)
Siblings		0.23***	0.23***	0.20**	0.20**	0.13
Ref: Single child		(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
PCG Not in employment			-0.01	-0.08	-0.07	-0.04
			(0.07)	(0.08)	(0.08)	(0.08)
PCG works less 15 hours			0.00	-0.02	-0.01	-0.02
Ref: PCG works 15+ hours			(0.13)	(0.13)	(0.13)	(0.13)
Relative childcare				0.00	0.00	-0.00
				(0.10)	(0.10)	(0.10)
Non relative childcare				-0.01	-0.01	-0.01
				(0.10)	(0.10)	(0.10)
Centre based childcare				-0.40***	-0.40***	-0.38***
Ref: Full parental childcare				(0.07)	(0.07)	(0.07)
Private Health Insurance					-0.08	-0.11
					(0.09)	(0.09)
Medical Card					-0.10	-0.12
Ref: No Health Cover					(0.10)	(0.10)
PCG Depression Score						-0.04***
						(0.01)
PCG Parental Stress Score						-0.04***
						(0.01)
Constant	1.21***	1.11***	1.23***	1.42***	1.49***	1.99***
	(0.24)	(0.25)	(0.27)	(0.28)	(0.29)	(0.36)
N	9083	9083	9083	9083	9083	8962

Note: Model also includes variables relating to the age at which the infant took their first steps, height at age three, cognitive scores at age three, the employment situation of the family, if the family are in receipt of social welfare payments, family social class, and the age of the PCG.

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A11: Coefficients of Logistic Regression Model of the Probability of Being Rated by Parents as 'Very Healthy', 9 year old cohort

	Individual Characteristics	Family Structure	Childcare Arrangement	Family SES	PCG Characteristics
Birth Weight	0.11**	0.11*	0.10*	0.09*	0.10*
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Infant was breastfed	0.12*	0.11*	0.09	0.04	0.06
Ref: Never breastfed	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)
Chronic Illness at age 9	-1.74***	-1.74***	-1.75***	-1.76***	-1.76***
Ref: No such illness	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Special educational need	-0.23**	-0.22**	-0.21**	-0.19**	-0.18*
Ref: Child no SEN	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
No treatment when required	-0.56***	-0.55***	-0.55***	-0.53***	-0.51***
Ref: Medical treatment	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Child does not eat breakfast	-0.45**	-0.43*	-0.41*	-0.35*	-0.37*
Ref: Child has breakfast	(0.17)	(0.17)	(0.17)	(0.17)	(0.18)
Child is underweight	-0.49***	-0.50***	-0.49***	-0.49***	-0.45***
	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)
Child is overweight	-0.44***	-0.44***	-0.43***	-0.41***	-0.35***
Ref: Appropriate Weight	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
Experienced traumatic event	-0.31***	-0.29***	-0.29***	-0.27***	-0.26***
Ref: No such experience	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Lone Parent family		-0.13	-0.04	0.14	0.23*
Ref: PCG lives with partner		(0.08)	(0.09)	(0.10)	(0.11)
Relative afterschool care			-0.25**	-0.27**	-0.25**
			(0.09)	(0.09)	(0.09)
Non relative afterschool care			-0.04	-0.09	-0.11
			(0.10)	(0.10)	(0.10)
Centre-based afterschool care			-0.02	-0.04	-0.01
Ref: Full parental care			(0.15)	(0.15)	(0.16)
Non manual/Skilled manual				-0.05	-0.08
				(0.07)	(0.07)
Semi-Un-skilled manual				-0.16	-0.15
				(0.11)	(0.11)
No Social Class				-0.44*	-0.36
Ref: Professional/managerial				(0.19)	(0.21)
PCG Depression Score					-0.04***
					(0.01)
PCG Fair/Poor Health					-0.49***

Ref: PCG in good health					(0.11)
Constant	1.31***	1.33***	1.24***	1.59***	1.52***
	(0.17)	(0.17)	(0.22)	(0.26)	(0.27)
N	8442	8442	8442	8442	7763

Note: Model also contains variables relating to PCG employment situation and family employment situation, PCG education levels, and household health cover.
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A12: Coefficients of Logistic Regression Model of the Probability of Being Rated 'Very Healthy' by Parents by Age 3, Longitudinal Data

	Child Characteristics	Family Structure	Family Employment	Child Care	Family SES	PCG Characteristics
Temperament Fussy	-0.02**	-0.02**	-0.02**	-0.02**	-0.02**	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Temperament Unpredictable	-0.03**	-0.02*	-0.02*	-0.03*	-0.03*	-0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Passed Personal/Social Test at 10 months *Ref: Did not*	0.18*	0.20**	0.20**	0.20**	0.20**	0.21**
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Male *Ref: Female*	-0.22***	-0.22***	-0.22***	-0.23***	-0.23***	-0.24***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Very Healthy at Birth *Ref: Less healthy at birth*	0.46***	0.45***	0.45***	0.44***	0.44***	0.43***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Less Healthy at 9 months *Ref: Very healthy at 9 months*	-0.81***	-0.82***	-0.82***	-0.84***	-0.84***	-0.81***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)
Presence of health condition *Ref: No condition at 9 month*	-0.61***	-0.63***	-0.62***	-0.62***	-0.62***	-0.61***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Presence of health issue *Ref: No issue at 9 months*	-0.40***	-0.38***	-0.39***	-0.41***	-0.41***	-0.41***
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Lone Parent Household *Ref: PCG lives with partner*		-0.31***	-0.17	-0.17	-0.10	-0.06
		(0.08)	(0.11)	(0.11)	(0.13)	(0.13)
Siblings at nine months *Ref: Lone child at 9 months*		0.18***	0.20***	0.19***	0.19***	0.17**
		(0.05)	(0.05)	(0.05)	(0.05)	(0.06)
SCG in Employment			-0.15	-0.22	-0.22	-0.26*
			(0.12)	(0.12)	(0.12)	(0.13)
SCG Status Unknown *Ref: SCG other status 9 mths*			-0.24	-0.27*	-0.29*	-0.31*
			(0.12)	(0.12)	(0.12)	(0.13)
Relative care at 9 months				0.20*	0.20*	0.23*
				(0.09)	(0.09)	(0.09)
Non- relative care at 9 mths				0.16	0.16	0.17
				(0.10)	(0.10)	(0.10)
Centre based care at 9 mths *Ref: Full Parental Care*				0.35***	0.35***	0.37***
				(0.10)	(0.10)	(0.10)
No Change in care type T1-T2 *Ref: Change in care type*				0.16**	0.16**	0.15**
				(0.05)	(0.05)	(0.05)
PCG Under 25						-0.11
						(0.11)
PCG 25-29						-0.16*
						(0.08)

PCG 30-34						-0.06
Ref: PCG 35+						(0.06)
PCG Parental Stress Score						-0.01*
						(0.00)
Constant	1.96***	1.87***	1.91***	1.84***	1.92***	1.81**
	(0.16)	(0.17)	(0.19)	(0.20)	(0.22)	(0.61)
N	8987	8987	8987	8987	8987	8817

Note: Model also includes variables relating to whether the child was breastfed as an infant, temperament at nine months (un-adaptive), result of fine motor skill tests at ten months, PCG employment status, household employment situation, changes in household employment situation between T1 and T2, household social class, region that the family live in (urban/rural), PCG Quality of attachment score, and PCG depression score. Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A13: Coefficients of Linear Regression Model of Gross Motor Skill Development, 9 month cohort

	Child Characteristics	Family Structure	Family Employment	Child Care	Family SES	PCG Characteristics
Temperament Fussy	0.26***	0.26***	0.25***	0.25***	0.22***	0.21***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Temperament Dull	-1.42***	-1.34***	-1.34***	-1.33***	-1.31***	-1.29***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Male	0.94**	0.85**	0.87**	0.89**	0.92**	0.93**
Ref: Female	(0.31)	(0.31)	(0.31)	(0.31)	(0.31)	(0.31)
Very healthy at birth	3.01***	3.22***	3.22***	3.26***	3.23***	3.15***
Ref: less healthy at birth	(0.41)	(0.41)	(0.41)	(0.41)	(0.40)	(0.40)
Some health problems	-1.02*	-1.18**	-1.18**	-1.12**	-0.98*	-1.12**
Ref: No health problems	(0.42)	(0.41)	(0.41)	(0.41)	(0.41)	(0.41)
Health condition at 9 mths	-2.33***	-2.25***	-2.21***	-2.21***	-2.11***	-2.10***
Ref: No health condition	(0.38)	(0.38)	(0.38)	(0.38)	(0.37)	(0.37)
Infant was breastfed	5.66***	5.37***	5.50***	5.59***	4.37***	4.47***
Ref: Never breastfed	(0.32)	(0.32)	(0.32)	(0.33)	(0.34)	(0.34)
Lone parent family		1.57**	-0.35	-0.30	-2.29***	-2.46***
Ref: PCG lives with partner		(0.49)	(0.58)	(0.59)	(0.68)	(0.69)
Infant has siblings		-3.66***	-3.76***	-3.73***	-3.48***	-2.75***
Ref: Single child		(0.32)	(0.33)	(0.33)	(0.33)	(0.35)
Father in employment			-2.23***	-1.96***	1.34*	1.29*
Ref: Father other status			(0.57)	(0.58)	(0.63)	(0.63)
Infant in relative care				0.10	0.56	0.31
				(0.54)	(0.53)	(0.54)
Infant in non-relative care				-1.47**	-0.68	-0.61
				(0.57)	(0.57)	(0.57)
Infant in centre based care				-1.30*	-0.59	-0.50
Ref: Infant in full parental				(0.60)	(0.60)	(0.60)
White Irish					-5.10***	-4.93***
Ref: Other ethnic group					(0.42)	(0.42)
2nd highest income quartile					-0.51	-0.68
					(0.51)	(0.51)
Middle income quartile					0.63	0.32
					(0.55)	(0.56)
2nd lowest income quartile					1.09	0.69
					(0.60)	(0.60)
Lowest income quartile					2.94***	2.51***
					(0.64)	(0.64)

Household income unknown					0.46	0.23
Ref: Highest income quartile					(0.71)	(0.71)
Non manual/skilled manual					1.58***	1.31**
					(0.42)	(0.42)
Semi-skilled/unskilled manual					0.91	0.64
					(0.62)	(0.62)
Never worked					1.85*	1.38
Ref: Professional/managerial					(0.85)	(0.85)
Primary/Lower secondary household education					-4.50***	-4.69***
					(0.70)	(0.70)
Upper secondary hh education					-1.78***	-2.02***
					(0.54)	(0.54)
Third level hh education					-1.21**	-1.36***
Ref: HE Degree/Postgraduate					(0.40)	(0.40)
Infant lives in urban area					-0.95**	-0.93**
Ref: Infant lives in rural area					(0.32)	(0.32)
PCG under the age of 25						3.21***
						(0.64)
PCG aged 25-29						2.49***
						(0.46)
PCG aged 30-34						1.86***
Ref: PCG aged 35+						(0.38)
Constant	32.11***	33.91***	36.07***	35.96***	38.35***	36.86***
	(0.93)	(0.95)	(1.02)	(1.03)	(1.24)	(1.26)
N	10932	10932	10932	10932	10932	10932
R^2	0.085	0.098	0.101	0.102	0.124	0.128

Note: Model also includes variables relating to health status at nine months, PCG employment status at nine months, and household employment situation.
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A14: Coefficients of Logistic Regression Model of the Probability of Passing the Gross Motor Skill Test at Age 3

	Standing on One Leg	Pedal a Tricycle	Throw a Ball
Age took first steps	-0.02***	-0.02***	-0.01*
	(0.00)	(0.00)	(0.01)
Height	0.01***	0.01*	0.00
	(0.00)	(0.00)	(0.00)
Weight	0.02*	0.02*	0.01
	(0.01)	(0.01)	(0.02)
Vocabulary Score age 3	0.02***	0.00*	0.02***
	(0.00)	(0.00)	(0.00)
Picture Similarities Score age 3	0.02***	0.00**	0.01***
	(0.00)	(0.00)	(0.00)
Ongoing illness/disability	-0.25**	-0.09	-0.08
Ref: No such illness	(0.09)	(0.06)	(0.14)
Child has siblings	-0.11	-0.39**	-0.29
Ref: Single child family	(0.18)	(0.13)	(0.25)
Low Income Quartile	0.20	0.19*	
	(0.12)	(0.09)	
2nd Lowest Income Quartile	0.05	0.11	
	(0.11)	(0.08)	
Middle income quartile	0.00	-0.02	
	(0.10)	(0.07)	
2nd Highest Income Quartile	0.06	0.15*	
Ref: Highest Income Quartile	(0.10)	(0.07)	
Primary Education	-0.04	0.28**	-0.02
	(0.13)	(0.10)	(0.18)
Upper Secondary or Lower	0.12	0.00	0.12
	(0.11)	(0.07)	(0.16)
Third Level Education	0.02	0.04	0.22
Ref: Degree +	(0.08)	(0.05)	(0.12)
PCG Depression Scale		-0.02***	
		(0.01)	
Age of PCG	0.00	-0.02***	
	(0.01)	(0.00)	
PCG Parental Stress Scale	0.00	-0.03***	-0.01
	(0.01)	(0.01)	(0.01)
Constant	-1.27***	0.73*	0.53
	(0.38)	(0.29)	(0.41)
N	8972	8962	8972

Note: Model also includes variables relating to BMI at age three, family structure (parents), PCG employment situation, household employment situation and a variable indicating whether the family is in receipt of welfare payments. Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.000$

Table A15: Coefficients of Logistic Regression Model of the Probability of Passing the Gross Motor Skill Development Test (Standing on One Leg) by Age 3, Longitudinal Data

	Infant Characteristics	Early Childhood Characteristics	Family SES	PCG Characteristics
Male	-0.21**	-0.07	-0.06	-0.07
Ref: Female	(0.06)	(0.07)	(0.07)	(0.07)
Temperament Dull	-0.04**	-0.04*	-0.04*	-0.03*
	(0.01)	(0.01)	(0.01)	(0.01)
Very healthy at birth	0.32***	0.22*	0.22*	0.21*
Ref: Less healthy at birth	(0.08)	(0.09)	(0.09)	(0.09)
Passed Communication skills test	0.27*	0.13	0.14	0.14
Ref: Did not pass at 10 months	(0.11)	(0.13)	(0.13)	(0.13)
Passed Gross Motor skills test	0.17*	-0.07	-0.08	-0.07
Ref: Did not pass at 10 months	(0.08)	(0.10)	(0.10)	(0.10)
Passed Fine Motor skills test	0.30**	0.18	0.17	0.18
Ref: Did not pass at 10 months	(0.10)	(0.11)	(0.11)	(0.11)
Age took 1st steps		-0.06***	-0.06***	-0.06***
		(0.01)	(0.01)	(0.01)
BMI age 3		0.04***	0.04***	0.04***
		(0.01)	(0.01)	(0.01)
Cognitive Naming Vocabulary score		0.02***	0.02***	0.02***
		(0.00)	(0.00)	(0.00)
Cognitive Picture Similarities score		0.01***	0.01***	0.01***
		(0.00)	(0.00)	(0.00)
Ethnicity other than White Irish			0.26*	0.28*
Ref: White Irish			(0.12)	(0.12)
Constant	1.17***	-0.13	-0.29	-0.56
	(0.20)	(0.40)	(0.42)	(0.87)
N	8898	8363	8363	8332

Note: Model also includes variables relating to the temperament of the child (dull), health at birth, health at nine months, problem solving and personal/social skills at ten months, child health at age three, total strength and difficulties score at age three, changes in child care arrangements between T1 and T2, family structure (parents), household employment situation, PCG and SCG employment status, household income, PCG education levels, PCG age, PCG quality of attachment score and PCG depression score. Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A16: Coefficients of Logistic Regression Model of the Probability of Passing the Gross Motor Skill Development Test (Pedal a Tricycle) by Age 3, Longitudinal Data

	Infant Characteristics	Early Childhood Characteristics	Family Structure	Family Employment	Family SES
Birth Weight	0.07***	0.08***	0.08***	0.08***	0.08***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Infant was breastfed	-0.19***	-0.24***	-0.22***	-0.13*	-0.11*
Ref: Never breastfed	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Very Healthy at Birth	0.17**	0.11	0.10	0.09	0.08
Ref: Less healthy at birth	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Temperament Unpredictable	-0.03***	-0.03**	-0.02*	-0.02*	-0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Communication score at 9 months	0.15*	0.08	0.09	0.06	0.05
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Gross Motor score at 9 months	0.31***	0.30***	0.31***	0.32***	0.31***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Problem Solving score at 9 months	0.15**	0.11*	0.11*	0.11*	0.11*
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Personal/Social score at 9 months	0.13*	0.13*	0.15**	0.15**	0.15**
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)
Age took first steps		-0.02***	-0.02***	-0.02***	-0.02***
		(0.00)	(0.00)	(0.00)	(0.00)
Total SDQ Score age three		-0.03***	-0.03***	-0.03***	-0.03***
		(0.01)	(0.01)	(0.01)	(0.01)
Siblings at nine months			0.19***	0.17**	0.24***
Ref: single child			(0.05)	(0.05)	(0.06)
PCG Upper Secondary				-0.41***	-0.43***
				(0.10)	(0.10)
PCG Third Level				-0.30**	-0.30**
				(0.10)	(0.10)
PCG Higher Education				-0.36***	-0.34***
Ref: PCG lower levels of education				(0.10)	(0.10)
Non/Skilled Manual				0.11	0.09
				(0.06)	(0.06)
Semi-Unskilled Manual				0.04	0.02
				(0.10)	(0.10)
Never Worked				0.22*	0.15
Ref: Professional/Managerial				(0.10)	(0.10)

Lives in an urban area				-0.24***	-0.23***
				(0.05)	(0.05)
PCG Age					-0.11***
					(0.03)
Constant	-0.11	-0.04	-0.21	0.15	-0.09
	(0.22)	(0.29)	(0.30)	(0.31)	(0.62)
N	8713	8190	8190	8190	8157

Note: Model also contains variables relating to health status at nine months, infant temperament (unadaptive, dull), fine motor skill development scores at nine months, BMI at age three, cognitive scores at age three, health status at age three, household health cover, changes in household income between T1 and T2, PCG quality of attachment score, and PCG parental stress score.
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A17: Coefficients of Logistic Regression Model of the Probability of Passing the Gross Motor Skill Development Test (Throw a Ball) by Age 3, Longitudinal Data

	Infant Characteristics	Early Childhood Characteristics	Family SES	PCG Characteristics
Very Healthy at birth	0.27*	0.26*	0.24	0.23
Ref: Less healthy at birth	(0.11)	(0.11)	(0.13)	(0.13)
Health Condition in infancy	-0.21*	-0.22*	-0.15	-0.15
Ref: No such condition	(0.10)	(0.10)	(0.12)	(0.12)
Passed Communication skill tests	0.36*	0.38*	0.25	0.25
Ref: Did not pass at 10 months	(0.15)	(0.16)	(0.18)	(0.18)
Passed Fine Motor skill test	0.30*	0.29*	0.23	0.23
Ref: Did not pass at 10 months	(0.14)	(0.14)	(0.16)	(0.16)
Passed Personal/Social skill test	0.30**	0.29*	0.23	0.24
Ref: Did not pass at 10 months	(0.11)	(0.11)	(0.13)	(0.13)
Relative care at 9 months	0.07	-0.06	-0.01	-0.02
	(0.13)	(0.15)	(0.15)	(0.16)
Non relative care	0.29	0.17	0.24	0.25
	(0.15)	(0.17)	(0.17)	(0.17)
Centre based care	0.78***	0.54**	0.62**	0.64**
Ref: Full parental care	(0.19)	(0.21)	(0.21)	(0.21)
Age took 1st steps		-0.05**	-0.05**	-0.05**
		(0.02)	(0.02)	(0.02)
BMI Age 3		0.04***	0.04***	0.04***
		(0.01)	(0.01)	(0.01)
Cognitive Test Score Naming Vocabulary		0.01***	0.01***	0.01***
		(0.00)	(0.00)	(0.00)
Cognitive Test Score Picture Similarities		0.01**	0.01**	0.01**
		(0.00)	(0.00)	(0.00)
PCG F/T Employment at 9 months			-0.31*	-0.31*
			(0.15)	(0.15)
PCG P/T Employment at 9 months			-0.29	-0.29
Ref: PCG other status			(0.17)	(0.17)
Constant	1.35**	1.27**	0.64	0.88
	(0.43)	(0.44)	(0.68)	(0.71)
N	8805	8805	8275	8275

Note: Model also includes variables relating to the birth weight of the infant, infant temperament (unadaptive, dull, unpredictable), gross motor skill, and problem-solving scores at ten months, total strength and difficulties score at age three, health status at age three, changes in childcare arrangements, family structure (parents), family health cover, SCG employment status, household employment situation, PCG age, and PCG quality of attachment score.
Standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A18: Coefficients from Linear Regression Model of Fine Motor Skill Development at 10 months, 9 month cohort

	Child Character	Family Structure	Household Employment	Family SES	PCG Characteristics
Temperament Unadaptive	-0.16***	-0.13***	-0.13**	-0.12**	-0.11**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Temperament Dull	-0.62***	-0.61***	-0.61***	-0.62***	-0.62***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Temperament Unpredictable	-0.26***	-0.29***	-0.29***	-0.29***	-0.26***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Male	-1.34***	-1.39***	-1.38***	-1.39***	-1.40***
Ref: Female	(0.28)	(0.28)	(0.28)	(0.28)	(0.28)
Very healthy birth	2.44***	2.51***	2.50***	2.51***	2.54***
Ref: some health	(0.36)	(0.36)	(0.36)	(0.36)	(0.36)
Very healthy 9 months	1.48***	1.42***	1.42***	1.42***	1.35***
Ref: some health	(0.39)	(0.39)	(0.39)	(0.39)	(0.39)
Listed health condition	-0.85*	-0.83*	-0.82*	-0.82*	-0.82*
Ref: no health cond	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)
Breastfed	1.85***	1.41***	1.42***	1.02***	0.92**
Ref: Never breastfed	(0.28)	(0.29)	(0.29)	(0.31)	(0.31)
Lone Parent		-2.10***	-2.05***	-1.99**	-1.68*
Ref: Two parents present		(0.43)	(0.57)	(0.64)	(0.66)
Infant has siblings		-2.08***	-2.05***	-1.89***	-2.34***
Ref: lone child		(0.29)	(0.29)	(0.30)	(0.32)
PCG F/T employment			1.77**	1.34	1.28
			(0.67)	(0.73)	(0.75)
PCG P/T employment			1.90**	1.65*	1.57*
Ref: PCG other status			(0.68)	(0.73)	(0.75)
SCG in employment			-0.19	-0.64	-0.60
Ref: SCG other status			(0.46)	(0.53)	(0.54)
Working out households			-1.59*	-1.44*	-1.31
Ref: Other			(0.71)	(0.73)	(0.74)
Primary/Lower Secondary				-2.70***	-2.64***
				(0.63)	(0.64)
Upper Secondary				-1.43**	-1.17*
				(0.48)	(0.49)
Third Level				-0.40	-0.27
Ref: Degree or Higher				(0.36)	(0.36)

PCG Under 25					-2.27***
					(0.58)
PCG 25-39					-0.11
					(0.42)
PCG 30-34					0.61
Ref: PCG 35+					(0.34)
Constant	44.51***	45.98***	45.84***	47.34***	47.10***
	(0.85)	(0.86)	(0.94)	(1.07)	(3.26)
N	10633	10633	10633	10633	10391
R^2	0.035	0.042	0.043	0.046	0.049

Note: Model also includes temperament (fussy), health problem at nine months, child care arrangement at nine months, ethnicity, household income, household social class, region, PCG Quality of Attachment Score, PCG Depression Score and PCG Parental Stress Scale, Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A19: Coefficients from Logistic Regression Model of the Probability of Passing the Jigsaw Fine Motor Skill Development Test at Age 3, 3 year cohort

	Type of Childcare Arrangement	Duration of Childcare	Number of Arrangements
Vocabulary Score at age 3	0.02***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)
Picture Similarities score at age 3	0.02***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)
3 year old in Relative Care	0.40		
	(0.24)		
3 year old in Non-relative Care	-0.04		
	(0.22)		
3 year old in Centre Based Care	0.50**		
Ref: Parental Care	(0.16)		
8-15 Hours of childcare per week		0.45*	
		(0.19)	
15-30 Hours of childcare per week		0.32	
		(0.18)	
30+ Hours of childcare per week		0.32	
Ref: Parental Care		(0.24)	
Multiple Childcare Arrangements			1.00**
			(0.38)
Single Childcare Arrangement			0.33*
Ref: Parental Care			(0.14)
Low Income Quartile	-0.54*	-0.55*	-0.54*
	(0.23)	(0.23)	(0.23)
2nd Lowest Income Quartile	-0.59**	-0.61**	-0.59**
	(0.22)	(0.22)	(0.22)
Middle income quartile	-0.49*	-0.51*	-0.50*
	(0.21)	(0.21)	(0.21)
2nd Highest Income Quartile	-0.14	-0.16	-0.16
Ref: Highest Income Quartile	(0.23)	(0.23)	(0.23)
Welfare Household	0.32*	0.33*	0.33*
	(0.14)	(0.14)	(0.14)
PCG Depression Scale	-0.03*	-0.03*	-0.03*
	(0.01)	(0.01)	(0.01)
Constant	1.21*	1.23*	1.19*
	(0.60)	(0.60)	(0.60)
N	8962	8962	8962

Note: Model also includes Age took first steps, illness/disability at age three, lone parent, household social class, PCG education, PCG employment situation, Household employment situation, Age of PCG and PCG Parental Stress Scale. Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A20: Coefficients from Logistic Regression of Probability of Passing the Vertical Line Fine Motor Skill Development Test at Age 3, 3 year cohort

	Includes Type of Childcare Setting	Includes Number of Childcare Arrangements
BMI at age 3	0.04***	0.04***
	(0.01)	(0.01)
Vocabulary Score at age 3	0.02***	0.02***
	(0.00)	(0.00)
Picture Similarities Score at age 3	0.03***	0.03***
	(0.00)	(0.00)
Managerial	-0.12	-0.13
	(0.14)	(0.14)
Non Manual	-0.15	-0.17
	(0.17)	(0.17)
Skilled Manual	-0.35	-0.36*
	(0.18)	(0.18)
Semi-Unskilled Manual	-0.11	-0.13
	(0.20)	(0.20)
Never Worked	-0.48	-0.48
Ref: Professional	(0.26)	(0.26)
PCG Not in Employment	-0.39*	-0.35*
	(0.17)	(0.17)
PCG Works 15+ Hours per week	0.06	0.09
Ref: PCH Works <15 hours	(0.21)	(0.21)
PCG Parental Stress Scale	-0.04***	-0.04***
	(0.01)	(0.01)
Constant	0.25	0.20
	(0.49)	(0.49)
N	8962	8962

Note: Model also includes age took first steps, illness/disability at age three, childcare arrangements, family structure (parent), household income, PCG education, Household employment situation, Welfare recipient, Age of PCG and PCG Parental Stress Scale. Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A21: Coefficients from Logistic Regression of Probability of Passing the Pincer Grip Fine Motor Skill Development Test at Age 3, 3 year cohort

	Type of Childcare Setting	Duration in Childcare	Number of Childcare Settings
Weight	-0.03**	-0.03**	-0.04**
	(0.01)	(0.01)	(0.01)
Vocabulary Score at age 3	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)
Picture Similarities Score at age 3	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)
Ongoing illness/disability at age 3	-0.06	-0.06	-0.06
Ref: No such illness/disability	(0.06)	(0.06)	(0.06)
3 year old in relative childcare	-0.01		
	(0.08)		
3 year old in non-relative childcare	-0.04		
	(0.07)		
3 year old in centre based care	0.19***		
Ref: Parental Care	(0.05)		
8-15 Hours in childcare per week		0.10	
		(0.07)	
15-30 Hours in childcare per week		0.04	
		(0.06)	
30+ Hours in childcare per week		0.23**	
Ref: Parental Care		(0.07)	
Multiple Childcare Arrangements			0.05
			(0.09)
Single Arrangement			0.11*
Ref: Parental Care			(0.05)
PCG Parental Stress Score	-0.02***	-0.02***	-0.02***
	(0.01)	(0.01)	(0.01)
Constant	-0.69**	-0.69**	-0.70**
	(0.22)	(0.22)	(0.22)
N	8962	8962	8962

Note: Model also includes variables relating to age at which the infant took their first steps, the height of the child at age three, the BMI of the child at age three, family structure (parents), family employment situation, and PCG depression score. Standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A22: Coefficients of Logistic Regression Model of the Probability of Passing the Fine Motor Skill Development Test (Jigsaw) by Age 3, Longitudinal Data

	Infant Characteristics	Early Childhood Characteristics	Family Structure	Family SES	PCG Characteristics
Infant was breastfed	0.33**	0.35**	0.23	0.23	0.23
Ref: Never breastfed	(0.11)	(0.12)	(0.12)	(0.13)	(0.14)
Temperament Fussy	-0.03**	-0.01	-0.00	-0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Temperament Dull	-0.05*	-0.04	-0.04	-0.04	-0.05*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Passed communication test	0.36*	0.22	0.26	0.31	0.30
Ref: Did not pass at 10 months	(0.18)	(0.21)	(0.21)	(0.21)	(0.22)
Passed Personal/Social test	0.61***	0.46***	0.47***	0.47***	0.48***
Ref: Did not pass at 10 months	(0.12)	(0.14)	(0.14)	(0.14)	(0.14)
Relative care in infancy	0.46**	0.24	0.07	0.04	0.07
	(0.16)	(0.18)	(0.21)	(0.21)	(0.22)
Non relative care in infancy	0.64***	0.44*	0.17	0.04	0.00
	(0.19)	(0.21)	(0.24)	(0.25)	(0.25)
Centre based care in infancy	1.24***	1.07***	0.75*	0.62*	0.59
Ref: Parental Care	(0.26)	(0.28)	(0.31)	(0.31)	(0.31)
BMI Age Three		-0.03	-0.03	-0.03	-0.04*
		(0.02)	(0.02)	(0.02)	(0.02)
Naming Vocabulary score age 3		0.02***	0.02***	0.01***	0.01**
		(0.00)	(0.00)	(0.00)	(0.00)
Picture similarities score age 3		0.02***	0.02***	0.02***	0.02***
		(0.00)	(0.00)	(0.00)	(0.00)
Total SDQ score age 3		-0.07***	-0.07***	-0.06***	-0.06***
		(0.01)	(0.01)	(0.01)	(0.01)
No Change of care setting		-0.36**	-0.25	-0.21	-0.21
Ref: Changed care setting since baby		(0.13)	(0.13)	(0.14)	(0.14)
Child had siblings at 9 months			-0.29*	-0.25	-0.29*
Ref: No siblings			(0.14)	(0.14)	(0.15)
SCG In Employment at 9 months			0.57*	0.27	0.27
			(0.25)	(0.26)	(0.26)
SCG Status Unknown at 9 months			0.37	0.10	0.16
Ref: SCG Other			(0.24)	(0.25)	(0.26)
PCG in Employment at age 3			0.55***	0.44**	0.40**
Ref: PCG other status			(0.15)	(0.15)	(0.16)
Ethnicity other than Irish				-0.45*	-0.43*
Ref: White Irish				(0.18)	(0.19)

Low Household Income				-0.10	-0.08
				(0.15)	(0.15)
High Household Income				0.41*	0.39*
Ref: Middle income family				(0.19)	(0.19)
PCG Quality of Attachment Score					-0.06*
					(0.03)
Constant	2.93**	1.45	1.51	2.20	4.73**
	(1.08)	(1.26)	(1.29)	(1.33)	(1.80)
N	8699	8179	8179	8179	8099

Note: Model also includes weight at birth, temperament (unadaptive, unpredictable), communication, gross motor skill, problem solving skill developments at nine months, age took 1st steps, BMI at age three, illness at age three, PCG employment status at nine months, family structure (siblings, parents), Household employment situation, household social class, PCG education, PCG age, PCG Depression score. Standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A23: Coefficients from Logistic Regression Model of the Probability of Passing the Fine Motor Skill Development Test (Vertical Line) by Age 3, Longitudinal Data

	Infant Characteristics	Early Childhood Characteristics	Family Structure	Family SES	PCG Characteristics
Male	-0.60***	-0.60***	-0.50***	-0.50***	-0.50***
Ref: Female	(0.08)	(0.08)	(0.09)	(0.10)	(0.10)
Very Healthy at Birth	0.22*	0.21*	0.10	0.11	0.10
Ref: Less healthy at birth	(0.10)	(0.10)	(0.11)	(0.11)	(0.11)
Child was breastfed	0.23**	0.20*	0.30***	0.30**	0.29**
Ref: Never breastfed	(0.08)	(0.08)	(0.09)	(0.10)	(0.10)
Passed communication test	0.42**	0.46***	0.30	0.31	0.30
Ref: Did not pass	(0.13)	(0.13)	(0.16)	(0.16)	(0.16)
Passed Personal/Social Skill test	0.34***	0.32***	0.21	0.20	0.20
Ref: Did not pass	(0.10)	(0.10)	(0.11)	(0.11)	(0.11)
Infant in relative care at 9 months	0.13	0.01	-0.08	-0.07	0.13
	(0.11)	(0.13)	(0.16)	(0.16)	(0.11)
Infant in non relative care at 9 months	0.28*	0.10	0.04	0.05	0.28*
	(0.13)	(0.14)	(0.17)	(0.17)	(0.13)
Infant in centre based care at 9 months	0.73***	0.38*	0.34	0.36	0.73***
Ref: Infant in full parental care	(0.15)	(0.17)	(0.19)	(0.19)	(0.15)
No change in care setting T1 & T2		-0.29***	-0.27**	-0.25**	-0.26**
Ref: Change in type of care setting		(0.08)	(0.10)	(0.10)	(0.10)
BMI Age 3		0.04***	0.04***	0.04***	0.04***
		(0.01)	(0.01)	(0.01)	(0.01)
Naming Vocabulary Score Age 3		0.01***	0.01***	0.01***	0.01***
		(0.00)	(0.00)	(0.00)	(0.00)
Picture Similarities Score Age 3		0.03***	0.03***	0.03***	0.03***
		(0.00)	(0.00)	(0.00)	(0.00)
Total SDQ Age 3		-0.04***	-0.04***	-0.04***	-0.04***
		(0.01)	(0.01)	(0.01)	(0.01)
Constant	1.84***	-0.82*	-0.84*	-0.44	-1.98*
	(0.20)	(0.40)	(0.40)	(0.46)	(0.98)
N	8794	8268	8268	8268	8181

Note: Model also includes health status and presence of health condition at nine months, temperament (fussy, unadaptive), Gross motor skill development at ten months, Age took 1st steps, Health status at age three, family structure (parental), PCG employment status, Household employment situation, Household social class, Household income, PCG education, PCG age, PCG Quality of Attachment Score, PCG Depression Score. Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A24: Coefficients from Logistic Regression Model of the Probability of Passing the Fine Motor Skill Development Test (Pincer Grip) by Age 3, Longitudinal Data

	Infant Characteristics	Early Childhood Characteristics	Family Structure	Family SES
Male	-0.84***	-0.81***	-0.81***	-0.81***
Ref: Female	(0.05)	(0.05)	(0.05)	(0.05)
Very healthy at birth	0.13*	0.07	0.06	0.06
Ref: Some health problems	(0.06)	(0.06)	(0.06)	(0.06)
Passed Fine Motor Skill Test	0.17*	0.13	0.12	0.13
Ref: Did not pass at 10 months	(0.08)	(0.08)	(0.08)	(0.08)
Passed Personal/Social Test	0.18**	0.12	0.12	0.12
Ref: Did not pass at 10 months	(0.07)	(0.07)	(0.07)	(0.07)
Cognitive Test Score		0.00	0.00*	0.00*
Naming Vocabulary		(0.00)	(0.00)	(0.00)
Cognitive Test Score		0.01***	0.01***	0.01***
Picture Similarities		(0.00)	(0.00)	(0.00)
Total SDQ Score		-0.02***	-0.02***	-0.02***
		(0.01)	(0.01)	(0.01)
Non/Manual Skilled				0.14**
				(0.05)
Semi-Unskilled Manual				-0.07
				(0.09)
Never Worked				0.22**
Ref: Professional/Managerial				(0.08)
Constant	0.22	-0.11	-0.19	-0.26
	(0.20)	(0.25)	(0.25)	(0.25)
N	8829	8298	8298	8298

Note: Model also includes infant birth weight, health condition at nine months, temperament at nine months (dull), communication, problem solving at ten months, BMI at age three, illness at age three, changes in childcare arrangements by age three. Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A25: Coefficients from Linear Regression Model of Total Strengths and Difficulties Scores at Age 3, 3 year old cohort

	Model includes Type of Childcare Setting	Model includes Duration of Childcare	Model includes Number of Childcare Settings
Vocabulary Score at age 3	-0.02***	-0.02***	-0.02***
	(0.00)	(0.00)	(0.00)
Picture Similarities at age 3	-0.02***	-0.02***	-0.02***
	(0.00)	(0.00)	(0.00)
Ongoing Illness/Disability age 3	0.82***	0.81***	0.81***
Ref: No such illness/disability	(0.12)	(0.12)	(0.12)
Fine Motor Jigsaw Test	-1.34***	-1.35***	-1.35***
	(0.22)	(0.22)	(0.22)
Fine Motor Vertical line test	-0.44*	-0.44*	-0.45**
	(0.17)	(0.17)	(0.17)
Fine Motor 3 Pincer grip test	-0.27**	-0.27**	-0.27**
	(0.09)	(0.09)	(0.09)
Managerial	0.16	0.17	0.17
	(0.12)	(0.12)	(0.12)
Non Manual	0.19	0.21	0.21
	(0.15)	(0.15)	(0.15)
Skilled Manual	0.21	0.23	0.23
	(0.17)	(0.17)	(0.17)
Semi-Unskilled Manual	0.55**	0.56**	0.56**
	(0.19)	(0.19)	(0.19)
Never Worked	0.12	0.12	0.13
Ref: Professional	(0.26)	(0.26)	(0.26)
Low Income Quartile	0.04	0.04	0.05
	(0.16)	(0.16)	(0.16)
2nd Lowest Income Quartile	0.23	0.23	0.25
	(0.15)	(0.15)	(0.15)
Middle income quartile	0.34*	0.35*	0.36**
	(0.13)	(0.13)	(0.13)
2nd Highest Income Quartile	-0.04	-0.03	-0.03
Ref: Highest Income Quartile	(0.13)	(0.13)	(0.12)
Primary Education	1.19***	1.19***	1.19***
	(0.18)	(0.18)	(0.18)
Upper Secondary or Lower	0.60***	0.61***	0.61***
	(0.14)	(0.14)	(0.14)
Third Level Education	0.44***	0.45***	0.44***
Ref: Degree +	(0.10)	(0.10)	(0.10)

PCG Not in Employment	-0.51***	-0.56***	-0.53***
	(0.15)	(0.15)	(0.15)
PCG Works 15+ Hours per week	0.09	0.05	0.09
Ref: PCH Works >15 hours	(0.19)	(0.19)	(0.19)
All Parents Working Out	-0.44**	-0.42**	-0.43**
Ref: Other	(0.14)	(0.14)	(0.14)
Welfare Household	0.49***	0.48***	0.49***
	(0.11)	(0.11)	(0.11)
Age of PCG	-0.09***	-0.09***	-0.09***
	(0.01)	(0.01)	(0.01)
PCG Depression Score	0.13***	0.13***	0.13***
	(0.01)	(0.01)	(0.01)
PCG Parental Stress Score	0.35***	0.35***	0.35***
	(0.01)	(0.01)	(0.01)
Constant	10.08***	10.16***	10.12***
	(0.57)	(0.57)	(0.57)
N	8964	8964	8964

Model also includes variables relating to weight and BMI at age three, gross motor skill development at age three (standing on one leg, throwing a ball), family structure (parents, siblings), and childcare arrangement at age three. Standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A26: Coefficients of Linear Regression Model of Strengths and Difficulties Scores at Age 3, Longitudinal Data

	Infant	Child	Family Structure	Family SES	PCG Characteristics
Male	0.75***	0.36***	0.35***	0.39***	0.37***
Ref: Female	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Child was breastfed	-0.52***	-0.48***	-0.45***	-0.15	-0.09
Ref: Never breastfed	(0.09)	(0.09)	(0.09)	(0.10)	(0.10)
Very healthy at birth	-0.31**	-0.10	-0.05	-0.06	0.00
Ref: Less healthy at birth	(0.12)	(0.12)	(0.12)	(0.11)	(0.11)
Less healthy at 9 months	0.59***	0.34**	0.37**	0.38**	0.19
Ref: Very healthy	(0.13)	(0.13)	(0.13)	(0.12)	(0.12)
Health problem at 9 months	0.31**	0.23	0.18	0.13	0.09
Ref: no health problems	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Temperament Fussy	0.15***	0.14***	0.14***	0.14***	0.09***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Temperament Un-adaptive	0.08***	0.07***	0.07***	0.07***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Temperament Unpredictable	0.14***	0.15***	0.13***	0.13***	0.09***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Personal/social development test	-0.38***	-0.13	-0.26**	-0.30**	-0.26**
Ref; Did not pass milestone	(0.10)	(0.10)	(0.10)	(0.10)	(0.09)
Relative care at 9 months	0.05	0.34**	0.16	0.31*	0.17
	(0.13)	(0.12)	(0.12)	(0.13)	(0.13)
Non relative care at 9 months	-0.68***	-0.40**	-0.36**	-0.05	-0.09
	(0.14)	(0.13)	(0.13)	(0.14)	(0.14)
Centre based care	-0.87***	-0.44**	-0.47***	-0.11	-0.23
Ref: Parental care	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
Ongoing illness age 3		0.41**	0.38**	0.37**	0.34*
Ref: no such illness		(0.14)	(0.14)	(0.14)	(0.14)
Very healthy age 3		-1.02***	-0.95***	-0.97***	-0.91***
Ref: less healthy at age 3		(0.12)	(0.12)	(0.11)	(0.11)
Naming vocabulary score		-0.02***	-0.02***	-0.02***	-0.02***
		(0.00)	(0.00)	(0.00)	(0.00)
Picture similarities score		-0.02***	-0.02***	-0.02***	-0.02***
		(0.00)	(0.00)	(0.00)	(0.00)
Fine Motor Jigsaw Test		-1.50***	-1.47***	-1.29***	-1.29***
Ref: Did not pass the test		(0.23)	(0.23)	(0.23)	(0.23)
Fine Motor Vertical line test		-0.68***	-0.69***	-0.65***	-0.58***

Ref: Did not pass the test		(0.18)	(0.18)	(0.18)	(0.18)
Fine Motor Pincer grip test		-0.27**	-0.27**	-0.29**	-0.28**
Ref: Did not pass the test		(0.09)	(0.09)	(0.09)	(0.09)
Lone parent family			1.27***	0.64***	0.14
Ref: PCG lives with partner			(0.14)	(0.19)	(0.19)
Infant has siblings			-0.73***	-0.83***	-0.64***
Ref: single child			(0.09)	(0.09)	(0.10)
Eth				0.29*	0.17
				(0.14)	(0.14)
Non manual/skilled				0.49***	0.45***
				(0.11)	(0.11)
Semi-unskilled				0.67***	0.60***
				(0.18)	(0.18)
Never worked				0.79***	0.59**
Ref: Prof/Managerial				(0.22)	(0.22)
PCG Upper Second				-0.54**	-0.60***
				(0.17)	(0.17)
PCG Third Level				-0.74***	-0.74***
				(0.16)	(0.16)
PCG HE				-1.24***	-1.18***
Ref: PCG Lower Level of Educ				(0.18)	(0.18)
PCG Age					-0.38***
					(0.05)
PCG Quality of attachment score					-0.12***
					(0.02)
PCG Depression Score					0.07***
					(0.01)
PCG Parental Stress					0.08***
					(0.01)
Constant	4.08***	10.25***	10.47***	10.49***	14.92***
	(0.24)	(0.47)	(0.48)	(0.50)	(1.10)
N	9458	8878	8878	8878	8752
R^2	0.096	0.140	0.156	0.170	0.205

Note: Model also contains variables relating to the presence of a health condition at nine months, BMI at age three, Gross motor skill development at age three (stand on one leg, throw a ball), ethnicity, household income and region. Standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A27: Coefficients of Linear Regression Model of Total Piers Harris Score, 9 year cohort

	Child Characteristics	Family Structure	Family SES	PCG Characteristics	Socio-Emotional
Birth Weight	0.44**	0.41**	0.37*	0.28	0.19
	(0.15)	(0.15)	(0.15)	(0.16)	(0.16)
Chronic Illness age 9	1.98***	1.98***	1.90***	2.00***	2.17***
Ref: No chronic illness	(0.39)	(0.39)	(0.39)	(0.41)	(0.40)
Special Educational Need	-2.97***	-2.94***	-2.82***	-2.69***	-1.92***
Ref: SEN	(0.26)	(0.26)	(0.26)	(0.28)	(0.27)
Child is Underweight	-0.82**	-0.84**	-0.82**	-0.82**	-0.43
	(0.31)	(0.31)	(0.31)	(0.32)	(0.31)
Child is Overweight	-1.36***	-1.33***	-1.23***	-1.16***	-0.71**
Ref: Appropriate weight	(0.26)	(0.26)	(0.26)	(0.28)	(0.27)
Child traumatic event	-0.83***	-0.72**	-0.76***	-0.66**	-0.37
Ref: No such event	(0.22)	(0.22)	(0.22)	(0.23)	(0.23)
Lone Parent family		-0.95**	-0.37	-0.25	0.02
Ref: PCG lives with partner		(0.30)	(0.33)	(0.36)	(0.35)
Non Manual/Skilled Manual			-0.62**	-0.60*	-0.53*
			(0.23)	(0.24)	(0.23)
Semi/Unskilled Manual			-1.28***	-1.35***	-1.26**
			(0.37)	(0.40)	(0.39)
No Social Class			-0.39	-0.42	-0.35
Ref: Professional/Managerial			(0.70)	(0.77)	(0.75)
High HH Income			-0.02	-0.02	-0.11
			(0.26)	(0.27)	(0.26)
Low HH Income			-0.80**	-0.71*	-0.64*
			(0.29)	(0.30)	(0.29)
Household Income Unknown			0.35	0.27	0.24
Ref: Middle Income Family			(0.41)	(0.43)	(0.42)
PCG Depression Score				-0.17***	-0.05
				(0.03)	(0.03)
SDQ Total Score					-0.37***
					(0.02)
Child Conflict Score					-0.03*
					(0.01)
Measure of childhood isolation					0.17**
					(0.05)
Constant	46.71***	46.81***	47.32***	47.89***	49.69***
	(0.61)	(0.61)	(0.81)	(0.87)	(0.96)
N	7867	7867	7867	7256	7225
R^2	0.025	0.026	0.035	0.038	0.087

Note: Model also includes variables relating to health status at age 9, Out-of-school childcare arrangement, Household employment situation, PCG education level, PCG health. Standard errors in parentheses* $p <$ 0.05, ** $p < 0.01$, *** $p < 0.001$

Table A28: Coefficients of Linear Regression Model of Total SDQ Score, 9 year cohort

	Child Characteristics	Family Structure	Household Emp	Out-of-school Care	Family SES	PCG Characteristics
Male	0.46***	0.47***	0.48***	0.48***	0.52***	0.49***
Ref: Female	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
MMB1	-0.37***	-0.32***	-0.29***	-0.29***	-0.27**	-0.19*
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)
Child was breastfed	-0.91***	-0.84***	-0.79***	-0.77***	-0.45***	-0.46***
Ref: Never breastfed	(0.10)	(0.10)	(0.10)	(0.10)	(0.11)	(0.11)
Very healthy at age 3	-1.20***	-1.17***	-1.15***	-1.14***	-1.10***	-0.83***
Ref: Less healthy	(0.13)	(0.12)	(0.12)	(0.12)	(0.12)	(0.13)
Special educational need	2.35***	2.30***	2.25***	2.24***	2.18***	2.12***
Ref: No SEN	(0.15)	(0.15)	(0.15)	(0.15)	(0.14)	(0.15)
Child is underweight	1.11***	1.16***	1.15***	1.15***	1.15***	0.99***
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
Child is overweight	1.32***	1.28***	1.27***	1.27***	1.20***	1.09***
Ref: Appropriate weight	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Traumatic life event	1.05***	0.86***	0.84***	0.83***	0.87***	0.66***
Ref: No such event	(0.12)	(0.13)	(0.12)	(0.12)	(0.12)	(0.13)
Lone parent family		1.55***	1.31***	1.28***	1.00***	0.61**
Ref: PCG lives with partner		(0.17)	(0.18)	(0.18)	(0.20)	(0.20)
Child has siblings		-0.22	-0.28	-0.25	-0.24	-0.40*
Ref: Single child		(0.17)	(0.17)	(0.18)	(0.17)	(0.18)
Household with work			-0.73**	-0.74**	-0.48*	-0.45
Ref: Jobless household			(0.23)	(0.24)	(0.24)	(0.24)
Working out household			-0.99***	-1.00***	-0.77**	-0.43
Ref: Parent at home			(0.21)	(0.21)	(0.27)	(0.29)
Relative afterschool care				0.21	0.18	0.13
				(0.18)	(0.18)	(0.18)
Non relative afterschool care				-0.25	-0.08	-0.07
				(0.18)	(0.18)	(0.18)
Centre based afterschool care				0.61*	0.80**	0.92**
Ref: Parental afterschool care				(0.28)	(0.28)	(0.29)
Skilled Manual/Non manual					0.27*	0.27*
					(0.13)	(0.13)
Semi-unskilled manual					0.42*	0.17
					(0.21)	(0.21)
No class position					0.30	0.33
Ref: Professional/managerial					(0.38)	(0.41)

Primary/Secondary					0.93***	0.89***
					(0.14)	(0.14)
Third Level					0.69***	0.66***
Ref: Higher Education level					(0.14)	(0.14)
PCG Depression score						0.28***
						(0.02)
PCG Health						1.03***
						(0.23)
Constant	8.02***	7.99***	9.56***	9.51***	8.21***	7.20***
	(0.34)	(0.37)	(0.50)	(0.50)	(0.56)	(0.58)
N	8403	8403	8403	8403	8403	7731
R^2	0.114	0.124	0.130	0.131	0.141	0.175

Note: Model also includes variables relating to the presence of a chronic illness when the child was age 9, PCG employment status, and household income. Standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A29: Coefficients of Linear Regression Model of Communication Scores at Ten Months, 9 Month Data

	(1) Child Character	(2) Family Structure	(3) Household Employment	(4) Child Care	(5) Family SES	(6) PCG Characteristics
Temperament Fussy	-0.06*	-0.06*	-0.06*	-0.06*	-0.06*	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Temperament Unadaptive	0.06*	0.07*	0.07*	0.06	0.05	0.05
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Temperament Dull	-0.83***	-0.80***	-0.79***	-0.78***	-0.76***	-0.74***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Temperament Unpredictable	-0.24***	-0.26***	-0.26***	-0.26***	-0.26***	-0.21***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Male	-1.88***	-1.90***	-1.89***	-1.88***	-1.86***	-1.87***
Ref: Female	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)
Very healthy birth	-2.72***	-2.80***	-2.79***	-2.84***	-2.81***	-2.72***
Ref: some health	(0.28)	(0.28)	(0.28)	(0.28)	(0.28)	(0.28)
Very healthy 9 months	-0.79**	-0.78**	-0.75*	-0.63*	-0.65*	-0.62*
Ref: some health	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)
General Health Problem	1.03***	0.94***	0.91**	0.98***	0.97***	0.83**
Ref: No general health problem	(0.28)	(0.28)	(0.28)	(0.28)	(0.28)	(0.29)
Listed health condition	-0.83**	-0.79**	-0.75**	-0.76**	-0.74**	-0.68**
Ref: No listed health condition	(0.26)	(0.26)	(0.26)	(0.26)	(0.26)	(0.26)
Breastfed	-1.08***	-1.06***	-0.95***	-0.82***	-0.49*	-0.46
Ref: Never breastfed	(0.22)	(0.22)	(0.22)	(0.22)	(0.24)	(0.24)
Lone Parent		1.59***	0.16	0.10	-0.39	-0.34
Ref: Two parents present		(0.33)	(0.44)	(0.44)	(0.49)	(0.50)
Infant has siblings		-1.22***	-1.26***	-1.18***	-1.23***	-0.91***
Ref: lone child		(0.22)	(0.22)	(0.22)	(0.22)	(0.24)
SCG in employment			-1.89***	-1.85***	-1.02*	-0.98*
Ref: SCG other econ status			(0.35)	(0.35)	(0.40)	(0.41)
Care of a relative				0.82*	0.82*	0.67
				(0.37)	(0.37)	(0.37)
Care of non-relative				-1.22**	-1.01**	-0.99*
				(0.39)	(0.39)	(0.39)
Centre based care				-1.40***	-1.06*	-0.96*
Ref: Full parental care				(0.41)	(0.41)	(0.42)
Non Manual/Skilled Manual					0.91**	0.77**
					(0.28)	(0.28)
Semi-Unskilled Manual					1.29**	1.31**
					(0.42)	(0.43)

Never Worked					1.17*	0.95
Ref: Professional/Managerial					(0.53)	(0.55)
Primary/Lower Secondary					1.27**	0.90
					(0.48)	(0.49)
Upper Secondary					0.86*	0.60
					(0.37)	(0.38)
Third Level					0.81**	0.73**
Ref: Degree or Higher					(0.27)	(0.28)
PCG Under 25						1.43**
						(0.44)
PCG 25-39						1.50***
						(0.32)
PCG 30-34						1.02***
Ref: PCG 35+						(0.26)
Quality of Attachment Scale						0.10*
						(0.05)
PCG Parental Stress Scale						-0.05**
						(0.02)
Constant	56.37***	56.96***	58.31***	58.01***	55.73***	51.44***
	(0.61)	(0.63)	(0.69)	(0.69)	(0.82)	(2.54)
N	10859	10859	10859	10859	10859	10627
R^2	0.064	0.070	0.074	0.077	0.082	0.086

Standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A30: Coefficients of Linear Regression Model of Problem Solving Scores at Ten Months, 9 Month Data

	(1) Child Character	(2) Family Structure	(3) Household Employment	(4) Child Care	(5) Family SES	(6) PCG Characteristics
Temperament Unadaptive	-0.11**	-0.09*	-0.09*	-0.09*	-0.09*	-0.08*
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Temperament Dull	-0.74***	-0.71***	-0.71***	-0.71***	-0.71***	-0.71***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Temperament Unpredictable	-0.21***	-0.24***	-0.24***	-0.24***	-0.24***	-0.20***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Male	-0.99***	-1.03***	-1.02***	-1.02***	-1.01***	-1.02***
Ref: Female	(0.26)	(0.26)	(0.26)	(0.26)	(0.26)	(0.26)
Very healthy birth	2.34***	2.42***	2.41***	2.41***	2.39***	2.41***
Ref: some health	(0.33)	(0.33)	(0.33)	(0.33)	(0.33)	(0.34)
Very healthy 9 months	1.14**	1.11**	1.11**	1.16**	1.18**	1.08**
Ref: some health	(0.36)	(0.36)	(0.36)	(0.36)	(0.36)	(0.37)
Breastfed	0.83**	0.58*	0.60*	0.63*	0.45	0.37
Ref: Never breastfed	(0.26)	(0.26)	(0.27)	(0.27)	(0.28)	(0.29)
Infant has siblings		-1.78***	-1.75***	-1.71***	-1.62***	-1.59***
Ref: lone child		(0.27)	(0.27)	(0.27)	(0.27)	(0.30)
PCG F/T employment			1.83	1.89	2.18	2.49*
			(1.08)	(1.10)	(1.17)	(1.18)
PCG P/T employment			1.74	1.83	2.12	2.49*
Ref: PCG other econ status			(1.12)	(1.13)	(1.19)	(1.21)
Care of a relative				0.19	0.21	0.16
				(0.44)	(0.44)	(0.45)
Care of non-relative				-0.86	-0.83	-0.80
				(0.47)	(0.48)	(0.48)
Centre based care				0.62	0.61	0.71
Ref: Parental care				(0.50)	(0.50)	(0.51)
Income Quartile 2					-0.86*	-0.90*
					(0.43)	(0.43)
Income Quartile 3 (middle)					-0.32	-0.39
					(0.46)	(0.46)
Income Quartile 4					-0.67	-0.74
					(0.50)	(0.51)
Income Quartile 5					-0.25	-0.30
					(0.53)	(0.54)
Income Unknown					-0.38	-0.35
Ref: Income Quartile 1					(0.61)	(0.62)

Non Manual/Skilled Manual					0.94**	0.87*
					(0.35)	(0.35)
Semi-Unskilled Manual					0.21	0.27
					(0.52)	(0.53)
Never Worked					0.40	0.24
Ref: Professional/Managerial					(0.73)	(0.75)
Primary/Lower Secondary					-1.09	-1.33*
					(0.58)	(0.59)
Upper Secondary					-1.15**	-1.25**
					(0.45)	(0.46)
Third Level					0.06	-0.05
Ref: Degree or Higher					(0.33)	(0.34)
PCG Under 25						-0.10
						(0.53)
PCG 25-39						1.23**
						(0.39)
PCG 30-34						0.54
Ref: PCG 35+						(0.32)
Constant	50.11***	51.17***	51.20***	51.16***	51.82***	48.45***
	(0.78)	(0.80)	(0.87)	(0.87)	(1.05)	(3.03)
N	10309	10309	10309	10309	10309	10090
R^2	0.039	0.043	0.044	0.045	0.047	0.050

Note: Model also includes variables relating to the child's temperament (fussy). Standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A31: Coefficients of Linear Regression Model of Naming Vocabulary Scores at Age 3, Cross-Sectional Data

	(1) Infant and Childcare Characteristics	(2) Family Structure	(3) Household SES	(4) PCG Characteristics
Picture Similarities Score	0.51***	0.50***	0.49***	0.48***
	(0.01)	(0.01)	(0.01)	(0.01)
Gross Motor 2: Stand on one leg	4.48***	4.44***	4.33***	4.24***
	(0.59)	(0.59)	(0.59)	(0.59)
Gross Motor 3: Throw ball	2.84**	2.79**	2.86**	2.88**
	(0.93)	(0.93)	(0.92)	(0.92)
Fine Motor 1: Jigsaw	7.18***	6.86***	5.73***	5.61***
	(0.98)	(0.98)	(0.97)	(0.99)
Fine Motor 2: Vertical line	3.99***	3.94***	3.66***	3.60***
	(0.78)	(0.78)	(0.77)	(0.78)
Fine Motor 3: Pincer grip	0.72	0.69	0.86*	0.88*
	(0.39)	(0.39)	(0.38)	(0.38)
Relative Care	3.74***	3.90***	2.19**	2.40***
	(0.62)	(0.62)	(0.68)	(0.69)
Non-relative Care	2.99***	2.73***	0.17	0.07
	(0.59)	(0.59)	(0.67)	(0.67)
Centre Based Care *Ref: Parental Care*	1.56***	1.57***	-0.55	-0.46
	(0.45)	(0.45)	(0.50)	(0.50)
Lone Parent *Ref: Dual Parent Family*		-3.49***	0.12	0.26
		(0.58)	(0.76)	(0.77)
Low Income Quartile			-4.84***	-4.66***
			(0.73)	(0.74)
2nd Lowest Income Quartile			-4.31***	-4.24***
			(0.68)	(0.68)
Middle income quartile			-3.27***	-3.20***
			(0.60)	(0.61)
2nd Highest Income Quartile *Ref: Highest Income Quartile*			-0.97	-1.05
			(0.57)	(0.57)
Managerial			-0.24	-0.24
			(0.55)	(0.55)
Non-manual			-2.10**	-1.93**
			(0.69)	(0.70)
Skilled manual			-4.13***	-3.77***
			(0.78)	(0.79)

Semi and unskilled			-3.94***	-3.36***
			(0.86)	(0.86)
Class unknown			-4.25***	-3.84**
Ref: Professional			(1.16)	(1.17)
Age of PCG				0.13***
				(0.04)
PCG Parental Stress Scale				-0.14**
				(0.05)
Constant	22.84***	24.52***	30.88***	28.77***
	(1.88)	(1.90)	(2.17)	(2.66)
N	9058	9058	9058	8938
R^2	0.182	0.185	0.205	0.205

Note: Model also includes variables relating to age took 1st steps, gross motor skill tests (tricycle), family structure (number of children), PCG education level, PCG hours worked, household employment situation, welfare status, PCG depression score Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A32: Coefficients of Linear Regression Model of Naming Vocabulary Scores at Age 3, Longitudinal Data

	Infant Characteristics	Early Childhood Characteristics	Family Structure	Family SES	PCG Characteristics
Male	-5.08***	-3.05***	-3.08***	-3.19***	-3.07***
Ref: Female	(0.43)	(0.40)	(0.40)	(0.39)	(0.39)
Child was breastfed	1.29**	0.27	-0.08	0.25	0.25
Ref: Never breastfed	(0.43)	(0.40)	(0.41)	(0.42)	(0.42)
Temperament Un-adaptive	-0.28***	-0.16**	-0.14*	-0.08	-0.07
	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)
Passed Communication Test	1.74**	1.64***	1.70***	2.28***	2.26***
Ref: Did not pass	(0.53)	(0.49)	(0.49)	(0.48)	(0.47)
Passed Fine Motor Test	3.25***	1.92**	1.80**	1.68**	1.67**
Ref: Did not pass	(0.65)	(0.60)	(0.60)	(0.58)	(0.58)
Passed Problem Solving	1.88***	1.15**	1.18**	1.32**	1.38***
Ref: Did not pass	(0.46)	(0.42)	(0.42)	(0.41)	(0.41)
Passed Personal/Social	2.55***	1.77***	1.70***	1.52***	1.59***
Ref: Did not pass	(0.50)	(0.45)	(0.46)	(0.44)	(0.44)
Care of a relative at 9 months	4.39***	3.66***	3.54***	1.75**	1.98***
	(0.60)	(0.55)	(0.55)	(0.55)	(0.55)
Care of a non relative at 9 months	4.18***	2.99***	2.80***	-0.01	-0.05
	(0.64)	(0.59)	(0.59)	(0.59)	(0.59)
Centre based care at 9 months	5.01***	3.33***	3.05***	0.45	0.30
Ref: Full parental care	(0.68)	(0.63)	(0.63)	(0.64)	(0.63)
Picture Similarities Test Score		0.47***	0.46***	0.45***	0.46***
		(0.01)	(0.01)	(0.01)	(0.01)
Total SDQ Score		-0.37***	-0.36***	-0.26***	-0.26***
		(0.05)	(0.05)	(0.05)	(0.05)
Passed Stand on one leg test		4.12***	4.12***	4.05***	3.97***
Ref: Did not pass		(0.62)	(0.62)	(0.60)	(0.59)
Passed throwing a ball test		2.57**	2.54**	3.08***	2.69**
Ref: Did not pass		(0.95)	(0.95)	(0.92)	(0.92)
Passed Jigsaw Test		5.75***	5.58***	3.89***	3.39***
Ref: Did not pass		(1.01)	(1.01)	(0.98)	(0.99)
Passed Vertical line test		3.28***	3.27***	3.05***	3.22***
Ref: Did not pass		(0.80)	(0.80)	(0.78)	(0.77)
Lone parent family			-3.08***	-0.41	-0.48
Ref: PCG lives with partner			(0.63)	(0.81)	(0.82)
Child has siblings			-0.97*	-0.54	-1.19**
Ref: *No siblings*			(0.42)	(0.41)	(0.44)

Ethnic				-10.82***	-10.29***
				(0.62)	(0.62)
Low HH Income				-2.34***	-2.11***
				(0.56)	(0.56)
High HH Income				1.93***	1.81***
Ref: Middle Income				(0.54)	(0.54)
Non Manual/Skilled				-1.38**	-1.21*
				(0.50)	(0.50)
Semi-Unskilled Manual				-1.89*	-1.45
				(0.77)	(0.78)
Never Work				-3.46***	-2.79**
Ref: Managerial/Prof				(0.94)	(0.94)
PCG Upper Secondary				0.29	0.24
				(0.73)	(0.73)
PCG Third Level				0.56	0.69
				(0.71)	(0.71)
PCG Higher Education				1.79*	1.67*
Ref: Lower Sec or Less				(0.78)	(0.78)
Living in urban area				-1.30***	-1.29***
				(0.39)	(0.39)
HH Income Increased Between T1 and T2				1.03*	0.97*
				(0.49)	(0.48)
HH Income Decreased				0.07	0.07
				(0.50)	(0.50)
Change Unknown				-0.11	0.22
Ref: Household Stable				(0.71)	(0.71)
PCG Age					0.80***
					(0.23)
Constant	70.89***	29.91***	31.29***	32.94***	29.91***
	(1.20)	(2.10)	(2.13)	(2.22)	(2.44)
N	8281	8252	8252	8252	8149
R^2	0.056	0.211	0.213	0.261	0.262

Model also includes variables relating to Health at birth, health at nine months, temperament at nine months (fussy), BMI at age three, health status at age three, Gross motor test at age three (pedal a tricycle), Fine motor skill test at age three (pincer grip), change in care setting between T1 and T2, PCG depression score, and PCG stress score.
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 33: Coefficients of Linear Regression Model of Picture Similarities Scores at Age three, Cross-Sectional Data

	(1) Type of Childcare Setting	(2) Duration of Childcare	(3) Number of Childcare Arrangements
Age took first steps	-0.08**	-0.08**	-0.08**
	(0.03)	(0.03)	(0.03)
Naming Vocabulary Score	0.26***	0.26***	0.26***
	(0.01)	(0.01)	(0.01)
Gross Motor 2: Stand on one leg	2.31***	2.31***	2.31***
	(0.43)	(0.43)	(0.43)
Fine Motor 1: Jigsaw	3.91***	3.92***	3.93***
	(0.72)	(0.72)	(0.72)
Fine Motor 2: Vertical line	5.01***	5.03***	5.02***
	(0.56)	(0.56)	(0.56)
Fine Motor 3: Pincer grip	0.95***	0.94***	0.96***
	(0.28)	(0.28)	(0.28)
Relative Care	-0.33		
	(0.50)		
Non-relative Care	-0.51		
	(0.49)		
Centre Based Care	-0.02		
Ref: Parental Care	(0.36)		
8-15 Hours		0.03	
		(0.42)	
15-30 Hours		-0.60	
		(0.40)	
30+ Hours		0.41	
Ref: Parental Care		(0.49)	
Multiple Arrangements			-0.43
			(0.58)
Single Arrangement			-0.14
Ref: Parental Care			(0.34)
Has siblings	-2.74***	-2.71***	-2.75***
Ref: Single child	(0.80)	(0.80)	(0.80)
Low Income Quartile	-0.04	0.00	-0.06
	(0.54)	(0.54)	(0.54)
2nd Lowest Income Quartile	0.09	0.12	0.07
	(0.50)	(0.50)	(0.50)
Middle income quartile	0.90*	0.95*	0.88*
	(0.44)	(0.44)	(0.44)

2nd Highest Income Quartile	0.23	0.27	0.21
Ref: Highest Income Quartile	(0.41)	(0.41)	(0.41)
Primary Education	-3.55***	-3.53***	-3.55***
	(0.59)	(0.58)	(0.58)
Upper Secondary or Lower	-2.08***	-2.08***	-2.09***
	(0.47)	(0.47)	(0.47)
Third Level Education	-0.97**	-0.95**	-0.97**
Ref: Degree +	(0.34)	(0.34)	(0.34)
PGC Not in Employment	1.37**	1.39**	1.41**
	(0.51)	(0.51)	(0.50)
PCG Employed <15hrs	-0.00	0.04	0.03
Ref: 15+ hours	(0.62)	(0.63)	(0.62)
Working Household	1.72**	1.72**	1.72**
Ref: Workless Household	(0.54)	(0.54)	(0.54)
Age of PCG	-0.09**	-0.09**	-0.09**
	(0.03)	(0.03)	(0.03)
PCG Depression Scale	-0.10*	-0.10*	-0.09*
	(0.04)	(0.04)	(0.04)
Constant	30.80***	30.71***	30.77***
	(2.05)	(2.05)	(2.05)
N	8962	8962	8962
R^2	0.191	0.192	0.191

Note: Model also includes variables relating to gross motor skill development tests., the presence of an illness or disability, family structure (number of parents present), household social class, family employment situation and PCG depression scores

Table A34: Coefficients of Linear Regression Model of Picture Naming Scores at Age three, Longitudinal Data

	Infant Characteristics	Early Childhood Characteristics	Family Structure	Family SES	PCG Characteristics
Male	-3.38***	-1.40***	-1.43***	-1.47***	-1.43***
Ref: Female	(0.31)	(0.30)	(0.29)	(0.29)	(0.30)
Very Healthy at Birth	0.81*	0.33	0.37	0.39	0.41
Ref: Less healthy	(0.40)	(0.38)	(0.38)	(0.38)	(0.38)
Child was Breastfed	1.31***	0.58*	0.34	-0.05	-0.03
Ref: Never Breastfed	(0.32)	(0.29)	(0.30)	(0.31)	(0.31)
Un-adaptive	-0.17***	-0.07	-0.06	-0.06	-0.07
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Very Healthy	-0.77	-0.51	-0.47	-0.50	-0.52
	(0.42)	(0.40)	(0.40)	(0.40)	(0.40)
Communication	-0.27	-0.78*	-0.77*	-0.65	-0.70
	(0.39)	(0.36)	(0.36)	(0.36)	(0.36)
Gross Motor Skill	0.94**	1.05***	1.02**	0.99**	0.95**
	(0.33)	(0.31)	(0.32)	(0.32)	(0.32)
Fine Motor	1.64***	0.29	0.23	0.18	0.21
	(0.47)	(0.44)	(0.44)	(0.44)	(0.44)
Problem Solving	0.91**	0.25	0.27	0.28	0.19
	(0.33)	(0.31)	(0.31)	(0.31)	(0.31)
Personal/Social	1.10**	0.08	-0.00	-0.01	0.01
	(0.36)	(0.33)	(0.33)	(0.33)	(0.34)
Care of a relative	1.54***	0.20	0.07	0.23	0.10
	(0.43)	(0.40)	(0.41)	(0.50)	(0.50)
Care of non-relative	1.61***	0.10	-0.01	0.12	0.21
	(0.47)	(0.43)	(0.43)	(0.52)	(0.53)
Centre based care	2.08***	0.19	-0.02	0.15	0.32
Ref: Full parental care	(0.50)	(0.46)	(0.46)	(0.55)	(0.55)
Age took 1st steps		-0.06*	-0.07*	-0.07*	-0.06*
		(0.03)	(0.03)	(0.03)	(0.03)
Naming Vocabulary		0.25***	0.25***	0.25***	0.25***
		(0.01)	(0.01)	(0.01)	(0.01)
Total SDQ Score		-0.24***	-0.24***	-0.22***	-0.23***
		(0.03)	(0.03)	(0.03)	(0.04)
Passed Jigsaw Test		4.07***	3.95***	3.85***	4.15***
Ref: Did not pass		(0.73)	(0.73)	(0.74)	(0.74)
Passed Vertical line test		4.45***	4.45***	4.42***	4.22***
Ref: Did not pass		(0.58)	(0.58)	(0.58)	(0.58)

Standing on one leg		2.28***	2.28***	2.24***	2.21***
		(0.45)	(0.45)	(0.45)	(0.45)
Lone Parent family			-1.71***	-0.61	-0.67
Ref: PCG has partner			(0.46)	(0.73)	(0.74)
Child has siblings			-0.95**	-0.93**	-0.58
Ref: No siblings			(0.31)	(0.31)	(0.34)
Low Household Income				1.00*	0.96*
				(0.40)	(0.41)
High Household Income				0.46	0.59
Ref: Middle Income				(0.39)	(0.39)
PCG Upper Secondary				1.29*	1.21*
				(0.55)	(0.55)
PCG Third Level				2.59***	2.41***
				(0.54)	(0.54)
PCG Higher Education				2.44***	2.44***
Ref: Lower Sec or Less				(0.59)	(0.59)
PCG Age					-0.57**
					(0.18)
Constant	60.14***	34.79***	35.92***	33.35***	30.09***
	(0.93)	(1.65)	(1.67)	(1.85)	(3.75)
N	8592	8268	8268	8268	8158
R^2	0.033	0.193	0.195	0.199	0.204

Note: Temperament (fussy, dull), Throw a ball test, Pedal a tricycle test, Pincer grip test result, Health status age three, BMI age three, Change of care setting between T1 and T2, Household social class, PCG employment status, SCG employment status, PCG quality of attachment score, PCG Parental stress score, and PCG depression score,
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A35: Coefficients from OLS and Quantile Regression Models of Reading Performance at Age 9

	(Model 1: OLS)	Model 2 (Quantile Regression)		
	Reading Performance	Q25	Q50	Q75
Male	-0.06***	-0.09***	-0.03	-0.00
Ref: Female	(0.02)	(0.02)	(0.02)	(0.02)
Birth Weight	0.04**	0.05**	0.03	0.03
	(0.01)	(0.02)	(0.02)	(0.02)
Ever breast fed as a baby	0.06***	0.07**	0.07***	0.05*
Ref: Never Breastfed	(0.02)	(0.02)	(0.02)	(0.02)
Current Ongoing Illness	0.19***	0.16*	0.22***	0.21***
Ref: No such illness	(0.04)	(0.06)	(0.04)	(0.05)
Child has a special educational need	-0.30***	-0.32***	-0.32***	-0.27***
Ref: No SEN	(0.02)	(0.03)	(0.03)	(0.04)
Math Score at age 9	0.56***	0.57***	0.58***	0.58***
	(0.01)	(0.01)	(0.01)	(0.01)
Parent reads with child	-0.11***	-0.13***	-0.09***	-0.09***
Ref: Parent does not	(0.02)	(0.03)	(0.02)	(0.02)
Child always likes reading	0.30***	0.30***	0.32***	0.30***
	(0.02)	(0.02)	(0.02)	(0.02)
Child never likes reading	-0.20***	-0.14*	-0.20***	-0.28***
Ref: Child sometimes likes reading	(0.04)	(0.07)	(0.05)	(0.05)
Child always likes school	-0.09***	-0.11***	-0.09**	-0.07*
	(0.02)	(0.03)	(0.03)	(0.03)
Child never likes school	-0.08*	-0.05	-0.06	-0.11*
Child sometimes likes school	(0.04)	(0.04)	(0.05)	(0.04)
Lone Parent Family	0.09*	0.08	0.06	0.10*
Ref: PCG lives with partner	(0.03)	(0.05)	(0.06)	(0.04)
Child has siblings	-0.05	0.04	-0.09**	-0.09*
Ref: Child has no siblings	(0.03)	(0.03)	(0.03)	(0.04)
Relative out of school care	-0.01	0.00	-0.00	-0.02
	(0.03)	(0.05)	(0.04)	(0.05)
Non relative out-of-school care	0.01	0.03	-0.02	-0.03
	(0.03)	(0.04)	(0.05)	(0.05)
Centre based out-of-school care	-0.06	-0.01	-0.08	-0.12**
Ref: Parental care	(0.05)	(0.06)	(0.06)	(0.04)
Non manual	-0.08***	-0.10***	-0.10***	-0.06**
	(0.02)	(0.03)	(0.02)	(0.02)
Semi-unskilled manual	-0.05	-0.04	-0.03	-0.05
	(0.03)	(0.07)	(0.07)	(0.05)

No social class group *Ref: Professional/managerial*	-0.08 (0.07)	-0.10 (0.09)	-0.06 (0.09)	-0.12 (0.08)
Secondary education or lower	-0.15*** (0.02)	-0.14*** (0.03)	-0.16*** (0.03)	-0.15*** (0.03)
Third level education *Ref: PCG Higher Education*	-0.15*** (0.02)	-0.17*** (0.03)	-0.13*** (0.03)	-0.13*** (0.04)
High Household Income	0.07** (0.02)	0.07 (0.04)	0.04 (0.03)	0.07 (0.05)
Low Household Income	-0.04 (0.03)	-0.00 (0.03)	-0.04 (0.03)	-0.06* (0.03)
Household income unknown *Ref: Middle income household*	0.05 (0.04)	0.08 (0.06)	0.01 (0.03)	0.04 (0.05)
10-30 Children's books in the home	-0.17*** (0.02)	-0.16*** (0.03)	-0.18*** (0.02)	-0.19*** (0.03)
None/Few Children's books in the home *Ref: 30+ Children's books in the home*	-0.29*** (0.03)	-0.24*** (0.04)	-0.30*** (0.03)	-0.33*** (0.05)
Mother in Poor Health *Ref: Mother in good health*	-0.00 (0.04)	-0.08* (0.03)	0.02 (0.05)	0.03 (0.06)
Constant	0.36*** (0.10)	-0.14 (0.10)	0.42** (0.15)	0.96*** (0.13)
N	7533			
R^2	0.456			

Note: Models also include variables relating to the child's health status in the past year, Weight of the child, Child eats breakfast, Child experienced a traumatic life event, Academic self-concept, PCG employment status, Household employment situation, Parental involvement with school, Parent-child conflict score, PCG depression score.

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A36: Coefficients of OLS and Quantile Regression Models of Maths Performance at Age 9

	(Model 1 OLS)	Model 2 (Quantile Regression)		
		Q25	Q50	Q75
Male	0.07***	0.04	0.06***	0.10***
Ref: Female	(0.02)	(0.02)	(0.02)	(0.02)
Birth Weight	0.02	0.04***	0.06***	0.01
	(0.01)	(0.01)	(0.02)	(0.02)
Child has an ongoing illness	-0.03	-0.11*	-0.02	0.01
Ref: No such illness	(0.03)	(0.04)	(0.03)	(0.04)
Child has a special educational need	-0.06**	-0.04	-0.05*	-0.07*
Ref: SEN	(0.02)	(0.03)	(0.02)	(0.03)
Child eats breakfast	-0.13*	-0.17	-0.09	-0.08
Ref: No breakfast	(0.06)	(0.09)	(0.07)	(0.07)
Reading Score at age 9	0.50***	0.52***	0.51***	0.49***
	(0.01)	(0.01)	(0.01)	(0.01)
Parental perceives child average, below average or poor in math	-0.33***	-0.28***	-0.32***	-0.33***
Ref: Parental rating of above average	(0.02)	(0.02)	(0.02)	(0.02)
Child always likes maths	0.14***	0.13***	0.13***	0.15***
	(0.02)	(0.03)	(0.02)	(0.02)
Child never likes maths	-0.11***	-0.13***	-0.12**	-0.12***
Ref: Child sometimes likes maths	(0.03)	(0.03)	(0.04)	(0.03)
Child always likes school	-0.10***	-0.12***	-0.10***	-0.12***
	(0.02)	(0.02)	(0.02)	(0.02)
Child never likes school	-0.04	-0.07	-0.02	-0.07
Ref: Child sometimes likes school	(0.04)	(0.04)	(0.04)	(0.05)
Lone Parent family	-0.06*	-0.03	-0.06*	-0.02
Ref: PCG lives with partner	(0.03)	(0.04)	(0.03)	(0.03)
Child has siblings	0.10***	0.16***	0.11**	0.07
Ref: No siblings	(0.03)	(0.03)	(0.03)	(0.04)
Non manual/skilled manual	-0.04*	-0.09***	-0.05	-0.03
	(0.02)	(0.02)	(0.03)	(0.04)
Semi-skilled and Unskilled manual	-0.10**	-0.19***	-0.09**	-0.06
	(0.03)	(0.06)	(0.03)	(0.05)
No social class group	-0.00	-0.04	-0.05	0.01
Ref: Professional/Managerial	(0.06)	(0.07)	(0.06)	(0.08)
10-30 Children's books in the home	0.04*	0.01	0.05*	0.05*
	(0.02)	(0.02)	(0.02)	(0.02)
<10 or no children's books in the home	-0.00	0.01	-0.01	-0.03

Ref: 30+ books in the home	(0.03)	(0.04)	(0.04)	(0.07)
Mother-child conflict scale	-0.00***	-0.00**	-0.00***	-0.00*
	(0.00)	(0.00)	(0.00)	(0.00)
Mother's Health (poor)	-0.04	0.04	-0.08	-0.11*
Ref: Mother in good health	(0.04)	(0.04)	(0.04)	(0.05)
Constant	-0.76***	-1.28***	-0.88***	-0.36**
	(0.09)	(0.11)	(0.10)	(0.12)

Note: Model also includes variables relating to whether the child was breastfed, Current health status, Child's weight, Child experienced a traumatic life event, Child's academic self-concept, PCG employment status, Household employment status, Out-of-school childcare arrangement, Parental involvement in education, Household income, PCG education, and PCG depression score.

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A37: Probit and PSM Estimates of Childcare Effects on Health Rating by PCG

	Health Rating in Infancy
Probit- centre based care	-0.416 (.045)*
PSM (NN)	-0.193 (.053)*
PSM (Kernel)	-0.127 (.013)*
Probit duration of childcare (31 hours +)	-.189 (.046)*
PSM (NN)	-.124 (.044)*
PSM (Kernel)	-.042 (.012)*
	Health Rating at Age 3
Probit- centre based care	-.212 (.034)*
PSM (NN)	-.078 (.058)
PSM (Kernel)	-.076 (.010)*
	Health Rating at Age 9
Probit- relative care	-0.136 (.053)*
PSM (NN) relative care	-0.732 (.036)*
	Health Rating at Age 3 (longitudinal)
Probit relative care	0.132 (.053)*
PSM (NN)	.046 (.039)
PSM (Kernel)	.014 (.013)
Probit centre based care	.211 (.059)*
PSM (NN)	.006 (.075)
PSM (Kernel)	.007 (.014)
Probit 16+ hours in childcare	.144 (.043)*
PSM (NN)	.058 (.062)
PSM (Kernel)	.034 (.014)*
Probit single childcare arrangement	.147 (.045)*
PSM (NN)	.066 (.053)
PSM (Kernel)	.021 (.013)
Probit no change in care type T1 and T2	.086 (.032)
PSM (NN)	.069 (.053)
PSM (Kernel)	.038 (.009)

Standard errors in parentheses * $p < 0.05$

Table A38: Probit and PSM Estimates of Childcare Effects on Gross Motor Skill Development

	Gross Motor Skill Development at Age 3 (longitudinal)
	Throw a ball
Probit centre based care	.276 (.092) *
PSM (NN)	.080 (.037)*
PSM (Kernel)	.080 (.037) *

Standard errors in parentheses * $p < 0.05$

Table A39: Probit and PSM Estimates of Childcare Effects on Fine Motor Skill Development

	Fine Motor Skill Development at Age 3 (cross-sectional)
	Jigsaw
Probit centre based care PSM (NN) PSM (Kernel)	.211 (.067)* .006 (.029) .015 (.004)*
	Jigsaw
Probit 8-15 hours of childcare PSM (NN) PSM (Kernel)	.166 (.081)* .011 (.016) .015 (.005)*
	Pincer Grip
Probit centre based PSM (NN) PSM (Kernel)	.129 (.030)* .095 (.068) .053 (.011)*
	Fine Motor Skill Development at Age 3 (longitudinal)
	Vertical Line
Probit centre based care PSM (NN) PSM (Kernel)	.175 (.082) * .052 (.052) .024 (.008)*
Probit Type of care arrangement did not change PSM (NN) PSM (Kernel)	-.136 (.048) * -.019 (.008)* -.018 (.006)*

Standard errors in parentheses * $p < 0.05$

Table A40: Probit and PSM Estimates of Out-of-School Care Arrangements on Strengths and Difficulties Total Score at Age 9

	SDQ
Probit centre based out-of-school care PSM (NN) PSM (Kernel)	.932(.288)* .889 (1.033) .791 (.320)*

Standard errors in parentheses * $p < 0.05$

Table A41: Probit and PSM Estimates of Out-of-School Care Arrangements on Cognitive Development Outcomes

	Communication: Infancy (9 month data, cross-sectional)
Probit centre based childcare	.-.956 (.415)*
PSM (NN)	-1.65 (1.63)
PSM (Kernel)	-.896 (.359)*
Probit non-relative childcare	-.990 (.393)*
PSM (NN)	-1.588 (1.43)
PSM (Kernel)	-0.588 (.340)
	Naming Vocabulary (3 year olds, cross-sectional)
Probit relative care	2.402 (.686)
PSM (NN)	1.820 (2.02)
PSM (Kernel)	2.790 (.680)*
	Naming Vocabulary (3 year olds, longitudinal)
Probit relative care	2.07 (.551)*
PSM (NN)	5.34 (1.82)*
PSM (Kernel)	2.67 (.622)

Standard errors in parentheses * $p < 0.05$

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