16 Years Old: Educational Outcomes of a Subsample of the Irish IEA Preprimary Project Within the Contexts of Home, Preschool and School.

Siobhán Keegan
Dublin Institute of Technology

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Submitted in Fulfilment of the Requirements for the Award of

Doctor of Philosophy

Siobhán Keegan

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2016

Volume 1 of 2
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July 2016
by
Siobhán Keegan

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School of Languages, Law and Social Sciences
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Abstract

This thesis considered the bio-ecological model as a research frame with which to develop policies and practice that are important for the academic development of children and young people, in Ireland. The research aimed to build on the IEA Preprimary Project by investigating the relative impact of children’s experiences at age four on their development (cognitive, social, academic, physical and language) at ages seven and sixteen, by using the data collected for the two Irish publications of the Preprimary Project and supplementing it with data collected on the academic outcomes of the original sample at age sixteen. The research questions were;

1. What are the home, environmental and/or individual variables (at Ages 4, 7 and 16) that predict academic outcomes at Ages 7 and 16 and;
2. How do these predictors relate to academic outcomes at Age 16? 

The results indicated that the adults (parents and educators) in the lives of four year olds determine their long-term outcomes. Whole group teaching and adult-centred teaching rather than child-centred teaching in the Age 4 ECEC and primary settings negatively related to children’s outcomes in the short and longer term. Maternal education was a strong positive predictor of Age 16 outcomes across most subjects. This provides support for the notion of maternal education as an intervention in, and of, itself. Better Age 16 attitude to school and being a boy predicted better Maths and Science outcomes, which underlines the importance of engaging all young people, particularly for the more traditionally “difficult” subjects. Involvement in extra-curricular activities is also supportive for many academic outcomes, which emphasizes the importance of a school/life balance for young people. Where direct relationships were absent in the current study, chains of prediction led through the developmental trajectory that coincided with participation in the early, primary and secondary education systems. Findings suggest that tackling aspects of the family environment, early childhood-, primary- or secondary-education experience will lead to better academic outcomes in the short-term for children and young people but only for the aspect that is explicitly targeted. In order to ensure more meaningful, lasting and effective academic benefits, the learning from the research is that theory
and practice at the micro- and meso-level should be coupled with or extended upon by the development of effective wraparound mechanisms at the macro policy level. This research thesis confirms the need for many of the policy changes that have been introduced since 1994 in the early years, primary and secondary education sectors. However, the similarity in its findings and the findings of more recent research confirms that policy change alone is not sufficient to affect a change in practice. This thesis argues that children, families and education settings should be supported by the development, integration and implementation of theory with rights-based policy and practice in order to ensure that children succeed in the Ireland of the today, while also ensuring that they are well equipped to succeed on a lifelong journey of learning and discovery.
Declaration

I certify that this thesis which I now submit for examination for the award of
Doctor of Philosophy, is entirely my own work and has not been taken from the work of
others save and to the extent that such work has been cited and acknowledged within the
text of my work.

This thesis was prepared according to the regulations for postgraduate study by research
of the Dublin Institute of Technology and has not been submitted in whole or in part for
an award in any other Institute or University.

The work reported on in this thesis conforms to the principles and requirements of the
Institute's guidelines for ethics in research. The Institute has permission to keep, to lend
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of the thesis be duly acknowledged.

Signature ________________________________ Date ___________
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discussions that began in the postgraduate room in DIT Mountjoy Square continue to this day so thanks are due to the many colleagues who shared that journey with me, particularly Dr Sinead Freeman and Dr Kalis Pope for showing me what is possible. Special thanks to my friend Cathy Kelleher whose advice on statistics, methodology and much more besides has helped me to complete this research.

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## Glossary/Abbreviations

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<td>AB</td>
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<td>Age 4</td>
<td>From the first phase (1994) of the Irish IEA Preprimary Project, when the sample were aged four, on average.</td>
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<td>Age 7</td>
<td>From the follow-up phase of the Irish IEA Preprimary Project (1997) when the sample was aged seven, on average.</td>
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<tr>
<td>Age 16</td>
<td>From the PhD research phase (2007), when the sample had completed their Junior Certificate examinations.</td>
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<td>Aistear</td>
<td>The National Early Childhood Curriculum Framework</td>
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<td>CA</td>
<td>Child Activities Observation System</td>
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<tr>
<td>CECDE</td>
<td>Centre for Early Childhood Development and Education</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence Interval</td>
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<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
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<td>CSO</td>
<td>Central Statistics Office</td>
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<td>DCYA</td>
<td>Department of Children and Youth Affairs</td>
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<tr>
<td>DD</td>
<td>Designated Disadvantaged</td>
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<tr>
<td>DES</td>
<td>Department of Education and Skills (since 2005), previously Department of Education and Science</td>
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<tr>
<td>DEIS</td>
<td>Delivering Equality of Opportunity In Schools (designation of disadvantage)</td>
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<td>ECCRN</td>
<td>Early Child Care Research Network (ECCRN) in United States</td>
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<td>ECEC</td>
<td>Early Childhood Education and Care</td>
</tr>
<tr>
<td>ECS</td>
<td>Early Childhood Supplement</td>
</tr>
<tr>
<td>ERC</td>
<td>Educational Research Centre</td>
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<tr>
<td>F</td>
<td>F test</td>
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<td>FPSY</td>
<td>Free Pre-school Year</td>
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<td>GUI</td>
<td>Growing Up in Ireland, a national longitudinal study of children</td>
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HLM Hierarchical Linear Modelling
HSE Health Services Executive, responsibility for running all health services in Ireland
IEA PPP International Association for the Evaluation of Education Achievement
Preprimary Project. The IEA supported a longitudinal, cross-national project exploring the impact of early educational experiences on later school success that was entitled the IEA Preprimary Project. Ireland was one of the participating countries.
IMF International Monetary Fund
INTO Irish National Teachers’ Organisation (primary teachers’ union)
IPFI Individual Protective Factors Index
IPPA Irish Pre-schools and Playgroup Association
JCSA Junior Cycle Student Award, the planned replacement for the Junior Cert.
Junior Cert. The Junior Certificate examination is a set of state examinations that take place in the third year of secondary school in Ireland
Leaving Cert. The Leaving Certificate examination is a state examination that takes place in the final year of secondary school, the results of which determine access to university
\( M \) Mean
MAR Missing at Random
MCAR Missing Completely at Random
MOT Management of Time Observation System
\( N \) Whole sample
\( n \) Part of the whole sample
NCCA National Council for Curriculum and Assessment
NCNA National Children’s Nurseries Association
NCIP The National Childcare Investment programme
NDD Non-designated Disadvantaged
NICHD  National Institute of Child Health and Development (NICHD) in United States

NMAR  Not Missing at Random

OECD  Organisation of Economic Co-operation and Development

$p$  $p$-value, the probability of achieving a result by chance

PBI  Pupil Behaviour Inventory

PISA  Programme for International Student Assessment

PPCT  Person Process Context Time (Bronfenbrenner)

PPS  Probability Proportional to Size (sampling technique)

SD  Standard Deviation

SEN  Special Educational Needs

Síolta  National Early Years Quality Framework

SPSS  Statistics Programme for Social Sciences

SST  Sustained Shared Thinking

STEM  Science, Technology, Engineering and Mathematics

$t$  measures of the difference between an observed sample statistic and its hypothesized population parameter in units of standard error

YRS  Ypsilanti Rating Scale

$B$  Regression co-efficient

$SE B$  Standard error of the regression co-efficient

$\beta$  Standardized regression co-efficient

$R^2$  Measure of the variance accounted for by the model

$\chi^2$  Chi-square statistic
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CHAPTER 1
INTRODUCTION

The human curiosity about the interplay between the past, the present and the future has spawned great works of art, been the subject of literature and films and fascinated scientists for generations. Quite simply our human awareness of the past, the present and the future is equitable with our mortality; to live is to understand that time passes, inexorably, a second at a time. This thesis also concerns itself with the temporal dimension of human existence, not metaphorically but literally, through the longitudinal tracking of a sample of Irish children, as they moved from the early education and care system into the school system, became established and then prepared to leave secondary school to embark on adult life. The research seeks to track a developmental trajectory in order to better understand the outcomes for individuals who developed in a world that was constantly shaping their development. In the case of the current thesis, that world consisted of the Irish early education and school system; its encapsulation within a modern and changing Ireland and the social and family context of every child that participated in the research. While it has been claimed that every life is worthy of examination, it is argued that these lives, in particular, are worthy of focus, given that they, as a collective, allow heretofore impossible inferences to be made about the Irish ECEC and school system and Irish society as a whole. In particular, the thesis adds richness to the annual data on academic outcomes that is released by the Department of Education in the form of Junior Certificate results. This study offers the opportunity to consider academic outcomes in Ireland as being dependent on the context in which Irish children and young people grow and learn; be that the home, school, classroom setting or society. Thus, the concept of academic outcomes need not continue to be conceptualized merely in the form of points tables in the national press. Elucidation of the developmental trajectories involved are of value to policy-makers and researchers alike as the intersection of individual children’s lives within a bio-ecological model of human development is presented. That we are the sum of our genetics and our experience is
generally established as a given. This thesis seeks to identify those experiences that work well for children and young people, by drawing them more sharply into focus for the attention of policy-makers and researchers. The corollary is that, in identifying what works well, the research also adopts a critical lens, which seeks to elucidate the barriers to positive academic development, which builds on a movement towards change in policy, practice and research terms that will benefit future generations of Irish children and young people.

1.1 Irish Context

The field of Irish Early Childhood Education and Care has seen a comparative proliferation of policy development in the last twenty years. This is related to the increased availability of European funding and a growing cultural impetus for equality within the home and the workplace, which increased the demand for childcare. Other drivers for the development of the sector are the desire to target disadvantage both through the creation of employment within childcare on community employment schemes and the provision of childcare for children who were deemed to be most in need due to disadvantage.

This development coincided with the data collection of the first two phases of the IEA Preprimary Project. Laterally, at the time of the follow-up with the sample at age sixteen, in 2005, Ireland was operating with 47,000 new childcare places, almost doubling the number available at the start of the decade (Wolfe, O’ Donoghue-Hynes & Hayes, 2013). The Organisation for Economic Co-operation and Development (OECD) thematic review of ECEC in Ireland, which was published in 2004, underlined the regulatory shortcomings within the sector as being of cause for concern, particularly in terms of the lack of requirement for, let alone incentivisation of, settings to train and/or to employ qualified staff. Among its recommendations was a national strategy for ECEC, an increase in investment, professionalization of the sector and universal preschool provision for 3-4 year olds. These recommendations notwithstanding, ECEC policy in the boom years (2004-2008) of the Celtic tiger economy was mainly characterised by
investment for disadvantaged families and highly visible direct payments to all families with children. As a result of the economic downturn, the less costly Free Preschool Year was introduced in 2009, which provides one free year of preschool to children between the ages of 3 years and 3 months and 4 years and 6 months at the 1st September in a given year, for the duration of a school year. This first step towards universal provision for the early years has been praised by many, in spite of its cost-saving roots. Yet, it is still the case that all of the measures mentioned above are still one step removed from tackling larger issues within the ECEC sector, particularly those relating to training and professionalization of staff, which are key in the research literature for quality outcomes for children. Aistear, the Early Childhood Curriculum Framework (NCCA, 2009) is almost universally regarded to offer opportunities to strengthen children’s learning and smooth the transition between ECEC setting and school, while keeping children’s rights, interests and identity as a key consideration at all times. Yet questions remain over the ease and level of engagement of primary school teachers and early educators with the framework. Moreover, this underlines a repeated finding that staff qualifications alone are not necessarily a guarantee that children will have educational experiences that could be internationally identifiable as being of high quality. The Junior Certificate outcomes reported are presented at a time when a third attempt at Junior cycle reform and a projected timeline of 2020 for ultimate reform has been posited. If one was needed, it is a reminder that the pace of reform has always been slow in the Irish educational sector. This thesis reports on the educational outcomes of sixteen years olds within a secondary system that is only now beginning to embark on the changes that have been called for ever since the system was last reformed in 1991. Moreover, the sixteen years olds grew up within an early educational and primary school system that, although changing, was changing in a primarily reactive manner, designed to win over the electorate or to balance the inequalities (labour market, educational disadvantage) already inherent in society rather than to achieve lasting and sweeping change. The results of this thesis will be contextualized within the contexts that shaped them while also allowing inferences to be
made about the home, family, and earlier educational experiences of the participants, as outlined in the following section.

1.2 Theoretical Context

The conceptual framework of this thesis is guided by the work of Bronfenbrenner (1979, 1992) and in particular, his bio-ecological model of human development (Bronfenbrenner & Morris, 1998). The academic development of the sample is characterised according to the interlinking layers or systems that represent the home, educational, policy and cultural contexts with which individuals interact as they grow and develop from children into young adults. In its broadest sense, this model is broken up into five systems that range from the individual level to the global:

- **Microsystem**: Child and immediate surroundings.
- **Mesosystem**: Relationships with microsystem.
- **Exosystem**: Settings in which child is not present but which have an influence on their life.
- ** Macrosystem**: Attitudes, ideologies of the culture.
- **Chronosystem**: Patterning of environmental effects over time.

Therefore, according to Bronfenbrenner’s theory, each individual child interacts with its environment and is influenced by each level of the environment in a different way. The multiplicity of human relationships is firmly emphasised, as are the interrelations between cultural context and the individual child. When this theory was adapted to the study of children in an early educational setting for the purpose of the IEA Preprimary Project, it involved an examination of the complex interactions between the child, the family, the teacher, and the environment. Such an ecological approach to researching child development is based on the presumption that a child’s learning experience is nested within the environments of home, school and the wider world, as well as being shaped by the individual child at the personal child level. This approach is essentially a process-person-context-time
model that examines the developmental process as well as the influence of person and environmental effects on outcomes.

Given the emphasis on the importance of interaction for development, this research is informed by a socio-cultural view of development, which de-emphasises traditional views of the child as a tabula rasa or sum of their biology but rather characterises the child as a thinking, dynamic being that progressively moves into and restructures the surroundings in which it finds itself through the mediating relationships that build up between contexts. The activity of learning and development is to the forefront as it is in the work of key contemporary theorists and researchers (Bruner, 1996; Pellegrini, 1996; Valsiner, 1997). This view of the child is also reflected in *Aistear*, which, while acknowledging the importance of creating a sense of individual identity, also recognises how intrinsic relationships and interactions within the home and educational environment are for development and growth. Moreover, the environment within which children learn and how they interact with each other and adults within those environments are firmly emphasised. This is different than traditional maturational (Gesell, 1925) theories of child development or indeed the developmental paradigm exemplified in the work of Piaget (1959), among others, which while recognised by many as providing useful signposts for practitioners and parents alike, lacked space for cultural sensitivity, individual difference or the consideration of the multiplicity of concentric circles within which humans and children live and learn.

### 1.3 Background to the Research

In *A Window on Early Education in Ireland: The First National Report of the IEA Preprimary Project*, Hayes and O’Flaherty and Kernan (1997) highlighted the need for, and utilization of, early childhood care and educational arrangements in Ireland for four-year olds, as well as exploring the quality of the child’s experience in these settings. Furthermore,
the role of care and educational arrangements in child development was considered. A total of 396 children formed the sample. These children came from designated disadvantaged and non-designated disadvantaged schools and preschools in 23 different Irish counties in 1993 and 1994. The follow-up report on the Preprimary Project (Hayes & Kernan, 2001) presented data from when the sample were seven years old (in 1997/1998) in order to get a picture of their family life, school experience and developmental outcomes as they grew older. Therefore, a rich database of information pertaining to the familial, educational and developmental experiences of a final sample of 374 Irish seven-year olds was established, which was noteworthy for many reasons. Firstly, such a large-scale longitudinal tracking of Irish children had not previously been attempted and secondly, detailed research on early childhood settings in Ireland was rare if not almost unheard of (Hennessy & Hogan, 2000). The cross-national data analyses that arose out of the overall IEA Preprimary Project were published in monograph form and to date six international monographs have been published (Olmsted & Weikart, 1989; Olmsted & Weikart, 1994; Weikart, 1999; Olmsted & Montie, 2001; Weikart, Olmsted & Montie, 2003; Montie, Xiang & Schweinhart, 2007). The latter monographs prove insightful for this thesis due to the fact that they present analysis on early educational issues in up to fifteen countries, including Ireland. Thus, it is possible to consider how Ireland compares globally in terms of items such as teacher training, parental involvement or classroom resources. This, in turn, informed the conceptualization process when it came to embarking on a study of the relationship of educational factors to developmental outcomes in a singularly Irish context.

1.4 Rationale for the Current Research

The current study aims to build on the IEA Preprimary Project by investigating the relationship of children’s experiences at age four to their development (cognitive, social, academic, physical and language) at ages seven and sixteen, by using the data collected for
the two Irish publications of the Preprimary Project (Hayes, O’Flaherty & Kernan, 1997; Hayes & Kernan, 2001). The scale of the data that was collected in the Irish phases of the IEA Preprimary project and the size of the sample used marked the project out as novel and exciting at its inception in the early nineties. It provided rich and varied information about what four year olds and seven year olds were doing in Irish preschools and schools. Furthermore, it considered the children’s family context, which was in line with expert knowledge in the area of developmental research. The addition of a further longitudinal strand for the PhD research is justified if it is considered that there has never been an opportunity to track the patterning of early education outcomes over twelve years in Ireland. For the purposes of the PhD research, data was collected in 2007 from a follow-up sample (n=110) of the original Age 4 and Age 7 sample and outcome measures included Age 16 educational outcomes on state Junior Certificate examinations, in addition to measures of social development, extra-curricular and school activities. Positive educational outcomes continue to be a concern for society and policy-makers and researchers alike have called for findings that can shape and guide continued investment in education. This study has produced findings that will not only increase national knowledge of longitudinal early educational outcomes but that could inform future research directions and given the thesis’ basis in an international study, provide a point of comparison for international knowledge on best practice.

1.4.1 Aims and objectives of PhD research

The research question is;

− What are the home, environmental and/or individual variables (at Ages 4, 7 and 16) that predict academic outcomes at ages 7 and 16

and

− How do these predictors relate to academic outcomes at Age 16?
1.5 Organisation of the Thesis

This thesis is organised into seven chapters. This chapter introduces the main aim of the thesis, giving a brief background to the research problem, the rationale for the study and the research questions which drive the study. Chapter 2 locates the research within historical and contemporary theories of child and adolescent development and, in doing so, arrives at a theoretical model for the consideration of child and adolescent development over time that is primarily bio-ecological (Bronfenbrenner and Morris, 1998). In this model, the importance of the individual as the starting point for development, as well as being the channel through which change is exhibited, is firmly emphasized. The mechanisms that inform how and why this change occurs are considered in Chapters 3 and 4 respectively. Chapter 3 encapsulates the macro-level of the bio-ecological model and, in addition to identifying key aspects of the national policy context, posits how these policies influence or act as barriers to development for the participant sample. Chapter 4 comprises a literature review of early educational and developmental research and seeks to identify key features of home, ECEC and school experiences that contribute to positive educational outcomes for children and young people in the short and longer term. In doing so, this chapter reflects the inter-linking layers of the bio-ecological model, with children being considered as active participants in the learning process, while also being guided and shaped by those with whom they interact at home and within educational settings, over time. Chapter 5 introduces the research sample, in addition to outlining the conceptual framework, the instruments used, and the methods undertaken to gather and analyse the research. In this chapter, limitations are discussed and identified, in addition to a discussion of the ethical considerations. Chapter 6 presents the results of the research, beginning with descriptive statistics of the sample at Age 4, 7 and 16. Age 4 data includes the outcomes for the sample in relation to how they spent their time when in early educational settings using the observational data presented under Management of Time,
Child Activities, and Adult Behaviour. *Age 7* data included measures of child development at *Age 7*, in addition to some teacher-rated measures. *Age 16* data was presented in terms of educational outcomes on state Junior Certificate examinations, in addition to measures of social development, extra-curricular and school activities. The outcomes of regression models are presented in this chapter and used to demonstrate if, and how, early educational experiences predict outcomes in the short and longer term. Chapter 7 discusses the significance of the findings, contextualising them within the wider exosystem and chronosystem of a changing Irish educational system amid social, cultural and economic changes. It sets out recommendations for policy makers, researchers and practitioners alike, with a guiding principle of improving educational outcomes for children and young people in Ireland.
In its most fundamental sense, development is about change. Regardless of theoretical approach or framing ideology, it is generally acknowledged that when we talk about development we are talking about a means by which change comes about. In the case of human development, the concept relates to change within a human being, whether it is physical, emotional, cognitive, or behavioural. The multiplicity of the types of change that may occur in humans is due to the different types of change processes that interact to bring change about. Transformational change results in the emergence of novelty (Overton, 2006) and is commonly referred to as qualitative change, given that the change that has come about is discontinuous with previous development and could not solely be labeled additive (Overton & Reese, 1981). Conversely, variational change exists on a continuum, has a linear trajectory, and is about a skill or ability becoming more precise and accurate. When transformational and variational changes are considered in relation to each other, they each complement each other in the formation of a unified concept of developmental change. As Overton puts it, “Transformational systems produce variation and variation transforms the system” (p. 28). To understand change, is to understand that it is, to a certain extent, always happening and furthermore, that it does not always happen in the same way and to the same degree. Charles Darwin has long been hailed as a key figure in the creation of a discrete psychology of development and his contribution to the field has been described thus, “Partly as a result of the publication of On the Origin of Species in 1859, the notions of temporality, historicity, and open-ended development began spreading through nineteenth-century science and letters” (Dixon & Lerner, 1988, p. 251). The concepts of change and development came to be increasingly considered in the context of human and individual development, given that, as Darwin had implied, “there was descriptive and explanatory continuity between human and animal at a given point in time, and if this continuity could be
extended longitudinally through childhood, then the adult of the species was, at least in part, a product of the child” (Dixon & Lerner, 1988, p. 251).

2.1 The Evolution of Child Development Theory

It has been claimed that historically, childhood did not always exist (Ariés, 1962). Certainly, children existed, but in many cultures and periods, children were not differentiated from adults in legal or occupational terms. Rather, the modern concept of childhood is something that has developed within Western culture from the late 19th and early 20th century. The field of child development is approximately 100 years old and has undergone considerable fluctuations in the past century as the criteria used to determine topics of interest change as a function of changing environmental conditions.

Alfred Gesell (1928) pioneered the systematic observation of children at different developmental stages, indicating to other researchers that children’s behaviour was worthy of such intense examination and furthermore, that precise charting of observed characteristics was the way forward for child research. Gesell was likely to have been strongly influenced by Darwin (Santrock, 2006) who published extensive observations on his young son, which some regard as having contributed to our current understanding of child development (Elkind, 1976; Marchand, 2012; Overton, 2013). Certainly, Gesell’s contention that children simply bloom with age because of a biological, maturational blueprint had something in common with Darwin’s blueprint for human development. At the very least, it is undeniable that Darwin’s evolutionary theory informed subsequent researchers such as Baldwin (1895) and Stern (1938) who linked evolutionary and individual developmental processes. In the case of Baldwin, his proposal of a process termed “organic selection” offered an alternative to Darwin’s position that the sole function of the environment is to select from what is provided by the genome. Rather, Baldwin proposed that there was a possibility of phenotypic adaptation coming to be replaced by a genetic
mutation. His explicit linkage of children and evolution was documented in his major work, *Mental Development in the Child and the Race* and reflected a move towards the study of human development, which was beginning in the late 19th century. Indeed, many recognise Baldwin as the first scholar to attempt to use developmental ideas to bridge the gap between sociology and psychology (Lerner, 2006).

2.1.1 From structuralism to constructivism in child development theory.

One scholar that identified with and capitalized on the linkages made by Baldwin was the Swiss psychologist Jean Piaget, who dominated the field of child development for a considerable period of the twentieth century. Piaget was perhaps most noted for explicitly linking children’s thinking with their learning and development. He offered an account of universal stages in human development and detailed specific cognitive advances, while also providing an explanation for the temporal and mental occurrence of such advances by organizing them into age-related stages. During the sensorimotor stage from birth to two years, Piaget theorized that the infant progressed from reflexive, instinctual action to the beginning of symbolic thought as a means of understanding the world and coordinating sensory experience. The preoperational stage was posited as lasting from two to seven years of age and coinciding with the beginning of formal schooling. Piaget regarded this stage as being characterized by the child’s attempt to represent his/her experience of the world with words and images. At age seven through to eleven, Piaget surmised that the child could begin to reason logically about concrete events and display the ability to classify objects and information into different sets. In Piaget’s final stage of cognitive development, the child moves into adolescence and has developed the ability to reason in abstract and logical ways, while becoming more idealistic in thought pattern. Piaget undeniably made a significant contribution to a contemporary understanding of child development by demystifying the cognitive processes that allow developmental change to come about. He has been criticized for his lack of attention to contextual details such as culture, social interaction and emotions but
this so-called oversight might better be conceptualized as, “an explicit choice of focus” (Suizzo, 2000, p. 848). Dasen (1984) has replicated Piagetian experiments in different countries and has reviewed cross-cultural neo-Piagetian research and while he admits to there being a significant amount of variance in child performance, particularly in relation to age of skill attainment, he nonetheless concludes that, “it remains that concrete operational reasoning has been found worldwide” (Dasen, 1984, p. 424). Bjorklund (1997) similarly conceptualizes Piaget’s contribution as being in terms of the data his studies unearthed. He concerned himself with concepts such as object permanence, the conservation of physical quantities and knowledge of numbers, all of which are undeniably related to children’s developing understanding of their physical environment. Piaget’s real triumph may have been “studying cognitive problems that all members of our species face” (Bjorklund, 1997, p. 147). His notion of the child as an active constructor of knowledge through the mediation of cognitive and schematic mechanisms affords contemporary researchers a sound base for conceptualization of the representation and organization of human experience. Children assimilate knowledge through accommodating new information that they receive through active engagement with their world. Learning, therefore, from a Piagetian viewpoint is constructed by the child and stimulated by the presence of tasks to solve.

2.1.2 Dynamic theories of child development.

It has been suggested that cognitive development may be the missing link in the evolution of human behaviour (Cosmides & Tooby, 1987). Cosmides and Tooby have focused on the evolution of the information-processing mechanism as being a key step towards human adaptive behaviour. Within this theory, human thought is conceptualized as having evolved in order to solve problems brought about by the environment. An important implication is that when humans are put in situations that are not similar to the conditions which stimulated information-processing and therefore adaptive behaviour (i.e. evolution through natural selection), their
performance may not be optimal. Bjorklund & Pellegrini (2002) have applied this concept to an analysis of the formal schooling system and caution that children’s difficulty with many school-related learning tasks should be seen as the norm rather than as a problem, if it is considered that human information processing was developed long before the existence of anything even resembling a classroom. This does not mean however, that classroom-based learning has no place in an evolutionary view of child development. Rather, it may be accommodated in a theoretical viewpoint such as that of Geary (1995), who classifies cognition into biologically primary and biologically secondary categories. Geary regards biologically primary cognitive abilities as being natural and shaped by evolutionary processes to the extent that they generally develop inherently and without a huge level of effort from the child e.g. language acquisition. Those abilities that belong to the biologically secondary category, however, tend to be determined by the culture and involve the use of primary abilities in ways that initially seem novel and unnatural e.g. learning to read. While some might argue (as an indictment of the formal school system, for example) that cognitive abilities that are culturally determined in a situation such as the formal schooling system are somehow less valuable and relevant than biologically primary or evolutionary abilities, it is important to remember that the construction of such abilities is reliant on the use of the building blocks of the biologically primary abilities. Culturally determined, biologically secondary cognitive abilities are made possible only through the adequate development and combination of biologically primary cognitive abilities. Their complex combination marks a type of development in itself and, I believe, attaches a high level of importance to the study and understanding of situations such as the formal schooling system.

2.1.3 Social learning theory in child development.

Geary’s description of culturally determined, biologically secondary cognitive abilities may have been influenced by the work of Lev Vygotsky, who drew a social and cultural view of child concept of learning into sharp focus. In contrast to Piaget, he emphasized the link between socio-
cultural factors and the development of a child’s education and in doing so, significantly influenced future researchers (Lave, 1991; Palinscar & Brown, 1984; Rogoff, 1990; Tudge, 1992; Valsiner, 1988). Vygotsky’s (1962) zone of proximal development (ZPD) introduced the notion of “context”, specifically the context of social interaction with peers or a trained adult as a valid concept in the study of children’s development and undoubtedly turned the focus from the individual child alone towards the individual child as a developer within a community of other developers. The ZPD was imagined as a hypothetical, dynamic region in which learning and development takes place. Criticisms of the concept of the ZPD have been targeted at its hypothetical formulation and lack of specificity (Valsiner, 1997) and also at its interpretation as a concept which emphasised the importance of adult participation at the expense of child activity and involvement.

In terms of child development in the home or classroom, Vygotsky focused attention on, “the teaching-learning process (as it guides the child toward overcoming the present state of being, through a process of relying on presently existing psychological functions in the service of developing novel ones) (Valsiner & Van de Veer, 1991, p. 38). He underlined the importance of fitting the introduction of scientific concepts in school with the previous potential readiness (based on the development of everyday concepts) of the child (Vygotsky, 1933/1935). The process of scientific learning from a Vygotskyian perspective happens when the scientific concepts are theoretically introduced, “from above” to reorganise the structure of everyday concepts that have developed previously, “from below.” Thus, the learning process becomes one which is social, first and foremost, and individual, secondly. Neither the social aspect nor the individual are entirely responsible for learning, when it occurs, rather both contribute in a social constructivist model, which marks a movement away from a simple cognitive construction model of learning, favoured by Piaget. Ultimately, Vygotsky contributed to a contemporary understanding of cognitive development by stimulating interest in the view that knowledge is
 situated and collaborative (Rogoff, 2003). This fact has important implications for those who find themselves situated with young children, be it teachers, parents or carers because it underlines the inherent power that they have to collaborate with the children in a way that will stimulate learning. Current development and learning models tend to advocate an amalgamation of cognitive and social aspects, at the expense of neither and in the hopes of providing a wider, more comprehensive model with which to understand and support development.

Rogoff has developed the zone of proximal developmental concept in an interesting way. According to her concept, development occurs both due to a culturally aware and goal-oriented adult guide and due to a child who is active and goal-oriented. This development takes place due to the “event” (i.e. the interaction between the guide and the child) and is reliant on the different roles adopted by each, given that the guide has more knowledge and skills, forming a sort of cultural apprenticeship for the child. This joint action process is guided by meanings and purpose (Rogoff, 1990), and can be studied adequately only in the dynamic form of processes that lead to the unfolding of events. Therefore, the child may demand a task that has some meaning for them. Tasks have meaning for children if they are correctly pitched by an adult at children’s age-and stage appropriate developmental level. Such a process was described by Ellis and Rogoff as involving an adult guide supporting or suggesting a task that they know is “comfortable-yet-challenging” (Ellis & Rogoff, 1986, p. 315) for children. There are echoes of similar concepts in the work of Lillian Katz, whose (1993; 1995; 1999) discussion of the normative and dynamic nature of child development has contributed significantly to the current understanding of child development theory and practice. The normative dimension concerns the typical or normal capabilities as well as limitations of most children of a given age within a given cultural milieu in much the same way as Geary describes biologically primary abilities. Normative development, therefore, is that development which is typically expected of a given child at a given age based on the knowledge that the child’s cultural milieu has built up from biological, social, and
educational expertise. Dynamic development refers to the sequence and changes that occur in all aspects of the child's functioning with the passage of time and increasing experience, and how these changes interact dynamically (Saarni, Mumme, & Campos, 1998). However, the very consideration of a dynamic dimension of development problematises the notion of normative development, according to Katz (1999), because it raises, “questions about what children should or should not do at a particular time in their development in light of possible long-term dynamic consequences of early experience” (p.1). In other words, Katz sounds a note of caution with regard to overly prescriptive early education models, which demand specific learning goals such as reading achievement or mathematics ability from children, rather she points towards the dynamic process of development as being the goal. Children may benefit more from learning in a particular way than from learning a particular thing, given that how they learn will inform their future learning experiences. What they learn may be of value mainly in terms of reflecting the achievement of culturally approved developmental milestones. This kind of distinction becomes particularly important if considered in light of minority populations that may not share the standards, goals and advantages of the powerful majority population in society, yet who might have children who are being educated within an education system that it is administered and designed with the majority population in mind. How these minority children learn within this context may be of more use than what they learn, in terms of long-term goals and achievement.

2.1.4 From social constructivism towards contemporary theories of child development.

Bruner (1966) held a constructivist view of child development and learning, although he went further than Piaget by examining the process through which the knowledge-stimulating problems are presented to children. He argued that problem-solving situations did not just present themselves suddenly to children who were working alone in the learning process. Rather, knowledge about the processes that stimulate learning is held by adults who transmit this knowledge to children through the framing medium of culture. Bruner argued that a theory of
instruction should address four major aspects; predisposition towards learning, the ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner, the most effective sequences in which to present material, and the nature and pacing of rewards and punishments. An adult guide, therefore, may facilitate child learning by presenting learning tasks with suitable content in the context of the child’s existing cognitive level. Specifically, in the case of language acquisition, an adult’s child directed speech may be adapted to support the process. Bruner’s concept of a Language Acquisition Support System (LASS) proposes a system where adult support is intrinsic to child language development. Wood, Bruner & Ross (1976) termed interaction of this kind as scaffolding. The metaphor of scaffolding has been criticised, particularly when it is interpreted as a process weighted towards an active adult expert at the expense of the social and interactional dimension of the process (Meadows & Cashdan, 1988; Rogoff, 1998), but the argument has moved on in recent years.

In his more recent work, Bruner has addressed the concept of intersubjectivity, whereby an adult expert and novice child pay joint attention to a task and yield shared understanding (Bruner, 1996). Now, terms such as sustained shared thinking (Siraj-Blatchford, 2007; 2009), or dialogic teaching (Alexander, 2004) or dialogical enquiry (Wells, 1999) are increasingly used to describe the aspects of joint activity and thinking inherent in positive and educationally supportive adult-child interactions. Moreover, the emphasis now is on the importance of ‘emergence’ of learning and thinking, not simply as a result of the sustained and shared interactions with adults but also as function of the restructuring of children’s thinking patterns, which are determined by children themselves and by the creative processes that they use to reach impressions and structure their experiences. Siraj-Blatchford (2009) argues that the process of sustained shared thinking is valuable to a child beyond the years spent in early educational settings, offering as it does, a blueprint for interactions with peers, teachers and work colleagues. She comments that,

In terms of competence, progression goes from mastering the very informal and strongly
improvised **sustained and shared** interactions to more highly structured and much more formal **sustained and shared** interactions in adult life (Siraj-Blatchford, 2009, p. 6).

In arguing for sustained shared thinking as a higher order pedagogical concept, Siraj-Blatchford (2009) underlines the potential it has for smoothing transitions across phases and contexts, thereby benefitting children as learners in their early educational and school contexts in the short to medium term and laying strong foundations for their transitions into and throughout adult life.

### 2.2 Developmental Theories of Adolescence

A key transition for humans is the transition from childhood to adolescence, which coincides in many cultures with the transition to secondary schooling. Ever since G. Stanley Hall began to devote attention to the study of adolescence, it has grown into a discrete discipline within modern psychology. As one of the founding fathers of psychology in the United States, Hall’s theories on adolescence (1916) served to establish at the very least, that adolescence could be distinguished as a developmental period in its own right and at the most, through his belief in the plasticity of adolescent development, that human development was contextually determined. Hall, like many others, was inspired by evolutionary theory and displayed a remarkable insight into the emotional processes that occur during adolescence in his exposition of 12 opposing emotions that adolescents experience, which may have gone on to influence other researchers in the field. Certainly, Margaret Mead (1949) was aware of Hall’s thesis when she contributed to adolescent developmental theory by challenging the universality of Hall’s “storm and stress” notion of adolescence. Her work with Samoan teenagers led her to claim that Western civilization posed more demands for teenagers than Samoan culture did, thus resulting in a higher level of emotionally disturbed behaviour. While her work has been the subject of much criticism, particularly from a fellow anthropologist named Derek Freeman (1999), Mead did make a notable contribution to the study of adolescence that was in a similar vein to the contribution that
Hall had made earlier. Specifically, Mead highlighted the fact that negative behaviour and emotions in adolescence may be determined by context, particularly by the framing influence of the cultural milieu and many other factors in their daily lives.

Similarly, cognitive theorists have had their part to play in an integrative construction of adolescence. Since cognition does not occur on its own, a single cognitive theory of adolescence as posited by theorists such as Inhelder and Piaget (1958) and later Elkind (1967) may not be sufficient to account for entire realm of developmental outcomes that occur during adolescence. Rather, they are useful to explain aspects of adolescence, in the case of Piaget, by accounting for an increased ability to reason and “think about thinking” and in the case of Elkind, to explain the adolescent tendency towards feelings of uniqueness and invulnerability. The cognitive processes thought to be at work in Piaget’s conceptualisation of adolescence was the transition from concrete to formal operational thinking, which involved an increasing ability to think about abstract ideas and concepts. Elkind’s theory included a suggestion that adolescents often held the false belief that an audience existed that examined their behaviour and existence as rigourously as they examined themselves. Elkind also posited that adolescents over-differentiated their feelings from those of others, which resulted in the mental construction of a personal fable in which the adolescent becomes the important focus to the point of exclusion of others. In a broad sense, cognitive theories of adolescence underline the fact that differences at the individual level (which have been mediated by biological and thus mental processes) are as important to an understanding of adolescent development as any other single theory. A meta-theory approach that emphasizes integration versus reductionism and that draws on the best work of numerous researchers in multiple disciplines seems to be the key to creating an epistemology of adolescence. In such a creation, adolescents become thinking, feeling, social and acting beings who are paradoxically both culturally-determined and individually free. At the very simplest level, they are a simple biological phenomenon, yet at their most complex they are multi-faceted individuals who are in possession of evolving potential due to an increase in their capacities in
both level and range. Any attempt to capture the reality of their experience must first be reduced to some smaller aspect of experience, much in the same way that protons, electrons and neutrons were necessarily isolated in order to capture the actuality of an atom. Many contemporary developmental theories share this emphasis on the layers or subsystems that interact to contribute to and determine development.

2.3 Contemporary Developmental Theory

As noted in the preceding section, contemporary developmental systems theories are notable for a movement away for the dichotomisation of components of human development (nature versus nurture, continuity versus discontinuity or stability versus instability). Rather systemic syntheses and integration are emphasized by theorists who reject Cartesian dualism and the one-time tendency towards the reductionist partition of the developmental system (Lerner, 2006). This anti-split metatheory has significant implications for the field, through the furthering of a multidisciplinary approach to epistemology. Given that to reject all splits between the components of the ecology of human development is to predicate a system based on integration of such components, modern developmental theories are essentially relational in both content and construction. Inherent in the emphasis that is placed on the fusing of different levels of organization is the necessity for broad collaboration among scholars from multiple disciplines who serve to act as representatives of the different organizational levels contained within the system.
2.4 Resilience as a Developmental Concept

A concept that has encapsulated the ecological, environmental, relational yet individually determined nature of human development quite neatly is the emerging concept of resilience as it applies to the range of human developmental trajectories, be it social, cognitive, language or biological. Popular interest in the notion of resilience as a biological and genetic construct reflecting positive or negative adaptation to the environment perhaps first began with the publication of Darwin’s *On the Origin of Species*. His ideas on natural selection, which accounted for the survival of certain members of a species while other members perished, catapulted the figure of the resilient survivor into the world of biological science. This interest was partly based on the inference, which was supported by fossils and subsequent research, that what Darwin had observed in different plant and animal species was applicable to all life forms, including humans. Embedded in Darwin’s evolutionary framework is the idea of an ecological sub-system, within which the species (be it equus caballus or homo sapiens) lives successfully through adaptation or dies due to maladaptation. In evolutionary terms, therefore, resilient members of a species display adaptive abilities in the face of change, thus ensuring the propagation of their species in the future. Darwin’s extensive travels brought him to study ecological systems that consisted variously of coral reefs or volcanic islands yet what was important about them was not particularly their exotic location, rather the fact that they were discrete environments that allowed for the study of both negative and positive features that may have been present.

Holling (1973; 1996) expanded on the topic of resilience as it applies to biological ecology by explaining the relevance that it has for the functioning of systems. His theory holds that ecosystem resilience is the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary. Resilience in social systems
has the added capacity of humans to anticipate and plan for the future. In his seminal work in 1973, Holling remarked that, “the resilience framework does not require a precise capacity to predict the future but only a qualitative capacity to devise systems that can absorb and accommodate future events in whatever unexpected form they may take” (p. 21). The concept of adaptive capacity is central to the functioning of a resilient ecosystem and one of the key tenets of adaptive capacity is learning to live with change and uncertainty. Not surprisingly, Holling’s work has informed theory and research in a diverse range of disciplines from engineering to economics to sociology and psychology.

2.4.1 Early human resilience theory.

The seeds for the modern version of the concept of resilience theory as it applies to the disciplines of psychology, psychiatry and social work were sown by pioneers such as Emmy Werner, who wrote about the concept of resilience from the seventies onwards. She (Werner & Smith, 1977) is perhaps best known in the field of child development for marrying a psychological concept of resilience to child development theory through her leadership of a thirty year longitudinal study of 698 infants on the Hawaiian island of Kauai—the island's entire birth cohort for the year 1955. Moreover, as the longitudinal nature of the study allowed for the tracking of the sample from birth through to adulthood, the temporal dimension of resilience (as a function of environmental factors over time) became established. In psychological research, the term resilience has been variously used to describe hardiness and invulnerability in an individual or group of individuals or the capacity for successful adaptation to a changing environment. However, what is perhaps most noteworthy about the term is the manner in which it is linked to the interaction of protective factors and risk factors. Most psychological iterations of resilience place a strong emphasis on the interface between such factors, identifying their interplay as “a dynamic process encompassing positive adaptation within the context of significant adversity” (Coleman & Ganong, 2002, p. 101). Thus, while resilience may be defined as an outcome of
significant negative processes, to merely conceptualise it in this way is an over-simplification according to some researchers (Olsson, Bond, Burns, Vella-Brodrick & Sawyer, 2003). Rather, as with the various biological, mechanical and economic definitions of resilience, and in line with contemporary theories of development and change, it is best to consider it as a multi-factorial concept.

2.4.2 Resilience as a multi-factorial concept.

The relationship between human beings and adversity is neither linear nor unidirectional. In developmental terms, positive and negative factors may occur within the individual (e.g., neurobiological disorders, cognitive skills, etc.), within the family (e.g., parental alcoholism, role flexibility, etc.), within the community (e.g., a dangerous neighbourhood, self-help groups), or within larger social and environmental systems (e.g., poverty, racism, affirmative action legislation, etc.). In developmental research, the concept is an attempt to account for the fact that some families facing adversity produce children who exhibit positive child outcomes, while in other families facing similar problems, children’s development can be seriously impaired (Mackay, 2003). Resilience is usually conceptualised along family lines in ecological research, particularly when looking at developmental outcomes for young children. However, resilience may be a more personal construct, which although influenced by the environment (in the shape of events or relationships with others), can also be actively shaped and formulated by an individual and by his/her perceptions of the environment. The ecological balance of interacting systems in our lives is dynamic (Germain, 1991). It is constantly changing as individuals and larger social systems are bolstered by good fortune and challenged by adversity. Similarly, protective factors, and risk factors within a given ecosystem are dynamic. They are not fixed attributes (Rutter, 1987). Rather, their effect is evident only in the context of their interaction, the larger context in which this interaction occurs, and the meaning of a particular factor to a given individual. There is growing recognition therefore, that resilience is multidimensional and
multidetermined, and can best be understood as the product of transactions within and between multiple systemic levels over time (Walsh, 1998), much in the same way that Bronfenbrenner outlines the interactions within and across levels in his bio-ecological model.

2.5 The Bio-ecological Model of Development

It is the work of Bronfenbrenner that has contributed most over the years to the study of ecological (Bronfenbrenner, 1977; 1979; 1986; 1989) and later bio-ecological development (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998). His bio-ecological model is an evolving theoretical system for the scientific study of human development over time (Bronfenbrenner, 2005). On one level the model addresses the occurrence of continuity and change in human development and on another, it focuses on the development of scientific tools such as theoretical models that are anchored to research designs, with which to investigate continuity and change. His theory evolved over time moving from its original incarnation to one that placed more emphasis on the role of the individual and paid more attention to developmental processes. Proximal processes were drawn more sharply into the focus in his writings spanning the years 1993 to 2006, in the Person-Process-Context-Time model, which he proposed as a way to use the model in research design and culminating in what became known as the bioecological model of human development and/or the biological theory.

In its inclusion of a wide range of contextual factors that also allow for the pervasive influence of biology and the reciprocal interaction between contexts, Bronfenbrenner’s latest model is perhaps the best framework in which to consider the development of a child in the contexts of school, home and society. Firstly, the child is not considered as a tabula rasa but rather as a thinking, dynamic being that progressively moves into and restructures the surroundings in which it finds itself through the mediating relationships that build up between contexts (mesosystem). These contexts are in turn modelled as nested layers moving from the individual level
(microsystem) out towards, and influenced by, family or school (exosystem) and cultural ideologies (macrosystem) within the context of the progression of time as the child matures from childhood into adolescence (chronosystem). This most recent iteration has been termed a bio-ecological model of development (Bronfenbrenner & Morris, 1998) and is noteworthy for its consideration both of process effects and of the human as a biological organism. The acknowledgement of bio-psychological concerns is a testament to what Rutter (2002, p. 457) terms the “genetic revolution,” which showed the importance of genetic influences on all aspects of human development. Rosa & Tudge (2013) comment that it was also influenced by the work of Elder (1974) on the Great Depression and Steinberg, Darling & Fletcher’s (1995) work on the effects of parenting on adolescent outcomes. In the new model, the importance of the individual as the starting point for development, as well as being the channel through which change is exhibited, is firmly emphasised. Therefore, the child’s own traits and genes may act to shape his/her individual development over time by acting as the precursors to later development. In other words, characteristics of the Person appear twice in the bio-ecological model, first as an indirect producer of development and later as a product of development (Bronfenbrenner & Morris, 2006). The child may display Person characteristics that influence development and exist in the form of dispositions, resources or demand characteristics. These three characteristics are also incorporated into the Microsystem if it is considered that individuals, who interact with the children on a daily basis and therefore participate in their lives and development, will also possess certain Person characteristics.

Bronfenbrenner includes proximal processes in his bio-ecological model of development. These are characterised as being the primary mechanism in human development and the degree to which they influence development is theoretically mediated by the characteristics of the individual, the degree of proximity between the individual and the environment in which the
processes are occurring and the time in which the processes are occurring. In defining the
construct of proximal processes, Bronfenbrenner & Morris (2006) identified some key features;

- For development to occur, the person must engage in activity
- To be effective, the activity must take place on a fairly regular basis over an extended
  period of time
- Activities that take place over an extended period of time have the opportunity of
  becoming more complex, thus are more likely to cause some form of change
- Developmentally effective proximal processes must not be unidirectional
- Proximal processes are not limited to interactions with people, they can involve
  interaction with symbols and objects
- Proximal processes are influenced in terms of content, timing, and effectiveness as a
  function of the changing characteristics of the developing person. Therefore, proximal
  processes must increase in complexity and range as human potential evolves but this may
  result, as adulthood approaches in a slowing of developmental pace. Similarly, significant
  others (which can mean parents, teacher, friends, lovers, colleagues) can mediate
  proximal processes through regular, sustained interaction with an individual.

Just as humans are inseparable from time, so too was time inextricable from Bronfenbrenner’s
later theories of human development. His earlier incarnation of the chronosystem (1988) was
broadened to include what Rosa and Tudge (2013) term, “ontogenetic and historical time” (p.
254). In the bioecological model, the individual’s life course is situated and shaped by conditions
and events that occur during the historical period during which a person is alive. The influence of
time on the individual depends on the continuity and discontinuity in the proximal processes
surrounding an individual, the frequency of such processes and changes in society, within and
across generations.
2.6 Research Implications of Contemporary Developmental Science

Lerner (2006) posits that the key question for researchers interested in describing, explaining, or aiding human development is actually five interrelated “what” questions:

1. What attributes (?) of
2. What individuals (?) in relation to
3. What contextual/ecological conditions (?) at
4. What points in ontogenetic, family or generational, and cohort or historical, time (?) may be integrated to promote
5. What instances of positive human development?

Such a multiplicity of questions can best be answered through a multi-faceted approach to methodology. A longitudinal design is necessary to ensure that the methodology is change-sensitive (Cairns & Cairns, 2006), while diversity-sensitive measures allow for the richness of inter- and intra-individual differences, ranging from developmental status to family and neighbourhood differences to societal differences. Bronfenbrenner (1979) states that, “In ecological research, the principal main effects are likely to be interactions” (p. 38), therefore underlining the importance of allowing for the possibility of such interactions in the construction of an ecological research design. Moreover, when considering the impact of proximal processes on developmental outcomes, the effects of the given proximal processes will vary depending on the developmental outcome. In disadvantaged samples, the greater developmental impact of proximal processes is to be expected for outcomes reflecting dysfunction. Conversely, in more advantaged and stable environments, proximal processes are posited to have greater developmental influence on outcomes that reflect competence. A corollary of this is that where proximal processes are positive in disadvantaged populations, the net effect of the process may be a reduction of the level of dysfunction exhibited by participants rather than the sudden occurrence of competence. Practical implications of such hypotheses exist in terms of parental behaviour and capacity to meet the needs of their
children; in disadvantaged populations, positive parental processes can have a positive influence simply through a mediation of the levels of dysfunction displayed by their children. In advantaged populations, it seems, positive parental processes have most influence on levels of competence displayed by their children, through skills promotion and learning development. However, it is important to note that the positive effect of parental processes is likely to have been itself influenced by the interlinking positive contexts of family background, economic level and neighbourhood environment, all of which are associated with more advantaged status.

Fabes, Martin, Hanish & Updegraff (2000) advocate utilising a researcher-in-context model to understand the trajectory that the field of developmental psychology has taken to the present day. In the late nineteenth century, researchers in the Child Study movement focused on real-world problems of children and studied them in a naturalistic context, which could be attributed to the power of the macrosystem above all other systems. With a move towards experimental methodologies, the Microsystem of the researcher became more relevant, as many researchers worked in laboratory settings, isolated from the influence of the outside world in the form of the exosystem. After the Second World War in the United States, macrosystem effects introduced an emphasis on mental illness through the mediation of two economic changes (Seligman & Csikszentmihalyi, 2000). The first, the founding of the Veteran's Administration, meant that thousands of psychologists could make a living treating mental illness. In 1947, the National Institute of Mental Health was also founded to provide grant aid for the study of mental illness, which meant that many academics in the field of psychology began to conduct research about pathology. However, the civil rights movement of the 1960s and 1970s brought about another sea change, by introducing the exosystem to the forefront of developmental practice, as researchers were faced with social and economic injustice on a large scale and were tasked with ameliorating the phenomenon through targeted research initiatives. Increasingly, economic growth has contributed to a
business model of developmental research, whereby researchers are encouraged to pursue research interests that are deemed to be of interest to investors; the emergence of the notion of social capital and the cost-benefit models of educational intervention being examples of the phenomenon. Ultimately, however, contemporary developmental researchers on the whole, aim to apply their expertise to improve the lives of adults and children by encouraging and ensuring the emergence of optimal developmental outcomes. As Seligman and Csikszentmihalyi (2000, pp. 7-8) note, “The major psychological theories have changed to undergird a new science of strength and resilience,” which is itself a function of the current exosystem framing psychological research. That this is currently possible is a testament to contemporary culture and the numerous historical changes that have brought developmental psychology to its current incarnation.

Summary

Detailed examination of educational achievement within the ecological subsystems of Irish society, community, family and education should serve to elucidate and unpack the multiplicity of factors that can influence educational outcomes. In seeking to capture the complexity inherent in development, this research will contribute to consensus about what matters for educational experiences for children and young people in Ireland. Drawing on Bronfenbrenner’s bioecological model of development and shaped by contemporary theories on child and adolescent development, the research adopts a lens encapsulating culture, biology, and time, which also focuses on relationships and interaction, within the system and across its interlinking layers.
CHAPTER 3

THE IRISH POLICY CONTEXT

If one is to understand the policy climate that existed during the Irish phases (1994-1997 and 1997-2001) of the IEA Preprimary Project and more importantly the climate that exists now, it is necessary to consider the key developments in the areas of ECEC and education policy in Ireland since the early 1990s. There has been an increased impetus towards establishing early education as a distinct and relevant field in recent years, with some estimating that the field has been progressing more rapidly at national level from the early nineties onwards (Walsh & Cassidy, 2006). Firstly, a general awareness of the benefits for all children of a good quality early childhood education seemed to be growing in both the research and public consciousness. Furthermore, early education was recognised as being an important factor in combating socio-economic disadvantage and was resultantly deemed to contribute to economic development, through the creation of human capital. Finally, changes in the labour force and the demand for increased numbers of workers by employers had put a strain on the childcare system by increasing the demand for, and simultaneously reducing the number of, childcare places. The need for good quality, affordable childcare was driven by a cultural move towards gender equality both in the workplace and the home. Hayes and Bradley (2006) posit that it was this context combined with increased availability of EU funding that yielded, “a more concerted approach by interest groups in Ireland for policy action” (p. 168) in the area of ECEC.

3.1 The Policy Context During the Age-4 Data Collection Phase (1994)

When *A Window on Early Education in Ireland: The First National Report of the IEA Preprimary Project* was published in 1997, the idea that care and education were discrete but
related was just beginning to take root in Ireland. That there had been a separation between the two in the public consciousness was partly due to the split in provision for the education of young children in Ireland. Moreover, the compulsory school starting age is six, but half of four year olds and nearly all five year olds attend State-funded primary schools under the auspices of the Department of Education, where they are educated by graduate primary school teachers. Since the 1970s, primary teaching in Ireland had been an all-graduate profession and entry to primary teacher education programmes is highly competitive (Greaney, Burke & McCann, 1987; Coolahan, 2004).

Children under six years of age who were not attending a national school or equivalent were defined as pre-school children and came under the aegis of a range of departments including Health and Social Welfare. The Minister for Health bore ultimate responsibility for preschool children under the terms of the Child Care Act (1991), which evidenced the divided nature of provision and policy on the education of preschool aged children. Pre-school settings were inspected by the Health Services Executive (HSE), which operated under the auspices of the Department of Health and Children, while, in contrast, infant classes in primary school were inspected by the Department of Education and Skills. In an indication of a divide between ECEC settings and primary school settings, which continues to this day, four-year olds who attended primary school followed the early sections of the Primary School Curriculum (1971), while their four-year old counterparts in preschool did not have to follow any curriculum at all. Moreover, there were strict qualification requirements for primary school teachers (a graduate degree) while their counterparts in the early years sector were not subject to any regulation in terms of qualifications.
With changes in the labour force increasing the demand for childcare places, it seemed likely, even inevitable, that parents would find themselves compromising on their choice of childcare with considerations such as educational provision losing out. When the first phase of the IEA Preprimary Project was being conducted in Ireland, the Child Care (Pre-school Services) Regulations, 1996 had not been published and preschool education lacked co-ordination and uniformity. There were some attempts to regulate the ECEC sector through the publication of the Child Care (Pre-school Services) Regulations, 1996 but those regulations were concerned mainly with structural quality indicators such as health and safety and did not address issues such as ECEC training requirements or indicators of high quality practice such as interactions, planning and activities. Critics of the 1996 regulations hit out at the focus on health and safety issues instead of areas that were important for child development and learning (Department of Justice, Equality and Law Reform, 1999; O’Kane, 2005; Schonfeld, 2007). The predominantly health and safety focus of the regulations was likely due to the fact that, at the time, responsibility for regulating the ECEC sector lay with the Department of Health and Children, who also had responsibility for looking after the welfare, safety and protection of all children (Hayes, 1995). Moreover, the regulations had no training requirement for staff working with children in settings, although some settings regarded the regulations as minimum standards. With the help of organisations such as the Irish Pre-schools and Playgroup Association (IPPA) and the National Children’s Nurseries Association (NCNA), many settings set up quality initiatives that superseded the state requirements as set down in the regulations (O’Kane, 2004). Such initiatives not only adhered to the regulations but also attempted to strive for high quality ECEC through up-skilling of staff and a focus on the importance of interactions between staff and children, in line with best international practice. Overall, the regulations could be regarded as a tentative first step in regulating
ECEC, which were as notable for their structural focus as for their omissions, particularly in relation to promoting high quality staff-child interactions and activities. A review of the regulations led to their revision and to the eventual publication of the Child Care (Pre-school Services No. 2) Regulations, 2006. While these regulations made more explicit reference to children’s learning (under Regulation 5), they were still regarded as minimal when it came to ensuring high quality early educational experiences for children in centre-based care. At time of Age 4 data collection, the sample were either attending ECEC settings with staff (ratio 1:10) who were not required to have any qualifications in early childhood education and care (although same may have had) or they were attending the infant class of primary school, where they had a degree-level qualified primary school teacher and ratios of 1:18.5 (Hayes, O’Flaherty & Kernan, 1997). In the ECEC settings, there was no set national curriculum and guidelines for the provision of appropriate activities were minimal. By contrast, children in the infant class of primary school were taught by teachers implementing the Primary School Curriculum (1971), which had not been reviewed for over twenty years. Nonetheless, it had clear guidelines for appropriate content to support children’s learning. While at the time of its inception in 1971, the Primary Curriculum had marked a step towards a more child-centred approach to education, this perhaps reflected the fact that the previous curriculum had effectively ignored child interests by placing insular and national concerns, such as mainstreaming the Irish language, at its core (Walsh, 2005; 2016; Horgan & Douglas, 2001). Sugrue (1997) noted that while the teachers of the curriculum endorsed a progressive child-centred pedagogy, practical evidence usually exemplified a more adult-centred, formal teaching approach. The slow journey towards child-centredness was to continue in state policy affecting the lives of children for many years to come. The differential policy approach to the education of four year olds depending on whether they were attending an
early years or primary setting raises important policy questions that the current research seeks to explore. If nothing else, the simple fact that the education and care of four year olds was handled so differently in policy terms (and still is) depending on whether children attended primary or ECEC settings draws the issue of smooth transition between early educational and primary settings sharply into focus. Moreover, it emphasises the lack of a children’s rights-based approach to policy making for the education of young children. This research is in a position to examine the extent to which macro-level differences such as qualifications of educators, curricular content and ratios made a difference to the educational outcomes of the current sample. The implications of the presence or absence of such differences is relevant for current and developing policy on children’s education.

3.2 Relevant Policy developments in Ireland since the publication of the second IEA Preprimary Project Report

In Seven Years Old: School Experience in Ireland, Hayes and Kernan (2001) pointed out that the period from 1994 to 1998 was characterised by a growing interest in policy that affected the lives of children, which might have marked the tentative first steps towards a child’s rights-based approach to policy reform. Reports such as Strengthening Families for Life: the Report of the Commission on the Family (1998); the Report of the National Forum on Early Childhood Education (1998); the National Children’s Strategy (2001) and the Report of the Partnership 2000 Expert Working Group on Childcare (1999) were all published in this period and created an optimism that those policy-makers who had the power to improve children’s lives would be spurred into action by the comparative proliferation of such relevant research. The White Paper on Early Childhood Education-Ready to Learn (1999) focused on the early educational needs of children from birth to six years and set down key
recommendations and objectives relating to the development of children in the home, the support of private and voluntary/community childcare groups and the quality of education in the infant classes of primary school.

The passage of time since the publication in 2001 of the second Irish report of the IEA Preprimary Project allows consideration of the degree to which, if any, the policy developments mentioned above and others since, have contributed towards a current policy framework. It still remains questionable as to whether Irish child-related policy has gone even some of the way to catching up with the debate that sought to inform it. Commentators at the time hit out at the apparent gap between “rhetoric and reality” when it came to the State’s provision for those under six years of age (Hayes, 2000b). In that article, Hayes argued that while documents such as the White Paper clearly laid out a need for a holistic and integrated approach to early childhood education, it lacked specificity when it came to dealing with the proposed structures for achieving this approach. Part of the problem was that a fragmentation of responsibility for early years services still existed, which resulted in the separation of care and education in both theoretical and practical terms. This fragmentation was at odds with one of the key underlying principles of Ready to Learn, which stated that, “for young children, education and care should not be separated, but should be provided in a complementary, seamless fashion” (DES, p. 2). The legacy of a national thinking that subsumed children into their families or the cultural institutions that catered for their needs (schools, hospitals, clinics) was that children became disjointed entities in a policy sense, being served by many departments singly but by no department which recognised them as, “a defined age group with its own specific health, developmental and cognitive traits” (DES, pp. 23-24).
3.2.1 Increased investment in Early Childhood Education and Care.

The publication of a national strategy for childcare in 1999 led to the establishment of the Equal Opportunities Childcare Programme (2000-2006). The programme aimed to improve the quality of childcare, to increase the number of childcare facilities and childcare places and to introduce a coordinated approach to the delivery of childcare places. This was intended to facilitate parents’ engagement in work, training and education, an intention that indicated that child-centered concerns were not the primary driver of the investment. The programme was made possible through the provision of EU structural funding and created 47,000 new childcare places, almost doubling the figure from the start of the decade (Wolfe et al., 2013).

A staffing grant was provided for community childcare providers participating in the scheme to provide up to three staff but this was often insufficient and services relied on the Community Employment scheme to ensure enough staff members were in place. The scheme was targeted at ensuring employment opportunities for the long-term unemployed, therefore was not concerned with ensuring practitioners were adequately trained to provide for children’s education and care. Staff on the scheme tended to work part-time for short periods, a practice which continues to help fund provision to the present day. The Organisation for Economic Cooperation and Development (OECD) conducted a thematic review of ECEC in Ireland, which was published in 2004. It pointed to the regulatory shortcomings within the sector as being of particular cause for concern, including the lack of requirement for, let alone incentivisation of, ECEC settings to train and/or to employ qualified staff. It recommended a national strategy for ECEC, an increase in investment, professionalization of the sector and universal preschool provision for 3-4 year olds and was echoed in its recommendations by national reports published at around the same time (National Economic and Social Forum, 2005; National Women’s Council, 2005). It also made recommendations in relation to the
infant classes of primary schools, including a recommendation that a more child-centred pedagogy be integrated into practice to replace the more didactic approach that the report found was predominant. The publication and content of such reports reflected a growing national policy consciousness of the importance of quality, spurred on by international attention, European funding and national economic growth. There was still a sense that the economy rather than children’s best interests was driving the move towards positive policy change for children, however.

The National Childcare Investment programme (NCIP, 2007 to 2011) differed from the EOCP, in that it was fully funded by the Irish government and used a fee subsidy for providers (Community Childcare Subvention Programme) based on the total number of parents of enrolled children in receipt of social welfare. Criticism of the scheme was levelled at its focus on welfare and the segregation in state policy and funding terms of disadvantaged children and non-disadvantaged children. Hayes and Bradley (2006) argued that early childhood education and care policy in Ireland was driven by a desire to ameliorate inequality and educational disadvantage that has created a tiered approach to provision, reducing the possibility of developing high quality childcare for all children. Even more troubling, in terms of the creation of high quality childcare, was state policy in the boom years, which involved cash payments to parents of children in the form of the Early Childhood Supplement (ECS). This was a direct payment of €1,000 to families of each child under five years of age, a large spend, which was possible and largely unremarked upon in the boom period before the impending bust in 2008. It meant that parents chose where, how and, most significantly whether, to spend the supplement on childcare and did little to address the problems of high cost childcare, which had been an issue for middle-income parents. Commentators regarded it
as a highly visible, expensive and politically-motivated instrument, which allowed the government to avoid criticism from middle-income families for its targeting of disadvantaged families in the NCIP and in other state policies on families (Wolfe et al., 2013). As such, it was not a guarantee that children would attend any early childhood education and care setting and it meant that high quality education and care for all was moving further out of focus. The recession of 2008 necessitated a change in policy and the costly ECS was abolished, in favour of the Free Pre-school Year, which was announced in April 2009. Up until that point, investment in ECEC was most noteworthy for having a focus which was less about high quality educational experiences for children in early childhood education and care services and more about ensuring labour market access for middle class parents, targeted provision for disadvantaged families and employment opportunities for unemployed people. With such a policy focus, it was inevitable that considerations such as staff training, quality educational experiences and the pedagogy in ECEC settings lost out.

The Free Pre-School Year in Early Childhood Care and Education (ECCE) Programme is the common name used for the funding mechanism behind the scheme, also referred to as the ECCE programme. Wolfe et al. (2013) argue that the Free Pre-School Year (FPSY) most accurately represents and differentiates the scheme from that which has gone before; therefore I adopt the same nomenclature when referencing the policy. The FPSY administers funding directly to participating preschools to provide two free years of preschool (second free year starting September 2016) to children between the ages of 3 years and 3 months and 4 years and 6 months at the 1st September in a given year, for the duration of a school year. The scheme can be administered in both private and community services. In spite of the fact that the scheme was a substantial money saver for the state at its inception (€170 million as
opposed to €500 million for the preceding ECS, (Start Strong, 2009)), it has been largely welcomed by commentators and experts in the field (Wolfe et al., 2013; O’ Kane, 2013), in particular for being the first attempt at providing truly universal early childhood education and care in the state. Uptake has recently been reported to be over 95 % (MacGinnity, Russell & Murray, 2015). At the very least, the scheme marks an important change of focus in ECEC policy in Ireland, which is more aligned to international best practice models and increases the likelihood that children will have preschool- and school-based early education from the age of three to six, which had previously only been a guarantee once children entered the formal school system at age four or five. The staffing requirements of a QQI Level 5 qualification for educators and QQI Level 6 for team leaders or managers is still significantly below the QQI Level 8 qualification requirement for primary school teachers, demonstrating that education policy still differs significantly for children depending on whether they attend school or early education and care settings. National policy targeted at upskilling early years educators is a limited provision, which does nothing to target the upskilling of staff who work with children from birth to three. In addition, there is a concern in some quarters that the age-limited nature of the FPSY could be interpreted as a governmental recommendation for when children should be ready for school (O’Kane & Hayes, 2010). This has relevance both for those who advocate a later school starting age in line with European standards and for parents who have a tendency to rely on age-related judgments on school readiness rather than focusing on their child’s skills or dispositions.
3.2.2 Primary school curriculum change.

By the time the report on the second phase of the IEA Preprimary Project was ready to be published, a revised *Primary School Curriculum* (1999) was being introduced into primary schools. The content purported to involve movement away from the traditional skills of reading, writing and mathematics towards a more holistic, life-skills based approach, with an emphasis on six specific areas: Scientific Education; Arts Education; Physical Education; Language; Mathematics and Social, Personal and Health Education. However, the curriculum remained unpublished at the time of data collection. The *Primary School Curriculum* (1999) is designed as a child-centred curriculum that seeks to emphasise the uniqueness of each child and that aims to help him/her reach his/her full potential. It recognises that learning is developmental and should be based on children’s prior experience and the context of their immediate environment. It advocates hands-on learning through the guided activity and discovery method (NCCA, 1999). Although the importance of play for young children is emphasised in the curriculum, it is nonetheless the case that the transition to primary school sees a greater expectation for children to sit attentively for long periods of time (Murphy, 2004; Moloney, 2011; McGettigan & Gray, 2011), which is in stark contrast to the more free-flowing classroom environment that they experience in preschool. In spite of the presence of a new curriculum since 1999, there is some degree of uncertainty in relation to the fidelity with which primary school teachers in Junior and Senior Infant classes implement aspects of the curriculum, particularly, play and activity-based learning. As previously discussed, the didactic approach of infant class teachers had been the subject of a recommendation in the OECD Thematic Review (2004). Murphy (2004) examined the degree to which the Irish Primary School Curriculum informed infant classroom practice. He found that play was mainly used as a rest period for teachers during which they caught up on work such as
correcting or planning and that some teachers even advocated silence while children played. Coupled with evidence of an over-reliance on workbooks, Murphy found that many teachers in his study failed to implement the active learning and play-based aspect of the primary school curriculum. Other researchers have reported that there is little change to that finding almost ten years later (Moloney, 2011; McGettigan & Gray, 2012; Ring et al., 2016).

Teachers, for their part, claim that the current adult: child ratios or child demographic characteristics (disadvantage, gender or migrant status) make it difficult to carry out play or active learning aspects of the primary curriculum (Devine, Fahie & McGillicudy, 2013). The OECD (2015) reports that primary class sizes in Ireland are the second highest in Europe, second only to the United Kingdom. Teachers argue that smaller classes are most important when children are young, when they are learning how to be pupils in classrooms for the first time (INTO, 2012). The INTO recommends that infant classes should be reduced to a maximum of 20:1 in a single-grade classroom, and 15:1 in a multi-grade class. The general average pupil: teacher ratio recommended for primary schools in Ireland is 28:1 (Department of Education and Skills, 2013). Irish teachers teach more children per class than their EU colleagues (average of 20 per class) with many teachers in Ireland teaching classes of twenty five to thirty children (OECD, 2004; 2006; O’Kane, 2007; Moloney, 2011). The DES reported an average class size of 24.9 pupils for mainstream primary classes for the 2014-2015 school year in Ireland (DES, 2015). In his review of one hundred years of primary school curriculum and reform, Walsh (2016) identified historical impediments to curriculum implementation, under three themes, which still resonate today. The first, the impact of wider, societal and social factors on reform, which moved from the disproportionate influence of the Catholic Church from the 1920s onwards to a lack of economic resources to implement the
suggested curricular reforms in the 1970s and 1980s, is now echoed in the form of reduced teacher salaries and the influence of the global educational reform movement, among other factors. His discussion of the negative effects of the radical and swift nature of reform during periods in the last hundred years applies today in the sense that there is evidence that teachers are still pedagogically conservative (Simola, 2005; Devine et al., 2013). Therefore, they may require significant support and consultation to buy-in to a reform agenda, particularly if it involves working in a way that is significantly different from that which has gone before.

Finally, given the presence of the afore-mentioned limitations, it is advisable, according to Walsh (2016) that a focus on implementation in practice is coupled with any curricular reform attempt. He lays part of the blame for the inadequate implementation of previous curricular reform in the primary sector at the door of policy-makers, who, having developed the policies for change, focused insufficiently on the roadmap for that change. This identification of a gap between rhetoric and reality, is not new in the educational sector and will continue to be an issue according to Walsh (2016), unless those required to implement change (teachers and principals) are supported to internalise and integrate new and increasingly child-centred practice with existing attitudes and practice, which is the key to lasting and real change (Evans, 1996; Hargreaves & Fullan, 2012).

3.3 Putting Quality on the Policy Agenda—Síolta and Aistear

In October 2002, the Minister for Education and Science launched the Centre for Early Childhood Development and Education (CECDE). The Centre's brief covered children from birth to 6 years of age in a wide variety of settings, including families, nurseries, crèches, playgroups, child minders, preschools and the infant classes of primary schools. The CECDE was responsible for a large number of research and policy-based publications on early...
childhood issues in an Irish context (Duignan & Fallon, 2004; Duignan & Walsh, 2004; Walsh & Cassidy, 2006). It succeeded in constructing a National Quality Framework for Early Childhood Education, which is entitled Síolta (CECDE, 2006). Síolta represents the edited work of a wide range of stakeholders in the early childhood care and education (ECCE) sector in Ireland and is a part realisation of the White Paper on Early Education’s objective to facilitate the development of a high quality learning system for early childhood education in Ireland (DES, 1999). A number of underlying principles are intrinsic to the construction of the Síolta framework. One key principle is that responsive, sensitive, and reciprocal relationships, which are consistent over time, are essential to the wellbeing, learning, and development of the young child. This principle has important implications for the nature and degree of interactions that take place in early years and primary classrooms and puts a strong onus on teachers and early childhood practitioners to ensure that all interactions enhance development and learning. Moreover, the framework holds that play is a key for early childhood learning, as is the physical environment in which learning takes place. Essentially, the holistic nature of learning, childcare and education is emphasised in order to ensure that no one aspect is neglected in favour of the other to the detriment of the child’s development. Aistear is the national Early Childhood Curriculum Framework, developed by the National Council for Curriculum and Assessment for children from birth to six years of age. It contains themes and principles that all early childhood services (including homes, schools, preschools, child-minding services) for children aged zero to six should work towards. Aistear aims to support the development and learning of children under four main themes; well-being; identity and belonging; communicating; and exploring and thinking. It is a flexible curriculum framework, which can underpin many diverse approaches to the education and development of young children. Moreover, Aistear, in particular, marked a
departure in policy terms, as it embodied a children’s rights-based approach to their education and drew on the best evidence internationally for what works for children in ECEC settings. Currently *Aistear* has only been funded for rollout out on a national basis in the infant classes of primary schools, in spite of its design for children from birth to six.

### 3.3.1 *Aistear* as a unifying mechanism across early education and primary sectors

As with *Síolta*, the government supported and funded the development of *Aistear*, yet had no firm plan for its implementation. Wolfe et al. (2013) regard *Aistear* and *Síolta* as embodying, “a conception of children’s rights as a basis for ECEC practice” that is positively at odds with the prevailing policy paradigm of a separation of education and care” (p. 13). However, the under-implementation of both actually serves to reinforce and reflect the policy status quo according to Wolfe et al. (2013), instead of overturning the divide between care and education that the frameworks were designed to challenge (Hayes, 2006). The split system of education and care is problematic for frameworks such as *Síolta* and *Aistear*. The split has directly contributed to diverse approaches and expectations in relation to staff training, appropriate ratios and class sizes for the education of children from birth to three and from three to six. More problematic is the fact that, for children aged three to six, there is a lack of curriculum continuity between ECEC settings and the infant classes of primary school (Hayes, 2006). Nic Craith & Fay (2007) point out that children of the same age, needs and abilities can experience large differences in adult: child ratios depending on whether they happen to be attending an early years setting (e.g. 1:10) or a primary school setting (e.g. 1:30). Furthermore, it is also the case from anecdotal evidence that children aged three to six in ECEC settings may also experience better quality experiences than those from birth to three, which is related to the higher capitation provided for those working with the older
children in the ECCE scheme and a tendency for the younger, or less experienced staff to be allocated to work with the younger children. O’Kane (2013) comments that there is still a lack of clarity in relation to the question of how practitioners in the early years and primary school settings will make use of both *Aistear* and *Siolta*. Commentators are agreed, that, if universally implemented, the framework offers opportunities to strengthen children’s learning and smooth the transition between ECEC setting and school, while keeping children’s rights, interests and identity as a key consideration at all times (O’Kane, 2013; Start Strong, 2014).

In 2014, some 70,000 children transitioned to the infant class of primary school in Ireland (DES, 2015). The opportunity that *Aistear* offers for bridging and smoothing that transition has already been mentioned. Early research on the implementation of *Aistear* has been mostly limited to pilot programmes, qualitative studies or small-scale undergraduate theses but they underline the difficulties currently inherent in how *Aistear* is being used and point towards the opportunities it could offer for transitions if implemented universally across early years and primary settings. The ease with which the *Aistear* framework has been adopted into the existing primary school curriculum (NCCA, 1999) has been questioned (O’Connor & Angus, 2011). The authors identify crucial differences between the primary school curriculum and *Aistear* curriculum framework, which require reconciliation in order for the existing curriculum and the curriculum framework to be implemented side by side. Some of the most important of these differences are *Aistear*’s focus on dispositions in place of the curriculum’s mention of knowledge, skills and attitudes; the centrality of play-based learning in *Aistear* and the integrated and holistic focus of *Aistear*, which is at odds with the primary school curriculum’s organisation of learning into divided curriculum areas and time-based allotments. Recent research on infant class teachers has found that primary teachers are still unlikely to report using it and that children are more likely to play in the breaks between
subjects than having play as part-and-parcel of their learning experience as the framework intended (Ring et al., 2016). Early years educators from the same study were significantly more familiar with the curriculum framework, and reported implementing it (or aspects thereof) significantly more, in spite of the fact that it had not been rolled out to them in the same way it had been to the primary sector. Part of the difficulty for primary school teachers may be inherent in perceived dissonances between the subject-based and competency driven primary school curriculum and the holistic, cross-curricular opportunities that Aistear offers to young learners. Primary school teachers speak of the pressure to cover everything on the curriculum, while also being expected to implement the Aistear curriculum framework, in addition to that. The difficulty may be that teachers tend to see the curriculum and the curriculum framework as being discrete and competing entities rather than considering how the themes and principles can be integrated into their ongoing practice while they fulfil the requirements of the primary curriculum. The findings from Ring et al. (2016) suggest that Aistear may challenge many primary infant teachers to work in a way that is not usual for them. The primary school curriculum focuses on content domains that are primarily subject-based and discrete. For reasons of familiarity with this model, ease of managing ratios and perhaps parental expectations, many teachers reported having difficulty adopting and implementing the principles of Aistear into their everyday practice. This leads to anecdotal reports of the, “Aistear hour”, and “the Aistear room” in primary schools. These reports suggest implementation strategies which comfortably fit Aistear into the daily classroom routine without requiring much upheaval or change to the existing subject-based curriculum. This mode of engagement with Aistear does not sit comfortably within the vision and principles of the Aistear framework, however. It is a misinterpretation of the framework that indicates that many teachers may require additional support to integrate Aistear into their
existing practice. This potential difficulty had been flagged in the final report of the consultation group that the NCCA published in advance of developing and publishing the Curriculum framework (NCCA, 2005) and is not new in the area of programme or curriculum implementation. Bleach (2011) reported a willingness on the part of ECEC practitioners in 14 early years settings in two designated disadvantaged communities in Dublin to use a curriculum framework such as *Aistear* but found that their ability to implement such a curriculum was influenced by a lack of familiarity with ECEC pedagogy and a lack of confidence and experience with describing and organising their practice beyond a basic task-oriented structure. Professionalisation of the ECEC sector has been identified in international research as important for quality provision and child outcomes (Barnett & Frede, 2010; Montie et al., 2006; Siraj-Blatchford & Sylva, 2004). The lack of a statutory early years curriculum and the development of the sector as a reaction to labour market need and European funding provision has meant that early years educators were simply required, under the preschool regulations, to engage in practice that gave “appropriate opportunities”, to support child development, no more or less. Therefore, unlike their primary school counterparts, there was no mandatory national curriculum against which early years educators are required to adapt *Aistear*, thereby making it easier to integrate into their everyday practice. While some ECEC services already implement distinctive curricular approaches, such as High/Scope, Montessori or play-based curricula, there is perhaps less dissonance between such approaches and *Aistear* than between primary teachers’ pedagogical approach under the primary school curriculum and an approach framed by *Aistear*. The more favourable ratios in early years settings are also likely to be a supportive factor for implementation. Key support strategies would help to ensure that *Aistear* is universally implemented and this may involve capacity building for both teachers and early years staff,
albeit in different ways. Teachers need to be supported to think about *Aistear* as a new way of being a teacher, rather than simply a new module to include in their teaching. Early years practitioners on the other hand, need to be given the training and support to use *Aistear*, which will increase their profile as professionals, increase their confidence and improve the quality of provision for children.

### 3.4 Research on Educational Outcomes within Irish Early Years Settings

In the past ten years and as a result of increased funding from a variety of programmes, there has been additional research evidence gathered within Irish early education and care contexts. Hayes, Siraj-Blatchford, Keegan & Goulding (2013) found that an early childhood education intervention programme with disadvantaged Irish children did not have a significant effect on child level outcomes but did result in significantly better ECEC quality as a result of staff training provided and a significantly better home learning environment as a result of the parental component of the intervention. The results of the Age 5 cohort of the Growing Up in Ireland study (McGinnity, Russell & Murray, 2015) found that educational outcomes for those who attended early childhood education and care settings and those who were cared for in the home did not differ, when family background factors had been controlled for. However, this study did not collect data on the quality of ECEC settings, which is internationally recognised as predicting positive educational outcomes. The authors identified a significant effect of home factors (including parental education and home learning environment) on the cognitive outcomes of five year olds. There was also evidence of a marginally statistically significant effect of staff qualifications within early years settings on cognitive outcomes; children attending the Free Pre-school Year who had a graduate leader did better on non-verbal reasoning but this was only true within community settings for
children’s vocabulary outcomes. The evaluation of the National Early Years Access Initiative (NEYAI), a three-year programme (2011-2014) to improve quality and outcomes in the early years sector reported on findings on a cohort of children who were also participating in the free pre-school year in its first year of implementation. The authors (McKeown, Haase & Pratschke, 2014) found that home and family factors were stronger predictors of improvement over time than attending the Free Pre-School Year but concluded that one year may have been insufficient to generate change and that success of many pre-school programmes rely on them being high quality, multi-year and in addition to allied support services for vulnerable families. The results should not be seen to justify abolition of the Free Pre-School Year, given the limitations acknowledged by the authors such as the lack of a matched control group and the lack of representativeness in the sample. It points towards the importance of conducting nationally representative and up-to-date research that accounts for the quality of the ECEC provision when considering whether ECEC provision influences children’s development.

The two reports on a sample of Irish children, from which this research is drawn, reported on the development of children within the context of preschool and school and were some of the first attempts to examine the experiences and development of Irish children within their educational contexts. They were also relatively unique within an Irish context because while they reported on developmental outcomes for designated disadvantaged and non-designated disadvantaged children, the sampling strategy was designed to shine a light on provision for, and outcomes of, a nationally representative sample of Irish children. The research was also unusual in that it was not related to an intervention in the lives of those children; rather it aimed to open a window on early education in Ireland, which could also be compared to
international ECEC contexts for the purposes of policy development. *A Window on Early Education in Ireland* (Hayes, O’Flaherty & Kernan, 1997) found that aspects of children’s Age 4 cognitive development were predicted by maternal education level and that those in school were likely to perform better on certain cognitive tasks than those still in preschool. Mother’s education level, size of the household and presence of a dictionary in the home (a proxy for home learning environment) were all found to positively predict Age 4 language development. Significant differences were found between children in designated disadvantaged preschools and children in both designated disadvantaged and non-designated disadvantaged primary schools on all cognitive and language measures at Age 4 (children in designated disadvantaged settings had significantly lower scores than those in non-designated disadvantaged settings). This had both implications for the quality of designated disadvantaged preschools, the lack of a set curriculum in preschools in general and the hot-housing effect of attending school when children learn more traditionally academic skills as prescribed by the primary school curriculum. At Age 7 (when all sample children were attending school), the researchers found that children attending designated disadvantaged primary schools scored significantly lower on cognitive development, language development, mathematics, reading comprehension and science than those in non-designated disadvantaged schools. Teachers were more likely to rate girls higher than boys for academic motivation and achievement and more likely to rate boys more negatively than girls for conduct and personal behaviour. Reports on the international database of the IEA Preprimary Project published comparative findings across participant nations on the role of preschool experience in children’s development (Montie, Xiang & Schweinhart, 2006; Weikart, Olmsted, Montie, Hayes & Ojala, 2003). The reports indicated that, in Ireland and other countries with a high frequency of Age 4 adult-centred teaching, adult-child interaction was negatively associated
with children’s Age-7 language performance. Moreover, as the amount of whole-group activity increased, children’s Age-7 cognitive scores decreased. Children who were in Age 4 settings in which free choice activities predominated achieved significantly or almost significantly higher Age 7 language scores. The report on observations in the 15 IEA Preprimary Project countries (Weikart et al., 2003) had indicated that Irish non-disadvantaged national schools had a predominance of preacademic activity (41%) over any other type of activity (physical/expressive, free choice activities or personal/social activities). This is obviously related to the Irish primary school curriculum and particularly that which was in place in 1994, when Age 4 data were collected. Moreover, children’s Age 4 language performance was more strongly related to their Age 7 language performance if teachers spent more time participating with children (as opposed to instructing them). The authors recommend that the findings be used to inform practice and curriculum with four year olds in participating countries, in particular; more focus on free choice activities to promote children’s language development; less focus on whole-group and adult-directed teaching to allow children to develop creativity and thinking skills in the context of individualized play or within small groups. This requires attentiveness to curriculum content but also to teacher training requirements so that teachers may be supported to plan with, talk to and engage with children in smaller groupings in order to promote better cognitive and language outcomes for them in the longer term. It also emphasised that as children transition between educational contexts and systems, they carry the experiences with them from their previous educational systems and contexts and points towards the value of considering continuity within and across the educational system to reduce the need for children to adapt and change their learning styles to meet the expectations of the system.
3.5 Research on Educational Outcomes within Irish Primary School Settings

Much of the research into primary school children’s development has concerned itself with intervention and targeted provision for disadvantaged children and schools. A number of Irish studies have found that pupils attending primary schools with a high proportion of disadvantaged pupils, or schools designated as disadvantaged, have significantly lower reading achievement scores than their counterparts in non-designated schools or in standardization samples (e.g., Archer & O’Flaherty, 1991; Hayes & Kernan, 2001; Smyth & Hannan, 2000; Weir, Milis & Ryan, 2002). In her review of education and disadvantage, Weir (2001) concluded that standards in the most disadvantaged schools had declined, citing the significant declines in achievement between the 1993 and 1998 National Assessments of English Reading among pupils in Fifth class whose parents held medical cards (Cosgrove, Kellaghan, Forde & Morgan, 2000) and between 1997 and 2000 among pupils assessed in the Breaking the Cycle scheme (Weir et al., 2002). This is echoed in examination of schemes such as Early Start and the Home/School Liaison Project, which were introduced by the government in order to help with education in designated disadvantaged areas. Such schemes, Early Start in particular, reflected a general growing public awareness of the importance of preschool education for children at risk of educational disadvantage. The Early Start programme is a preschool intervention that has been running under the auspices of the Department of Education. However, the programme has received criticisms for its continued pilot-programme status and for its mixed results. Moreover, its effectiveness may be contingent on the absence of numerous negative factors in a child’s life and its structure (one year of intervention) may not be enough for all disadvantaged children. Kelly & Kellaghan (1999) found no significant improvements in Early Start children’s literacy and numeracy skills by second class in primary school (Age 7/8) when compared to a comparison group of
children from similar backgrounds within the same schools who had not received the programme. They identified issues with programme implementation including difficult working relationships between the childcare worker and the teacher delivering the programme and difficulties with child attendance and outreach to families as being possible explanations for the lack of effect. Similarly, Lewis & Archer (2002) identified wide-ranging differences (percentage time of small-group activities, effort made to target families, level of parental involvement, clarity of planning notes) in implementation of the Early Start programme in different schools, which led them to recommend deferring child-level testing until implementation issues could be fixed using direct observation of implementation.

Weir et al. (2002) found that there was no significant improvement in children’s reading achievements in response to a scheme targeted at breaking the cycle of disadvantage. This was in spite of the positive impression that principals and teachers had reported in relation to the scheme. A noteworthy finding from Weir’s evaluation was that teachers of children in the more disadvantaged schools appeared to hold low long-term expectations for their children. The majority of teachers in the evaluation believed that most of the children in their class would not stay in school beyond the Junior Certificate examination, despite the fact that 80-90% of students nationally did so (Weir et al., 2002). Clerkin (2013) found that teachers in DEIS Band 2 (disadvantaged schools) reported lower levels of job satisfaction than their counterparts in other schools.

The Growing Up in Ireland study (McCoy, Quail & Smyth, 2012) was the first large-scale (N=8,568) study to provide an insight into the lives of nine-year-olds in the contexts of home and school. The study found gender differences in frequency of reading; boys were less likely
to read for pleasure, particularly when they also did not enjoy school-based reading. Children who enjoyed reading and who engaged in organised cultural activities outside of school performed significantly better at reading than those children who engaged in more traditional activities such as watching television, hanging around with friends or sports activities. The authors surmised that the presence of additional ‘cultural capital’ outside of school represented a concerted cultivation of their skills on the part of their families in line with Lareau’s (2011) theory. This theory holds that parental concerted cultivation of education achievement is a mediator of the positive effect of parental socio-economic status on school academic achievement. The authors suggested that children from more advantaged socioeconomic backgrounds were more likely to have families that provided such cultural capital to them. Clerkin (2013) found evidence that teachers in Irish primary schools were unusual compared to international counterparts in terms of the lack of collaborative teaching practice. Almost one quarter of children were taught by a teacher who never discussed their teaching with colleagues or who never engaged in collaborative planning in relation to materials for lessons.

3.6 The Irish Secondary Education System

To register as a second level student in post-primary school in Ireland, a student must be 12 years of age on the 1st January in the first year of attendance (DES, 2004). At that point, they make the transition from the primary school system to the secondary school system, where they will stay for 5 or 6 years and be taught by teachers educated to degree level who also hold a higher diploma in education. Approximately 50,000 Irish children make that transition on an annual basis. After three years, they will complete the state examination called the Junior Certificate and two or three years later (depending on whether they choose to complete
a transition year); they will complete the Leaving Certificate examination. In the period from 2001 to 2007, between 4 and 6 percent of students left school before completing their Junior Certificate examination (DES, 2014). This figure ranged between 6 and 11 percent for schools that had a designation of disadvantage. In the 2010/2011, approximately 600 students who had transferred from primary school to secondary school the previous year had already left school during their first year (DES, 2013). Given that attainment of educational qualifications has been found to be strongly predictive of access to employment, social mobility and future earnings (European Commission, 2014; McCoy & Smyth, 2003), it is important that students stay and engage in school and succeed in school assessments. International research has identified that a positive transition from primary school to secondary school is critical in ensuring children’s future success and development, while negative transitions can lead to lasting difficulties, problematic behaviour and poorer educational outcomes (Niesel & Griebel, 2005; Woodhead & Moss, 2007). Educational attainment, which in Ireland involves completing and passing the Junior Certificate and Leaving Certificate exams, is strongly linked to social class and predicts labour force achievement (McVeigh, 2006). National research (O’Toole, Hayes & Mhic Mhathúna, 2014; Nolan, 2012) has found that the transition to secondary school can be a stressful time for young people, which if not tackled in an ecosystemic way, can lead to continuing stress and poorer outcomes. Effective smoothing of the transitions pathways from primary school requires that supports and systems are in place to help and support those who are negotiating their way through. First and foremost, an ability to deal with change is important, which often begins in the transition from the home to the ECEC setting, then from the ECEC setting into the primary school and on as an individual grows and develops throughout the lifespan.
3.7 Junior Certificate Examination

The Junior Certificate examination is held at the end of the Junior Cycle in secondary schools, when students have completed three years of secondary schooling. It was introduced in 1989, to replace the outmoded Intermediate and Group cert examinations and the syllabus was officially published by the Department of Education in 1990. The Junior cycle became a three year programme of education that caters for students in the 12 to 15 year old age group and is assessed by a summative final examination in the subjects that the students studied over the three years. Students normally sit the examinations at the age of 14 or 15, after 3 years of secondary education. The examination incorporates written tests in all subjects except Art, Craft and Design. There are optional oral examinations in the subjects Irish, French, German, Italian and Spanish. There are practical examinations in Art, Craft and Design; Music; Home Economics; Metalwork (Higher Level only). There is Practical Course Work in Art, Craft and Design; Materials technology (Wood); Home Economics; Religious Education; Metalwork; Environmental and Social Studies and Civic, Social and Political Education, Technology, Science and Science with Local Studies. Each Junior Certificate subject can be taken at one of three levels: higher, ordinary and (for English, Irish and Maths) foundation.

The Junior Certificate and Leaving Certificate examinations have developed into annual events that occupy a significant place in the national consciousness. The scores obtained in the Leaving Certificate (terminal school examinations) dictate entry to third level courses, therefore the attention paid to results, points tables and entry requirements is perhaps to be expected. The field of education, historically regarded as being “of necessity” and economically neutral, has developed into a competitive entity that offers increasingly diverse
services to children and young people. In the United States, in particular, school districts have become fiercely competitive, while in the United Kingdom, school league tables help parents to decide on a school for their child. In Ireland, where schools are broadly state-funded on a nationwide basis, the business of creating successful students also resonates. Fee-paying grind schools for Junior Certificate and Leaving Certificate students have sprung up in the last fifteen years as competition for university places has increased. Teachers report pressure from middle class parents for good marks for their children in state examinations (Devine et al., 2013). National newspapers have capitalized on the phenomenon by vying to offer supplements on state examinations while an industry in additional reading material outside of the standard school curriculum has begun to thrive. In such a climate, questions of equality of opportunity arise, that are related to Bourdieu’s (1973) theory of social reproduction and cultural capital, which holds that the culture of the dominant class is reproduced by the educational system. This cultural capital is acquired through the mediation of the ecological environment in the form of macrosystem effects such as family and socio-economic status and exosystem effects such as cultural climate. Although the Irish secondary educational system culminates in a points system that is designed to be meritocratic, with equal access to university for all students who sit the Leaving Certificate examination, Bourdieu’s hypotheses suggests that the reality may be different for many students as a function of their ecological context. Young people who sit exams in Ireland are as much a product of the policy that informs the Irish educational system as they are a product of their relationships with families, friends and teachers.
3.8 Research on Junior Certificate Outcomes

The topic of Junior Certificate performance is regularly covered in the Irish media and seems to occupy a significant place in the public consciousness that is not on a par with other countries worldwide. Media reports underline the importance of Junior Certificate science and Maths as subjects, which will help to create a skilled workforce for the existing and as yet uncaptured Research and Development industries across the country (Donohue, 2013; Jeffes et al., 2012). An OECD study comparing the performance of teenagers in reading, maths and science across 57 OECD states found that Irish teenagers showed a better than average performance in reading and literacy (OECD, 2006). This was particularly true for students in certain schools, including fee-paying schools and boarding schools. The authors surmised that these schools benefitted from the “advantages” their students bring to school, including a family background that values academic performance. Students from families with a more advantaged socio-economic background were more likely to show a general interest in science, and this relationship was strongest in Ireland, France, Belgium and Switzerland. One significant feature of a student’s background was whether he/she had a parent in a science-related career. The earlier students were stratified into separate institutions or programmes, the stronger the impact of the school’s average socio-economic background on performance, which is evidence of the negative impact of streaming on student performance. This finding is backed up by evidence from the longitudinal study of students’ experiences of schooling research conducted by the Economic and Social Research Institute (ESRI) that was commissioned by the National Council for Curriculum Assessment (NCCA) (Smyth, Darmody & McCoy, 2003). The researchers found that ability grouping had a significant effect on student outcomes i.e. those students who had been streamed into lower classes achieved lower grades in the Junior Certificate exam than similar students in other
classes. The researchers theorised that this underachievement reflected less access to higher level subjects, a slower pace of instruction and lower expectations among teachers and students. Given that the day-to-day interaction between teachers and students in a school influences student engagement with schoolwork and therefore achievement levels (Smyth, Darmody & McCoy, 2007), it is important to consider the nature of student-teacher relationships. Devine, Fahie & McGillicuddy (2013) researched teacher beliefs in primary and secondary schools in Ireland and found a contradiction evident between teacher beliefs and observation of their practice, with the latter mediated by sociocultural factors such as gender, social class and migrant children. Teachers in the sample reported that they believed strongly in the importance of active learning, yet active learning was one of the least evident practices based on observation of those same teachers. Shiel, Perkins, & Proctor (2009) found that collaborative practices such as observing other teachers’ classes were rare in Irish secondary schools. Moreover, teachers in designated disadvantaged schools demonstrated lower expectations for student outcomes and lower likelihood of implementing educationally supportive strategies such as active learning if they taught in a designated disadvantaged school or single-sex school, particularly boys-only schools. Research by Sonofriu, Shiel & Cosgrove (2000) found that attending a designated disadvantaged secondary school meant a student was more at risk of poor performance on Junior Certificate English outcomes and on PISA literacy scores. Home-based factors such as socio-economic status, the index of the number of books in the home and attitude to reading also significantly predicted both PISA literacy scores and Junior Certificate English scores and this was more so the case in homes with at least some books and for female students on the Junior Cert English score. In addition to home-based factors such as socio-economic status, the model predicting success on Junior Certificate Mathematics outcomes found that absence from school negatively predicted
Mathematics achievement meaning that exposure to the curriculum mattered more than factors such as parental support with mathematics (Sofroniou, Cosgrave & Shiel, 2002). This is likely related to the fact that Junior Certificate Mathematics curriculum content was abstract and context-free, in contrast to the Realistic Mathematics Approach (RME, van den Heuvel-Panhuizen, 1998) adopted in PISA mathematics assessments, for example (Shiel, Cosgrave, Sofroniou & Kelly, 2001). According to Sofroniou, Cosgrave & Shiel (2002) routine absenteeism is more detrimental to a subject such as Junior Certificate Mathematics, as its abstract nature means a greater degree of teacher support is required in order to ensure students engage with and understand the content. In the model predicting Junior Certificate science performance, negative disciplinary environment predicted poorer science outcomes. Sofroniou et al. (2002) surmised that the practical and group work requirements of the Junior Certificate Science curriculum would be more difficult in a climate where students were being repeatedly disciplined and that this may have been the explanation for the poorer outcomes in schools where such a climate prevailed.

3.8.1 Research on the transitions to, and within, secondary schools.

Recognition of the importance of the transition to secondary school has allowed for a contextualization of the debate about educational outcomes in examinations such as the Junior Certificate exam, in recent years. The ESRI first-year study (Smyth, McCoy and Darmody, 2004), completed in 2004 with a panel of 900 students, examined the experience of moving from primary to post-primary education. The research found that students became less positive about school over the course of their first year, particularly those students in lower streams in schools where streaming was used. The study found that the second year was a pivotal one for many students. A chasm began to open up between two groups of
students. One group of students tended to engage more with the learning process. These were more likely to be girls, from professional backgrounds and with high academic ability. The other group tended to be drifting within the educational system and exhibited signs of disaffection and disengagement from school life. Moreover, the students in this group tended to be male, from a lower socio-economic background and classified in a lower educational stream. That this drifting and disengagement from formal education began to happen in the second year of the Junior Certificate cycle was significant, according to the report authors. They surmised that students had become used to the secondary school system after their transition the previous year but without the focus of a formal examination, those with less life advantages and males, in particular, were finding it difficult to stay interested and involved in school.

This disengagement may be further heightened as students move into third year (a State examination year) and students report a requirement from teachers to “knuckle-down” to the books, less opportunities for fun activities and a decline in their positive interactions with their teachers who have expectations of hard-work and good behaviour of them. Smyth (2009) describes some key factors that predicted negative academic outcomes in the Junior Certificate, including student misbehavior and negative teacher-student interactions, which can be disproportionately present for working class male students, who get caught up into a cycle of acting out and being reprimanded by their teachers/principal. These students are also more likely to become disaffected by the education process if they feel that the rules of their school are unfair and arbitrary. Smyth (2009) describes some major policy implications of this longitudinal research, including; a need for different forms of assessment to prevent the narrowing of educational experience in second and third year of school along exam
preparations lines only; improvement of the school experience for students by being more flexible about ability grouping and in encouraging students to take up higher level subjects; using diverse and engaging teaching methods even within the existing system and focusing on positive behaviour reinforcement rather than negative sanction in response to student misbehavior. There is a requirement according to Smyth, that schools are supported by government to implement the changes.

The *Growing Up in Ireland* study returned to a cohort when the children were 13 years of age and in the first or second year of secondary education. The report (2012), echoing the ESRI study, found that girls preferred secondary schools to boys, although engagement with education also differed as a function of family background; those participants with highly educated mothers and parents from professional/managerial backgrounds were more positive about school than others. Liking school at age nine also predicted whether students would like school at age thirteen and if students liked mathematics or reading when in primary school, they were more likely to still like it on entry to secondary school. This emphasises the importance of the development of learning dispositions and the persistence of attitudes to learning throughout the life cycle. Moreover, the finding that disengagement with the education system begins to happen in second year of secondary school (Smyth, 2009) was echoed in the nationally representative *Growing Up in Ireland* sample, with those participants in second year of the secondary school less likely to report that they liked school *very much* compared with their first year counterparts. Moreover, there was evidence of a widening chasm between girls and boys in terms of their engagement with teachers, with boys more likely than girls to report being reprimanded by a teacher for misbehaviour. Children from lower-socio-economic backgrounds and those who had mothers with lower education levels were more likely to receive detention than young people with professional/managerial parent
and better educated mothers (higher secondary or more). Maternal education level was also significant in terms of the expectations that young people had for their own educational attainment, with children of more highly educated mothers being more likely to hold higher expectations for themselves.

3.9 Significant Changes in Irish Education Policy

The notion that there is an Irish educational “system” that caters for the education of children from birth to adulthood is still open to considerable debate. The notion is problematic for at least two reasons; firstly, the use of the word system implies the presence of order, consistency, and smooth progression from each stage of the given system and secondly, that universal policy provision has been made for children from birth to six (and including those from birth to three). Rather, Irish children and young people learn and develop within multiple systems and succeed in spite of, rather than because of, those systems. The following sections will explore the recent policy changes as they apply to educational experiences and provision for those participating in the ECEC, primary and secondary educational and care settings. The current study is situated in a somewhat different context than the earlier phases of the Preprimary Project. There is an increased need and agenda for reform of curriculum and practice driven by macro-level change in Irish society, which requires curriculum and practice that is responsive to the changing demographic profile of early education and school settings and a recognition of the increased diversity of children and young people (NCCA, 2014). The increasing number of families with children who do not speak the language of the curriculum at home has implications for curricula and practice that are responsive to the added supports that these children may require to engage with a curriculum (NCCA, 2014). Children at risk of educational disadvantage attending DEIS
schools also require an approach to education that recognises the importance of early experiences (both in the home and the early education setting) in ameliorating disadvantage and setting up a strong basis for lifelong learning and achievement. The fact that almost 95 percent of eligible children took up the Free Preschool Year indicates that children are accessing ECEC, in line with the near universal uptake of primary and (to a lesser extent) secondary schooling. Building on this equity of access, it is important that educators are supported and equipped to help children and young people to learn to the best of their abilities, through their education, CPD, supervision, and remuneration arrangements. By the same token, equity of access should address the rights of children with exceptional talent to experience rich and varied learning experiences. The increasing availability and use of personal electronic devices and home and portable computers have implications for the use of digital tools in teaching, as well as opening up a world of potential for communication and sharing of learning with parents, which will prepare children and parents for a world where the term digital native becomes obsolete.

3.9.1 Relevant Changes in Early Childhood Education and Care policy.

A spotlight was shone on the quality of some preschool services in Ireland through an RTE television documentary, ‘A Breach of Trust’, which consisted of hidden camera footage of the mistreatment of children at three early years settings in Dublin and Wicklow in 2011. Expert commentators regarded the footage as horrific but unsurprising, in light of the absence of regulation on staff training; the lack of a national plan to implement either Síolta or Aistear; and the structural focus of inspections in ECEC settings (Early Childhood Ireland, 2013; Moloney, 2013; Wolfe et al., 2013; Start Strong, 2013). Early educational policy changes in the wake of this documentary have met mixed response; the commitment and
budget provision for the up-skilling of existing practitioners to a minimum of a QQI Level 5 qualification is viewed by many as reaching a bare minimum threshold rather than the highly trained competent workforce that children deserve. The publication of a national literacy and numeracy strategy, *Literacy and numeracy for learning and life, Ireland’s national strategy to improve literacy and numeracy among children and young people* (DES, 2011), has identified goals in relation to the upskilling of the ECEC sector. In an attempt to redress the lack of focus on educationally appropriate practice under the Pre-School Regulations, funding has been recently made available for Education-Focused Early Years Inspectors. They will be housed in the Department of Education and Skills and will conduct inspections on the quality of educational provision in early childhood education settings participating in the Free Pre-school Year programme, which has been extended to allow access for children from age three to five. *Aistear* and *Síolta* are important frameworks that bring together the best of international knowledge and reflect growing policy awareness that education and care in Ireland are inseparable and that both begin at birth. The development of the *Aistear Síolta* Practice Guide (2014) by the NCCA is a step towards translating the National Quality frameworks into practice through the creation of Pillars of Practice and the provision, under each pillar, of self-evaluation tools, videos and online resources to allow practitioners to reflect on and develop quality, independently.

### 3.9.2 Relevant changes in primary education policy.

The revised Primary Curriculum has been in existence since 1999, although questions about the successful implementation of the structures and procedures that it outlined still remain. Inspectors identified difficulties with aspects of implementation of the Maths curriculum (DES, 2005), among other aspects. Difficulties in implementation of the curriculum were
noted in areas such as Problem-solving and Shape and Space. The use of guided discovery methods as outlined in the curriculum were absent in one third of classrooms observed, and replaced by passive, unfocused activities that required teacher direction. Inspectors also found that whole-group teaching predominated with a high level of teacher- rather than child-talk. A DES survey of newly qualified teachers (2005) found that a third of newly qualified teachers reported themselves to be poorly prepared to teach Mathematics, while 16% felt a lack of confidence about teaching English, followed by 12% who felt ill prepared to teach Irish. A key difficulty reported by teachers was in integrating the learning from mathematics to other curricular areas, which is likely related to the design of the Primary School Curriculum where content and processes are presented separately, and content is emphasised over processes (Dunphy et al., 2014). Aspects of the primary school curriculum have been targeted for reform in recent years, mainly driven by the publication of a national Literacy and Numeracy strategy to improve literacy and numeracy among children and young people (DES, 2011), but also influenced by a general national agenda for educational reform. This strategy acknowledges the importance of mathematics and literacy for children, young people and adults and presents shared goals for numeracy and literacy for parents and communities; practitioners and teachers; and leadership in schools. As part fulfillment of these goals, a new Primary Language Curriculum for children in junior and senior infants and first and second class has been launched and aligned with the principles of Aistear (NCCA, 2015). This marks part fulfillment of a broader intent outlined under the strategy for seamless continuity for the learner across all stages of education, which is the focus of development in terms of transitions from the primary and secondary sector also. Curricular continuity across early educational and primary settings is just one way that seamless transitions and accordingly better educational outcomes can be achieved. The strategy, albeit focused specifically in the
key areas of literacy and numeracy, if acted upon in full would constitute a vastly changed educational system in Ireland by 2020. This would bring change to areas ranging from Junior Cycle reform, teacher and early years educator training to the home learning environment.

3.9.3 Relevant changes in secondary education policy.

Even as far back as the late nineties, moves were being made to address a mismatch between the content of the Junior Certificate syllabus and the terminal examination at the end of the three year assessment period (NCCA, 2010). For example, Coy (1997) (as cited in O’Neill and Howley, 2001, p. 61) noted of Junior Certificate English, “The greatest obstacle to teaching the Junior Cert. course is the Junior Cert. exam. It has reduced English once again to a written subject despite the promise of the syllabus.” In 1999, the NCCA published a review of the Junior Cycle and the Department of Education and Science (1999) published a document entitled The Junior Certificate: Issues for Discussion to address concerns such as these. As a result of these discussions, the NCCA undertook to balance the curriculum, which was criticized by many for being over-crowded and constrained by the exam requirements, in order to create the space for active learning and student engagement that the original syllabus had intended but failed to provide since its introduction in 1990 (NCCA, 2011). Adding an impetus to the changes were a number of reports providing evidence of educational disengagement among young people during the Junior certificate cycle (Smyth, Dunne, Darmody & McCoy, 2006; 2007) and publication of the PISA findings, which evidenced a deterioration in mathematics and literacy among Irish 15 year olds as compared to other countries (Perkins, Moran, Cosgrave & Shiel, 2010).
While many interested commentators have been openly critical of the Leaving Certificate examination, taken after 5 or 6 years of secondary schooling, there has been less heated criticism levelled at the Junior Certificate system, perhaps because it has lower stakes. That notwithstanding, the system has been the target of unsuccessful reform twice already and is now once again the target of reform, perhaps as a tentative first step towards eventual reform of the Leaving Certificate. The Department of Education & Skills has outlined a range of measures relating to the new Junior Cycle Student Award (JCSA) aimed at ensuring a gradual but effective transition to a new way of learning and teaching. This marks the first major overhaul of the existing Junior Certificate in 25 years and comprises a move away from a narrowly focused final examination in June of a student’s third year in school, to a school-based continuous assessment approach. There are also short courses in new and more exciting topics on offer to students, in an attempt to engage students and to teach them skills relevant for 21st century Ireland such as computer programming and Japanese. Governmental justification for the move included a desire to move away from the phenomenon of, “teaching the test”, where teachers teach subjects based on what is likely to come up on a high-stakes final test, rather than affording the students an opportunity to pursue their interests across a variety of areas (Marshall, 2012). It was believed that this would reduce student disengagement from the education system and reduce pressure on students who, due to the third level points system, often pick subjects upon entry to secondary school that will be required or helpful to them for their third level college course. Teacher unions and parents have expressed concern at the changes, particularly at the plan for teachers to assess their own students, which some have argued places teachers in a position of judgment over their students when they would rather champion them. An opinion poll found that parents overwhelmingly sided with teachers in their opposition to having teachers mark their own
pupils. Concerns were expressed about the independence of assessments and the impact that assessing students would have on the teacher-student relationship, as well as potentially putting teachers under pressure from parents to mark children highly (Sheahan & Doyle, 2014). Teachers rejected the former Minister for Education’s claim that the abolition of the final examination would reduce student disengagement, rather teacher representatives report that the removal of a formal examination to work towards will be more likely to increase disengagement, particularly as plans are that the examination will not carry an externally graded State certification (King, 2014). The former Minister responded to these concerns by slowing the pace of change, meaning that in September 2014, English was the only subject to change to the new JCSA system. He attempted to address concerns in relation to quality assurance by discussing the possibility of external moderators to help ensure that work is fairly and accurately assessed (2014).

There have also been other voices calling for educational reform. Many experts support the educational intent behind reform, while declining to become involved in the industrial relations issues that it has created between the Department of Education and Skills and teachers’ unions (Hallissy, Butler, Hurley & Marshall, 2013; Ryan, 2009; Smyth, 2009). Murchan (Murchan, as cited in Donnelly, 2014) felt that while the changes would be difficult to implement, they were necessary to make the system fit for purpose in a modern, technological and multi-cultural Ireland and suggested that teachers’ concerns could be addressed through spot-checking of marked scripts or teachers exchanging exam scripts with colleagues from other schools for marking. Ryan (2009) called for an increased focus on STEM (Science, Technology, Engineering and Mathematics) within the education system and this was echoed by the National Competitiveness Council (2009) and in the government’s
report on Building Ireland’s Smart Economy (2008). Such reports advocate a change in how STEM subjects are taught in school as well as continuous up-skilling and training of teachers to allow them to have the most up-to-date knowledge to impart to their students. Hallissy et al. (2013) welcome the move away from high-stakes summative examination at Junior Certificate in favour of transformed education and assessment strategies, student-led learning and short courses, which they believe echoes a successful paradigm shift in Singapore summed up as “teach less-learn more” (p. 6). However, they caution that teachers must be adequately supported to implement new strategies and activities such as technology-based learning. Adequate resourcing and oversight will be key to the success of Junior Certificate reform, in order to ensure that reform does not simply happen for the sake of reform or budgetary reasons. Conway & Murphy (2013) identified a ‘perfect storm’ comprising concerning educational outcomes in PISA 2009 (Baird et al., 2011), the economic bailout and changes in education system leadership which coincided with a rising tide of accountability due to education policy change at a European and national level (self-regulation and legislation change) as driving educational reform from the late nineties onwards. They characterised the move towards accountability in teaching as narrowing the focus along the lines of standardization, literacy and numeracy outcomes and higher stakes accountability, in an echo of the dominant global education reform movement (Sahlberg, 2007). Similarly, Walsh (2016) identified that the curricular reform movement in Irish education was catalysed by a focus on the competencies required for individuals and economies to prepare for and prosper in the knowledge society. While educational reform is welcome for many different reasons, reform for the sake of the market alone is neither sustainable nor desirable in Ireland. The economic downturn exemplified the fact that the market could not always be relied upon to provide once much-vaulted careers, as degree-
educated building industry professionals and many more besides, left Ireland in their hundreds of thousands, to make their living outside of Ireland. The case study of the introduction of the continuous assessment system in the UK should act as a cautionary tale for Ireland. Critics have pointed to the decline in educational standards since the introduction of competency and outcomes-based assessment and there has been a controversial rowing back on this method of assessment in curricula there (England and Scotland) and in New Zealand (Walsh, 2016). Measured analysis seems to suggest that rather than continuous assessment being the problem, per se, the form of the continuous assessment may have contributed to declining standards. Analysts found evidence of a “tick-box culture”, in which assessment of students was used primarily as a means of providing evidence of learning for bureaucratic reasons e.g. to satisfy managers and inspectors (Mansell, James & the Assessment Reform Group, 2009). The authors also found that allowing teachers the time to support students to develop self-reflective skills in order for learning to occur was difficult within the confines of a curriculum that had prescribed requirements and learning goals.

Rather, person-centred educational policies such as those adopted in Finland, based on equity, flexibility, creativity, teacher professionalism and trust (Sahlberg, 2007) ensure that people rather than the market drives learning. Now, more than ever, a shared vision for education as a public service, first and foremost, would ensure that education policies meet the need of Irish citizens to learn in a seamless way in order to live fulfilling and rewarding lives. That this is the third attempt at Junior cycle reform and the projected timeline of 2022 (DES, 2014) for ultimate reform of the remaining subjects should serve as a reminder that the pace of reform has always been slow in the Irish educational sector. Primary curriculum reform, begun in 1999, is scheduled to continue until 2018. Therefore, the timing of this
research is still relevant, given that it reports on students’ performance within a system that is only now beginning to embark on the changes that have been called for ever since the data was first collected with the Age 4 sample in 1994. The outcomes will help to inform and contextualize the change process and the recommendations that derive from this research are to be made at an exciting time, when there is an appetite for change at a policy level. Sahlberg (2007) notes that as well as boasting a high-tech knowledge economy, Finland also has the highest number, per capita, of musicians and symphonic conductors when compared to any other nation. Keeping a public service, and rights-based, focus for educational reform in Ireland can meet the dual aims of creating a thriving economy, while also allowing for a diversity of economic activity that also reflects the interests, skills and artistic creativity for which Ireland (land of saints and scholars) was once renowned.

Summary

McGinnis (2006) remarked that, “in a decade, we will know a great deal more about what matters in primary and secondary education” (p. 6) and it is hoped that research detailed in the current study will make a significant contribution to achieving that end. The policy trajectory leading to the current day was discussed in this chapter, underlining the key implications that policy decisions have for ‘how’, ‘what’ and ‘where’ children learn in Ireland. In spite of some large-scale Irish studies such as that of the Growing Up in Ireland Study, the ESRI and the PISA research, the field of educational achievement in Ireland tends to be characterized by shorter-term, case-study style research consisting in the main of qualitative evidence and examination of targeted interventions to tackle disadvantage. This restricts the level and power of inferences that can be made about the effects of ECEC and family factors on long-term educational outcomes nationally. The current research will bridge the gap in the existing educational research by outlining the relationship between family,
school, ECEC experiences and educational achievement in a country-wide sample. The many recent policy developments in the fields of ECEC, primary and secondary education means the research is well timed to add to the knowledge base on how Irish children and young people develop and learn and how educators plan and teach. The findings will help to inform these policies as they branch into newer territories in an effort to improve the lives of children and young people into the future. The current study accommodates itself well within a policy climate that both values child-centered enquiry, recognises the multiplicity of factors that influence positive educational outcomes and that lacks longitudinal data on Irish children and their educational experience in order to inform and drive policy direction for the educational system from the early years into primary and secondary education.
CHAPTER 4

LITERATURE REVIEW

This chapter contains a review of academic literature that has influenced the direction of the current study. Such influence comes in diverse forms, ranging from pervasive psychological and educational theories to key experiments with young children to emerging concepts of learning and development. While no review can be fully exhaustive, a close analysis of the relevant literature will yield a clearer picture of the predictors of child and adolescent development within the contexts of early education, school and family settings and accommodate this study within the wider framework of child-related research that takes place on the world stage. As the design of this research is longitudinal, there will be a focus on predictors of academic outcomes over time. Cathy Wylie (2001, p. 3) remarks that the longitudinal researcher is “always on the hunt for measures which are like the tips of icebergs, flagging something larger and deeper underneath”. In the field of early education, predictors are a guiding light for teachers, researchers and policy-makers and reflect the current cultural, social and economic trends within the society that informs them. These predictors are drawn from cross-disciplinary and multi-dimensional studies of child and adolescent development and can be accommodated with the first two conclusions of the National Research Council and Institute of Medicine report entitled *From Neurons to Neighborhoods: The Science of Early Childhood Development*. The first conclusion states that all children are born wired for feeling and ready to learn and the second holds that early childhood environments matter and nurturing relationships are essential (Shonkoff & Phillips, 2000). While the importance of early experience will be emphasised, the research design acknowledges the importance of continuing experience and relationships and therefore focuses on the developmental contexts of adolescents as well as children. The examination of
such predictors will be of particular use in the identification of predictors of academic success from the early education stage onwards, which has not been possible to date, within the Irish policy and research context.

4.1 The Effectiveness of Early Childhood Education and Care

International reviews of the research on the effectiveness of early childhood education and care (ECEC) have found a consistent link between ECEC and positive child outcomes in a wide range of areas, most commonly social and cognitive gains (Camilli, Vargas, Ryan & Barnard, 2010; Gilliam and Zigler, 2000; 2004; Gormley, 2005; Gorey, 2001; Karoly, Kilburn & Cannon, 2005). The notion that early education could be either effective or ineffective and the ensuing research on the topic was necessitated by a slow response from policy-makers when it came to investing in government-sponsored programmes of early education (Barnett, 2011; Engle et al., 2007). The focus of early pioneers such as Montessori (1917) and Gesell (1925, 1929) has now grown into both a research and practical tradition whose proponents are convinced that early education is beneficial for the lifelong development of the child. In the past twenty years, the belief that early childhood education is one of the best mechanisms for providing educational and developmental opportunities for all children, regardless of race or social class, has become widespread (Heckmann & Masterov, 2007; Shonkoff & Phillips, 2000). Current researchers see it as incumbent upon themselves to convince policy-makers of this fact in the hope that early education can be seen as a necessary target for expenditure (Carneiro & Heckmann, 2003; Nores & Barnett, 2010; Osakwe, 2009). Pianta, Barnett, Burchinal & Thornberg (2009) describe the field of early educational scientific enquiry as being “at the nexus of basic developmental science, policy, research and analysis, and the applied disciplines of education and prevention science” (p.
A wide array of preschool and school programmes and systems have been evaluated by numerous researchers who all sought to further a general understanding of early education, albeit using different approaches or emphasising different programme types (Campbell et al., 2012; Diamond, Barnett, Thomas & Munro, 2007; Domitrovich, Cortes & Greenberg, 2007; Gormley, Gayer, Phillips & Dawson, 2005; Howes et al., 2008; Puma et al., 2010; Reynolds, Temple, Ou, Arteaga & White, 2011; Schweinhart, Montie, Xiang & Barnett, 2005). The multiplicity of perspectives that such studies exhibit on the methods and effects of early intervention, developmental outcomes and contextual effects should not be regarded as unduly problematic, however. This diversity is perhaps a measure of the changing cultural and policy contexts in which the programmes were evaluated and reflects the need for researchers to continue to adapt in response to new evidence from current literature and its significant findings (Shonkoff, 2010). The vibrancy of the field reflects the drawing together of multiple strands from scientific and theoretical advances, policy and programme development in addition to practice and pedagogy. Where once the key question being posed by early education researchers was whether or not early education was effective, now multiple questions are posed by researchers who know that early education is effective but who want to know how to make it even more effective for as many children as possible and for as long as possible (Currie, 2001; Gorey, 2001; Gormley, 2011; Engle et al., 2007; Heckmann & Masterov, 2007).

4.1.1 Evaluating the effectiveness of early childhood education and care.

There is now general consensus among researchers that those early educational programmes that provide intensive, sustained, high-quality early childhood education and care have consistently found positive effects on cognitive and language development, early learning and
school readiness and achievement (Barnett & Frede 2010; Brooks-Gunn et al., 1994; Burchinal, Campbell, Bryant, Wasik & Ramey, 1997; Burger, 2010; Camilli et al., 2010; Gormley, Phillips & Dawson, 2005; Gormley, Phillips & Gayer, 2008; Melhuish et al., 2008). Some studies have focused on the persistence of the effects of early education into adult life (Campbell & Ramey, 1994; Lazar & Darlington, 1982; Schweinhart et al., 2005; Reynolds, Temple, Ou, Arteaga & White, 2011), resulting in reduced offending, school completion or lower rates of unemployment, among others. In their meta-analytic review, LaParo & Pianta (2000) reported effect sizes of .49 and .51 for prediction from children’s cognitive and academic skills in preschool and kindergarten to later school outcomes. In addition, such research has found that children’s maths, reading, language, and attention skills as they leave preschool and enter school predicts academic performance through middle childhood and adolescence (Claessens, Duncan, & Engel, 2009; Duncan et al., 2007; Snow, Porsche, Tabors & Harris, 2007). Moreover, these effects are usually strongest for children from families who experience multiple stressors or disadvantages (Camilli et al., 2010; Caughy, DiPietro & Strobino, 1994; NICHD ECCRN & Duncan, 2003; Shonkoff & Phillips, 2000). It may also be important to have a parent education element in early educational programmes to strengthen and consolidate classroom based learning (Barnett, 2011).

There has also been an accumulation of knowledge from large-scale, non-experimental studies (NICHD-ECCRN 2001, 2002, 2005; Sylva, Melhuish, Sammons, Siraj-Blatchford & Taggart, 2004; Sylva, Siraj-Blatchford & Taggart, 2008; Wylie et al., 2004) examining ECEC contexts in a more general sense, which adds to the evidence offered by intervention/experimental designs. As a result, it is now the case that it is possible to identify, with some conclusiveness, the aspects of early childhood education and care that are
associated with positive child outcomes into the short- and longer term. Therefore, there is a
great deal to learn from focusing on different aspects of the numerous studies that have been
conducted on early education programmes. Sylva’s (1994) review of the direct and indirect
effects of preschool and school on children’s development underlines the afore-mentioned
diversity of programmes and approaches to the education of children, yet makes the ultimate
unifying conclusion that “when schools change pupils’ self-concepts, goals, beliefs about
success and social responsibility, they exert powerful influence not only on subsequent
education but also on employment and community participation in adulthood” (p. 163). The
current research comes at a time when it has been well-established that early educational
experiences matter and so expansion on this fact is required to elucidate what this may mean
in Irish early education and school contexts.

Early studies typically compared IQ scores of the participants but as longitudinal findings
began to suggest that IQ gains were a temporary rather than a lifelong effect (Royce,
Darlington & Murray, 1983; Barnett, 1995; Karoly & Levaux, 1998) it became necessary for
researchers to adopt a different approach to measuring preschool effects. Furthermore, a more
sophisticated approach to conceptualising and analysing the child that spanned many
disciplines, as outlined earlier, meant that researchers had to consider a wider array of
outcomes when approaching the issue of children’s education. Despite their different
geographical locations, what follows brings together research studies that are united in an aim
to answer many of the unanswered questions about early childhood education. To greater or
lesser degrees, they aim to determine:

- if, and how, early childhood education impacts on subsequent and later child
development;
In order to meet these wide and varied aims, it became necessary for the researchers to adopt an approach to studying early educational settings that was similarly all-encompassing.

4.1.2 Large-scale longitudinal studies.

Historically, there has been examination of the effects of ECEC in longitudinal studies. Osborn and Milbank’s (1987) statistical review of the Child Health and Education Study that was conducted in Britain in the 1980s, measured academic test score differences between preschool attendees and non-attendees. None of the programmes reviewed by Osborn and Milbank were model programmes; rather, they were pre-existing ECEC programmes that had no greater aim than the education of the attendees. Moreover, the study was important in its analysis of the effect of twelve social and family factors on age-seven and age-ten test scores. It indicated attentiveness on the part of the researcher to the wider contexts of family, social and cultural environment, which although not new (Dewey, 1911; Vygotsky, 1987), would remain some of the dominant methodological criteria for any study concerned with early education. Their study confirmed that preschool experience did influence later child development and behavioural adjustment and the results were all the more telling for the fact that the programmes were not model programmes. The Consortium for Longitudinal Studies’ (1983) pooled analysis of studies in the United States concerned with the longitudinal effects of preschool programmes and found that those who had participated in ECEC programmes were more likely to have positive attitudes toward achievement and also to have parents who
held higher aspirations for them than the control group. Moreover, they were likely to continue their education through to the attainment of a high school diploma. The authors speculated that a system of mutual reinforcement is stimulated by ECEC programmes. This system consists of a cycle of reinforcement relationships between the parent and child and between the teacher and the child. This feedback loop leads to a positive academic outlook for the child, which is manifested in the positive results that ECEC programmes tend to yield. In general, more recent studies have established that early education and care programmes usually have significant positive short-term and moderate longer-term effects on the cognitive and social development of children (Anderson et al., 2003; Barnett, 1995; Barnett, 2008; Currie, 2001; Nelson et al., 2003; Reynolds et al., 2007). While the short-term effects are most clear and easier to research and fund, some studies have considered the extent to which early childhood educational experience effects persist into adolescence and later adulthood. Magnuson et al. (2007) posit that the effects of early education diminish by the time a child is eight or nine but this claim is directly refuted by numerous studies which demonstrate the persistence of effects into adolescence and beyond.

The question of the effectiveness of early education has been incorporated into large-scale government-sponsored programmes of longitudinal development that have particularly begun to flourish in the last ten years in Ireland (Williams et al., 2009; Williams, Green, McNally, Murray & Quail, 2010; Williams, Murray, McCrory & Nally, 2013) and further afield in places like France, New Zealand and Australia (Bradshaw et al., 2008; Charles, Leridon, Dargen & Geay, 2011; Daraganova, Maguire, Kaspar & Edwards, 2013; Hansen, Joshi & Dex, 2010; Wylie & Hodgen, 2011). Such birth cohort studies utilise the co-occurrence of children’s physical growth and development and their necessary interaction with their meso-
system (i.e. the structures and contexts around them such as health services, ECEC system and the school system) to find out more about how children develop within, and in response to, those structures. In the *Growing Up in Ireland* study, some age five cohort results have been published on well-being, play and family circumstances, allowing for a consolidation of the knowledge already accumulated from the birth to three report (Williams, Murray, McCrory & Nally, 2013). In addition to finding that developmental delays at nine months predicted a delay at 3 years, the researchers found that there was a social gradient in child cognitive ability that was related to differences in primary caregiver (most commonly maternal) education level.

New Zealand’s Competent Children project has concerned itself with the continuing development of children’s competencies from just before they start school all the way through the school system into adulthood (age 20) (Wylie, Thompson,& Kerslake Hendricks, 1996; Wylie, Thompson & Lythe, 1998; Wylie, Thompson & Lythe, 2001; Wylie & Thompson, 2003; Wylie, Thompson, Hodgen, Ferral, Lythe & Fijn, 2004; Wylie, Ferral, Hodgen & Thompson, 2006; Wylie & Hodgen, 2007; Wylie & Hodgen, 2011). The project’s design is consistent with the country’s early childhood curriculum, which, in itself, is noteworthy for its incorporation of important early childhood research findings (New Zealand Ministry of Education, 1996). The recent age 20 follow-up found links between age 5 experiences and development and a rewarding pathway into employment and/or study. Those children who had low performance levels on maths, reading and writing measures at age 5 and onwards, were significantly less likely to be in or working towards a rewarding career at age 20. They also found that the mid-teens period was important in determining subsequent engagement with rewarding employment and study. In particular, those who were less
convinced of the value of learning, less interested in reading for pleasure and felt less supported by, and interested in school at age 14, were more likely to find themselves out of work or in unfulfilling employment/study at age 20. This research points to the importance of early experience and development in determining life outcomes, in addition to identifying crucial time points such as the mid-teens, where it is important for educators as well as parents to be vigilant for signs of turning away from a positive pathway into further education and employment. Similarly, the Effective Provision of Preschool, Primary and Secondary Education (EPPSE) project in Britain has reported on the longitudinal effects of preschool, primary and secondary education on development of a sample of 3000 children over a thirteen year period from age 3 through to 16 (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2004; Sylva, Melhuish, Sammons, Siraj-Blatchford & Taggart, 2008; Sammons, Sylva, Melhuish, Siraj-Blatchford & Taggart, 2012). In addition to investigating the effects of pre-school provision, the EPPSE project explored the characteristics of effective practice (and the pedagogy which underpins it) by further examining settings where positive child outcomes were reported. For the preschool phase of the research, the researchers (Sylva et al., 2004) found that having preschool experience, compared to none, enhanced all round development in children, which was a particularly important finding, given the fact many studies on the effects of preschool do not include a comparison group containing children who have had no early educational experience at all. They also found that disadvantaged children benefitted significantly from good quality pre-school experiences, especially where they attended a preschool with children from a mixture of different social backgrounds. At the primary school phase, Sylva et al. (2008) reported that higher qualification levels for the mother and early years Home Learning Environment (HLE) strongly predicted better academic and social-behavioural outcomes at age 10 and 11. Preschool quality at age 3 also
significantly predicted outcomes such as maths, reading and social/behavioural development at age 10/11; children in higher quality preschools did better and this was particularly true for the most disadvantaged children. For the secondary school phase, the team found that students who experienced multiple disadvantage in the early years had an increased risk of poorer social-behavioural development and lower educational attainment at age 14. In addition, they were still influenced by parental factors, including fathers’ qualification level, but more particularly, mothers’ qualification level. Better attitude to school significantly predicted better academic attainment at the adolescent stage of the research.

4.1.3 Experimental studies of ECEC effectiveness.

Many studies of ECEC effectiveness study children who attend a specialised designed preschool programme and compare them to children who go to a non-specialised programme (treatment as usual). Feuer, Towne & Shavelson (2002) posit that randomized trials are the optimal method for asking well-defined questions about the impact of policies such as ECEC policy. Indeed, the strongest evidence for the effectiveness of ECEC comes from research on ECEC programmes, which are most likely to be scientifically rigorous as a result of randomisation of children or settings to intervention or control groups (Anderson et al., 2003; Karoly & Levaux, 1998). As researchers became increasingly aware of contextual effects such as poverty or a problematic family life (Brooks-Gunn, 2003), projects aimed to help in the education of children from disadvantaged backgrounds. An early study entitled the Abecedarian Project, which began in 1972 is one of the most famous projects of its kind and is a carefully controlled scientific study of the potential benefits of ECEC for children living in poverty. The study followed 111 children from programme entry through to age 21 (Campbell & Ramey, 2007). By identifying multi-risk families and their children and making
the children the recipients of full-time, high-quality educational intervention from infancy through to age five, the longitudinal findings of the project pointed towards substantial academic gains (Ramey & Campbell, 1984; Ramey & Campbell, 1991; Campbell & Ramey, 1994; Campbell & Ramey, 1995; Campbell et al., 2001). Moreover, participants were less likely to have a teenage pregnancy, to smoke marijuana and were significantly more likely to be employed in skilled labour at the age of 21 (Campbell, Ramey, Pungello, Sparling & Miller-Johnson, 2002).

The Head Start programme was a comprehensive child development programme designed to help communities meet the needs of disadvantaged preschool children, including a targeted ECEC programme as well as health and social services support for eligible children and families (Valentine & Zigler, 1979). Meta-analysis of Head Start programme studies indicated that the programme did have immediate, positive effects on children’s cognitive development but that this effect did not sustain itself for very long (Gilliam & Zigler, 2000; McKey et al., 1985). However, further analyses of the programme, indicate that, at the very least, Head Start was capable of closing the gap between disadvantaged and non-disadvantaged children. Garces, Thomas and Currie (2000) showed that white participants were significantly more likely to complete high-school and to attend college, while for black participants there was a decreased probability of being charged with or convicted of a crime. Some researchers have suggested that the differences in the Head Start results for different ethnic groups could be more a reflection of the limitations of the methods and data than a real difference in outcome, however (Barnett & Camilli, 2002; Ludwig & Phillips, 2008). Another randomized trial of the Head Start programme found strong positive effects of the programme in terms of cognitive and health gains (Abbott-Shim, Lambert & McCarty, 2003). The
National Impact Study (NIS) of the Head Start programme is regarded by some as the most rigorous in terms of design and assessment (Pianta et al., 2009) and found weak positive effects on broad cognitive measures and somewhat stronger effects on easily-mastered literacy skills after 3 year olds attended for 9 months (Puma et al., 2005). What emerges is a picture of modest effects for child learning and development, particularly in controlled studies. Pianta et al. (2009) note that the effects of Head Start are larger for educationally intensive programmes with a high level of match between programme content and outcome measure and caution that considering variations in programme design and delivery is crucial in estimating the overall benefits of the Head Start programme.

4.1.4 Economic returns of ECEC programmes.

Some researchers have felt the imperative to justify ECEC programmes in terms of the economic returns that are yielded for society after initial investment and it is difficult to argue against this as a means of bringing early childhood issues to the attention of those policy-makers who hold the purse strings. The Perry Preschool Project is one such landmark study that is most notable for its long-term commitment to exploring the effects of participation in a preschool programme. The same participants were studied every year from the age of three to seven and were visited again at ages 14, 15, 19 and 27 and 40 (Berrueta-Clement, 1984; Schweinhart & Weikart, 1980; Schweinhart, Barnes & Weikart, 1993; Weikart, Bond & McNeil, 1978). The longitudinal effects through to age 40 have economic implications. A cost-benefit analysis is included in the results that reports a return to society of $17 for every $1 that the government invested in the original programme when the participants were aged three and four (Belfield, Nores, Barnett & Schweinhart, 2006). Participants were significantly less likely to have been repeat criminal offenders or drug users by age forty and earned
significantly more money, had better relationships with their family and were more likely to have completed a high-school education and to own their own homes. Heckmann, Moon, Pinto, Savelyev & Yavitz (2010) revised this rate downwards in an analysis that took into account the compromises that occurred during randomisation and the standard errors. While the rate of the return was not as high as reported by Belfield et al. (2006), Heckmann et al. (2010) found that returns were significantly different than zero and above the historical return of equity. The researchers suggested that an emergence of mechanisms such as the development of habits, traits and dispositions could have been stimulated by the programme and thus, may have enabled children to interact in a positive manner with others and to handle tasks effectively (Schweinhart & Weikart, 1993). Similarly, results from the Chicago Child-Parent Centre Study indicate that the benefit–cost ratio for the preschool program offered by the Child–Parent Centers ranged from $5.98 to $10.15 (Temple & Reynolds, 2007). The Abecedarian study reported a projected return rate to society of 1:3.78 (Masse & Barnett, 2003). The authors reported a significant difference in the education rates of a subgroup of (teenage) mothers of participants, and a significant difference in the type of employment of all mothers (although not in rates of employment), with the intervention group exhibiting the more favourable outcomes. The Abecedarian study also showed a difference between the smoking habits of the intervention group compared with the control group and a reduced likelihood of grade repetition or remedial education for the intervention group.

To a lesser but increasing extent, some authors have attempted to quantify the rate of return to investment in an Irish context (Goodbody Economic Consultants, 2011; O’Neill, McGilloway, Donnelly, Bywater & Kelly, 2013). The National Economic and Social Forum
(2005) quantified a return rate of between €4 and €7 for every euro invested in universal early childhood care and education in Ireland. Lawlor and McGilloway (2012) estimated a rate of return of €4.50 for the ‘Young Ballymun’ targeted early education and care programme. Harvey (2014) advocates the scaling up of such interventions in Ireland across the range of existing and new services for children, which, he argues, would improve the welfare and outcomes for young children and reduce the cost to the justice system in the long term. This would require better use of existing resources and coordination of planning for prevention and early intervention by the Child and Family Agency, according to Harvey (2014). Penn et al. (2006) critiqued many of the key U.S. ECEC intervention programmes and raised questions about their generalizability, given that they were targeted at low-income African-American children in a time of racial tension and educational policy change. They argue that the savings reported are approximate estimates that should not be relied on as precise calculations. Moreover, they caution that too much focus on savings and economic returns risks obscuring a child-centred lens of child well-being and development, through which a child may be viewed as deserving of intervention for his/her own sake rather than economic reasons alone. The reviewers concede, however that targeted early childhood educational intervention did have a positive effect on cognitive and educational outcomes across all interventions reviewed, while the findings for other outcomes (crime, employment) were not so clear-cut and universal.

4.2 The Ecology of Early Childhood Development

The recognition of the early childhood environment as an ecological ‘zone’ owes much to theories of development and to a gradual accumulation of research on the importance of context in the study of human development. Vygotsky’s (1962) zone of proximal
development introduced the notion of context, specifically the context of social interaction with peers or a trained adult as a valid concept in the study of children’s development and undoubtedly turned the focus from the individual child alone towards the individual child as a developer within a community of other developers. In a parallel vein, Dewey (1911) conceptualised development as being embedded within a cultural medium, which was related to social practices, belief and ideologies. Researchers such as Weisner (2002) have argued for the exposition of an ecocultural theory of development. Weisner contends that the most influential factor in determining a child’s developmental pathway is not whether he/she is protected, loved or from a ‘good’ background but rather where he/she is going to grow up. Accordingly, in order to gain an accurate picture of the developing child, it becomes absolutely imperative to take into account “the ecological and institutional forces that impinge on the everyday activities of families by focusing on their impacts on the developmental niche and psychocultural worlds of parents and children” (p. 277). While it may seem a truism to point out that a child growing up in rural Kenya will have a different upbringing to a child in Los Angeles (Weisner, 2002), doing so has the effect of underlining the importance of considering wider contextual concerns when seeking to understand human development. Super and Harkness’ developmental framework (Harkness & Super, 1983, 1996; Super & Harkness, 1986) conceptualized the “developmental niche” as consisting of three dimensions of contextual structure to which children must adapt: the physical and social settings in which the child lives, the culturally determined customs of child-rearing and educational practice and finally, the psychological characteristics of the caregiver such as the pervasive ethnotheories of development. While the framework is most explicitly useful for cross-cultural research, it has informed research on children’s literacy (Serpell, 1997),
language development (Mogford-Bevan, 2000) and family health practices (Harkness and Super, 1994).

It is the work of Bronfenbrenner, however, that has contributed most over the years to the study of ecological (Bronfenbrenner, 1979; Bronfenbrenner, 1989; Bronfenbrenner, 1986) and later bio-ecological development (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998). In its inclusion of a wide range of contextual factors that also allow for the pervasive influence of biology and the reciprocal interaction between contexts, Bronfenbrenner’s latest model is perhaps the best framework in which to consider child development as ecological in its own right. Firstly, the child is not considered as a tabula rasa but rather as a thinking, dynamic being that progressively moves into and restructures the surroundings in which it finds itself through the mediating relationships that build up between contexts (mesosystem). These contexts are in turn modelled as nested layers moving from the individual level (microsystem) out towards, and influenced by, family or school (exosystem) and cultural ideologies (macrosystem) within the context of the progression of time (chronosystem). This most recent iteration has been termed a bio-ecological model of development (Bronfenbrenner & Morris, 1998) and is noteworthy for its consideration both of process effects and of the human as a biological organism. The acknowledgement of bio-psychological concerns is a testament to what Rutter (2002, p.457) terms the “genetic revolution,” which showed the importance of genetic influences on all aspects of human development. In the new model, the importance of the individual as the starting point for development as well as being the channel through which change is exhibited is firmly emphasised. Therefore, the child’s own traits and genes may act to shape their individual development over time by acting as the precursors to later development. Bronfenbrenner
includes proximal processes in his bio-ecological model of development. These are characterised as being the primary mechanism in human development and the degree to which they influence development is theoretically mediated by the characteristics of the individual, the degree of proximity between the individual and the environment in which the processes are occurring and the time in which the processes are occurring. In an early childhood classroom, relevant framing contexts include teacher behaviour, child activities, or the management of time within the classroom.

4.3 Identification of Predictors of Academic Outcomes for Children in ECEC and Primary Education

As studies of ECEC and school effectiveness began to consider wider contextual factors such as teacher effects, class size, parental involvement and school resources, it became clear that a battery of what could conceivably be termed predictors of child and adolescent development was emerging in the research literature. These predictors can typically be accommodated within one or more of Bronfenbrenner’s systems, indicating the degree to which they were intrinsic to the child or individual, related to the family or school (and those a child encountered in their families and school), culturally determined (public policy etc.) or temporal (as a result of the interaction between the passage of time and any other given level of the system). Replication of findings in major research countries such as the United States, New Zealand and England have contributed to the establishment of such predictors, with their consistent appearance across studies acting to confirm their existence, not just in the minds of researchers but also in the public consciousness. These predictors may broadly be categorised in either structural or process terms but it is also important to remember that in longitudinal
research, initial child characteristics that have been either genetically or socially determined may also be regarded as having an important impact on later development.

4.3.1 Family-level (exosystem) predictors of educational outcomes.

When Bronfenbrenner wrote about the ecology of the family as a context for human development (1986) he added support to a growing awareness that the family environment was a crucial factor in individual development. At that time, available research was not consistent on effects of family environment on development, particularly on development within a school situation. Many studies particularly focused on parent-child interaction in the form of parental responsiveness to children’s signals, varied and positive patterns of reciprocal interaction and communication. Rutter’s (1985) conclusion that family influences are particularly influential in the later preschool years and on into the school years was one which would have held considerable weight among researchers, who were doubtless aware of the findings of numerous studies, which indicated that certain features of the home environment contributed to optimal development. Bronfenbrenner’s approach to studying the child as a function of the family context differed crucially from previous theories in that he was not solely concerned with the intrafamilial processes such as parent-child interaction but also by processes that were once removed from these processes. These conditions were termed “extrafamilial” and featured concepts such as genetic-environment interaction in family processes, parental employment and even governmental family policy. Sections 4.3.1.1 to 4.3.1.4 will describe such predictors and their interaction in the academic development of the child within the contexts of family and educational settings.
4.3.1.1 Family resilience.

An emerging concept that draws together much of the information yielded by studies on development within a family context is that of family resilience. The concept is an attempt to account for the fact that some families facing adversity produce children who exhibit positive child outcomes, while in other families facing similar problems, children’s development can be seriously impaired (Mackay, 2003; Melhuish, Belsky & Leyland., 2012; Siraj-Blatchford, 2010). Family resilience is defined as “a dynamic process encompassing positive adaptation within the context of significant adversity” (Luthar, Cichetti & Becker, 2000, p. 543). The afore-mentioned predictors are incorporated, along with more contextual factors into a cohesive concept of resilience, where each may contribute significantly to maintaining the smooth functioning of a family. In families where there is a high level of parental investment in the child either through material (books, nutritional care) or non-material (information, education) provision or both, the child is more likely to exhibit positive outcomes (Mackay, 2003). Moreover, a family may produce resilient children by having positive expectations for their children’s futures that become a self-fulfilling prophecy. Siraj-Blatchford (2010) conducted follow-up case studies of a sample of children from the EPPE study who had ‘succeeded against the odds’ or performed well on academic measures of cognitive and reading development in spite of being at risk due to factors such as ethnic minority, low socio-economic status, single parent households. She found that disadvantaged families and ethnic minority families often had high educational aspirations for their children and provided educational support through “concerted cultivation” or active involvement in their child’s learning journey from preschool to secondary school. Some parents contribute to their family’s resilience through the provision of social capital. Coleman (1988) identified social capital as inhering in the relations between parents and children. He also argued that social
capital serves as a mechanism through which the effects of income and parental education are transmitted from parents to children. In educational terms, social capital can contribute to children’s schooling by providing them with a strong support network consisting of community, extended family and influential institutions (Teachman, Paasch & Carver, 1997; Carbonaro, 1998). Thus, the context surrounding the child’s parents becomes as important as the immediate context surrounding the child and certain aspects of the family environment can contribute to or detract from a child’s development.

4.3.1.2 Maternal education.

There has been a considerable focus in the research literature on the effects of parental background on child outcomes including cognitive development, education, health and subsequent income, which was reviewed by Black and Devereux (2010). Although there is still considerable debate on the topic within the scientific community there is nonetheless a widely-held belief that, “the external effects on children associated with parental education are larger for maternal education than for paternal because mothers tend to be the main provider of care within the household” (Chevalier, Harmon, O’Sullivan & Walker, 2013, p. 2). A variety of research studies ranging from twin studies (Behrman & Rosenzweig, 2002; Holmlund, Lindahl & Plug, 2011) to adoption studies (Sacerdote, 2007) support this belief, with varying degrees of evidence for the effect of maternal education on early school leaving, health and cognitive and social development. Chevalier (2004) used a change in the compulsory schooling laws in Britain to look at the impact of maternal education on children’s education and found a large positive effect of mother’s education on her child’s education. Magnuson (2007) found evidence of an effect of mother’s education on children’s academic school readiness by studying a programme in which mothers on social welfare were randomly assigned into a human capital development programme. Black, Devereux, and
Salvanes (2005) found that, in Norway, maternal education had a positive effect on children’s attainment. Datcher-Loury (1988) found that the more hours a highly educated mother spent with her child, the higher the child’s educational attainment.

Carneiro, Meghir & Parey (2013) found that maternal education had positive impacts both on cognitive skills and behavioral problems of children, but that the impact on behavioural development (at Age 7 or 8) was more sustained than that on cognitive (maths ability at the same ages). They posited that the more sustained effects for behaviour might have been because, as Carneiro & Heckmann (2003) suggest, behaviour is more malleable than cognition. They suggest that it may be the case that a better-educated mother may be able to help accelerate academic achievement, which becomes weaker over time. However, they argue that the impact of maternal education on behaviour is sustained and possibly reinforced with time. Similar findings have been put forward in other studies (Cunha & Heckmann, 2010; Knudsen, Heckmann, Cameron & Shonkoff, 2006). Carneiro & Meghir & Parey (2010) posit that the effects of maternal education are large enough to compete with the alternative effects reported in various differing educational interventions (Aizer, 2004; Bernal & Keane, 2006; Dahl & Lochner, 2005; Carneiro, Loken, & Salvanes, 2010; Currie & Thomas, 1998). Carneiro and colleagues argue that, “If the objective is to increase children’s outcomes, additional maternal education is a serious competitor to the other types of interventions” (p. 26). They suggest a change in education policy in terms of specifically focusing on increasing the years of maternal education as a means of ensuring better home learning environment and therefore better learning outcomes for future generations of young children. In light of the weight of evidence in favour of a maternal education effect and albeit in the absence of consensus on the matter, it might be argued that they are correct in their contention. What
seems important for children, at the very least, is that mothers are well educated and that this will provide benefits to their children in the short-term and to a lesser extent into later life.

**4.3.1.3 Maternal socio-economic status.**

While better educated mothers predict better child outcomes, this may be also due to related factors which correlate with their higher years of education, which combine to enable them to promote such better outcomes. Given that maternal education level is often inter-correlated with socioeconomic status, it is important to consider maternal education findings within the frame of socioeconomic context. Researchers have repeatedly linked lower socioeconomic status to poor child outcomes (Fish & Pinkerman, 2003; Hart & Risley, 1995; Hoff-Ginsberg, 1998; Stipek & Ryan, 1997; Walker, Greenwood, Hart & Carta, 1994) with one meta-analysis of over 100 studies finding an average correlation of .31 between SES and verbal achievement, after controlling for other factors. Raviv, Kessenich & Morrison (2004) found that maternal education was significantly positively correlated with child language outcomes, while also being strongly positively correlated with SES and a positive home-learning environment as measured by the HOME inventory. This provides support for the cumulative effect of positive home-based factors and indicated that a well-educated, financially secure mother may act as a developmental asset for young children. Hashima and Amato (1994) found a significant negative correlation between punitive parenting and income, while higher SES mothers uttered fewer behavioural directives than lower SES mothers in the results of a study conducted by Hoff (2003). Hart and Risley (1992) provided further support for the association between lower SES parents and authoritarian, unresponsive parenting, when they reported SES-related differences in the number of prohibitions uttered by a parent. Conversely, many studies have indicated that higher SES mothers are characterised by a responsive communication style, which leads to longer conversations, which elicit more talk
and information from their children (Farran & Ramey, 1980; Hoff, 2003; Hoff-Ginsberg & Tardif, 1995). These results are important in light of the stability of the predictive relationship between early language and later school performance that has been established by many researchers (Morrison, Robertson, Laurie & Kelly, 2004; Stevenson, Parker, Wilkinson, Hegion & Fish, 1976; Walker et al., 1994).

4.3.1.4 **Home Learning Environment; What do better educated parents do?**

If we consider Bronfenbrenner’s proximal processes, parents (and most commonly mothers) are children’s first and most important teachers. They promote children’s learning and development by structuring multiple aspects of the environment, including: spending more time in developmentally stimulating activities (Kalil, Ryan & Corey, 2012), initiating supportive parenting strategies (Steinberg, Darling & Fletcher, 1992), providing age-appropriate learning materials (Bradley, Corwyn & Tamis-LaMonda, 2006; Rodriguez, Umaña-Taylor, Smith & Johnson, 2009) and having positive expectations for their children’s educational achievement (Davis-Kean, 2005). Following in the same vein, better educated mothers are more likely to do certain things and provide certain opportunities than less educated mothers are. Rodriguez & Tamis-LaMonda (2011) found that the quality of the home learning environment differed by level of parental education, with better educated parents tending to be over-represented in the higher quality as opposed to the lower quality home learning environment groups. Davis-Kean (2005) found that parental education indirectly influenced children’s educational success. She found that better educated parents had more positive expectations for their children and also that they were more likely to initiate parenting strategies that have been linked to later success such as reading with their child and having a warm relationship with them.
Teachman (1987) found that parents use material resources to create a certain type of home environment, which may foster academic skills, motivation and orientation. The presence of educationally stimulating objects such as a dictionary, computer, encyclopaedia or reference book and the availability of a quiet suitable place to study are material resources that a parent can offer their child but which are largely dependent on the level of family income (Downey, 1994), which is, in turn, related to education levels. Carneiro, Meghir & Parey (2013) report that better educated mothers are more likely to provide a musical instrument and computer in the home, and to take their child to special lessons. The presence of such learning materials in the home has been found to relate to language and literacy development (Purcell-Gates, 1996; Sénéchal, LeFevre, Thomas, & Daley, 1998; Tabors, Roach, & Snow, 2001; Tomopoulos et al., 2006). McGinnity, Russell and Murray (2015) report in the Growing Up in Ireland study that home learning environment (as measured by number of books in the home and engagement in home learning activities) predicted cognitive outcomes at age five.

### 4.3.2 Educator-level predictors of academic outcomes.

Research has indicated that a positive relationship exists between the level of a child’s competence (i.e. a measure of the ease with which they interact with the things and people in the world around them, see Wylie and Thompson, 2003) and the frequency of a child’s interaction with an attentive, responsive adult (Howes & Stewart, 1987; Howes & Smith, 1995; Kontos, Hsu & Dunn, 1993). When children attend ECEC settings, that person ceases to be a parent and instead becomes an early years educator and in primary school, that person is a teacher. Therefore, educators who are attentive and who interact with children in a stimulating, encouraging and responsive way are more likely to promote positive
development (Kontos, Burchinal, Howes, Wisseh & Galinsky, 2002). The authors of a monograph (Pianta et al., 2009) sum up the established knowledge on the topic thus,

Effective teaching in early childhood education requires skilful combinations of explicit instruction, sensitive and warm interactions, responsive feedback, and verbal engagement or stimulation intentionally directed to ensure children’s learning while embedding these interactions in a classroom environment that is not overly structured or regimented. (p. 50)

If we consider that educator behaviour is influenced first and foremost by an educator’s own individual characteristics, it seems imperative to examine factors such as educator training and level of experience.

4.3.2.1 Educator training and education.

The positive effects of staff training and qualifications on child and quality outcomes have been found in many studies (Bowman, Donovan, & Burns, 2001; Lazar, Darlington, Murray, Royce, & Snipper, 1982; Oden, Schweinhart, & Weikart, 2000; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Sammons et al., 2004; Schweinhart & Weikart, 1999; Whitebook, Sakai, Gerber, & Howes, 2001, Peisner-Feinberg et al., 2001). Howes, James and Ritchie (2003) found that there was a significant main effect for formal educator education on time spent in language activities in the early childhood classroom. Debate on the length and content of the primary teaching degree (McMullen, Benson & Kazim, 2002) underlines the imperative that educator training should last a considerable length of time (Kontos & Wilcox-Herzog, 2001) but also that it is specialised and extensive (Bredekamp & Copple, 1997; Cassidy, Buell, Pugh-Hoese & Russell, 1995; Howe and Jacob, 1995; Hayes, Keegan & Goulding, 2012). In the IEA’s cross-national analysis of the longitudinal data of the Preprimary Project, results showed that those children who had better educated educators at
age four exhibited improved language skills at age seven (Montie, Xiang & Schweinhart, 2006). For every standard deviation rise (1.2 years) in the educators’ years of full-time education, there was a corresponding 0.7 point mean rise in children’s age-7 language scores. The finding was so strong as to have been replicated across eleven countries. Nonetheless, there is a lack of consensus among researchers about the exact nature of the relationship between educator qualifications and child outcomes (Pianta et al., 2009). At the very least, based on their systematic review on the topic, it is likely that better qualifications and professionalisation of teachers and early educators (e.g. through better pay) improves quality. Research has found that better educated staff has a pedagogical approach (incorporating specific characteristics) that promotes better outcomes for children (Marcon, 2002; Montie et al., 2006; Siraj-Blatchford & Sylva, 2004). Therefore, educators that were better educated spent more time involving children in activities that promoted their language skills. The REPEY study found that settings with longer serving educators (over 3 years), who supported less qualified educators to provide a mix of adult-initiated group work and child-initiated play, had the most positive effect on children’s social, cognitive and dispositional outcomes. The REPEY team found that in order for adults to provide effective learning and play opportunities for children, it was necessary that they had knowledge and understanding of how children learn. Moreover, these adults must have an awareness of the individuality of children and provide learning and play opportunities that are differentiated according to the child’s needs, which has also been found in other studies (Flynn, 2007; Smyth, 2006).

4.3.2.2 Type of adult-child interactions.

As discussed above, research indicated that in settings where adults are adept at interacting with children in a developmentally appropriate manner, more positive child outcomes are reported. Once the impact of educator training and experience are accounted for, it is then
necessary to capture the precise nature of the adult-child relationships in order to understand how and why certain adult behaviours and characteristics relate to child development. Theorists such as Piaget and Vygotsky have contributed greatly to our understanding of adult-child relationships. Elkind (1976) describes Piaget’s concept of communication as being his prime contribution to educational theory and practice. The concept holds that adults (educators in particular) must learn to comprehend the ideas that children have about the world and to respond to their ideas in the same mode of discourse that children use. Piagetian scholars suggest that appropriate verbal interaction with a child, which takes the form of leading questions or comments that promote reflective abstraction, is an ideal way to enhance language and cognitive development. Sigel (1982) has conducted research which supports the Piagetian idea that the amount and level of adult involvement and verbal stimulation are positively related to children’s cognitive competence. Vygotsky’s theory of learning has important implications for the teacher-child relationship also. The educator builds a scaffold, piece by piece, so that the child can learn and thus engage in understanding and development of scientific concepts on her own (Glassman, 2001). The unit of importance within this relationship is language, which enables children to organise their experience in a cohesive way and which, through communication, forms an important bond between educator and child. He conceptualises the educator-child relationship along mentor-learner lines that could involve adults offering demonstrations that they ask their students to repeat, or through presenting leading questions.

Peisner-Feinberg et al. (2001) found that closer educator-child relationships in kindergarten predicted positive second-grade cognitive and social outcomes. In a similar vein, the Effective Provision of Pre-school Education (EPPE) project in Great Britain found that
educators that were more highly-trained were the most effective in their interactions with children, given that they used the most sustained shared-thinking interactions (Siraj-Blatchford, Sylva, Mutton, Gilden & Bell, 2002). Siraj-Blatchford (2009) defines sustained shared thinking (SST) as an effective pedagogic interaction, where two or more individuals (adults or children) ‘work together’ in an intellectual way to solve a problem, clarify a concept, evaluate activities or extend a narrative. Research on sustained shared thinking in the Researching Effective Pedagogy in the Early Years (REPEY) study found that that the use of better pedagogy (such as use of sustained shared thinking) predicted better cognitive development in children (Siraj-Blatchford & Sylva, 2004). Burchinal, Vandergrift, Pianta & Mashburn (2010) examined educator behaviour within the early childhood classroom using two subscales from the Classroom assessment scoring system (Pianta, LaParo & Hamre, 2008). The first subscale considers the strategies educators employ to promote children's higher order thinking skills and creativity through problem solving, integration, and instructional discussions and the second; quality of feedback; concerns the quality of verbal evaluation provided to children about their work, comments, and ideas. The authors combined this into a construct called Instructional Quality. They found that children who experienced higher Instructional Quality tended to score higher on expressive language and maths overall. Moreover, in settings where there was also a high degree of emotional support for children, instructional quality also predicted outcomes such as expressive language, reading and maths more strongly. These findings suggests that, in order for educational experiences to improve children’s cognitive and language development, it is important for the learning relationship to be characterised by a high level of positive educator-child interaction as well as at least a moderate level of programme content (i.e. instructional quality). Similar findings in relation to instructional quality (and emotional support for children) have been
found elsewhere (Curby, Rimm-Kaufmann, Ponitz & Cameron, 2009). Schwarz & Copeland (2015) emphasise that the interplay between self-directed learning on the part of children and the support of a content-aware adult, who can help them to make their knowledge more explicit through conversations and extensions of activities, is key for sustaining and embedding learning for young children (Falk, 2009).

4.3.2.2.1 Adult- versus child-centred classrooms.

Lockhart, Xiang and Montie (2003) found that educator behaviour could broadly be categorised as adult-centred or child-centred. In an adult-centred classroom, educators gave demonstrations, engaged in directive teaching and elicited information related to learned concepts. Conversely, child-centred educators offered choices to children, encouraged activities and elicited information or knowledge related to a child’s own thoughts. Montie et al. (2006) found that children who attended settings where there was a greater proportion of free choice activities offered (i.e. child-centred), adult–child interaction was positively associated with age-7 cognitive outcomes, while in settings where practice was predominantly adult-led, adult–child interaction was negatively associated with Age 7 cognitive outcomes. Developmental outcomes may also be dependent on whether child activities were freely chosen by the children. Montie et al. (2006) also reported that children who were in settings in which free choice activities predominated had significantly better language performance at Age 7. This finding may be explained if we consider that a classroom that allows free-choice activities is more likely to be a child-centred classroom. The idea of children being permitted to pick their own activities is reflective of a constructivist learning model, which facilitates learning through stimulating children’s interests at the developmentally appropriate level. Children learn and gather facts through their senses, experiences and interactions with people and objects (Donaldson, 1978; Wann,
Dorn & Liddle, 1962) and the facts that they choose are determined by their developmental stage, prior knowledge and their individual interests (Forman & Kuschner, 1983). Thus a child is permitted to explore issues related to his/her own thoughts rather than those that are related to learned concepts. Children who are allowed to structure their own play environment may learn to similarly structure their own language development through a process of transforming the indeterminate into the determinate. Indeed, research has found that language acquisition may be related to reflective abstraction on the part of the child (Forman, 1992) which is more likely to occur during unstructured activities that the child rather than the teacher leads.

The Early Childhood Environment Rating Scale, an internationally used measure of ECEC quality, uses free choice as an indicator of programme structure quality, while also emphasising the importance of also allowing for some structured and adult-planned small group work (Harms, Clifford & Cryer, 1998). Chien et al. (2010) found that settings in which free play and low levels of adult-child interaction predominated, had the smallest academic and social gains for children when compared to children in settings characterised by individual instruction, group learning or scaffolded learning. The authors did not regard this as a criticism of free choice activities per se, rather evidence that free choice activities should still involve striking a balance with adult input and support. The High/Scope curriculum recognizes this balance and the curriculum is structured to allow children to freely choose some activities daily while also enabling adults to support the learning offered by such a child-centred approach when they ask children to review what they did, therefore concretising the experience for the child. The key seems to be to recognize that, as Early et al. (2010) comment, “All free time is not equal and the value of free time may vary with the
types of adult interactions in the classroom” (p. 179). As children move through the primary school system, the emphasis moved from learning through play but many of the principles that apply to playful learning are still relevant to promote children’s learning. The freedom inherent in play is important for children in middle childhood; they should still be granted autonomy in choices within the classroom and due to increasing personal autonomy, may benefit from being provided with opportunities to lead their own learning in small, independent groups with less educator interaction than was required when they were younger.

4.3.2.2.2 Whole-group versus individual or small group practice.

The longitudinal cross-nation analyses of the IEA Preprimary Project also illustrated the complexity of child-educator interaction. For example, if the educator proposed that most Age 4 classroom activities were conducted in whole group rather that partial group format, this factor was negatively related to children’s Age 7 cognitive performance (Montie, Schweinhart & Xiang, 2007). In many schools, whole-group activity tends to involve adult-centred teaching behaviour with a primary focus on preacademic activities (Weikart et al., 2003). The researchers suggest that whole group activities, given that they are designed to be undertaken by a large group of people at once, do not allow for individual interests or choice and may not suit all the children involved. There is a danger, according to Montie, Schweinhart and Xiang (2007), that the whole group activity is either not challenging enough or too challenging for at least some of the group, thus reducing the possibility of learning occurring, overall.

It is little wonder then that within this context, children who were afforded the opportunity to work in smaller groups or alone exhibited better cognitive performance. Whole-group activities tend to be didactic as it is easier to implement didactic activities in a whole group format (Early et al., 2010). Moreover, whole group and didactic instruction may predominate
in settings where practitioners are less skilled at individualisation and scaffolding of learning (Early et al., 2010). While a certain degree of didactic activity is appropriate for early learners, for example, using repetition and recitation to help them to consolidate new knowledge (Cornell, Senechal, & Broda, 1988) or simple provision of new information (Smerdon, Burkam & Lee, 1999), there is a general acknowledgement of the supremacy of scaffolded learning for keeping children interested, involved, motivated and engaged in the learning process (Early et al., 2010). Many experts in the field emphasise the importance of utilising small group structures in early childhood classrooms in order to allow for meaningful interactions between adults and children and among children to support and stimulate learning (Hendricks & Weissmann, 2013; Hohmann, Banet & Weikart, 1979; Hohmann, Weikart & Epstein, 1995; Katz, 1996; Wasik, 2008; Weikart, Rogers, Adcock & McClelland, 1971). Given that whole group activities often fail to facilitate a constructivist, interactive means of learning, cognitive gains are unlikely to be stimulated and perhaps more so if the child is not able for the activity on the one hand, or bored by the activity on the other. These findings are worth mentioning in light of the often contradictory results that have been reported on the relationship between educator-child interaction and children’s development. It illustrates that adult-child interaction does not mean the same thing in every classroom and consequently researchers should consider this when examining interaction effects.

4.3.3 Child activities and programme content.

Since Piaget first measured children’s cognitive competence with his water conservation task, researchers have been aware that children’s ease of interaction with objects is quite likely to be reflective of their developmental status. It is not only the fact that child activity is easily
observable that makes it a popular developmental research measure, however. Research now tells us, with some degree of certainty, that the presence of engaging materials, coupled with teachers who provide sensitive instruction, is associated with significant, but modest, gains in academic and social skills in preschool (Early et al., 2010). The inclusion of child activity variables in an ecobehavioural analysis of an early childhood classroom is valuable because activity variables are linked to the cognitive and social demands that are placed on active children (Kontos & Keyes, 1999; Rubin, Fein & Vandenberg, 1983). Child activities reflect the complexity of an early childhood classroom in that they can range from routine activities (queuing up to go outside) to creative activities (painting a picture) to motor activities (playing on a slide). Some researchers have seen fit to divide child activities along discrete lines. The notion of high, moderate or low yield activities was introduced by Sylva and her colleagues to account for the different amounts of cognitive demand or “stretch” that different activities in the early childhood classroom were thought to elicit (Hadeed & Sylva, 1996; Sylva, Roy & Painter, 1980). Artistic activities such as creative dramatic play were classified as high yield activities and indeed proved to be a good predictor of cognitive competence (Kontos & Keyes, 1999). Middle yield activities involved what have been termed manipulatives i.e. non-art fine motor activities such as puzzles, Lego or shape-sorters. Low-yield activity included gross-motor activities such as playing on a slide. Howes and Smith (1995) also demonstrated that their version of high-yield activities, which involved creative dramatic play, block play and open-ended artistic activity, was a predictor of subsequent cognitive competence. Kontos et al. (2002) found that complex child-object interaction was more likely to occur during activities that could be deemed to be more cognitively demanding such as during creative activities than during lower yield activities such as block-building or playing on the swings. Early et al. (2010) contend that, “The various subject areas are linked
for young children and instruction of discrete skills is often decontextualised and unstimulating” (p.179). They suggest that children in early childhood settings should therefore experience a rich variety of activities to include academic, creative, motor and social activities. Through their development of the Activities subscale of the Early Childhood Environment Rating Scale developed, Harms, Clifford & Cryer (1998) summarised the rich variety of activities that should be available to children in early childhood settings; fine motor; art; music/movement; blocks; sand/water; dramatic play; nature/science and maths/number activities. Higher overall scores on the activities subscale reflect greater diversity and frequency of the given activities, which is an indicator of higher quality ECEC environments.

4.3.3.1 Activities to support language and reading development.

The development of language skills is a key trajectory in human development and although it has biological antecedents (Pinker, 2009); it is also culturally (Hoff & Tian, 2005; Ochs, 1988; Rogoff, 2003) and socially determined (Bruner, 1977; Hart & Risley, 1999). Children’s reading skills and language abilities have long been a source of interest (Bryant, McLean, Bradley & Crossland, 1983; Clay, 1991; Whitehead, 2007). In the early childhood classroom, early childhood educators and teachers can do much to build on and develop children’s language (Wasik, Bond & Hindman, 2006). They can create print-rich environments (Dowhower & Beagle, 1998; Chambliss & McKillop, 2000; Neumann, Hood, & Ford, 2012) through indirect use of environmental print in displays, labels and everyday items. They can also more directly draw children’s attention to print in their environment and use this process to scaffold their learning (Bodrova & Leong, 2007). They can read to children in a way that allows children to become invested and involved in the story (Cabel, Justice, Vukelich, Buell & Han, 2008), while also taking the opportunity to point out letters in the text (Justice &
and provide information about concepts of print including book orientation and
directionality (Clay, 2001). Moreover, they can support the development of language through
the use of songs (Hill-Clarke & Robinson, 2004), rhymes (Bryant, Bradley, Maclean &
Crossland, 1989) and poems, particularly by drawing children’s attention to the sounds in the
highlighted important activity predictors of children’s ability to read, which have been
supported by other research including access to a print rich environment (Duke, 2000;
Neuman & Celano, 2001) and a language rich environment with interaction between children
and care-givers (Bus, 2001; Justice & Ezell, 2002; Price, Kleeck & Huberty, 2009; Pellegrini
& Galda, 2003; Piasta, Justice, McGinty & Kada ve ref, 2012). Research shows that better
trained educators and teachers are better at creating and structuring such language learning
opportunities for children (Hayes et al., 2011). Moreover, they are more likely to talk more
with children and to structure talk around children’s interests rather than their own.

A recent meta-analysis of 99 studies (n=7,669) with preschool-aged, primary-, secondary-, children and college students found an upward spiral of causality in relation to reading skills and reading habits. Those who were more proficient in comprehension and technical reading and spelling skills read more than those who were not proficient. Their comprehension and technical reading and spelling skills improved more with each year of education as a result of their greater exposure to print (Mol & Bus, 2011). In preschool aged children, print exposure explained 12% of the variance in oral language skills, in primary school 13%, in middle school 19%, in high school 30%, and in college and university 34%. The researchers also found that print exposure was moderately associated with academic achievement, indicating that frequent readers were more successful students. The OECD (2002) found that reading
enjoyment was a stronger predictor of children’s later educational success than their parental socioeconomic status. This finding is important for two reasons; firstly in and of itself, it implies that a child who is supported to love reading will have better educational outcomes and secondly, it implies that this love for reading can be a protective factor for all children, regardless of their family’s socio-economic status. Baker, Dreher and Guthrie (2000) found that when struggling child readers are not motivated to read, their opportunities to learn decrease significantly, which can in turn lead to strong negative feelings about reading and create a vicious circle of poor readers remaining poor readers (Juel, 1988). Conversely, motivated young readers become better at reading due to having more of a chance to practice reading and the gap between good readers and poor readers widens over time (Stanovich, 1986). Early childhood classrooms are therefore an important breeding ground for language development and early literacy, which will have far-reaching consequences for children, as they grow older.

4.3.3.2 **Activities to support cognitive, maths and science development.**

Later academic competency in maths and science (into primary and secondary school and beyond) can be predicted by early introduction to maths, science and nature concepts as part of the early childhood curriculum (Bowman, Donovan & Burns, 2001; Clements, 1999; Seefeldt & Galper, 2008; Van de Walle & Lovin, 2006; NRC, 2001). Indeed, research suggests that the relationship between mathematical ability in the early years and later on is twice as strong as the predictive relationship between early and later reading achievement (Duncan et al., 2007). However, research has also found that early years educators and teachers tend to lack confidence when it comes to planning and implementing appropriate mathematical activities (Copley, 2004; Copley & Padron, 1999; Farran, Silveri & Culp, 1991). Certainly, observational studies have found that the quality of mathematical activities
in early childhood settings is often low (Anders et al., 2012; Graham, Nash & Paul, 1997; Hayes, Siraj-Blatchford, Keegan & Goulding, 2013). Thiel (2010) found that some early educators perceived mathematical tasks in early childhood classrooms to relate only to number and shape. Lee (2010) found that early childhood teachers had a lack of pedagogical content knowledge (PCK) in relation to mathematical concepts, which meant that although they may have understood mathematical concepts, they lacked an awareness of how to teach children and engage with them in relation to such concepts. Recommendations for how to engage children in early mathematical learning include greater incorporation of children’s everyday lives and interests into mathematical learning (Lee, Lee & Fox, 2009; Linders, Powers-Costello & Stegelin, 2011; Munn, 1997), use of manipulatives (Heddens, 1986; Murray, 2001) and targeted professional development for educators (Darling-Hammond & Richardson, 2009).

In early childhood settings, science activities involve the identification and exploration of natural phenomena and include activities like working with mirrors, magnets, sand, or water, reading books about insects, trial and error experimentation and caring for living things. Science activities help children to generalize their learning to the world around them through the illustration of concepts such as cause and effect (Bullock, Gelman & Baillargeon, 1982), properties of living and non-living things (Baillargeon, 1995; Carey, 1985; Massey & Gelman, 1988; Spelke, 2000) and the changing of the seasons/weather change (Neuman, 1972). Lind (2000) identified three ways that children can learn from science; through structured activities that are planned and guided by the adults in their setting; through informal learning opportunities that are identified and developed by adults as a result of a naturalistic event or development; and through those spontaneous activities that children
initiate themselves as they go about their daily routine. Therefore, children rely to a certain extent on the adults around them to plan stimulating activities but also to firstly recognize and then capitalise on teachable moments that arise by chance (Lind, 2000; Tu, 2006). Learning requires a high level of child engagement, so science activities are an ideal way to support learning for children as they provide so many opportunities for active participation, discovery and direct observation of change (French, 2004). The fact that science activities offer more opportunities for children to learn from direct personal experience is important, particularly in the early years as younger children, in particular, learn more easily from doing and experiencing than being provided with information (Nelson, 1996). Moreover, while science activities can teach children about the world and living things, it is also important as an aid to vocabulary (Gelman & Lucariello, 2002), as a stimulator of expression (Gallas, 1996) and as a prompt for the recording of activities and ideas (Katz, 1993). Science activities, therefore, are extremely useful in stimulating cross-curricular learning in areas including mathematics, literacy and social development (Gelman & Brenneman, 2004).

4.4 Learning in Middle Childhood

When children move into middle childhood, a number of key micro-level biological and cognitive changes occur, which have relevance for how they learn. Their social environment becomes increasingly important as they become more involved with peers and adults outside their families in school and social clubs (Erikson, 1968). As a result of the development of self-esteem, they become more aware of comparison to peers and develop an understanding and even expectation for success or failure. Their orientation towards achievement will have implications for how they respond to school and other challenges for many years (Alexander, Entwistle & Horsey, 1997; Eccles, Wigfield, & Schiefele, 1998; Eccles, 1999). Given that the
social, biological and cognitive changes that children experience in middle childhood coincide with the beginning of formal schooling, the experience of children within that system is extremely important for their future development (Entwisle, 1995). Relevant areas of the primary school experience will be examined accordingly. Any culture that has a formal schooling system begins this stage from ages five to seven (Samerof & Haith, 1996). This is likely related to the afore-mentioned changes that occur in middle childhood, including the development of key conceptual and thinking skills (movement from preoperational to operational thinking) which are refined and consolidated as middle childhood progresses. Therefore, while there is a micro-level element to the changes that occur cognitively and biologically for children in middle childhood, the macro-level is also firmly relevant as a determinant of how children will begin to learn, and indeed, what the learning should be. Many cultures determine that children should learn valuable skills in middle childhood such as reading and arithmetic (Eccles, 1999). How they learn such skills is contingent on a number of factors including the relationships they develop with peers and teachers in primary school and the learning activities they experience while in the classroom.

4.4.1 Relationships in primary school.

The age-related homogeneity of primary school classrooms is one of the reasons that children begin to become more aware of the similarities and differences between and among themselves and their peers (Eccles, 1999). The other reason is a growing sense of self-concept, which tends to be characterised by a high sense of optimism in early middle childhood (Eccles et al., 1999; Parsons & Ruble, 1977; Stipek, 1984) that often tapers out as children grow older, and is thought to be a reflection of their internalisation of cultural understandings of failure, mediated by the experiences they have with others (Dweck &
Leggett, 1988). This underlines the importance of children developing an understanding of their own competency that is not divided into a binary construct characterised by success and failure only. In the absence of an overall framing culture that promotes such an understanding, this task falls to parents and to teachers in primary classrooms. They have the power to show children that their abilities are not necessarily innate, and can be subject to incremental improvement. Having and showing positive expectations and encouraging children to try in spite of a fear of failure is one of the most powerful ways that a primary teacher can help children to develop the skills needed to learn and to deal with initial frustrations that might otherwise block the learning process (Entwisle, 1995; Eccles, 1999). Many researchers have established the pervasiveness of the influence of teachers’ expectations in middle childhood on academic outcomes in high school and beyond (Entwisle & Hayduk, 1988; Pederson, Fauchner & Eaton, 1978; Stevenson & Newman, 1986). These effects could best be characterised as being indirect, involving an influencing of the child’s own attitude to learning and achievement, which is carried forward by the child throughout his/her educational experiences (Entwisle, 1995). Positive interactions and support between teachers and children can also simply protect children in middle childhood from the slings and arrows of fraught peer relationships and burgeoning self-awareness (Baker, 2006).

4.4.2 Activities and social groupings in primary school.

As already mentioned, what children learn in primary school is determined to a certain extent by cultural valorisation of skills such as reading and writing. Children certainly pick up on these cultural messages transmitted by the time-parcelled aspects of primary school classrooms to come to an understanding that subjects such as Maths and English are ‘real’ subjects with a practical work/life focus (Devine, 2002) and also an awareness that
acquiescence and concentration on those subjects in particular would be appreciated and welcomed by the teacher. This is not necessarily a negative for most children in middle childhood as many of the things that they enjoy to learn also happen to be things that help them to make sense of the world. Therefore, they are already quite in tune with many aspects of the school experience (Entwisle, 1995) as a result of the cognitive spurts that are taking place, which enable them to understand the world in a way that was not possible in early childhood. However, children seem to lose interest in activities such as reading and maths as they move through middle childhood (Eccles et al., 1998) and they tend to hold less positive judgements of their importance or value as they grow older (Wigfield et al., 1997). It is possible that this sense of disinterest is less linked to the subject content and more to the way in which the activities are introduced and offered to children. It is also possible that the growing social awareness of children is not considered sufficiently by educators when planning and participating in activities with children. Eccles (1999) recommends that school activities that provide children with the opportunity to learn without continual social comparison norms and the chance to control and direct their own learning are most appropriate for children in middle childhood. Thus, competitive and performance oriented learning activities, repetition or rote-learning are unlikely to benefit children in the long run and are more likely to demotivate them in situations where they cannot be convinced of, or identify the purpose of, the learning experience. Social groupings may play an important role in learning for children learning in middle childhood.

4.5 Transition to, from, and within Primary School
As underlined at the outset of this thesis, change and time are inextricable from human experience and interlinked with that is the concept of transition. Children transition from
home to early educational settings, and from early educational settings into formal schooling, which in Ireland involves movement into the primary school system at age four or five. Dunlop & Fabian (2006) emphasise that by the time children attend formal schooling, they may already have experienced many transitions, including the transitions from home to non-parental care and transitions within and across types of care and across rooms within early educational care and even within the day depending on the structure of the daily routine their education and/or care setting. Each transition can have an impact on the child and the ease with which they navigate such transitions has an influence on how they adjust and learn. Dunlop & Fabian (2007) analysed the research and practice literature to identify contributing factors towards smooth transitions for young children, including a focus on the development and stabilization of social competencies (Goleman, 1998), transferring with friends (Ladd, 1990; Margetts, 2002); planning and provision of a range of transition activities (Briody & McGarry, 2005; Brostrom, 2007; Margetts, 1999; 2000) and effective communication between all stakeholders including home, school, early education setting and child (Fabian, 2002; Griebel & Nielsen, 2002; Pianta & Kraft-Sayre, 2003). The importance of the interlinking levels surrounding children as well as their own personal experiences and personalities are firmly emphasized and Griebel and Nielsen (2002) describe starting school as a co-construction involving the participation of parents and educators working together to support children to transition through curricular phases in a way that increases the agency of the child. Smooth transitions can be influenced by the relationships children have with their parents, the information that parents and educators communicate about school and the practices they implement to ensure smoother transitions at the micro and meso-level. At the macro-level, education policy can be directly related to the ease of transitions, for example continuity of learning experiences between early educational settings and learning
experiences as they move to primary school settings can help to ensure positive transition to school and lay positive learning foundations that children will carry with them into later life. For this reason, many researchers recommend curriculum continuity and consistency of pedagogical approach between early years settings and primary settings, particularly as the child moves through the formative early childhood years. Indeed, the strategies that apply to the transition from early education settings to primary school are often equally apt for the transition to secondary school. Certainly, they have certain features in common; including recognition of prior learning, individual development, and experience; appreciation and accommodation of family and cultural concerns; effective communication strategies between stakeholders and the location of the learner at the centre of the transition process.

4.5.1 Practice and curriculum that supports transition and learning.

The experiences that children have in primary school are key to their developmental outcomes and these experiences vary as a function of the ecological context within which children are learning, as well as a function of their own individual skills and attributes. There are a number of key areas that have been found to be important for predicting positive educational outcomes in primary schools and these include; curriculum, relationships and teaching strategies. As most primary school teachers must teach a prescribed primary school curriculum, their initial education can tend to focus more on curricular context at the expense of the child perspective (Dunphy et al., 2014; McMullen et al., 2002; European Commission, 2014). This can risk children being taught content that is distant and removed from their lives. A literature review on early school leavers found that problems they experienced with curriculum related variously to it being too rigid with not enough teacher autonomy, too complex and boring or based too much on memorising content (European Commission,
The value of learner-centred curricula, which allow flexibility for individual learning styles and cross-curricular learning, is increasingly recognised in many countries (OECD, 2013). In the absence of curricula that are child and learner-centred, teachers in primary schools can combat the risks inherent in such content by ensuring that one of the key goals of classroom learning is the development of dispositions for learning. They would also benefit from training that supports them to recognise and plan for the diversity of their students. Methods to ensure this include inquiry-based learning during which students are offered the opportunity to solve problems rather than being provided with an answer, guidance for learning rather than direct instruction, having opportunities to make their own meaning and connect learning to their own lives, promoting language and literacy in a cross-curricular way (Hammond, 2003). All of these methods are more likely to create positive working relationships between children and teachers, which has been shown to be important in terms of ameliorating against early school leaving (Byrne & Smith, 2010) and increasing the likelihood of positive educational outcomes throughout the educational system. Siraj-Blatchford (2009) posits that the positive and responsive educator-child relationship that she describes as sustained shared thinking is a higher order pedagogical concept that directly benefits children as learners in their early educational and school contexts in the short to medium term. Moreover, she also emphasised the value into the longer term for the child learner, as the relationship lays strong foundations for the transitions into adolescence and throughout adult life.

4.6 Adolescent Development and Resilience

While life events and experiences are important determinants of development, perhaps what is most important is how individuals react to such experiences and how these experiences and
reactions can shape their cognitive style, personality and future behaviour. This becomes important as children get older and move away from the familiar contexts of home and primary school into the secondary school system, with its opportunities for increased autonomy, peer relationship building and personal choice. The ecological balance of interacting systems in our lives is dynamic (Germain, 1991). It is constantly changing as individuals and larger social systems are bolstered by good fortune and challenged by adversity. Similarly, protective factors, and risk factors within a given ecosystem are dynamic. They are not fixed attributes (Rutter, 1987). Rather, their effect is evident only in the context of their interaction, the larger context in which this interaction occurs, and the meaning of a particular factor to a given individual. The concept of adolescent resilience incorporates the dynamic aspect of adolescent development. It provides information on the ecological context in which an adolescent grows and learns by encapsulating information about the individual adolescent (relationships, cognitions, behaviour), process (interactions with others, interactions with objects) and context (greater model which incorporates all of these). It is therefore well accommodated in Bronfenbrenner’s Person Process Context Time (PPCT) model of development for these reasons. The literature is generally united in a view that a range of interlinking factors contribute to positive developmental outcomes for adolescents as described by Cisneros (2009) and these are; supportive relationships with parents, friends and adults (Gabriel, Hopson, Haskins and Powell, 1996); individual characteristics such as motivation and engagement in learning; community factors such as involvement and interaction with the wider community; school success such as positive experience of schooling both academic and otherwise. According to Benard (1991) three environmental protective factors consistently buffer risk and allow development to unfold: caring relationships, positive and high expectations, and opportunities to participate and
contribute. Scales (1999) summarized 40 key assets that help young people to experience positive outcomes in areas of their lives including the academic realm. These assets could be categorized as being external or internal to the young person and were further sub-divided along the lines of support; commitment to learning; boundaries and expectations; social competencies; constructive use of time and positive identity. The more vulnerable teens were, according to Scales (1999), the more they could benefit from the presence of such assets. Yates & Masten (2004) similarly described a range of assets/protective factors, in line with those of Scales (1999) and a range of adversities or risks for positive outcomes including economic disadvantage, poor parenting and lack of access to healthcare. Morrison, Robertson, Laurie and Kelly (2002) found that a decrease in anti-social behaviour of young adolescents could be predicted by subscales of the Individual Protective Factors Index (IPFI), specifically those which indicated better perceived social support, parent supervision and classroom participation. The authors regarded these findings as important for emphasising the protective power of being engaged in academic activity instead of anti-social behaviour. Moreover, it underlined the importance of helping young adolescents to learn, through both social supports and the home environment.

4.6.1 Transition to secondary school.

Just as a smooth transitions from the early years setting to the primary setting are key for developmental outcomes, so too is the transition from primary schooling to secondary school. Research has found that it is a stressful time for young people (Mackenzie, McMaugh, & O’Sullivan, 2012; Evangelou, Sylva, Kyriacuo, Wild & Glenny, 2009; McGee, Ward, Gibbons & Harlow, 2003). McGee et al. (2003) identified the following reasons for the stress and subsequent decline in outcomes; change in pupils’ concepts of
themselves as learners; changes in attitudes towards different subjects; and the onset of adolescence. Mackenzie et al. (2012) and Sutherland, Ching Lee & McNess (2010) identify barriers to successful transitions to secondary school, including; difference in environment between primary and secondary school (e.g. greater expectations of parents and teachers); larger schools and more competitors; higher stakes testing; interaction with larger numbers of teachers and teaching styles; social demands placed on students in terms of new social group formation; reduced social standing as youngest in the school and formation of self-concept.

Often, the transitions can be more difficult for students depending on group membership; Jackson (2000) and Hanewald (2013) found that being male made the transition more difficult; Graham and Hill (2002) posited that ethnic background was related to ease of transition, while Evangelou et al. (2009) and Lucey & Reay (2002) found that socioeconomic status and special educational needs were related to transition outcomes and school performance. Factors which aided positive student transition to secondary school included supportive parents (Sutherland et al., 2010); settling into and being connected to and interested in the school (Evangelou et al., 2008); development of positive peer relationships (Ashton, 2008; Ganeson & Ehrich, 2008); teacher support and curriculum continuity or bridging (Evangelou et al., 2008; Powell et al., 2006). Researchers posit that in addition to external characteristics, intrinsic student characteristics which can develop from the early years onwards predict successful transition to secondary school such as thinking skills (Siraj-Blatchford, 2009), ability to work independently; ability to cope with change (MacKenzie et al., 2012); sense of belonging and social connectedness (Hanewald, 2013). These key supportive factors and their relationships to positive academic outcomes will be discussed in the following section.
4.6.2 School connectedness.

Resilience has been found to relate strongly to educational engagement and motivation in adolescence (Fried & Chapman, 2012). Resilience has been used to explain why in some cases, adolescents succeed academically in spite of the obstacles stacked against them (Benard, 2004; Chavkin & Gonzalez, 2000; Constantine, Benard & Diaz, 1999). There may be considerable psychological and social value for a vulnerable child in a sense of ‘membership’ of a school (Wehlage, Rutter, Smith, Lesko & Fernandez, 1989). The academic, social and developmental importance of positive school experience (Gilligan, 2000; Glover, Burns, Butler & Patton, 1998) is significant and far-reaching. Understanding the interaction of different school features with the developmental needs of adolescents is critical to understanding the role of schooling in young people’s development. The concept of school connectedness has been repeatedly identified in the research literature as being key to academic and later life outcomes (Reynolds, Ou & Topitzes, 2004). The National Longitudinal Study of Adolescent Health, Resnick et al. (1997) found that perceived school connectedness was protective against every health risk behaviour measure (except youth pregnancy). The major message from long term studies of successful human development in high risk contexts as well as of successful schools in urban settings is that the ‘how’ of teaching young people may count more than the ‘what’. Benard (2002) sums it up thusly, “context matters more than content; process more than programme” (p. 26).

School connectedness has been termed variously; school bonding, school climate, school engagement and school connectedness (Blum, 2005; Libbey, 2004), although all terms attempt to capture some aspect of the degree to which young people interact with their school environment as well as the strength of their individual feelings about that school.
environment. The term school connectedness is chosen here for its encapsulation of commitment, power, belonging and belief in rules (Brown & Evans, 2002). This concept is a powerful predictor of a variety of positive health and academic outcomes (Whitlock, 2006). Students who feel like they are cared for and belong at their school have more success in school and have fewer problems in and out of school, including drug and alcohol misuse, violence or early sexual activity (Klem & O’Connell, 2004; McNeely, Nonnemaker & Blum, 2002). Darling et al. (2005) found that school connectedness predicted better academic performance. In a similar vein, large-scale longitudinal studies have found that the relationship between young people and school positively predicted academic outcomes. In the Effective Pre-school, Primary, and Secondary Education (EPPSE) study (Sammons et al., 2012), students’ ‘academic self-concept’ (whether they felt they were good at a subject) predicted better attainment for English and Maths at age 14, as did their rating of their enjoyment of school. The authors described the relationship between academic attainment and students’ academic self-concept as interdependent and reciprocal, with a continuous feedback loop between feelings of competency and enjoyment and attainment. Similarly, in New Zealand’s Competent Children study, the authors found that those young people who were less interested in school at age 14, were more likely to find themselves out of work or in unfulfilling employment/study at age 20 (Wylie & Hogden, 2011).

4.6.3 Extra-curricular activities in adolescence.

Participation in extracurricular activities has been shown to improve connectedness among students (Brown & Evans, 2002; Dotterer, McHale & Crouter, 2007) and is often identified as a primary way to encourage school connectedness and positive life outcomes (Brook, Nomura & Cohen, 1989; Masten & Coatsworth, 1998; Mills, 1990; Rutter, 1985; Werner &
Smith, 1992). One theory holds that more involvement by adolescents in extra-curricular activities and hobbies allows less time for adolescents to become involved in negative activities such as crime, drug use or violence. This certainly seems to be true for adolescents from disadvantaged areas as research has found that providing structured activated for these adolescents in the post-school hours reduces their likelihood of becoming involved in high-risk activities (Eccles & Gootman, 2002; Mahoney, Harris & Eccles, 2006).

Other researchers are interested in the opportunities for autonomy, positive development and self-exploration that extra-curricular activities offer to adolescents. Many have found positive and protective effects of extra-curricular activities on a range of outcomes including educational success (school completion, third level education attainment, income and occupational success) and positive adolescent development (better mental health and lower likelihood of anti-social behaviour) (Barber, Eccles, & Stone, 2001; Dworkin, Larsen & Hansen 2003; Eccles & Barber, 1999; Eccles, Barber, Stone, & Hunt, 2003; Mahoney & Cairns, 1997; McNeal, 1995; Peck, Roeser, Zarrett & Eccles, 2007). Leisure time provides a chance for young people to exert control over their environment and in doing so, may be key in their subsequent development (Darling, Caldwell & Smith, 2005) through the opportunities it allows for skill mastery, social development (Fredricks, Alfred-Liro, Eccles, Patrick & Ryan, 2002) and identity exploration. Bernard (2002) sums it up by stating that,

Youth need experiences that allow them to be good at something -anything-in order to develop that critical sense of self efficacy and self-confidence. For some youth, academics provides this hook; for others it is art or sports; for yet others it is auto mechanics, organic gardening, community service, and so on (p. 25).
Moreover, mastery or validation in one area or activity can carry over to other domains (Todd & Kent, 2003). Fletcher, Nickerson & Wright (2003) were interested in unpicking whether increased participation in extra-curricular activities affect adolescents positively or whether students who became more involved were already more likely to experience success despite extracurricular participation. This points to the possibility that adolescents who participate in school-based extracurricular activities often share qualities such as higher social class, more positive orientation toward school and adult standards and authoritative parents (Saelhof, 2009) and that it is these shared qualities rather than the activities per se that predict such outcomes. Kort-Butler & Hagewen (2011, p. 570) state that, “Research on the influence of the demographic characteristics of race/ethnicity and sex on extracurricular activity participation is equivocal.” Many researchers have found that male adolescents have more exclusive uptake of sports activities (Darling, 2005; Eccles, Barber, Stone & Hunt, 2003; Pedersen, 2005) and accordingly benefit more from them (Fredricks & Eccles, 2006a; 2006b, 2008; Gadbois & Bowker, 2007). Research suggests that girls are more likely than boys to participate in a wider range of activities and are more likely to be involved in multiple activity types (Eccles et al., 2003; Feldman & Matjasko, 2007). Some studies have found no particular race or sex differences in the relationship between participation in extra-curricular activities and well-being (Marsh & Kleitman, 2002; Simpkins, Eccles & Beclin, 2008). There is some evidence that, regardless of factors such as ethnicity, participation in extra-curricular activities resulted in better school-connectedness (Brown & Evans, 2002) or at the very least mitigated negative effects for at-risk young people (Shann, 2001). These differences are likely due to the variation in the nature and structure of extra-curricular activities under analysis, in addition to differing cultural meanings of certain activities and call for a nuanced reading of existing findings as well as suitably tailored future research in the area. Extra-
curricular activities may be of particular importance for adolescents who are at risk of disengaging (Bonny, Britto, Klostermann, Hornung & Slap, 2000; Brown & Evans, 2002; Roeser & Peck, 2003) by narrowing the gap between those adolescents and the school through creation of a sense of belonging (Eccles et al., 2003; Darling et al, 2005; Faircloth & Hamm, 2005; Finn, 1989; Gilman, Meyers & Perez, 2004) or compensation for a negative self-appraisal from another domain (Fredericks & Eccles, 2006a; 2006b). Research has found that participation in extra-curricular activities may have more strong and positive effects for adolescents who are at risk due to disadvantage (Bloomfield & Barber, 2011; Mahoney & Cairns, 2007; Marsh, 1992; Hull, Kilbourne, Reece & Husaini, 2008).

### 4.6.3.1 Types of activities in adolescence.

Research has found that adolescent involvement across a range of domains, such as sports, academics, and school clubs, have better psychological adjustment on measures including self-esteem and psychological resiliency, when compared to those adolescents who do not participate in any extra-curricular activities (Feldman & Matjasko, 2005; Fredricks and Eccles, 2006a; 2006b; Simpkins et al. 2008). Eccles et al. (2003) found that students who participated in team sports had a better attitude towards school, were more likely to proceed to and succeed in third level education, and were more likely to have a positive career trajectory at age 24. Wylie & Hodgen (2011) reported from New Zealand Competent Children study that those 14 year olds who were less interested in reading for pleasure were less likely to be successful in their subsequent college and career trajectories by age 20. Peck, Roeser, Zarrett & Eccles (2008) found that activities associated with extracurricular activities at school, with religious activity, and with volunteering were particularly important for building educational resilience in a disadvantaged population of adolescents. Reading for pleasure among children and young adults has been shown to have multiple benefits in areas
such as reading attainment and writing ability (OECD, 2002; Krashen, 1993; Anderson, Wilson & Fielding, 1988; Taylor, Frye & Maruyama, 1990); text comprehension and grammar (Cipielewski & Stanovich, 1992; Cox & Guthrie, 2001; Elley, 1994); vocabulary (Angelos & McGriff, 2002; Cunningham & Stanovich, 1998); general knowledge (Cunningham & Stanovich, 1998) and academic achievement (Mol & Bus, 2011). A growing body of research suggests that a lot of young people do not read for pleasure. A number of studies have shown that boys enjoy reading less and therefore read less than girls (Clark & Foster, 2005; Nestlé, 2003), while children from lower socio-economic backgrounds read less for enjoyment than their counterparts in higher socio-economic backgrounds (Clark & Akerman, 2006).

Bloomfield and Barber (2011) found that participating in a mix of domains (i.e. both sport and non-sport) was also important in predicting social self-concept and self-worth and this finding on the importance of a range of activities was supported by others (Bartko & Eccles, 2003; Feldman & Matjasko, 2007). Knifsend & Graham (2012) suggest that breadth of participation may be important and found that involvement in a moderate number of activity domains in 11th grade (age 16-18), predicted better school connectedness, and greater academic performance. However, there was evidence of a curvilinear relationship whereby, extra-curricular activities positively predicted better school connectedness and academic performance up to a threshold at which higher levels of extra-curricular activity participation no longer predicted such outcomes. The authors surmised that adolescents who are not involved in any activities may miss out on the opportunities for social bonding and mastery offered by participation in extra-curricular activity, while those who are involved in too many activities may run the risk of not fitting in with any of the multiple groups with which they
engage. In terms of academic outcomes, the authors argue that a moderate level of extra-curricular engagement is optimal because it allows for the time to complete academic activities as well as the development of feelings of mastery and belonging, which strengthen adolescents’ ability to tackle their academic work. Those who are not involved in extra-curricular activities do not develop protective characteristics such as feelings of belonging, mastery and competence to help them in their academic endeavours and those who are too involved in extra-curricular activities, simply may not have time left to prioritise academic tasks, which will therefore suffer. Fredricks (2012) supports this contention with the finding that breadth and intensity of extra-curricular activity participation has a curvilinear relationship with academic achievement test scores, expectations for educational attainment and post-school educational attainment (2 years after school).

4.6.4 Relationships with teachers in adolescence.

Research recognizing the importance to learning of the relationship between teachers and adolescents is not new (Brookover, Beady, Flood, Schweitzer & Weisenbaker, 1979; Goodenow, 1993a; Eccles & Wigfield, 1985). Therefore, it is now relatively clear that teachers can foster positive academic outcomes in ways other than simply providing adolescents with the relevant information needed to learn. One of the most important ways that teachers can support adolescents to learn is through the cultivation of caring and supportive relationships (Deci & Ryan, 2002; Goodenow, 1993b; Midgley, Feldlauer & Eccles, 1989; Roeser, Midgley, & Urdan, 1996; Wentzel, 2002; Wigfield, Eccles, Scheifele, Roesor, & Davis-Kean, 2006). Eccles & Roeser (2009) argue that the feelings of emotional support offered by a teacher in adolescence may be particularly important given that adolescents can often tend to feel a decline in support and a lack of belonging as they
undergo developmental change in conjunction with the physical and figurative change of moving from the comparative comfort and familiarity of the primary school context (Roeser, Peck & Nasir, 2006; Wigfield et al., 2006). Moreover, the presence of a stable and reliable adult may be important as a last bastion of non-parental stability at a time of ordinary teenage flux, and even more so, for those adolescents who are at risk due to lack of support from family or neighbourhood (Eccles, Lord & Roesor, 1996; Simmons & Blyth, 1987).

A further way that teachers can foster positive academic outcomes is through the creation of a positive learning environment (Darling-Hammond & Bransford, 2005; Pintrich & Schunk, 1996; Roeser, Issac, Abo-Zena, Brittain & Peck, 2008). McNeely et al. (2002) found that positive classroom management climates and tolerant disciplinary procedures predicted school connectedness, which in turn has been linked to positive academic outcomes. Positive classroom management climates were characterised as those in which adolescents were more likely to report getting along with the teacher and others as well as doing their homework and paying attention. Tolerant disciplinary procedures were those that did not operate zero tolerance procedures and mandatory expulsions but rather those that considered disciplinary procedures on a case-by-case basis. Wigfield, Byrnes & Eccles (2006) emphasised the importance of balancing students’ need for autonomy with a structured and organised classroom context, which also becomes more important as students’ grow older and feel more of a need for opportunities of autonomy (Eccles & Roesor, 2004; Eccles et al., 1993). Teachers who set adolescents interesting tasks are likely to increase their intrinsic motivation (Deci & Ryan, 2002) and as a result, they are more likely to develop a personal identity that is connected to, and interested in, learning (Eccles, 2009). Indeed, research has found that when schools and teachers seek to challenge adolescents by introducing work that the
adolescents find developmentally meaningful, their motivation to learn is maintained and
does not decline (Eccles, Wigfield & Schiefele, 1998; Jackson & Davis, 2000; Lee & Smith,
2001).

4.6.5 Family relationships in adolescence.

Parents may support their adolescent towards academic achievement by simply being
involved in their educational journey. Parental involvement may range from engaging with
the school (Fan & Williams, 2010), showing an interest by providing advice and
opportunities for discussion (McNeal, 1999; Wentzel, 1998; ), monitoring behaviour, helping
with homework (Lee & Bowen, 2006) or having rules about school and leisure time (Pong,
Hao & Garner, 2005). Lareau (2011) found that parental involvement differs according to
social class, with middle class parents more likely to have a parenting style of concerted
cultivation of academic achievement through the scheduling of appropriate activities and
opportunities to allow their child to develop the necessary academic skills. However, Siraj-
Blatchford (2010) also found in detailed case studies that some parents from lower socio-
economic classes could also engage in concerted cultivation of their adolescent as a means of
helping their child to succeed despite the odds being stacked against them. A study conducted
by Brody & Flor (1998) further underlined the importance of considering context when
conceptualising parenting. They studied a group of low-income African-American single
mothers and noted that they tended to adopt a “no-nonsense” parenting style. The style
involved high levels of warmth and affection and also high levels of control and even
physical discipline. The researchers deemed it likely that this unusual combination of
authoritativeness and warmth made the families of the women more resilient given that their
parenting style was an adaptation to the high-risk environment of poverty, racial tension and isolation to which their families were exposed.

While not explicitly predicting academic achievement, what does seem clear is that parental awareness and monitoring of adolescents acts a protective factor against anti-social behaviour such as binge-drinking and substance abuse (Barnes & Farrell, 1992; Piko & Kovács, 2010), which is an indirect support of academic achievement given the established negative relationship between such behaviour and academic achievement (Bardone, Moffitt, Caspi, Dickson & Silva, 1996; Masten et al., 1995; Risi, Gerhardson & Kistner, 2003). Perhaps the answer to the question of how parents influence academic outcomes lies in the research of Chan and Koo (2011). They found that authoritative parenting style predicted better academic outcomes than either authoritarian parenting or permissive parenting. Adolescents with authoritative parents were more likely to report that their parents told them where they were going when they went out; set limits on how much TV they watched; chose what they ate at home; talked to them about smoking, health and about drugs, and checked how well they did at school. In contrast, authoritarian parents were less likely to engage in the five listed behaviours above, while permissive parents were least likely to engage in them. Chan and Koo (2011) posited that the combination of the more traditionally authoritarian parenting behaviour of monitoring and supervision with the acceptance and involvement behaviours created a more differentiating concept of parenting style which had been elided in studies that focused too much on supervision and not enough on relationships. As a result, they found that parenting style was orthogonal to social class, in that it is additional rather than mediating in terms of predicting educational outcomes.

4.6.5.1 Parental expectations of adolescents.
Parental expectations may be defined as realistic beliefs or judgments that parents have about their children's future achievement as reflected in course grades, highest level of schooling attained, or college attendance (Alexander, Entwhittle, Dauber & Kabbani, 2004; Astone & McLanahan, 1991; Glick & White, 2004; Goldenberg, Gallimore, Reese & Garnier, 2001; Yamamoto & Holloway, 2010). Students whose parents hold high expectations receive higher grades, achieve higher scores on standardized tests, and persist longer in school than do those whose parents hold relatively low expectations (Davis-Kean, 2005; Pearce, 2006; Vartanian, Karen, Buck & Cadge, 2007). High parental expectations have also been linked to student motivation to achieve in school, scholastic and social resilience, and aspirations to attend college (Hossler & Stage, 1992; Peng & Wright, 1994; Reynolds, 1998). Moreover, parents' academic expectations can mediate the relation between family background and achievement, and it is likely that high parental expectations can act as a buffer against the influence of low teacher expectations on student achievement (Benner & Mistry, 2007; Zhan, 2006). Kirk, Lewis-Moss, Nilsen & Colvin (2011) found that parental expectations predicted adolescent educational aspirations and this was supported by other studies too (Benner & Mistry, 2007; Catsambis, 2001). Catsambis (2001) found a cumulative effect of parental expectations over time, with parents’ expectations of their children in 8th grade predicting the number of credits they received in high school. Zhang, Haddad, Torres & Chen (2011) suggest that the relationship between parental expectations and achievement, with each having a mutual influence on the other. Mistry, White, Benner & Huynh (2009) similarly found that parental expectations were dynamic and changed as a response to the student’s academic achievement over time.
Summary

This review of literature illustrates that children’s academic outcomes in the short- and longer-term are not only contingent on the country of their upbringing but also on the schools in which they are taught, the family from which they originate, their teachers and their experiences in- and out- of school. This review of the literature supports Bronfenbrenner’s PPCT model of development, where children and adolescents interact with the contexts surrounding them. Moreover each given level of the system can be thought of in terms of relative constancy and change (Tudge, Mokrova, Hatfield & Karnik, 2009), the rate and nature of which depends on individual characteristics, processes and cultural and historical events. This review embeds the current study within a research context and points the reader to the key findings for consideration in relation to academic outcomes at an Irish, school, classroom and teacher level.
CHAPTER 5

METHODOLOGY

This study focuses on a longitudinal sample of Irish children at four, seven and sixteen-years of age. The sample was drawn from the larger IEA Preprimary Project database, which consisted of children in designated disadvantaged (DD) and non-designated disadvantaged (NDD) preschools and schools from across the country. The study aimed to identify and analyse the factors in an early educational setting that are related to children’s development as measured at Age 7 and Age 16, while taking into account the dynamic effect of their ecological context on developmental outcomes. A longitudinal design was used to ascertain how and why children develop in the contexts of home and school in Ireland. While the tracking of children through the developmental trajectory is not a new research phenomenon, such tracking has not been possible in a large Irish school sample. To date, no other Irish researcher has tracked an extensive school sample from the age of four through to sixteen, thus there was a paucity of research findings on the long-term educational outcomes of attending early educational settings and schools in Ireland.

5.1 Ecological and Longitudinal Research Perspectives

From the 1920s onwards, longitudinal studies began to challenge constancy models of human development by indicating that humans could change considerably over time (Clarke & Clarke, 1984). The survival of the notion that human development could only be effected by one overriding factor whether it be heredity, social environments or critical experiences in infancy was due, in the most part, to the fact that developmental theorists lacked the empirical data to inform more enlightened claims. Numerous longitudinal studies of varying quality began to change this by examining topics ranging from major environmental shifts
(Koluchova, 1972, 1976; Bowlby, Ainsworth, Boston & Rosenbluth, 1956; Clarke & Clarke, 1984) to personality (Block, 1972) to temperament (Thomas & Chess, 1986). Longitudinal research has since come to be recognised as one of the most suitable methods for investigating individual differences and their stability over time (Weinert & Schneider, 1993). Longitudinal research serves the primary purposes of describing patterns of change and establishing the direction and magnitude of causal relationships (Menard, 2002). It must also be defined in terms of the data and the methods of analysis. Menard describes longitudinal research as follows; research in which data (a) are collected for each item or variable over two or more distinct time periods; (b) the subjects or cases analysed are the same or at least comparable from one period to the next and (c) the analysis involves some comparison of data between or among periods. The fact that it allows for the estimation and testing of developmental models is particularly advantageous as it permits the acquisition of new knowledge about long-term developmental trends that other methods such as cross-sectional analysis do not. Today, it is widely accepted that the dynamic, temporal, character of the change processes involved in individual development is in itself the self-evident reason for the need for longitudinal research (Magnusson, 1993; Bergman, Eklund & Magnusson, 1991; Clarke & Clarke, 1984). While time is not equivalent to development, it is true to say that development always has a temporal dimension. Furthermore, well-designed studies allow researchers to see that when individuals do change, it is less likely to be due to one single event. Rather, it is due to at least four interacting and transacting headlines in human development; the biological trajectory; the social trajectory; the effect of the individual on his environment which, by a feedback cycle, acts upon him; and finally, the chance event (Clarke & Clarke, 1984). Magnusson (1993) confirms this by indicating that areas of interest to longitudinal researchers include the individual, the environment and the reciprocal interaction.
of the dynamic structures therein. This ‘holistic’ perspective, as Magnusson terms it, is not new to the study of individual functioning and development, having its roots in James’ (1890) theory of the individual as a whole and Dewey’s discomfort at the growth of atomistic psychology growing out of Wundt’s school of experimentalism (Wertsch, 1991).

More recently, Bronfenbrenner commented in a similar vein, saying that the mid 1970s yielded an increasing number of investigations that employed research designs that took into account changes in time not only within the person but also in the environment, and critically, that permitted analysis of the dynamic relationship between the two. To distinguish such a research design from traditional longitudinal measures, Bronfenbrenner proposed the term Chronosystem. Like Clarke’s model, Bronfenbrenner’s Chronosystem consisted of normative (school entry, marriage, entering the workforce) and non-normative (sudden family death or illness, divorce, winning the lottery) events. Bronfenbrenner’s elucidation of chronosystem effects forced attention on the fact that, as an individual changes, he or she does so in an ever-changing set of contexts at every layer of the entire ecological system, from changes within the family to changes at the historical and cultural level (Tudge, Gray & Hogan, 1997).

Therefore, although the term ‘ecological’ has relevance for fields as diverse as biology and economics, it has a distinct meaning in the field of developmental psychology in that it represents a standpoint for conceptualising the changing, maturing person in relation to their changing social, physical and psychological environments. Bronfenbrenner’s (1977) assertion that scientific rigour could still be achieved if one sought to study human development in a way that was relevant to the real world gave birth to longitudinal research that had the added bonus of being ecological.
5.2 Research with Children

Any psychology of the child is necessarily informed by philosophical preunderstandings. Therefore, it is fundamentally shaped by the cultural-historical assumptions in which it already finds itself, before it can even begin to set up the harder criteria of data-gathering and informal analysis (Kennedy, 1988). However, the fact that researchers are invariably embedded within a ‘tradition’ that is informed by philosophical preunderstandings means that throughout the history of child research, children often became less important than the framing ideologies of the tradition within which they were being studied (Coady, 2010). Moreover, the simple fact that much of the process of development is neither intentional nor consciously registered means that ‘developmental time’ is often stripped from history (Elder, Pavalko & Clipp, 1993). Popular stage theory models of human development such as those of Freud (1949), Piaget (1954), Kohlberg (1976) or Erikson (1968) characterised childhood as being a transition period, through which the child must pass on the road to adulthood. Whether intentional or not, such models had the inevitable implication that children are somehow not fully whole, rather that they simply possessed the potential to one day be whole (Danby & Farrell, 2004; Waksler, 1991; 1996; James & Prout, 1997). Furthermore, they presented development as being unidirectional and de-emphasised the role of the environment.

Research with children that was informed by the developmental models of theorists such as Piaget or Erikson has often been heavily criticised. The major criticism that has been levelled at Piagetian research is that it has a tendency to underestimate the abilities of infants and young children (Bjorklund, 1997; Flavell, 1992). Under-performance on the part of children on some of Piaget’s tasks, which Piaget used as support for a cognitive stage-theory, has
since been explained in different terms, for example. Winer, Craig & Weinbaum (1992) found that what Piaget claimed to be an inability to perform a certain task was rather probably due to the way the questions were phrased. Similarly, experiments involving the systematic observation of the child in a laboratory setting (Ainsworth, 1979; Bandura, 1965) have been criticised for overly objectifying children. Children’s agency was being overlooked by the very traditions that were purporting to understand them and ultimately meant that the wider worlds of socio-cultural context and children’s subjective experience were being ignored. However, from the 1990s onwards a changing perspective began to view childhood as being socially constructed as well as socially, culturally and historically variable (Danby & Farrell, 2004; James & Prout, 1997). Research began to take this into account by considering the ecological contexts of children, as well as considering children as agents and actors in their own right (Beresford, 1997; Christensen & James, 2000; Hill, 1997; Hutchby, 2005). This has led to a wide array of research concentrating not only on the perspective of the developing child (Moss & Clark, 2011) but also on how the child relates to their surrounding contexts, including family contexts (Kelly, Sacker, Del Bono, Francesconi & Marmot, 2011), ECEC contexts (Vandell et al., 2010) and culture (Chen & French, 2008). More detail on the relevant literature has been provided in Chapters 2 and 3.

5.3 Research with Adolescents: Questions of Consent, Autonomy and Research Design

Research with adolescent participants requires the striking of a balance between parental protectiveness and due acknowledgement of growing adolescent autonomy (Santelli et al. Rogers, 2003). However, research indicates that the desire to err on the side of caution by superseding adolescent autonomy with parental concerns has meant that adolescents have been excluded from research, to their detriment as a group (Rogers, D’Angelo & Futterman,
In the US, the Society for Adolescent Health Medicine’s Guidelines for Adolescent Health Research (Santelli et al., 2003) suggest that for low risk (e.g. confidential survey) research, adolescent capacity to participate in, and understand the content of, research may be assumed based on the reasonable expectation of capacity for the subject group. Researchers have found no differences between older adolescents (age 14 and older) and adults, when it came to understanding research content and being cognitively capable of making decisions about research participation (Bruzzese & Fischer, 2003; Weithorn, 1983). In line with their burgeoning awareness of other people’s motives and the possibilities of autonomy, adolescents are less likely to be coerced or to misunderstand question content, therefore. In interview situations, open-ended questions are an ideal way to allow adolescents to shape and indeed present information about themselves in a way that makes them feel comfortable and autonomous. In the case of an adolescent sample, if a questionnaire incorporates items that are relevant to and reflective of the context of their lives, better response rates will be obtained.

Harvey and Byrd (1998) posit that in contrast to the information gathering and experiential phase of early adolescence, late adolescence (15-17 years) is characterised as being a period of identity development in which the information obtained earlier is used to build and consolidate a new identity. In a similar vein, Thompson (1990) contends that with increasing age, the self-concept becomes more coherent and integrated. Therefore, research questions designed for use with older adolescents can be more explicit than younger child research tools (such as looking at pictures and draw-and-tell methods) because adolescents have a keener sense of their own identity than when they were younger. Careful piloting of instruments with age-matched populations helps to ensure that the language and content of
research tools are appropriate and engaging to adolescents. Moreover, self-report paper questionnaires may be appropriate for topics that an adolescent might find difficult to talk about in an open forum such as exam results, interests or aspirations (Tinson, 2009). However, researchers should caution against patronising the adolescent by using words, slang, or phrases that although well intentioned may be anathema to adolescents (Tinson, 2009). Moreover, researchers should maintain awareness of adolescents’ vulnerability in terms of sensitivity around developmentally related areas such as body image and peer comparisons (Thompson, 1990) and their reluctance to disclose personal information to their parents (Petersen & Leffert, 1995).

5.4 The IEA Preprimary Project

The IEA (International Association for the Evaluation of Educational Achievement) is a non-profit-making, non-governmental organisation of research organisations and ministry of education units in over fifty countries. In 1985, the IEA supported a longitudinal, cross-national project exploring the impact of early educational experiences on later school success that was entitled the IEA Preprimary Project.

The project was designed in three phases.

(1986 – 1992) produced profiles of national policies on the care and education of young children (Olmsted & Weikart, 1989, 1994) and used a household survey to identify and characterise the major early childhood settings used by families with 4-year-olds. Ireland joined the project late and so did not participate in this phase.

(1989 – 1995) used extensive observational and interview data to examine the interactive and structural characteristics of the major early childhood settings and to explore the impact of expectations, curricular and familial factors on children’s development at age four.
completed the project by describing the child development status at age seven and documenting how the early experiences affect such development. Age seven was selected as the endpoint for the study as it represents the age when all children in the participating countries had at least one year of formal schooling.

5.4.1 The IEA Preprimary Preschool Project (PPP) in Ireland.
Nóirin Hayes of the Dublin Institute of Technology (DIT) secured permission from the IEA national office at the Educational Research Committee, Drumcondra to lead the project and the funding for the project was secured from the Department of Education and Science, the Combat Poverty Agency, the DIT and others to allow Ireland to join the project as a participant country in Phases 2 and 3. She writes in her published Ph.D. thesis that the theoretical framework informing the design of Phase 2 of the IEA project and the design itself attracted her attention and acted as the motivation behind seeking to secure Irish participation in the study (Hayes, 2004). The sample design and the broad aims of the Irish element of the project were in accordance with the requirements of the International Co-ordinating Committee and the IEA. However, they also reflected the particular interests of the funding agencies and researchers. In brief, the aims of the Irish study were (i) to describe the quality of early years experiences of a sample of Irish 4-year-olds; (ii) to examine designated disadvantaged and non-designated disadvantaged settings and (iii) to build up a knowledge base in the field of early education in Ireland.

5.4.2 The design of the IEA Preprimary Project.
In the conceptual framework of the Preprimary Project, Marcon used a multi-method approach to capture the social dynamics in an early education setting. Therefore, she involved
all those who are involved in such a setting, which ranged from teachers to parents to service providers to the children themselves. Indeed the value of multi-method approaches have been advocated by many researchers who regard an explicit measurement model as the key to accurately linking theoretical concepts and observed variables (Magnusson, 1988; Rudinger & Wood, 1990; Bergman et al., 1991). In other words, the research design must be tailored to suit the concept that it is attempting to measure; if the research goal is multi-faceted, then the research design must reflect that complexity.

It was clear that if the IEA Preprimary Project was to result in a clear and accurate picture of the children’s development in an educational setting, certain features had to be intrinsic to the design. This led Crahay (1990) to propose a research design that moved away from a simple quantitative stimulus-response design to a multi-layered design that reflected the complexity of children’s lives, inside and outside their classroom. Furthermore, a longitudinal design ideally accommodated the mixed methodology because research based on longitudinal data builds a bridge between ‘quantitative’ and ‘qualitative’ research traditions and allows for the re-shaping of the concepts of qualitative and quantitative. Some commentators have gone so far as to call longitudinal research the lifeblood of developmental psychology. Thus, the methodology of the IEA project which incorporated a design that aimed to be both longitudinal and ecological was designed to meet the demands of a research world in which children and their lives are increasingly being recognised as worthy of investigation in their own right (See Figure 5.2).

A final conceptual framework for the project was agreed upon by the IEA, ICC and the National Research Co-ordinators (NRCs) from the participating countries. This framework is
broadly based on the ecological systems model of development proposed by Bronfenbrenner (1979, 1994, 1998). Bronfenbrenner has sought to emphasise the multiplicity of human relationships, as well as the interrelations between cultural context and the individual child. Using the metaphor of a Russian nested doll, Bronfenbrenner portrays the developing child as being at the centre of an interconnected set of contexts, including those that directly impinge on the child and those that affect the child indirectly, mediated by those with whom the child comes into direct contact (Tudge, Gray & Hogan, 1997). He challenges researchers to achieve ecological validity in research design; that is, to produce research that validly reflects the everyday lives of the participants.

When the ecological systems model was adapted to the study of children in an early educational setting for the purpose of the IEA Preprimary Project, it involved an examination of the complex interactions between the child, the family, the teacher and the environment. Such an ecological approach to researching child development is based on the assumption that a child’s learning experience is nested within the environments of home, school and the wider world, as well as being shaped by the individual child at the initial child level. This approach essentially requires a Person-Process-Context-Time (PPCT) model that examines the developmental process as well as the influence of personal and environmental effects on outcomes. The methodology of the Preprimary Project was designed to adhere to the PPCT model in a variety of ways. Firstly, the ‘person’ level of the design was addressed by collecting biographical details about the children such as age and gender, in addition to biographical details about their parents and teachers. Furthermore, measures such as scales of cognitive and language development were included in the design of the personal level. The ‘process’ level was examined through the observation and recording of actions and
behaviours that were executed by children and teachers (when children were 4) within the classroom setting. Such processes provide the essence of what occurs every day in a classroom and are regarded as being proximal to development. The ‘context’ level is perhaps best characterised by Bronfenbrenner’s set of interacting systems or nested levels. These include the personal level of the child in their classroom (Microsystem); the local level that accommodates the interplay between parental and teacher beliefs and expectations (Mesosystem); the more-removed but undeniably influential area of educational policy formation and the framing influence of societal and cultural values (Macrosystem). Finally, consideration of the patterning of environmental effects over time (Chronosystem) is made intrinsic to the research, using a longitudinal design that takes place over three phases and that spans three years. The details of the conceptual framework of the Preprimary Project may be seen in Figure 5.1.
Figure 5.1 Conceptual Framework of IEA Preprimary Project

- **Chronosystem**: Patterning of environmental effects over time
- **Macrosystem**: Educational policies, Cultural values
- **Exosystem**: Indirect environmental effects
- **Mesosystem**: Family background, Parent/educator expectations and interactions, Setting activities
- **Microsystem (direct child context)**: Cognitive/language/social development, Social development, Designation as a DD or NDD child
5.4.3 **Irish IEA Preprimary Project methodology.**

The *Age 4* phase studied 396 Irish 4-year-olds, their families and their educators. It sought to explore the nature of these children’s educational experiences in designated disadvantaged (DD) and non-designated disadvantaged (NDD) preschool and primary school settings by using an integrated observation methodology. Structural features of the settings were described and teacher and parental expectations about the children’s schooling and development were examined. Developmental status measures of the sample of 4-year-olds were also obtained. The *Age 7* phase investigated the developmental status of the same children at *Age 7* years, along with their school experiences and family characteristics at that age. More details about the two original national studies and subsequent international studies may be found in numerous publications (Hayes, 2000; Hayes, O’Flaherty & Kernan, 1997; Hayes & Kernan, 2001; Kernan & Hayes, 1999; Weikart, 1999).

5.4.3.1 **The sample.**

The ICC worked closely with all NRCs in designing the sampling procedure for the settings within which the observation of children and adults took place. Dr. Leslie Kish, Professor Emeritus at the University of Michigan, acted as the sampling referee to the project and approved all sampling plans. The Irish Department of Education and Science cooperated very closely with the original research team in the detail of the sampling process and the IEA were also consulted.

Setting types were selected on the basis that 20% or more of 4-year-olds in Ireland attended such settings. From the data available at the time, two main setting types emerged – the preschool services and the junior infant classes of the primary school. These two types of setting were further divided in terms of designated disadvantaged (DD) status and non-designated (NDD) status. DD school settings were selected according to the criteria laid
down by the Department of Education and Science at the time of sample selection. Schools seeking disadvantaged status are assessed and prioritised as to need, on the basis of socio-economic factors such as the number of pupils whose families (a) reside in local authority housing or flat or non-permanent accommodation, (b) hold medical cards and (c) are in receipt of unemployment benefit or assistance.¹

The sample of school settings was developed as follows. Listings of children attending primary schools were obtained from the Department of Education. This listing was further divided in terms of DD or NDD for both types of provision (school or preschools). Approximately equal numbers of settings were to be chosen for each of the cells. From each setting within the four cells, the data collector chose, randomly, a maximum of four children from those within the target age-range and for whom parental permission had been received.

For setting selection, the Probability Proportional to Size (PPS) procedure was used. With probability sampling, each unit in the survey population has a known, positive probability of selection. This property of probability sampling avoids selection bias and enables researchers to use statistical theory to make valid inferences from the sample to the survey population. In PPS sampling, a unit’s selection (in this case a school) is proportional to its size measure (in this case the number of pupils) and is used to avoid the overrepresentation of very small units. This procedure is often used in cluster sampling, where clusters (or groups of sampling units) of various sizes are chosen in the first stage of selection. For example, clusters may be

¹ These criteria were refined to include such factors as the level of unemployment, the educational level of the parents and the number of one-parent households in determining designation. Furthermore, a mechanism for distinguishing between small rural schools and large urban schools with factors relating to farm income was taken into account in respect of rural schools and preschools.
schools, hospitals, or geographical areas, and the final sampling units may be students, patients, or residents.

5.4.3.1.1 Children.

Three hundred and ninety-six children, 209 boys and 187 girls, participated in the study. The majority of children were aged between 4 years and 0 months and 4 years 11 months at Phase 2. Over one-third of the sample came from Dublin, which reflects the general population distribution of the country. Twenty-two other counties also participated. Sampling guidelines limited the settings selected to the junior infant classes in primary schools and a selection of preschools. The funding groups (e.g. Combat Poverty,) required that the sample allow for comparisons across settings identified as designated disadvantaged and non-designated disadvantaged settings. Three hundred and seventy-four of the Age 4 children, 193 boys and 181 girls, participated in the Age 7 phase of the study. These children were three years older than they had been at the first phase. All of these children now attended primary schools in 23 different counties in Ireland. One third of the sample remained in the Dublin area. The research team succeeded in tracing all but three of the original 396 children and, due to parental or school refusal, 14 children did not take part in Phase 3. Therefore, the follow-up rate between Phase 2 and Phase 3 was 94%. One hundred and seventy-five of those who participated in Phase 3 now attended designated disadvantaged schools, while 199 attended non-designated disadvantaged schools.

5.4.3.1.2 Parents.

Parents of all 396 Age 4 children gave permission for their children to participate but only 382 parents participated by providing parent-level data as part of the study. Parents of 374 Age 7 children gave permission for their children to participate but only 361 parents agreed to be interviewed as part of the study. This represented a participation rate of 97%.
Setting Directors and Educators.

All directors and educators from settings participated in the first two phases of the study by providing permission for data collectors to visit their settings to interview children, staff and parents. Some also agreed to complete Expectations and Provider survey questionnaires and to be interviewed (Age 4 Phase).

5.5 Current Ph.D. Research (Age 16 Phase)

A distinction must be made between this study and the original IEA Preprimary Project. The significant link between the two arises from the fact that the data collected for the Irish sample of the IEA Preprimary Project forms the basis for this study. This study differs from previous output on the Preprimary Project in that the longitudinal aspect of the data is emphasised. Where the original project offered broad pictures of four and seven year olds in the context of school, family and development, this study seeks to pinpoint particular aspects of their educational and home experience of four and seven year-olds that influence their development over time. This research comprises two phases; the initial phase encompasses the portion of research carried out when the project was intended to fulfil the criteria for the submission of an M.Phil. thesis to the Department of Social Science in Dublin Institute of Technology (2003-2006). The second phase of the research marked the transfer of the project from the M.Phil. to the Ph.D. register in 2006. An independent panel of academics from Dublin Institute of Technology agreed that an extension of the research was justified based on their review of a report and oral presentation that both outlined the rationale and justification for extending the research. A submission was also made to the Research Ethics Committee of Dublin Institute of Technology and the PhD. research was cleared for progression by the committee in December 2005. The initial proposal was submitted to the Department of Social
Science at Dublin Institute of Technology for funding as an M. Phil. research project by the Professor Nóirín Hayes; the research supervisor. When the opportunity arose to transfer the study to the Ph.D. register, it was decided that the longitudinal design of the original study allowed for an extended mapping of the developmental trajectory of the original sample of four year olds. Thus, the original IEA sample of children that had been contacted when the children were aged four and seven was tracked through to when they were aged sixteen. Therefore, the research question became;

What are the predictors (at Age 4 and 7) that are related to academic outcomes at Ages 7 and 16 and how do these predictors relate to academic outcomes at Age 16?

Outcomes of interest at Age 16 were classified in terms of academic achievement, attitude to school and adolescent social development. It was decided to obtain a measure of academic development at age sixteen, in order to ascertain whether developmental outcome effects at age seven had persisted through to age sixteen. The inclusion of the measure of academic development was designed to maintain a continuation of the language and cognitive developmental outcome variables that were obtained at Age 4 and Age 7 and which were readily available due to the co-occurrence of state Junior Certificate examinations for the Age 16 sample at the time of PhD data collection. Such academically focused developmental outcomes have been the focus of considerable international research in the fields of developmental psychology and early education, thus justifying, if not necessitating their examination in an Irish context (Kelchen, Magnuson, Duncan, Schindler, Shager & Yoshikawa, 2011; Sammons et al., 2011; Vandell et al., 2010). The attitude to school and social development measures were not only intended to maintain continuity of social outcome measures between the earlier phases and the Age 16 follow-up but also as a means
of ensuring that Bronfenbrenner’s Microsystem was intrinsic to the research design. It was decided that it was not sufficient, when considering Age 16 outcome measures, to attempt to account for such outcomes with a mere linear mapping of the previous developmental outcomes and impact factors that were obtained at Age 4 and Age 7 without consideration of relevant factors that may have arisen in the interim. To have done so would be to ignore the fact that the Person is the most fundamental layer in the Person-Process-Context-Time model (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998; 2006). Therefore, while life events and experiences are important determinants of development, perhaps what is most important is how an individual reacts to such experiences and how these experiences and reactions can shape their cognitive style, personality and future behaviour. Moving beyond trait theories of resilience, an emergent research direction is the examination of the construct of resilience as a dynamic developmental process (Werner & Smith, 1992). A measure of resilience should be considered as a way of incorporating the dynamic aspect of adolescent development into a quantitative study of educational development.

Furthermore, the addition of a self-report measure is intended to take account of the fact that the individual is no longer a child but rather an adolescent, who is actively involved in shaping and conceptualising their own world and who therefore, is the best source for information about their own ecological context. Whereas earlier phases of the research had gathered information about four and seven year olds through observation, teacher and parent interview and researcher-administered standardised tests, this phase allowed for the active participation of the sample, through their responses to items on a self-report questionnaire. The measure of social development consisted of three broad domains under the headings Social Bonding, Personal Competence and Social Competence. It allowed inferences to be
made about the ecological context in which the school outcomes were obtained because it encapsulated information about the individual (relationships, cognitions, behaviour), process (interactions with others, interactions with objects) and context (greater model which incorporates all of these). This extensive additional analysis is designed to add to the considerable secondary research that has already been conducted on the Irish project data by examining a facet of the data that has not heretofore been the focus of research attention (Moore, 2000; O’Kane, 2003; Hayes, 2003).
Figure 5.2 Conceptual Design of the PhD. Research

Chronosystem
Patterning of Environmental Effects over Time
From Age 4 to Age 7 to Age 16

Macrosystem
Educational Policies
Cultural Values

Exosystem
Indirect Environmental Effects

Mesosystem
Family background/Relationships
Educator/School Relationships

Microsystem (Age 16 Participants)
Educational Outcomes
Social Development
Extra-curricular and School Activities
Figure 5.3 Data Map of Predictors and Outcomes for the PhD Research

Age 4 Development
- Family Income
- Maternal Education
- NDD or DD
- School or Preschool
- Classroom Processes

Age 4
- Cognitive
- Age 7
- Language

Age 7
- Parental Expectations
- Teacher expectations

Age 7 Outcomes
- Cognitive
- Language
- Social

Age 16 Outcomes
- Resilience
- Social development
- Positive events
- Attitude to school

Age 16
- Academic outcomes
5.6 Conceptual Design of the Research

The research design (Figure 5.2) extends the existing longitudinal design of the Preprimary Project, through the mapping of the developmental trajectories of participants for the twelve years that passed since they first became involved in the research. Longitudinal studies which track changes in development over time generally focus on cognitive development and suggest that there are multiple pathways to academic competence in the early years and later (Burchinal et al., 2002; Sammons et al., 2011). Researchers have established that there is a general upward trend in developmental outcomes over time and this development can roughly correlate with a series of broad and general stages in human development (Flavell, 1982; Hale, 1990). However, this upward trend is filled with peaks and troughs from one time point to another (Wilson, 1983) and is also mediated by several factors such as parenting and early educational experience (Burchinal et al., 2002). Data collection (Age 4) first occurred between March 1994 and June 1995, while Age 7 data was collected between March 1997 and September 1998 and Age 16 data was collected between March 2006 and February 2007. The twelve years since data was first collected with the participants co-occurred with their experience of formal schooling, as well as spanning a period when they developed from children into adolescents. Moreover, this period represents a time of marked change at the macrosystem level, with policy developments in early years, primary and secondary education echoing the corresponding development and change in the lives of participants. Accordingly, the research design sought to utilise this co-occurrence in order to investigate academic outcomes from preschool to secondary school, while also considering what effect, if any, the attendant contexts of family, community and
individuation may have on such outcomes. To that end, it would be theoretically possible to isolate system factors such as educational policy at Age 4 and to determine whether, and the extent to which, it affected Age 16 outcomes.

In addition to ‘person’ level details that were obtained at the Age 4 and Age 7 phases, the framework incorporated Age 16 ‘person’ level measures that were appropriate to an adolescent participant such as information about their activities, aspirations and exam results. The measure of adolescent resilience contained information about their Personal and Social Competence and Social Bonding. Items dealt with how they thought about things (cognitions), how they felt about others (emotions) and how they acted (behaviour), thereby allowing for the creation of a richly detailed microsystem that not only offered a picture of the adolescent as they were at time of data collection, but of the adolescent as an individual who is the product of their experiences. Some of the more important experiences in the life of an adolescent were incorporated in the research design through the inclusion of measures of school-connectedness, family interaction and community context and may be conceptualized as the dynamics at the local level or mesosystem of the PhD research design. As with previous phases, the macrosystem was represented by analysis of the policy, cultural and social context in which the research took place. The framework of the PhD research constitutes an ecosystem that not only has a microsystem, mesosystem and macrosystem but that also contains a chronosystem, namely the longitudinal tracking of participants from the age of four through to sixteen. It might best be considered as a map of interlinking development; ultimately, the design follows a trajectory of academic development within the Irish school system that
intersects unavoidably with the contexts of family and community and most importantly with the trajectory of individuation (See Figure 5.3 for more detail). In a broad sense, the framework may be summed up with a glance at the major constructs that the project sought to explore in the Age 4 and Age 7 and 16 phases and their corresponding instruments/measures (Table 5.1). Accordingly, it was hoped to understand not just whether, but also how, early experiences influence children’s short and long-term development.

Limitations

A problem in longitudinal research can be the fading relevancy of the data (Bergman, 1993). There is the danger that the theoretical framework that decided the design of the study may have become obsolete. The best way to combat this problem is to design the project in an eclectic manner, with a broad-minded theoretical approach that incorporates many factors that can combine to make up for a weakness in any particular area of the framework. In an Irish context, the changes in the landscape of child and education policy (see Chapter 3) mean that the policy that frames this study is significantly different from the policy that framed the earlier phases of the project. However, the pace of policy implementation in practice is slow and reform is scheduled to be ongoing until 2022. The original research design helped to ensure that the project would have longitudinal relevance by designing a mixed and broad-ranging conceptual framework (see Section 5.4).
### Table 5.1
List of variables within the conceptual framework at Age 4, 7 and 16

<table>
<thead>
<tr>
<th>Age 4</th>
<th>Age 7</th>
<th>Age 16</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family characteristics</strong></td>
<td><strong>Family and Community Interaction</strong></td>
<td><strong>Adolescent School and Extra-curricular Activities</strong></td>
</tr>
<tr>
<td>Household composition</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Setting Level</strong></td>
<td></td>
</tr>
<tr>
<td>IEA PPP Quality of Life Observation Systems (1992); Management of Time, Child Activities Observation Schedule, Adult Behaviour Schedule</td>
<td>Teacher Expectations</td>
<td></td>
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<td></td>
<td></td>
<td><strong>Academic development</strong></td>
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<tr>
<td><strong>Cognitive</strong></td>
<td><strong>Cognitive and Science</strong></td>
<td><strong>Grades on State Junior Certificate core subjects:</strong></td>
</tr>
<tr>
<td>Boehm’s Test of Basic Concepts (1969)</td>
<td>Items Adapted from:</td>
<td>English</td>
</tr>
<tr>
<td>Developmental Instruments submitted to the IEA</td>
<td>Woodcock and Johnson Psychological Battery (1984)</td>
<td>Maths</td>
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<td><strong>Adolescent Activities</strong></td>
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<td><strong>Resilience</strong></td>
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<td>Individual Protective Factors Index (Springer and Phillips, 1992)</td>
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5.6.1 Sample at Ages 4, 7 and 16

Age 4
This phase studied 396 Irish 4-year-olds, their families and their teachers. It sought to explore the nature of these children’s educational experiences in designated disadvantaged (DD) and non-designated disadvantaged (NDD) preschool and primary school settings by using an integrated observation methodology. Structural features of the settings were described and teacher and parental expectations about the children’s schooling and development were examined. Developmental status measures of the sample of 4-year-olds were also obtained.

Age 7
This phase investigated the developmental status of the same children at Age 7 years, along with their school experiences and family characteristics at that age. More details about the two original national studies and subsequent international studies may be found in numerous publications (Hayes, 2000; Hayes et al., 1997; Hayes & Kernan, 2001; Kernan & Hayes, 1999; Weikart, 1999).

Age 16
One hundred and ten young people participated in this phase of the study; 52 female and 58 male representing 27.7% of the original Age 4 sample and 29.4 % of the Age 7 sample. The participants were 9 years older than they had been at the Age 7 phase of the research.

5.7 Consent
Parents provided passive consent for the participation of the Age 16 sample in the research if they did not object (either over the phone, email or through returning a letter of refusal) to the participants completing a questionnaire after reading the information letter and/or speaking with the researcher on the telephone. Where it was understandably necessary to obtain full
parental consent for children who participated in the research at Age 4 and Age 7, the passage of time allowed for more autonomy of the Age 16 sample in the consent process. Brooks-Gunn and Rotheram-Borus (1994) posit that many adolescents are cognitively able to make reasoned decisions in relation to research participation and some classic studies have found that by mid-adolescence, the ability to consider treatment alternatives, risks and benefits and to provide rational and voluntary consent are comparable to that of adults (Grisso & Vierling, 1978; Weithorn, 1983; Weithorn and Campbell, 1982). A balancing of parental and adolescent concerns may be the way forward for longitudinal research with school samples. If parental permission is differentiated from adolescent assent, then a parent may still maintain an involvement in the research, while also offering the adolescent the opportunity to protect and indeed exert his/her growing autonomy. Moreover, if parental permission is obtained via passive consent, it might be argued that the adolescent maintains ultimate power over vetoing participation. Under passive consent procedures, a parent need only take action if they feel extremely strongly that their son or daughter should not participate. Therefore, an adolescent whose parent has allowed their passive consent may continue participation in a longitudinal project by assuming responsibility for their own participation in the research and thus becoming the main point of contact for the research team in the future. Such an approach to re-establishing contact with an adolescent participant in a longitudinal project may then be mirrored by any ensuing interaction or consultation with the research team and in the research methods used to obtain data.

In the current study, adolescents could consent to research participation through return of a consent form and the completed questionnaire in the stamped addressed envelope that was provided to them by the researcher. The reason that passive parental consent was used was
threefold; the participants had reached an age when they were more likely to make decisions autonomously (Lind, Anderson & Oberle, 2003); the research questionnaire was low-risk in content and used constructed identifiers to preserve confidentiality (Holder, 2008) and finally, research has shown that active parental consent in relation to research covering topics relevant to adolescents can result in a selection bias, whereby ‘model’ students with stable family backgrounds are more likely to respond than those from ethnic minorities or one-parent families (Anderman, Cheadle, Curry, Diehr, Schultz & Wagner, 1995; Wolfenden, Kypri, Freund & Hodder, 2009). According to Lind, Anderson & Oberle (2003, p. 507), “protection from harm does not mean prevention from decision-making” in the context of conducting research with adolescents. Therefore, passive parental consent may be appropriate when the researcher is working with older adolescents on research that has low-risk content (Santelli & Smith-Rogers, 2002). This method was approved by Dublin Institute of Technology’s Research Ethics Committee in December 2006 (See Appendix 4).

5.7.1 Consent process.

Telephone numbers for families had not been uniformly obtained in earlier phases of the research so it was necessary to look up contact details for some families using the family surname and address in the online database of Irish telephone numbers. However, this meant that many families who were ex-directory or who had changed address or telephone numbers in the intervening years were precluded from the search. When telephone contact was made, the researcher spoke with parents and then participants and obtained a preliminary verbal commitment to receive more information about the continued research. An overview of the research plan was explained and questions on the research were answered where applicable. Information letters were then sent to the address of interested participants and to participants
who it had not been possible to contact via telephone; one letter was addressed to the parent/guardian and one letter was addressed to the participant. A request to continue with participation in the research was included in each letter and the contact details of the researcher were provided in order that participation or withdrawal could be registered. In cases where it was impossible to obtain a telephone number for participants, two information letters with a copy of the questionnaire and a stamped, addressed envelope were sent to the address of the participant; one letter was addressed to the parent/guardian and one letter was addressed to the participant. Again, a request to continue with participation in the research was included in each letter and the contact details of the researcher were provided in order that participation or withdrawal could be registered by the parent, teenager, or both. Parents were involved in this phase through their provision of passive consent for their child’s participation. Detailed research with parents was beyond the scope of this study due to time and funding constraints. As the sample had last been contacted when the children were in primary school, no information existed about the secondary schools that the participants had moved to upon leaving primary school. Participants were asked to provide the name of the secondary school that they had moved to upon leaving primary school and these schools were then categorised based on a Department of Education and Skills designation of disadvantaged or non-disadvantaged status.

5.8 Research Instruments

The agreed framework was designed to explore the interplay of five major groups of variables outlined in Table 5.1. This comprehensive set of Age 4 variables forms the basis for a process model of research that seeks to understand not just whether but, more importantly, how early experiences influence children’s short and long term academic development. For the purposes
of this study, only those instruments that relate to the Age 16 follow-up phase will be discussed in detail.

5.8.1 Instruments used at Age 4.
The set of instruments used was designed by the National Research Committees under the direction of the ICC and was piloted prior to use in the project. Ireland was not part of the international piloting of the instruments as Irish participation began at Phase 2. Although not involved in the design of the instruments, the Irish team did pilot the material in advance of data collection. Arising out of the pilot a number of changes were made and agreed. For example, there was one recognition item in the child developmental status measure where a picture to be identified verbally was shown as representing a ‘cupcake’. In the Irish context at that time this answer would not be usual and so ‘bun’ or ‘fairy cake’ were agreed as acceptable. In the observational system, data was also gathered on the child’s exposure to the Irish language across different settings, a feature unique to the Irish study. These and other slight changes were agreed at a national and international level and the coding and analyses adjusted to allow for their inclusion in the overall results of the study. Trained data collectors administered the instruments in visits to the settings that lasted a minimum of two to three days depending on the amount of target children present in the setting.

5.8.1.1 Parent interview.
A Family Background Interview was administered to parents and this took place by arrangement, usually at the setting. The interview covered the following: child’s present caretaking situation, household description and family background details.
5.8.1.2 **IEA Quality of Life Observation Systems.**

In 1988/1989, a sub-group was established consisting of researchers from the IEA national committees, to compile instruments\(^2\) to measure setting-process variables such as the general nature of children’s activities, social context of activities, interactions, levels of engagement on different activities and adult behaviours. The sub-group reviewed contemporary reports from research projects including those observing adult-child interactions and those where children’s activities were observed. In addition, various rating scales and observation checklists were also reviewed. Three separate observation systems were developed in order to gather as much information as possible about the complex set of interactions and processes that takes place in the classroom among individual children, teachers and other children (See Appendix 1). The key areas of interest were identified as the following:

- **Child Activities (CA);** activities and interactions of each target child in a given setting
- **Adult Behaviour (AB);** general behaviours of the teacher/caregiver, the specific behaviours directed towards each target child, and the nature of the adult’s general involvement with the children
- **Management of Time (MOT);** how the adult organised the children’s time in the setting

5.8.1.2.1 **Child Activities (CA).**

The observation schedule provided data to answer a number of specific questions about the activities and the social context of activities. See Appendix 1 for a comprehensive list.

Type of activity

- In what types of activity were the children engaged?

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Verbalisation

- During what percentage of observations were children talking?

Group structure

- What type of groupings were children in during various activities?

Interaction with adults and children

- During what percentage of observations were children interacting with one or more adults?
- During what percentage of observations were children interacting with one or more children?

5.8.1.2.2 Adult Behaviour (AB).

The AB observation system provides information to answer two particular questions;

Type of behavior

- What types of physical behaviour or verbal statements does the adult use?

Degree of involvement

- What forms of involvement does the adult have with the children?

5.8.1.2.3 Management of Time (MOT).

The management of time system focuses on how adults plan and organize time in early years settings.

Type of activity;

- What types of activity did the adult plan/organise for the children?

Group structure

- What type of groupings did the adult plan/organize for children?
5.8.1.3  

**Age 4 child development measures.**

The measurements were intended to provide a snapshot of the developmental status of the children at four years of age. The developmental status measures were administered to the target children in each setting and were usually carried out on the second and fourth days of testing. These measures were designed to assess the children’s performance in cognitive and language development. See Table 5.1 for greater detail on the original instruments from which the items were adapted.

5.8.1.3.1  

**Age 4 cognitive development measure.**

The cognitive developmental status measure assessed the children’s knowledge and skills in three distinct areas; spatial relations, quantity and time. The assessment required each child to demonstrate an understanding of a wide variety of concepts by performing an action, pointing to a picture, or responding verbally. The spatial relations section consists of two distinct parts, requiring different types of responses from the child. In the first part, the child was asked to perform an action in response to the test question. For example, the data collector showed the child a toy and asked him/her to place it in a particular position or location, for example; *under* the chair or *behind* the chair. In the second part, the child was asked to indicate which one of a set of pictures fitted the description provided in the test description. For example, the data collector presented the pictures to the child, one at a time and told the child what to do for each picture card; “point to the jar that is *between* the spoons.” For the quantity assessment, the data collector instructed the child with regard to a set of pictures, for example; “look at the plates of buns. Point to the plate that has a few buns.” During the time assessment, the data collector first asked the child what day of the week it was and if she/he could name any other days. Next, the child was shown some pictures and was asked questions about the pictures, for example, “look at these pictures. Show me the picture of *night.*”

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5.8.1.3.2 Age 4 language development measure.

The language development status measure assessed the children’s verbal skills. The children were asked questions, for example, “what is your favourite story?” and given tasks, for example, examining picture cards that were designed to elicit receptive language and expressive language. For the receptive language tasks, children were shown a picture card and asked to point out an object such as a ball. During the expressive language task, for example, children were told by the data collector, “I am going to say something. Say it after me. Say it exactly as I say it.”

5.8.2 Age 7 instruments.

As the aim of this phase was to investigate the relationship between the experience of 4-year-olds in educational settings and their developmental status at Age 7, most of the instruments used were directed at getting a clear picture of the development of the participants in the family and school context.

5.8.2.1 Teacher interview.

This was administered to the class teacher of each of the target children. In most cases, this took place in the school setting but in some cases, teachers filled out the questionnaires in their own time and returned completed questionnaires to the data collector. The teacher was asked to rate the children on a measure devised from the Pupil Behaviour Inventory (PBI) and the Ypsilanti Rating Scale (YRS), which were divided according to four subcategories: academic potential; academic motivation; classroom conduct and personal behaviour. On the academic potential measure, for example, the teacher was asked to rate the likeness of the child succeeding academically. Academic motivation items included a teacher rating of the level of initiative that the child showed and the level of alertness and interest that the child
displayed in class. Classroom conduct items centred on teacher rating of children in relation to the level of supervision that they required or the level of resistance that they showed to the teacher, for example. Finally, personal behaviour items included a teacher rating of a child’s tendency to lie, cheat, or be impulsive.

5.8.2.2   Age 7 child development status measure.

The cognitive development status measure assessed the children’s knowledge and skills in areas such as spatial relations, quantity, time, memory and problem solving.

5.8.2.2.1   Age 7 cognitive development measure.

In order to assess spatial relations, children were shown nine different pictures and asked questions such as, “Look at the doors. Point to the door that is the widest” or, “Look at the children. Point to the children who are sitting across from each other.” Children received one point for each correctly answered item. In the quantity section of the test, children were shown six different pictures. Tasks included identifying the concepts such as the greatest, equal amounts and differences between quantities. The measure of Time used pictures, sentence cards and clocks. Children were asked to identify the clock that showed a specific time e.g. a quarter past seven. They were also asked to draw a specific time onto a blank clock face by drawing hands. They were also asked to show knowledge of the concept of before and after by pointing out a picture that was after the rain. The memory aspect of the cognitive assessment involved the child repeating a series of numbers and words and sentences in the same order after the researcher. Motor memory was assessed by asking the child to repeat a series of hand movements in the same way and order as the researcher has shown them. Object sequence was assessed by showing the children two different sequences of the same pictures and asking the child to recall the first sequence that was shown to them. Finally, the problem solving section was divided into Symbolic Relations and Logical
Solutions. For the symbolic relations test, the child was shown design cards that illustrated a pattern and the children were asked to point out a design that would best complete the patterns. The logical solutions part used picture cards depicting different scenarios. For example, the researcher showed a picture to the child and said, “A young boy is standing near an empty doghouse. He looks worried. He is looking at his dog’s broken rope that is attached to a stake close by. The dog is hiding behind a dustbin. The boy does not see the dog. What is the problem here?” The child was then shown three possible response cards and asked to pick the response that is most appropriate. In the case of the above example, the options were: A. The boy’s dog is lost; B. The boy broke the dog’s rope; or C. The boy thinks his dog has run away?

5.8.2.2.2 Age 7 language development measure.

The language development status measure assessed the children’s expressive and receptive language development. Expressive tasks included making sentences using single or two unrelated words, predicting consequences and illustrating knowledge of language form such as conjunctions. For example, the researcher says, “Mary found a spoon. She showed it to her mother. What do you think Mary asked her mother? What would you ask if you were Mary?” Suitable answers included: “Where should I put this spoon?”, “Whose spoon is this?” or “Can I play with this?” Declarative sentences were not suitable and received a score of zero.

Receptive tasks included nonsense recognition and understanding language content. For example, the researcher says, “Listen to what I say and tell me if it makes sense.” The boy who had the oranges fell down. Does that make sense? Dishes help chairs grow. Does that make sense? The boy who sang the song in the play met the girl who played the piano. Does that make sense?” Children had to get all three questions right to receive one point.
Children were also shown picture cards and were asked to show the card that corresponded to what the researcher described, for example; “Look at these pictures. Paul missed the bus one morning. He ran all the way to school. Then he was so tired that he fell asleep while the teacher was reading a story to the class. Point to the picture that shows what happened first.”

The researcher told the child that they were going to say something and then would tell the child some words. Then they asked the child to tell them the word that made sense to complete a phrase. For example, the researcher said, “A place where flowers grow is called a…” and offered the child the choice of garden, stem, street, or vase to complete the sentence. The child received one point for each item correctly answered. In the next section, the child was asked to name items or uses of items such as naming two pieces of furniture that people sit on. They were also asked to link similar words. For example, the researcher asked the child to tell them what was similar about a fly, bee and butterfly. Finally, the children were asked to construct sentences from a number of other sentences. For example, the researcher said, “She ate bread for breakfast. She drank milk for breakfast. Make one sentence and make it as short as you can.” An appropriate answer would be, “She ate bread and drank milk for breakfast.”

5.8.2.2.3 Age 7 social development measure.

The social/emotional (see Table 5.1) status measure assessed the children’s affective development at Age 7 from the perspective of both the child and the adult. Areas covered included relationships with adults and peers, motivation to learn, self-esteem and locus of control. The child was asked to rate themselves by listening to statements about a theoretical child and then pointing out the child that is most like them. For example, the theoretical child may be really good at numbers, pretty good at numbers, sort of good at numbers or not good or numbers. Similarly, the theoretical child is rated according to their number of friends or the
amount of times they are asked to play by others. In the second section, the child must respond in one of two ways to a statement relating to their home or school life. One of the options reflects a positive self-image, while the other shows that the child attributes external factors to any success that they may achieve.

5.8.2.2.4 *Age 7 mathematics development measure.*

In the mathematics section, specific problems were presented from categories including subtraction, addition, multiplication and division and children recorded their responses on a scores sheet provided. Children were also read mathematical problems aloud. For example, “A child had 40 marbles. He lost 3 marbles and then someone gave him 5 marbles. How many marbles does he have now?” There were additional questions which involved the interpretation of different graphs.

5.8.2.2.5 *Age 7 reading comprehension measure.*

The reading comprehension test involved picture comprehension, sentence comprehension and story comprehension items.

5.8.2.2.6 *Age 7 science development measure.*

The science section consisted of illustrations and graphs and included questions about appropriate scientific concepts including the water cycle, temperature estimation, planets, bounce and soil.

5.8.3 *Age 16 research instruments.*

A description of the research instruments and measures used with the sample at *Age 16* is discussed in the forthcoming sections. Please see Table 5.1 and Appendix 5 for more detail.
5.8.3.1 Age 16 measure of academic development.

Academic Achievement at age sixteen was measured according to the results that the participants obtained in the Junior Certificate examinations, which are standardised state examinations that every Irish student must sit in June of their third year of secondary school. Students may take examinations at a Higher or Ordinary level, the higher level denoting a more challenging paper than the Ordinary level. For the Junior Certificate, students receive grades for each subject that range from A through to D. If a student fails an exam, they receive a grade of E, F, or N/G, which means ‘No Grade’. It is important to note that students are not provided with their final percentage score in an exam, rather their results are categorised on an ordinal scale of A through to N/G for each subject for which they sat an exam.

5.8.3.2 Age 16 measure of school connectedness/attitude to school.

The degree to which participants exhibited a positive attitude to school was measured using a scale adapted from The Chicago Longitudinal Study (Reynolds, Ou & Topitzes, 2004; Reynolds, Temple, Robertson & Mann, 2002; Reynolds, 2000). The Chicago Longitudinal Study is a federally funded investigation of the effects of an early and extensive childhood intervention in central city Chicago called the Child-Parent Center Program. The study began in 1986 to investigate the effects of government-funded kindergarten programs for 1,539 children in Chicago Public Schools. The sixteen-item measure consisted of statements that the respondent must rate on a four-point Likert scale that ranged from ‘Strongly Agree’ to ‘Strongly Disagree’. Higher scores on the scale reflected a stronger commitment to schooling and were found to be significantly associated with children’s perceived competence and educational expectations and school achievement (Reynolds, 2000; Reynolds & Temple, 1996).
5.8.3.3 Age 16 measure of social development/resilience.

The measure of social development used in this study was an adapted version of the Individual Protective Factors Index (IPFI) (Springer & Phillips, 1997); a tool for evaluating prevention programmes for youth in the 10- to 16-age range, although it has been used with older populations also. The measure construct includes those dimensions most prominently referenced in the literature on protective factors associated with healthy personal and social development among youths in high-risk environments. The self-administered questionnaire is designed to measure adolescent resilience as defined by ten attitudinal orientations in three major domains (i.e., Social Bonding, Personal Competence, and Social Competence). In the Social Bonding domain, three 6-item subscales are categorized under the themes of School, Family and Pro-Social Norms. In the Personal Competence category, three 6-items subscales are designed to measure Self-Concept, Self-Control and Positive Outlook respectively, while one 7-item subscale is designed to measure Self-Efficacy. The Social Competence domain is divided into three 6-items subscales designed to measure Assertiveness, Confidence and Cooperation/Contribution. Respondents indicate the degree to which they agree or disagree with items by choosing one point on a four point Likert scale that ranges from ‘Strongly Agree’ to ‘Strongly Disagree’. Scores for items range from four to one, with a score of four indicating the respondent is in strong agreement with an item and so on. However, negative items are reverse scored, in which case a score of one might indicate strong agreement with a statement. Items, therefore, are scored such that a higher score indicates a higher degree of resiliency. Each subscale yields a raw score, which is the sum of scores attributed to each item on the scale. An adjusted scale score for each subscale is achieved by dividing the raw subscale score by the number of items on the subscale. A total measure of resilience for the whole index is obtained by adding the raw scale scores from the 6 subscales and dividing by
61, which is the total number of items contained in the subscales. Alpha coefficients of internal consistency for individual subscales range from .48 to .65, while the reliability of the entire index is represented with an alpha coefficient of .93. The IPFI was developed for evaluation purposes, not for diagnostic purposes. Since the analytic focus of evaluation instruments is mean differences, not individual diagnosis, the range of alpha coefficients for subscales indicates adequate inter-item consistency (Springer & Phillips, 1997).

5.8.3.4 **Age 16 activities.**

The questionnaire included questions about recent positive and negative life activities, which were based on questions asked in the Student Follow-Up Survey: A Youth Self-Report of the Chicago Longitudinal Study (Reynolds & Temple, 1998). Participants were asked to place a tick beside the statements that were true for them in the past year. For example, the questionnaire included statements as follows; “In the school year just gone by, I was: on a school sports team, had attendance problem in school, got a reward or prize for some achievement.” For scoring purposes, items were classified as either positive or negative and a variable was constructed which reflected the number of positive events that participants reported and the number of negative events. The inclusion of this dimension to the research was prompted by the repeated finding that clustering of negative or positive events might have more impact than single negative or positive happenings with research suggesting that a combination of protective influences can outweigh the negative impact of exposure to multiple risk factors (Masten et al, 1999; Werner & Smith, 1992). Further, the presence of multiple negative factors can tend to exacerbate the impact of a given individual factor (Barocas, Seifer, and Sameroff, 1985; Rutter, 1979). The self-report methodology was ideally suited to the topic because subjective, narrative accounts are the best way to capture the dynamic nature of both negative and positive life events (Waller, 2001). It was hoped that the
inclusion of positive events as well as negative events would offset what Jessor (1991) characterised as an often unequivocal preoccupation with risk in research with disadvantaged populations, while also allowing the participants to offer the most up-to-date picture of their lives.

5.9 Data Collection and Administration Procedures

The data collection procedures at the different age stages are described in the forthcoming sections.

5.9.1 Data collection with Age 4 sample.

Data collectors were sourced through ‘word of mouth’ or via the college or university that they were attending. Most were completing or had just completed a postgraduate degree in areas such as Social Science, Education or the Early Years. Initial training sessions were held in Cork, Dublin and Galway from February to April 1994. Training sessions lasted two-and-a-half days. They involved studying the instruments, learning observation techniques through viewing videotapes and demonstrations, and practicing the data collection procedures. A 75%-80% inter-observer reliability rate was achieved in training sessions. The project team monitored data collection closely. There were 42 data collectors, 32 women and 10 men. On completion of training, each data collector was given a set of the IEA Guidelines for each instrument. In addition, they were supplied with the data collection materials necessary to complete their first round of data collection. Additional material necessary for data collection was supplied by the research team as necessary. Each data collector visited a setting for a minimum of four days if there were four target children in attendance and a minimum of two, non-consecutive days where there might be only one target child. All observations took place in the morning over a three to three-and-a-half hour period. The systems were used by the
data collectors on each of two non-consecutive mornings per setting. The systems were used simultaneously with the Management of Time (MOT) system completed continuously over the entire observation period (3-3.5 hours/day). The Child Activity (CA) and the Adult Behaviour (AB) systems were each completed during various ten-minute periods. Child development assessment tests were usually carried out on the second and fourth days and interviews with parents, principals and teachers were arranged to suit all parties but within the four data collection days where at all possible. The observations of the adult behaviour and the individual target children were taken at different times on the two days to allow for a variety of behaviours to be observed. Over the two days, a total of 40 minutes of observation data was recorded for the teacher and a total of 40 minutes of observation data for each target child. In most settings, a total of 6 to 7 hours MOT data was recorded. It was a requirement that each data collector record at least 4 hours of MOT observation data over the two days.

**Limitations:**

The presence of a strange, albeit non-participant observer can have a disruptive influence on a setting, both for a child and for a teacher. To counter this, data-collectors attempted to establish themselves in the setting by being present for as long as was possible before observation began. Furthermore, observation took place on two non-consecutive days to minimize the influence of a special event or unusual behaviour (reactivity) that may have been prompted by the observer’s presence. Data collectors reported no instance of reactivity in either teachers or children, suggesting that observation had taken place naturalistically. In a study such as this, it is imperative that the observation system is a reliable system with data being collected in a consistent way. The IEA required an inter-observer reliability rate of 75-80%. The training video dealt with consistency in categorization and was used to test inter-observer reliability. Training sessions were also used to clarify category identification for
observers in order to achieve valid observations. Finally, observer bias was countered by the NRC and the ICC through the use of rigorous coding mechanisms that were repeatedly checked before data was submitted.

5.9.2 Administration of Age 7 instruments.

Age 7 participants were attending primary school and once parental consent for them to participate in the Age 7 phase of the research was obtained, a fieldworker visited their primary school setting in order to collect data through face-to-face administration of the child assessment measures. The measures were administered to each child individually in three to four periods of approximately 30 minutes each. A quiet work area away from the main classroom was used and in a small number of cases, the data collector administered the measures in the child’s home.

5.9.3 Administration of Age 16 questionnaire.

The questionnaire was piloted with a convenience sample of 15 adolescents, with an average age of 16.1 years and with 10 adults. Recommended changes included layout changes and changing the Americanised language on the positive and negative life events checklist and on the school commitment scale. Hence, “grades” became “marks,” “varsity sports team” was changed simple to “sports team,” “math” was changed to “maths” and “counselor” was changed to “career guidance counsellor.” Data was collected through the completion and return of the self-report questionnaire, containing the items outlined in the previous section and post-piloting adjustment. Data was collected over a three-month period, which spanned from January 2007 to March 2007, with the majority of data being returned in the first month of that period and the remainder being returned in smaller volume over the final two months.
Telephone reminders were used with those who had consented to participate but who had not yet returned the questionnaire as research suggests that both significantly predicted better response rates (Nakash et al., 2006).

5.10 Data Coding
All of the data collected for each participant in Age 4 setting was allocated a specific code by the data-collectors according to the IEA Pre-primary Project Guidelines contained in the original coding manuals. All NDD preschools were labeled using numbers in the ‘100s’ range, DD preschools were labeled with numbers in the ‘200s’ range, NDD schools were labeled in the ‘300s’ range and DD schools were labeled in the ‘400s’. Each child was given a unique ID three digit number at Age 4 that allowed for cross-referencing of data gathered on children at age four with that gathered when participants were age seven. All codes were double-checked before being entered on a specifically formatted disk that was then sent to the ICC for inclusion in the international data set. The information on the disks included SPSS PC+ dictionary files for each category of information e.g. provider survey, expectations, family background, observations and developmental status measures. Copies of the disks were maintained in Ireland for local analysis in studies such as the current study. These codes were also utilized at the Age 16 phase to further compare and contrast data between the different phases.

5.11 Data Analysis
The rationale for, and the exposition of, the data analysis methodology used in the research is explained in the forthcoming sections.
5.11.1 Management of potential bias in the sample.

While it is always preferable to have as large and complete a sample as possible, in real-world research situations, it is more often the case that the sample falls short of ideal status due to a combination of factors. Fortunately, there are a number of ways to deal with missing data or longitudinal loss to follow-up. In Sections 5.11.1 to 5.11.2.3, the steps taken to manage the missing data (110 participants out of a possible 374) will be discussed.

5.11.1.1 Missing data.

Data may be missing from a research study for a variety of reasons, which can be classified into a number of different categories ranging from; Missing Completely at Random (MCAR) to Missing at Random (MAR) to Not Missing at Random (NMAR). If data is missing completely at random (MCAR), it means that the probability that an observation (Xi) is missing is unrelated to the value of Xi or to the value of any other variables or that any piece of data is just as likely to be missing as any other piece (Howell, 2012). Data can be considered as missing at random if the data meet the requirement that missingness does not depend on the value of Xi after controlling for another variable. Howell describes this as being the case for people who are depressed, and therefore, less inclined to report their income. Thus, reported income will be related to depression. Therefore, to the extent that missingness is correlated with other variables that are included in the analysis, the data are MAR (Howell, 2012). The situation in which the data are at least MAR is sometimes referred to as ignorable missingness, which, although problematic, can be managed through analysis and modeling. The final type of missing data (i.e. that which is not missing at random (NMAR)) relates to missingness, which is regarded as non-ignorable. This occurs in cases where people with lower incomes are unwilling to disclose their income or where people with mental illness are unwilling to report their mental health status. It indicates a bias in the
complete dataset. The results of the analysis in the Results Section 6.3, indicate that the missing data from the current research, is not missing at random (NMAR), as there is a pattern whereby those from families with lower incomes, lower parental education and greater likelihood of attending a designated disadvantaged school did not respond to the questionnaires, thereby meaning that they were likely to be less willing to provide information on their Age 16 educational outcomes. The fact that there is substantial attrition, and that the missing data is NMAR, precludes the use of certain techniques to manage missing data, including multiple imputation (Kristman, Manno & Cote, 2005). Multiple imputation involves creating multiple data sets, each with a different set of imputed values and relies on the MAR assumption to be validly undertaken.

5.11.1.2 Justification for complete case analysis.

Mathews, Henderson, Farewell & Rodgers (2012) state that a complete case analysis can provide useful information about a smaller and rather different population from that originally envisaged. They argue that, while biased, this subset of participants may still be of particular relevance for research enquiry. In light of the potential bias in the sample and the unsuitability of data management techniques to account for that, it was decided that a complete case analysis would be conducted, meaning the analysis database consisted of only those participants for whom Age 16 data was available. According to Diggle, Farewell & Henderson (2007), “The complexity of some of the models and methods now available in the statistics literature [in relation to missing data] may obscure the focus of a study and its precise objective under drop-out.” (p. 2). Diggle, Farewell & Henderson (2007) state that complete case analysis is, “perfectly proper” if the research aim is to study the outcomes within the sub-population of participants, conditional upon the fact that they participated. In these circumstances, a supplementary analysis that seeks to determine the factors related to
dropout (as discussed in Section 6.3) can help in order to consider the implication of dropout factors in relation to the complete case analysis.

While the current sample disproportionately consisted of participants who came from non-disadvantaged schools and better educated and resourced families at Age 4, it is argued that the data is still worthy of analysis given its novelty in an Irish context. The dataset provided an opportunity for the identification of family and school factors (from a child to teenage developmental trajectory) that relate to Age 16 academic outcomes for a subsample of Irish young people. Given that the sample size of this research is small (n=110), it was already the case that the outcomes of the research were unlikely to be nationally representative and this study is not alone in reporting on relatively small Irish educational samples. This is likely a reflection of the still-developing educational research sector in Ireland (see Chapter 3), where much research is still under-funded and driven mainly by the researcher’s interests and concerns. It is within that context that I located this study and feel that, given the dearth of longitudinal data on Irish children and young people, particularly in the trajectory from early childhood education to secondary school, the research is of value mainly as a novel piece of work that adds to the growing canon of work that concerns itself with Irish children and their lives. Moreover, it allows for a more in-depth study of the educational experiences of a small, but nonetheless statistically viable portion of those children. Watt & van den Berg (2002) state that one of the values of unrepresentative samples is that they can provide targeted information about under-researched sub-populations. As this applies, in particular, to the longitudinal tracking of Irish children from the early education to the Junior Certificate examination stage, it is argued that this PhD study has relevance to a sector, which is
becoming more concerned about the outcomes and importance of early education in the longer term for Irish children.

To that end, a number of steps were taken to manage the bias and the missing data present in the sample. Complete case analysis was utilised, with the casewise deletion of cases for which Age 16 data was missing. In spite of the increasing prevalence of techniques such as multiple imputation and the direct maximum likelihood method, Jeličić, Phelps & Lerner (2009) found that listwise or pairwise deletion (i.e. complete case analysis) was the most common missing data management technique in longitudinal studies of development reported in the three flagship developmental journals (Child Development, Developmental Psychology and the Journal of Research on Adolescence). Mathews, Henderson, Farewell & Rodgers (2012) suggest that if a complete-case analysis is accompanied with a drop-out analysis and a careful statement of justified conclusions, then it may still be viable to use complete case analysis in longitudinal research. All research findings were qualified within the context of the study limitations, to avoid summative findings that relate to the whole population (Nulty, 2008), which in the event of sample bias would be misleading. Comparison of the findings from the complete case analysis were compared (where data was available) to the findings from the original Age 4 and Age 7 sample to determine if findings persisted across both samples and therefore more likely to be generalisable to larger, nationally representative sample. Sensitivity analyses were also conducted. The focus of the analysis was exploratory, which allowed for the discovery of unexpected findings about a novel sub-group of Irish young people in an educational context. To that end, all tests were two-tailed and regression analysis was entered in a stepwise fashion. Where practicable, non-parametric testing was
utilised as a cross-reference for all parametric tests to account for the presence of non-normal data.

*A note on Hierarchical Linear Modeling:*

It is sometimes appropriate to use hierarchical linear modeling for data in which participants are nested within contexts such as school or preschools. The possibility of using HLM was explored for the current research with the Level 1 variables to be individual children and the Level 2 variable to be their school setting. However, at each phase of the research, there was a wide dispersion of school groups across the sample, making it difficult to isolate the effect of a given school on outcome scores.

**Table 5.2**

*Dispersion of sample across schools*

<table>
<thead>
<tr>
<th>Age</th>
<th>$N_{\text{Schools}}$</th>
<th>$N_{\text{Participants}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 4</td>
<td>109</td>
<td>110</td>
</tr>
<tr>
<td>Age 7</td>
<td>84</td>
<td>107</td>
</tr>
<tr>
<td>Age 16</td>
<td>85</td>
<td>110</td>
</tr>
</tbody>
</table>

There was a high number of schools ($n=85$) across which the 110 *Age 16* participants were distributed. Most schools had an average of just one participant attending, 12 had two participants attending and only five had 3 children attending. Therefore, in light of this wide spread of schools and participants, it was decided that it would be inappropriate to use hierarchical linear modeling to estimate the outcome models as participants were nested in almost as many schools as there were participants, meaning the nested analysis would not have yielded meaningful results.
5.11.2 Missing data analysis methodology.

Mathews, Henderson, Farewell & Rodgers (2012) recommend conducting an analysis of the missing data in longitudinal research which consists of a comparison between those who participated and those who did not participate in given phases of data collection on the range of available variables. As well as identifying potential bias in the sample, it can help to provide an additional frame within which to accommodate research inferences. People may ‘actively’ drop out or withdraw or may for various reasons such as passage of time, high mobility or inadequate record-keeping become lost to follow up. In order to identify whether there were differences between those who participated in the research at the Age 16 phase and those who did not, chi-square tests were conducted for categorical variables and independent t-tests were conducted for continuous variables. The groups were divided based on whether they had participated in the Age 16 phase of the research or whether their data was missing at the PhD stage i.e. they had not participated. The results are presented in Section 6.2 and 6.3.

5.11.2.1 Independent t-tests.

The rationale for conducting an independent t-test is that it is an appropriate and versatile statistic to test for differences in mean scores, particularly in the case of two separate groups where different participants from the same population are assigned to each group. Where differences emerge between groups, it may be due to experimental manipulation of the variables or in the case of the missing data analysis, the influence of certain factors. The results of the independent t-tests conducted between the PhD sample and the Missing Sample are presented in Table 6.2 in the Results Chapter.

5.11.2.2 Chi-square tests.

Chi-square tests (Fisher, 1922; Pearson, 1900) become necessary when the research focus is on differences between categorical rather than continuous variables. The Pearson chi-square
statistic is based on comparing the frequencies observed in certain categories to the frequencies that one might expect to observe by chance (Field, 2009). Fisher’s exact test is a statistic that is advisable for use alongside the chi-square statistic when sample sizes are small (Field, 2009) so this statistic was interpreted from the SPSS outputs for the current research. One of the problems in interpreting chi-square tests is the determination of which cell or cells produced the statistically significant difference. Examination of percentages in the contingency table and expected frequency table alone can be misleading. Therefore, the residual, or the difference, between the observed frequency and the expected frequency is a more reliable indicator, especially if the residual is converted to a z-score and compared to a critical value equivalent to the alpha for the problem. As chi-square tests do not provide a measure of probability, the size of the standardized residuals was compared to the critical values that correspond to an alpha of 0.05 (+/-1.96) or an alpha of 0.01 (+/-2.58). This was equivalent to testing the null hypothesis that the actual frequency equals the expected frequency for a specific cell versus the research hypothesis of a difference greater than zero.

5.11.2.3 **Analysis of relationship between variables.**

The express aim of the research was to identify whether a relationship existed between the educational process and structural and family-level variables that were studied when the children were four years old and the developmental/educational outcome variables studied when the children reached seven years of age and again when the children reached sixteen. The process variables were drawn from the data obtained by observation at the Age 4 Phase, while the structural variables were obtained from teacher and provider surveys that were also completed at the same phase. The outcome variables were based on the data obtained from the developmental status measures that were administered to the participants at age four. If a significant correlation was found between Age 4 educational experience variables and Age 7
outcome variables, the extent to which experience variables had an impact on outcome variables was then examined in detail using linear multiple regression analysis. Therefore, the analysis of data first involved conducting bivariate correlational analyses between all Age 4 educational experience variables (both structural and process) and Age 7 developmental outcome variables in order to ascertain where the strongest relationships existed. The results of these preliminary correlational analyses are not presented for reasons of brevity but are available, on request. From this, it can reasonably be claimed that those variables that were most correlated with outcome variables were the educational factors that could be considered to predict age-seven developmental status. The second step involved more focused analysis of the relationship between the identified predictor variables (see Table 6.2) and outcome variables, in order to better explain and understand the developmental outcomes that had been recorded.

5.11.3 Multiple regression literature review.

A significant component of the current study involved examining outcomes at different points in time, based on the information that the data collection at three different time points allowed. As regression allows for the prediction of one variable from the information provided by another variable, it is perfectly suited to the analysis of outcomes based on age-linked information that was collected for the sample. Field (2009) comments on the value of multiple of regression being in the fact that, “it allows us to go a step beyond the data that we collected” (p. 125). In the current research, it is necessary to attempt to go a step beyond the Age 4, 7, and 16 data to fully understand the dynamics of child development and to identify the factors that predict better (or worse) educational outcomes for a sample of Irish young people. Although stepwise regression has been criticised in some quarters due to its over-
reliance on statistical techniques rather than theoretical knowledge of the field in question, it is nonetheless regarded as a defensible technique where the research is exploratory and the primary research concern is to find a model to fit the data (Menard, 1995, Field, 2009; Tabachnik & Fidell, 2007). Tabachnik and Fidell (2007) summarise the difference between stepwise (statistical) and standard regression thusly,

If standard multiple regression is used, two fundamental questions are asked: (1) What is the overall relationship between the [DV] and the set of IVs....(2) How much of the relationship is contributed uniquely by each IV?...If statistical regression is used, one asks: What is the best linear combination of IVs to predict the DV in this sample? (p. 59).

The use of stepwise regression therefore involves a reframing of the research question that although less generalisable, may lead to unexpected and useful findings.

5.11.3.1 Multiple regression analysis.

During multiple regression, data was entered in a stepwise fashion, meaning that the order in which the predictors were entered (and/or) removed from the model was based solely upon mathematical criteria (Field, 2009). The backward stepwise method in SPSS was used for linear multiple regression, meaning that the predictors were all firstly placed in the model, a significance value of their contribution to the model calculated and a comparison made between the significance value and a removal criterion. If the predictor met the removal criterion, meaning that it was not making a statistically significant contribution to the model, it was removed and the model re-estimated for the remaining predictors. Tabachnik and Fidell (2007) advise that stepwise regression should involve a cross-validation strategy to investigate the extent to which results may be more broadly generalised. First, the data should be divided into two separate samples, which should involve, according to Tabachnik and
Fidell (2007), at least a half and half split, if not the recommended 80% and 20% split that has become accepted in the literature.

5.11.3.1.1 Model-Checking in multiple regression.

Checks for all of the standard issues that may apply to multiple regression were conducted. Sample size and ratio of cases to IVs were considered. A ratio of the minimum 20 cases per predictor was exceeded in most models. Normality, linearity and homoscedasticity of residuals, outliers, multicollinearity and singularity were also examined for each model. Homoscedasticity means that the residuals at each level of the predictors should have the same variance. Plotting of residuals allowed for the examination of normality, linearity and homoscedasticity. Multicollinearity was tested for by obtaining VIF, tolerance and the eigenvalues of the scales, uncentred cross-product matrix, the condition index and the variance proportion for each predictor. The Durbin-Watson test statistic was used to test for independence of errors.

5.11.3.1.2 Cross validation in multiple regression.

In the current research, regression models were run on a randomly generated 80% of cases (the training sample). By forcing this model on the remaining 20% of cases (the holdout sample), it was possible to compare the values of $R^2$ and $b$ in the two samples and thus determine how well the model generalised (Field, 2009; Tabachnik & Fidell, 2007). In order for a model to be deemed useful, the cross-validation process must produce the same subset of predictors produced by the regression model of the full data set and the comparison of the $R^2$ for the training sample must not differ by more than 2% (0.02) from the $R^2$ for the holdout sample. Conclusions may validly be made about stepwise regression results that are consistent for both analyses in a cross-validation process (Tabachnik & Fidell, 2007).
5.11.4 Logistic regression literature review.

The examination of educational outcomes often involve dichotomous variables; whether a student passes or fails, whether they go to university or not; whether they leave school early or stay to complete their final exams (Peng, Lee & Ingersoll, 2002). Traditional techniques that were often used to answer questions about these dichotomous variables such as ordinary least squares regression or linear discriminant function analysis have come to be regarded as unsuitable due to strict statistical assumptions such as linearity, normality, continuity, multivariate normality and equality of variances and covariance (Cabrera, 1994; Cleary & Angel, 1984; Cox & Snell, 1989; Lei & Koehly, 2000; Press & Wilson, 1978). Tabachnik and Fidell (2007) comment that logistic regression is, “relatively free of restrictions” and allows for the analysis of a mix of all types of predictors whether they are continuous, discrete, or dichotomous. One advantage of logistic regression is that it does not assume that predictor variables are distributed as a multivariate normal distribution with equal covariance matrix. Instead, it assumes that the binomial distribution describes the distribution of the errors that equal the actual Y minus the predicted Y. The model also assumes that the same probability is present across all predictor variables due to the binomial distribution being the assumed distribution for the conditional mean of the dichotomous outcome. In the case of random data, the binominal assumption may be taken to be robust (Peng, Lee & Ingersoll, 2002) or this can be tested using the normal $z$ test (Siegel & Castellan, 1988). It has been recommended that a minimum sample size of 100 observations be available for standard multivariate regression, with a minimum observation–to-predictor-ratio of 10-1 (Lawley & Maxwell, 1962; Marascuilo & Levin, 1983; Tabachnik & Fidell, 2007). Less has been written in the case of logistic regression, although Peng, Lee & Ingersoll (2002) recommend operating with at least 100 cases and adopting the Hosmer and Lemeshow’s (1989) ten
observations per predictor rule and found stable results in their review of eight logistic regression studies that met and exceeded this general rule. In the current research, the complete sample size is 110, and all models exceeded the recommended observation-to-predictor ratio a number of times over. That notwithstanding, the need for caution when interpreting the results of logistic regression with small to medium sample size is recognised and the danger of overestimating effect sizes was considered. In particular, Harlow (2002) and Tabachnik and Fidell (2007) caution against the elimination of non-significant predictors using logistic regression in research fields which address life-and-death issues such as medical policy and practice. It is argued, however, that the corollary of that recommendation is that use of logistic regression to eliminate non-significant predictors is valid with caution in areas where findings may not relate to life-and death situations, rather to under-researched and emergent fields. In the case of most models, a rule of 20 observations per one predictor was followed because stepwise regression was being used and stepwise regression tends to overfit the model at the expense of generalisability. Although as previously mentioned, stepwise regression has been criticised in some quarters, it is nonetheless regarded as a defensible technique where the research is exploratory and the primary research concern is to find a model to fit the data (Agresti & Finlay, 1986, Menard, 1995, Field, 2009). In the current study, with a small sample size and novel data within an Irish educational context, it is argued that stepwise logistic regression is best suited to finding out more about the relationship between home, family and educational contexts over time for the subsample of young people. These findings may then be built on and tested in prospective studies.

5.11.4.1 Logistic regression analysis.

Logistic regression is similar to multiple regression, as described in Section 5.11.3, but the key difference is that the outcome variable is categorical rather than continuous. In a similar
vein to multiple linear regression, it is possible to predict an outcome using logistic regression
given certain other information is available. The key difference is that the prediction concerns
membership of one or other of the categories or groups that make up the outcome variable
rather than a level of a continuous construct as is the case with multiple regression. In a
binary regression model, the two levels of the outcome can represent anything, but
generically they are labelled as “Success” and the other “Failure”. In addition,
conventionally, the code 1 is used to represent success and code 0 to represent failure.
Therefore, logistic regression models the success probability as a function of the explanatory
variables. For any group of subjects, the 0/1 coding makes it true that the mean of Y
represents the observed fraction of successes for that group.

To assess the fit of the model, the log-likelihood measure is used:

\[ \text{log-likelihood} = \sum_{i=1}^{N} [Y_i \ln(P(Y_i)) + (1 - Y_i) \ln(1 - P(Y_i))] \]

The log-likelihood model is derived from summing the probabilities associated with the
actual and predicted outcomes (Tabachnick & Fidell, 2007). Crucial to the interpretation of
logistic regression is the value of the odds ratio (\( \text{Exp}(B) \)), which is an indicator of the change
in odds resulting from a unit change in the predictor (Field, 2009). Essentially, it is the
probability of an event occurring divided by the probability of the event not occurring. In
binary logistic regression, where an event occurring is coded as 1 and an event not occurring
is coded as 0, an odds ratio value that is greater than 1 indicates that as the predictor
increases, the odds of the outcome occurring increase. On the other hand, an odds ratio of less
than 1 indicates that as the predictor increases, the odds of the event occurring decrease.
All Junior Certificate outcomes scores were classified according to the binary classification, where High Attainment (i.e. a higher Level A or B grade) was coded as 1 and Lower Attainment (a grade that was not a Higher Level A or a B) was coded as 0. Therefore, odds ratio value that were greater than 1 indicated that as a predictor increased, the odds of the outcome occurring increase. On the other hand, an odds ratio of less than 1 indicates that as the predictor increases, the odds of the event occurring decreased. Predictors were included in the model based on the analyses described in Section 5.11.2.3, in addition to using judgements guided by evidence from literature review and predictors were entered using backwards deletion. Therefore, all predictors were entered at the start and then deleted if they did not make a significant contribution to the model. The final model was re-run containing only the predictors which had been left in the model after backwards deletion and model-checking was then conducted.

5.11.4.1.1 Model-checking in logistic regression.

In line with best practice in relation to regression, model checking was conducted through examination of the model residuals (Cook’s distance, leverage, standardized residuals and DFBeta values) to isolate possible instances of poor fit or cases that influenced an undue influence on the model. Common problems such as complete separation and high parameter estimates and standard errors were considered. Complete separation occurs when the outcome variable can be perfectly predicted by one or more of the independent variables and can arise when there are too many variables being fitted in a model that has too few cases. The assumption of linearity of the relationship between each predictor and the log of the outcome variable was tested as recommended by Hosmer & Lemeshow (1989). Finally, multicollinearity was tested for by obtaining VIF, tolerance and the eigenvalues of the scales,
uncentred cross-product matrix, the condition index and the variance proportion for each predictor.

5.11.4.1.2 Cross validation of logistic regression model.

Cross-validation of the model was conducted using an 80-20 split, in which 80% of the data was used to derive the model and its accuracy was tested on the remaining 20% of the cases. If the classification accuracy rate of the holdout sample is no more than 10% lower than that of the training sample, it is deemed to provide sufficient evidence of the utility of the logistic regression model and therefore supports the findings of the analysis using the full dataset. In addition it was necessary that there was evidence of a statistically significant overall relationship between the combination of independent variables and the dependent variable, that there was no evidence of numerical problems and that the classification accuracy should surpass the proportional by chance accuracy criteria in supporting the utility of the model. Such cross-validation was conducted for each logistic regression model. Unless otherwise stated, the models were deemed to be valid and to accurately predict the relationships presented in each table.

5.11.4.1.3 Effect size.

While linear regression produces a measure of variance called the $R^2$, there is no such figure in logistic regression that allows for the same variance interpretation. However, a number of measures have been proposed as an analog to $R^2$, which while being different statically from $R^2$, provide a conceptually similar approximate, which may be used in a similar way to $R^2$, when interpreting overall model variance and effectiveness (Field, 2009; Tabachnik & Fidell, 2007). Hosmer and Lemeshow’s $R^2_L$ measure is calculated by dividing the model chi-square (based by the log-likelihood) by the original -2LL (the log-likelihood of the model before any predictors were entered). Field (2009) describes it as, “a measure of how much the badness of
fit improves as a result of the inclusion of the predictor variables” (p. 269). Similar to this measure is Cox and Snell’s $R^2_{CS}$ (1989), which is based on the log-likelihoods of the new and the original model, as well as the sample size. As Cox and Snell’s $R^2_{CS}$ never reaches its theoretical maximum of 1, Nagelkerke (1991) amended it to produce Nagelkerke’s $R^2_N$. Field recommends that all three measures can provide some evidence of the significance of the model. All three measures are reported in the current study in order to account for variance in each model as comprehensively as possible.

Summary

This chapter has described the IEA Preprimary Project in terms of its conceptual framework, design and the methodology. That project resulted in two national publications which opened a window into early education settings in Ireland at a time when early education and care was only beginning to become part of the common parlance. The justifications for building on and extending that sound knowledge base through adding a longitudinal dimension for the PhD research study were presented. That extension was discussed both as a means of opening the window wider to discover more about the subsequent development of the IEA Preprimary Project children and as a means of understanding what that might mean for how children learn and develop nationally as they move through the non-statutory and statutory education systems. The methods and instruments of relevance to this particular study have been described and the process of data collection and analysis is also presented. Finally, the ethical considerations and limitations of the study were discussed.
CHAPTER 6
RESULTS

This chapter sets out the main results from this PhD research. The first section provides data on the tracking of the sample through from Age 7 to Age 16. Section 6.2 presents the participation and non-participation rates. Section 6.3 presents an analysis of the differences between those who participated at Age 16 and those who did not. Section 6.4 outlines the early educational experiences of the PhD sample when they were aged four. Section 6.5 presents a profile of the PhD sample at Age 4, in terms of their cognitive, language and social development. Section 6.6 details the cognitive, language and social development of the PhD sample at Age 7. Section 6.7 provides the descriptive statistics for the sample at Age 16, while Section 6.8 outlines the percentage of school-based and extracurricular activities that the sample participated in at Age 16. Section 6.9 presents the average scores of the Age 16 sample on measures of social development and also provides average scores for attitude to school, relationships to family and frequency of engaging in school-based and extra-curricular activities. Section 6.10 reports the outcomes on the state Junior Certificate examinations and compares these results to the statistics available from the national sample. Sections 6.11 to 6.13 present the results of the modelling analysis, which were conducted to identify key predictors of cognitive, language and overall academic outcomes at ages seven and sixteen.

6.1 Tracking the Sample from Age 7 to Age 16

Of the original sample of 374 participants, 110 consented to re-engage with the research project and participated in the Ph.D. phase of the research. This constituted 29 % of those who had participated at Age 7.
Table 6.1

Analysis of participation and non-participation at Age 16

<table>
<thead>
<tr>
<th>Reason</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consented and participated</td>
<td>110</td>
<td>29.4</td>
</tr>
<tr>
<td>Participant consented verbally but did not return questionnaire</td>
<td>49</td>
<td>13.2</td>
</tr>
<tr>
<td>Withdrew</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Questionnaire returned due to change of address /address no longer existed</td>
<td>48</td>
<td>12.8</td>
</tr>
<tr>
<td>Non-contactable</td>
<td>165</td>
<td>44.1</td>
</tr>
<tr>
<td>Total</td>
<td>374</td>
<td>100</td>
</tr>
</tbody>
</table>

The breakdown of participation and non-participation (by reason) is outlined in Table 6.1 (above). One obstacle to data collection (and therefore participation) was the fact that funding had not been made available to continue contact with the sample beyond Age 7. Therefore, there was a gap of 9 years between Age 7 and Age 16 data collection, during which the sample had no contact with any representatives of the original research team. Forty-eight of the addresses on record for the participants were inaccurate at time of data collection, which was ascertained when the original consent and information letters were returned to the research team with a note that the person was no longer residing at the address that was held on record for the participant. Given that it was not possible to source a contact for those families, these 45 previous participants were not contactable and therefore lost to follow up. It is likely that an additional proportion of participants had also changed address since the Age 7 data collection stage but that the letters had not been returned to research team by the new address residents. In addition, 49 participants gave verbal consent but did not return the consent form or the questionnaire. One additional reminder attempt was made in the case of these participants. Finally, 165 participants were contacted by post and there was no response. It is likely that they had either moved house or were not motivated to take part in the research.
and that they no longer felt a link to the research given the passage of time since the last phase of data collection.

The response rate is in line with national and international findings on postal return of questionnaires, which have typically placed the average return rate at between 30% and 40% (Baruch, 1999; Nair et al., 2005; Kerlinger, 1986; Nulty, 2008; Watt, Simpson, McKillop & Nunn, 2002). Given the passage of time between the participants’ last engagement with the research and the time of data collection (9 years), a response rate of 29% to a postal questionnaire represents a more positive rate than has been found in international studies using both postal questionnaires and longitudinal methodology. Doody et al. (2003), in a randomized controlled trial to estimate cancer risk among radiology technicians, found that follow-up questionnaires sent 8 to 10 years after initial participation had response rates ranging from 24.6 to 28.5% when an incentive was included with the questionnaire and only 16.6% return rate when no incentive was included. In a study with young Scottish people, aged 16 to 20, Henderson, Wright, Nixon and Hart (2010) found that better rates of response to postal questionnaires were predicted by a cash incentive of £10. However, even with a cash incentive, the response rate across all three waves of the study was still only 22% and for those who were not incentivised, this figure dropped to 16%. Therefore, it is argued that the response rate in the current study (29% of the sample from the last point of data collection, nine years previously), should be considered as positive, being, as it is, on a par with, or better than, the afore-mentioned studies and given that no incentives were offered. In particular, it should be noted that the current research was a PhD. project without the resources that would typically apply in most research studies, particularly in international longitudinal studies and that there were insufficient resources to send multiple waves of
soliciting information to all 374 original participants. Additional factors that may have affected the rate of response will be discussed in Section 6.3

6.2 Testing for Differences in Age 4 and Age 7 Data between Participant Sample and Missing Sample

In order to identify whether there were differences between those who participated in the research at Age 16 and those who did not, chi-square tests were conducted for categorical variables and independent t-tests were conducted for continuous variables. The results are presented in Tables 6.2 and 6.3.

Table 6.2

Test of differences between participant sample and missing sample at Age 4 and Age 7

<table>
<thead>
<tr>
<th>Child and Family Variables</th>
<th>N</th>
<th>$M_{Sample}$ (SD)</th>
<th>$M_{Missing}$ (SD)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at first assessment (in months)</td>
<td>386</td>
<td>54.9</td>
<td>54.5</td>
<td>-1.01</td>
<td>.31</td>
</tr>
<tr>
<td>Maternal Education (in years)</td>
<td>377</td>
<td>13.3 (3.2)</td>
<td>11.9 (2.8)</td>
<td>-4.16</td>
<td>.00***</td>
</tr>
<tr>
<td>Paternal education (in years)</td>
<td>338</td>
<td>12.6 (3.4)</td>
<td>11.6 (3.2)</td>
<td>-2.77</td>
<td>.01*</td>
</tr>
<tr>
<td>Annual income (in pounds)</td>
<td>317</td>
<td>19,649.9 (1183.3)</td>
<td>14,694.8 (672.1)</td>
<td>-3.77</td>
<td>.00***</td>
</tr>
<tr>
<td>Age 4 cognitive score (raw)</td>
<td>386</td>
<td>40.85 (8.2)</td>
<td>38.51 (9.3)</td>
<td>-2.26</td>
<td>.03*</td>
</tr>
<tr>
<td>Age 4 language score (raw)</td>
<td>386</td>
<td>15.96 (4.7)</td>
<td>14.11 (5.1)</td>
<td>-3.23</td>
<td>.00**</td>
</tr>
<tr>
<td>Age 7 cognitive score (raw)</td>
<td>369</td>
<td>41.42 (6.3)</td>
<td>38.66 (7.1)</td>
<td>-3.55</td>
<td>.00***</td>
</tr>
<tr>
<td>Age 7 language score (raw)</td>
<td>373</td>
<td>31.27 (5.5)</td>
<td>28.33 (7.1)</td>
<td>-3.88</td>
<td>.00***</td>
</tr>
<tr>
<td>Age 7 social score (raw)</td>
<td>370</td>
<td>39.78 (5.2)</td>
<td>39.77 (6.0)</td>
<td>-0.10</td>
<td>.99</td>
</tr>
</tbody>
</table>

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

An analysis of differences between those who re-engaged with the research (Sample) and those who did not (Missing) on Age 4 and Age 7 variables, indicated that there were
significant differences between the groups on some demographic and developmental variables (See Tables 6.2 and 6.3). Those whose participated at Age 16 had both mothers (11.9 years) and fathers (11.6 years) with significantly more years of education than the missing sample (13.3 years on average for mothers compared to 11.9 years and for fathers, 12.6 years compared to 11.6 years, on average). The annual family income of the participant group was significantly higher \( (M = £19,649.90) \)^3 compared to the non-participant group \( (M = £14,698.80) \). In addition, the group that participated at Age 16 had significantly higher cognitive \( (M = 41.42) \) and language scores at both Age 4 (Cognitive: \( M = 40.85 \); Language: \( M = 15.96 \)) and Age 7 (Cognitive: \( M = 41.42 \); Language: \( M = 31.27 \)) as compared to those who did not participate. There were no differences between groups when it came to age. These findings indicate a division between those who participated at Age 16 and those who did not, such that the participants had significantly higher levels (as measured when participants were Age 4) of parental education, of cognitive and language development both at Age 4 and Age 7 and wealthier family backgrounds. This suggests a bias in the Age 16 sample in favour of higher achieving children with less disadvantaged backgrounds, which will be discussed further.

\(^3\) The Irish currency was the Pound/Punt at the time of Age 4 data collection in 1994. Today’s equivalent salary in euros would be €47,159 (≈ £19,649) and €35,275 (≈ £14,698) approximately.
Table 6.3

Crosstabs Between Participant Sample and Missing Sample at Age 4 and 7

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>M _Sample</th>
<th>M _Missing</th>
<th>( \chi^2 )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>186</td>
<td>52.7</td>
<td>45.1</td>
<td>1.87</td>
<td>.18</td>
</tr>
<tr>
<td>Male</td>
<td>208</td>
<td>47.3</td>
<td>54.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Family Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lone parent family</td>
<td>57</td>
<td>6.6</td>
<td>18.0</td>
<td>7.87</td>
<td>.00 **</td>
</tr>
<tr>
<td>Two-parent family</td>
<td>327</td>
<td>93.4</td>
<td>82</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Setting Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>203</td>
<td>53.6</td>
<td>50.3</td>
<td>0.31</td>
<td>.57</td>
</tr>
<tr>
<td>Preschool</td>
<td>193</td>
<td>46.4</td>
<td>49.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Setting Designation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designated Disadvantaged</td>
<td>205</td>
<td>38.2</td>
<td>57.0</td>
<td>11.30</td>
<td>.00 **</td>
</tr>
<tr>
<td>school/preschool</td>
<td>(42/163)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-designated Disadvantaged</td>
<td>191</td>
<td>63.8</td>
<td>43.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>school/preschool</td>
<td>(68/123)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Geographical Location</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dublin or Cork city</td>
<td>116</td>
<td>18.2</td>
<td>36.9</td>
<td>12.62</td>
<td>.00 **</td>
</tr>
<tr>
<td>Rest of country</td>
<td>254</td>
<td>81.8</td>
<td>63.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

There were no significant associations between gender and whether or not participants took part in the Age 16 phase of the research and neither was there a significant relationship between Age 4 setting type and participation. This indicated that males and females were equally likely to participate at Age 16 and that this was also true regardless of whether they had attended a school or a preschool at Age 4. This also indicates that there was no gender bias in the sample nor was there a bias in favour of participants who had attended schools over preschools at age four or vice versa. However, there was a significant association
between family type and whether or not participants took part at Age 16, $\chi^2(1) = 7.87, p < .01$. The standardised residuals indicated that being in a lone parent family was significantly associated with whether or not participants took part at Age 16. Participants who did not take part were 3.1 times more likely to be from a lone parent family than those who participated at the same phase. This indicates that the research sample differed significantly from the missing sample in terms of family type and that this difference reflected a bias in terms of what is often used as a proxy for disadvantage (lone parent households) in the Age 4 sample.

There was a significant association between geographical location and whether or not participants took part at Age 16, $\chi^2(1) = 12.62, p < .01$. Analysis indicated that being resident in either Cork or Dublin city was related to the significant chi-square outcome. Those who did not participate were 2.5 times more likely to have lived in urban Cork or Dublin at Age 4. This finding indicates a bias towards more rural or, at the very least, small urban geographical locations in the research sample. There was a significant association between Age 4 school designation status and whether or not participants took part at Age 16, $\chi^2(1) = 11.30, p < .001$. Analysis indicated that both having designated and non-designated setting status was related to the significant chi-square outcome. Those who did not participate at Age 16 were 2.1 times more likely to have attended disadvantaged schools or preschools at Age 4. This finding indicates that those who participated in the research were less likely to have attended a designated disadvantaged school or preschool at Age 4, therefore suggesting a bias towards non-designated disadvantaged settings in the research sample.

Taken together, the findings reported in Table 6.3 indicate that the PhD research sample differed significantly from the original Age 4 sample in a number of ways. These differences
combine to form a picture of Age 16 participants who were significantly more likely to have a two-parent family (family type) and to live in a rural or small urban geographical location than the comparison group of non-participants. Moreover, their geographical location was significantly less likely to warrant a label of disadvantage (setting designation) than was the case for those who did not participate in Age 16 data collection. In combination with the findings as referenced in Table 6.2, these differences have implications for the interpretation of the results and constitute a limitation in the research, given that they indicate that the sample is biased in terms of certain demographic and developmental factors. It is important to remember that the Age 16 sample of 110 participants constituted 28 % of the original 396 Age 4 participants and 29 % of the 374 Age 7 participants. It is likely that the participants who continued their participation in the research did so because they were enthusiastic and motivated with regard to the research or that they had parents who encouraged them to be. Therefore, a more representative sample would include more children from disadvantaged schools/preschools who had parents with a lower educational level and lower family income. The findings in Tables 6.1, 6.2 and 6.3 are in line with international findings on study-leavers or dropouts and are confirmation that such factors can apply to an Irish educational cohort too. Although all efforts were made to keep the questionnaire short, it may have been that some of the information being requested was sensitive to the demographic in question i.e. those underperforming academically may have been reluctant to divulge their Junior Certificate exam scores. Goyder (1987), amongst other researchers, found that students who do not respond to surveys differ in terms of academic attainment, with those with higher attainment being more likely to respond to surveys (Astin, 1970; Neilsen, 1978; Watkins & Hattie, 1987). For example, in studies of adolescents, study-leavers have been shown to be more likely to be involved in drug use and deviant behaviour (Tebes, Snow, & Arthur, 1992;
Brook, Cohen, & Gordon, 1983); to have poorer academic performance and to have lower social influence/resistance skills knowledge than other research participants (Siddiqui, Flay, & Hu, 1996). Richardson (2003) notes that survey non-responders tend to have different demographic characteristics to responders. These can include gender, education level (Sonne-Holm, Sorenson, Jensen & Schnor, 1989) and socioeconomic status. Moreover, studies of non-response to postal questionnaires in particular, have highlighted factors that are associated with likelihood of response. In the case of one longitudinal study, the follow up of the Aberdeen Children of the 1950’s study (Nishiwaki, Clark, Morton & Leon, 2005) found that childhood cognitive test scores at every age were strongly and positively related to the response rate to a postal questionnaire independently of other early life factors monotonically across the entire range of test scores. Those in the bottom fifth at age 11 had a response rate of 49 % while those in the top fifth had a response rate of 75 %. In the current research, the differences between the sample and the missing sample on cognitive and language development at both Age 4 and 7 support the weight of evidence from international research and suggest that those who participated at Age 16 may have been more likely to do so because they were higher-achievers at every age tested who came from ‘better’ demographic backgrounds and who were thus more likely to want to share their achievement with a research team by responding to the questionnaire.
Table 6.4

*Descriptive statistics of the sample for Age 4 cognitive and language development*

<table>
<thead>
<tr>
<th>Child Development Measure</th>
<th>N</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive scaled score</td>
<td>104</td>
<td>-0.042 (0.87)</td>
</tr>
<tr>
<td>Language scaled score</td>
<td>104</td>
<td>-0.035 (0.73)</td>
</tr>
</tbody>
</table>

*Scale Min-Max*

<table>
<thead>
<tr>
<th>Child Development Measure</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive score (raw)</td>
<td>105</td>
<td>40.85 (8.2)</td>
</tr>
<tr>
<td>Language score (raw)</td>
<td>105</td>
<td>15.96 (4.6)</td>
</tr>
</tbody>
</table>

6.3 Child cognitive and language scores at Age 4

The mean cognitive and language scores and their scaled versions are presented in Table 6.4. The cognitive instrument ranged from 0 to 57, therefore the average raw score of 40.85, indicated a reasonably high level of cognitive attainment within the whole group. The language scale had a minimum possible score of 0 and a maximum possible score of 25 therefore language ability for the whole sample was average rather than extremely high or extremely low.

6.4 Early Educational Experiences while in Age 4 Settings

This section describes the types of in-setting activities in which the Age 4 sample participated, how their educators organized and planned to spend their time and the interactions that they had with their educators and other children.
6.4.1 Age 4 child activities.

The Child Activity (CA) observation schedule was designed to observe and record the activities and interactions of the children in the classroom setting at age four. See Table 6.5.

Table 6.5
List of Child Activity Categories with sample indicators

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td></td>
</tr>
<tr>
<td>Gross Motor:</td>
<td>running, climbing</td>
</tr>
<tr>
<td>Fine Motor:</td>
<td>puzzles, building with small blocks</td>
</tr>
<tr>
<td>Expressive</td>
<td></td>
</tr>
<tr>
<td>Dramatic Play</td>
<td>role plays, moving like an animal</td>
</tr>
<tr>
<td>Arts and Crafts</td>
<td>painting, cutting/gluing materials</td>
</tr>
<tr>
<td>Music</td>
<td>singing, playing instruments</td>
</tr>
<tr>
<td>Storytelling/Language</td>
<td>to stories, rhymes</td>
</tr>
<tr>
<td>Preacademic*</td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td>reading letters, independent reading</td>
</tr>
<tr>
<td>Writing</td>
<td>writing letters, practice with pencils</td>
</tr>
<tr>
<td>Numbers/maths</td>
<td>counting, adding/subtracting</td>
</tr>
<tr>
<td>Physical Science</td>
<td>planting seeds, weather lessons</td>
</tr>
<tr>
<td>Social Science</td>
<td>visiting local fire-stations</td>
</tr>
<tr>
<td>Other</td>
<td>calendar time, memory games</td>
</tr>
<tr>
<td>Religious</td>
<td>Praying, attending religious ceremonies</td>
</tr>
<tr>
<td>Media-related</td>
<td>Watching films or television</td>
</tr>
<tr>
<td>Personal/Social</td>
<td></td>
</tr>
<tr>
<td>Personal Care</td>
<td>washing hands, eating snack</td>
</tr>
<tr>
<td>Social</td>
<td>show and tell, sharing materials</td>
</tr>
<tr>
<td>Discipline</td>
<td>sitting in Time Out, discussing misbehaviour</td>
</tr>
<tr>
<td>Expression of Emotion</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>hugging, laughing, smiling</td>
</tr>
<tr>
<td>Negative</td>
<td>screaming, crying, fighting</td>
</tr>
<tr>
<td>Domestic/Economic</td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td>set-up/clean-up of materials</td>
</tr>
<tr>
<td>Economic</td>
<td>farming, selling produce</td>
</tr>
<tr>
<td>Transitional</td>
<td>Lining up, moving between activities</td>
</tr>
<tr>
<td>No Active Engagement</td>
<td>Looking around the room, unoccupied</td>
</tr>
</tbody>
</table>

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### Table 6.6

*Mean percentage of time spent in Child Activities and by social grouping structure*

<table>
<thead>
<tr>
<th>Child Activity Category</th>
<th>N</th>
<th>M</th>
<th>(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% CA Expressive</td>
<td>98</td>
<td>19.06</td>
<td>(15.19)</td>
</tr>
<tr>
<td>% Academic</td>
<td>98</td>
<td>18.83</td>
<td>(18.70)</td>
</tr>
<tr>
<td>% CA Physical</td>
<td>98</td>
<td>16.99</td>
<td>(15.35)</td>
</tr>
<tr>
<td>% No Active Engagement</td>
<td>98</td>
<td>9.72</td>
<td>(8.60)</td>
</tr>
<tr>
<td>% Transition</td>
<td>98</td>
<td>6.08</td>
<td>(6.01)</td>
</tr>
<tr>
<td>% Storytelling/Language</td>
<td>98</td>
<td>5.19</td>
<td>(8.5)</td>
</tr>
<tr>
<td>% Media</td>
<td>98</td>
<td>1.15</td>
<td>(4.37)</td>
</tr>
<tr>
<td>% Expression of Emotion</td>
<td>98</td>
<td>1.35</td>
<td>(2.64)</td>
</tr>
</tbody>
</table>

#### Child Activities by Social Context Grouping

<table>
<thead>
<tr>
<th>Child Activities by Social Context Grouping</th>
<th>N</th>
<th>M</th>
<th>(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% CA Adult/Child Interaction</td>
<td>98</td>
<td>7.36</td>
<td>(6.8)</td>
</tr>
<tr>
<td>% CA Child/Child Interaction</td>
<td>98</td>
<td>16.49</td>
<td>(15.6)</td>
</tr>
<tr>
<td>% CA Verbalization</td>
<td>98</td>
<td>24.41</td>
<td>(19.1)</td>
</tr>
<tr>
<td>% CA Group Response</td>
<td>98</td>
<td>6.41</td>
<td>(8.2)</td>
</tr>
</tbody>
</table>

#### 6.4.1.1 Child Activities in Age 4 Settings by grouping and verbalisation.

The most common types of child activity in Age 4 settings were expressive (19.06 %), academic (18.83 %) and physical (16.99 %). Expressive activity could include dramatic play, art activities or music/movement activities. Academic activities could range across categories such as reading, maths and social or physical science and would include activities such as reading, mark-making, counting, planting seeds or learning about the weather. Physical activity could include both fine motor and gross motor activities. Children were involved for a substantial portion of time in no specific activity (9.72 %) and transitioned for 6.08 % of the time they were being observed. No active engagement meant that children were looking around the room unoccupied or staring into space. To summarise, children spent their time in
four roughly equal types of activity, one portion of which meant that they were either not engaged in any activity or moving/being moved between activities. It is interesting to note the infrequency (1.35 %) with which children expressed emotions (such as hugs, kisses, and smiles), which calls into the question the level of enjoyment and engagement that the children derived from their activities and whether they were freely chosen. Certainly, the relatively high proportion of time that was spent in transitions and in no active engagement seems to indicate the children were not engaged in their activities and either chose not to or were not permitted to, wallow for long periods in their activities. The average amount of adult child interaction observed during the Child Activity (CA) observations was quite low at 7.36 %. Children spent more than double that amount of time, on average, engaged in interaction with other children (16.49 %). Analysis of child verbalization during the CA observation indicated that children were, on average, involved in verbalization 24.4 % of the time. However, given the differing levels of adult/child and child/child interactions observed, this verbalization was more likely to have been observed between two or more children than between an adult and a child. Moreover, given that a mean of 6.4 % of CA observations constituted a group response social context, this implies that most of the adult/child interaction observed in settings reflected the eliciting of a group response from the children by the teacher and that this was most likely to be happening during an academic, expressive or physical activity.

6.4.2 Management of Time in Age 4 settings.

The management of time (MOT) observation schedule was designed to record how adults organise and plan for children’s time in the classroom and to reflect the social groupings that they propose for different activities. The list of MOT observation system categories is presented in Appendix 3. The categories, with some examples are presented below.
Table 6.7
Management of Time categories with sub-categories and activity grouping structure

<table>
<thead>
<tr>
<th>MOT Category</th>
<th>MOT Activity Sub-categories</th>
<th>MOT Activity Grouping Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>MOT Gross Motor</td>
<td>Whole Group</td>
</tr>
<tr>
<td></td>
<td>MOT Fine Motor</td>
<td>Partial Group</td>
</tr>
<tr>
<td>Expressive</td>
<td>MOT Dramatic</td>
<td>Joint Activity</td>
</tr>
<tr>
<td></td>
<td>MOT Arts</td>
<td>Alone</td>
</tr>
<tr>
<td></td>
<td>MOT Music</td>
<td></td>
</tr>
<tr>
<td>Preacademic</td>
<td>MOT Story-telling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOT Reading</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOT Writing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOT Maths</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOT Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOT Social Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOT Other Academic</td>
<td></td>
</tr>
<tr>
<td>Religious/Ethics</td>
<td>MOT Religion</td>
<td></td>
</tr>
<tr>
<td>Media-Related</td>
<td>MOT Audio-visual</td>
<td></td>
</tr>
<tr>
<td>Personal/Social</td>
<td>MOT Personal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOT Social</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOT Discipline</td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td>MOT Domestic</td>
<td></td>
</tr>
<tr>
<td>Transitional</td>
<td>MOT Transition</td>
<td></td>
</tr>
<tr>
<td>Waiting</td>
<td>MOT Waiting</td>
<td></td>
</tr>
<tr>
<td>Free Activities</td>
<td>MOT Free activity</td>
<td></td>
</tr>
<tr>
<td>Irish language</td>
<td>MOT Irish language</td>
<td></td>
</tr>
</tbody>
</table>

*Reproduced from HighScope Educational Research Foundation (2007)*
Table 6.8
Mean percentage of time proposed by activity categories and social grouping

<table>
<thead>
<tr>
<th>Adult Management of Time in Age 4 Settings</th>
<th>N</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% MOT Academic</td>
<td>98</td>
<td>21.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(19.1)</td>
</tr>
<tr>
<td>% MOT Free Activities</td>
<td>98</td>
<td>15.37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(15.6)</td>
</tr>
<tr>
<td>% MOT Expressive</td>
<td>98</td>
<td>14.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(11.6)</td>
</tr>
<tr>
<td>% MOT Physical</td>
<td>98</td>
<td>14.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(14.7)</td>
</tr>
<tr>
<td>% MOT Social/Personal</td>
<td>98</td>
<td>14.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7.3)</td>
</tr>
</tbody>
</table>

MOT Activities by Grouping Structure

| % MOT Whole Group                         | 98  | 78.39   |
|                                           |     | (20.7)  |
| % MOT Partial Group                       | 98  | 21.61   |
|                                           |     | (20.7)  |
| % MOT Joint Activity                      | -   | -       |
| % MOT Alone                               | -   | -       |

6.4.2.1 Management of Time in Age 4 settings by category.

The most common activity proposed by adults was preacademic activity (21.23 %), which was followed by free choice activities (15.37 %). Adults proposed a similar amount of time, on average, be spent on physical activities (14.23 %), expressive activities (14.36 %), and personal/social activities (14.6 %). In Age 4 settings, adults proposed that most activities take place in a whole group structure (78.39 %), while the only other group structure they proposed was partial group structure (21.61 %). None of the adults proposed joint adult/child activities or that children should work alone, even though these categories were available on the rating scale. These results suggest that educators in the Age 4 settings of the sample were most concerned with planning activities to help children to learn and develop academically. There seemed to be little differentiation of activities at an individual child level as most activities were proposed in a whole group structure. They also considered the importance of allowing children to choose some of their activities and the benefit to children of physical
activity and activities that enabled children to express themselves. However, meaningfully free activities can only happen within the context of partial group, individual or alone time, which the educators planned for less than twenty percent of the time so free choice activities took less precedent than the other planned activities, which could be implemented in a whole group as well as partial group social structure. The percentages for management of time categories are roughly similar to the child activity figures reported in Table 6.6, indicating that educators planned activities in advance and generally implemented them as planned. This indicates that the emergent interests of children were less likely to be taken into account and incorporated into activities and future planning. While there was some evidence of planning for smaller groups of children, there was no evidence of tailoring learning to the needs, abilities and interests of individual children, which has been widely recognised to benefit children’s development.

6.4.3 Adult Behaviour in Age 4 Settings

The adult behaviour (AB) observation system was designed to record the behaviour of the adult in the settings and the nature of the adult’s involvement with the children. Detail of the AB categories, with examples, is given below in Table 6.9.
Table 6.9

Adult Behaviour categories with examples

<table>
<thead>
<tr>
<th>Type of Behaviour</th>
<th>Explanation/Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Informational/facilitative strategies</strong></td>
<td></td>
</tr>
<tr>
<td>Giving/receiving information/knowledge (content)</td>
<td>Tells/listens to child about facts, concepts, cause-effect relations, e.g., &quot;Apples grow on a tree.&quot;</td>
</tr>
<tr>
<td>Giving/receiving information/knowledge (non-content)</td>
<td>Tells/listens to child about information not related to teaching, e.g., &quot;Your dad will come to get you today.&quot;</td>
</tr>
<tr>
<td>Giving demonstrations</td>
<td>Shows/listens to child about how to do a task, e.g., shows how to tie a shoe.</td>
</tr>
<tr>
<td>Eliciting information/knowledge (concepts)</td>
<td>Asks/listens to child about facts, concepts, cause-effect relations, e.g., &quot;What day of the week is today?&quot;</td>
</tr>
<tr>
<td>Eliciting information/knowledge (thoughts)</td>
<td>Asks/listens to child about own thoughts, e.g., &quot;What games do you like to play?&quot;</td>
</tr>
<tr>
<td>Eliciting an action or behaviour</td>
<td>Tells child to do a task to demonstrate acquisition or improvement of skills, e.g., &quot;How do you use this toy?&quot;</td>
</tr>
<tr>
<td>Offering choices</td>
<td>Tells/listens to questions about alternative activities available, e.g., &quot;You may play with blocks or paint.&quot;</td>
</tr>
<tr>
<td>Encouraging activity</td>
<td>Encourages child to continue working or try again, e.g., &quot;You're almost done, find three more red blocks.&quot;</td>
</tr>
<tr>
<td>Providing assistance/clarification/suggesting solutions</td>
<td>Helps child with an activity or clarifies a task, e.g., holds paper for a child while he/she cuts or pastes.</td>
</tr>
<tr>
<td>Providing feedback (positive)</td>
<td>Makes/listens to comments indicating praise or approval of a task, e.g., &quot;I think this is a nice picture.&quot;</td>
</tr>
<tr>
<td>Providing feedback (negative)</td>
<td>Makes comment indicating criticism or disapproval of a task e.g., &quot;You didn’t do a very neat job.&quot;</td>
</tr>
<tr>
<td><strong>Participation/shared activities</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full participant in child's activity, e.g., singing and doing the movements with a group of children.</td>
</tr>
<tr>
<td><strong>Nurturance/expressions of affect</strong></td>
<td></td>
</tr>
<tr>
<td>Engaging in affectionate/friendly behaviour</td>
<td>Engages in/listens to child's requests for warm-hearted interactions, e.g., telling jokes and laughing.</td>
</tr>
<tr>
<td>Giving reassurance and support</td>
<td>Engages in/listens to child's requests for reassurance when ill or injured, e.g., cuddling a crying child.</td>
</tr>
<tr>
<td>Engaging in neutral behaviour</td>
<td>Parallel activity to child neither positive or negative, e.g. sitting on the couch reading different books.</td>
</tr>
<tr>
<td>Engaging in negative affective expression/behaviour</td>
<td>Says/does something of a degrading or demeaning nature, e.g., yells and calls child names.</td>
</tr>
<tr>
<td><strong>Child-management</strong></td>
<td></td>
</tr>
<tr>
<td>Establishing/reminding child of rules</td>
<td>Explains/listens to questions about standards of behaviour, e.g., “Don’t run on the stairs, you’ll get hurt.”</td>
</tr>
<tr>
<td>Verbal/physical intervention</td>
<td>Stops or restrains an undesirable behaviour, e.g. “Stop throwing the blocks!”</td>
</tr>
<tr>
<td>Giving an order</td>
<td>Insists child carry out a task/listens to answers about a task, e.g., “Bring your dishes here now! Jamie, come here!”</td>
</tr>
<tr>
<td>Giving permission</td>
<td>Permits the child to do what he/she wants to do, e.g., “Yes, we can take the bikes out today.”</td>
</tr>
<tr>
<td>Refusing permission</td>
<td>Does not permit the child to do what he/she wants to do, e.g., “No, you may not go outside to play in the rain.”</td>
</tr>
<tr>
<td>Listening to child’s requests for permission</td>
<td>Listens to child ask for permission to do something</td>
</tr>
<tr>
<td>Problem-solving/conflict resolution</td>
<td>Assists with problems/listens to solutions to conflicts between children or children and adults, e.g., “We could take turns playing with the truck.”</td>
</tr>
</tbody>
</table>
Providing feedback (positive) | Makes comments/listens to requests for feedback indicating praise or approval of behavior, e.g., “You did a good job sitting quietly for story time.”
---|---
Providing feedback (negative) | Makes comments indicating criticism or disapproval of behavior, e.g., “You just broke a toy can’t you be more careful?”
Calls for attention | Directs the child’s attention to what teacher is saying or doing, e.g., quickly turning the lights on and off to get children to look at the teacher.
Supervision | Watching activities in a supervisory manner, e.g., looking around the room to make sure children are playing safely.
Transitional activities | Moves purposefully toward an activity, object, person or place, e.g., moving from the block area to another area where children are playing.

Reproduced from HighScope Educational Research Foundation (2007)

Table 6.10
Mean percentage of time spent by adults in Age 4 settings by activity category and social grouping

<table>
<thead>
<tr>
<th>Adult Behaviour Category</th>
<th>N</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Adult Behaviour Teaching</td>
<td>98</td>
<td>28.71 (20.7)</td>
</tr>
<tr>
<td>% AB Routine</td>
<td>98</td>
<td>23.33 (13.4)</td>
</tr>
<tr>
<td>% AB Participation</td>
<td>98</td>
<td>22.46 (20.4)</td>
</tr>
<tr>
<td>% AB Management</td>
<td>98</td>
<td>12.26 (7.5)</td>
</tr>
<tr>
<td>% AB Supervision</td>
<td>98</td>
<td>5.62 (5.7)</td>
</tr>
<tr>
<td>% AB Transition</td>
<td>98</td>
<td>3.13 (3.6)</td>
</tr>
<tr>
<td>% Adult Behaviour Listening(within Teaching category)</td>
<td>98</td>
<td>1.6 (2.3)</td>
</tr>
<tr>
<td>% Adult Behaviour Directive(within Teaching category)</td>
<td>94</td>
<td>69.2 (27.7)</td>
</tr>
</tbody>
</table>

6.4.3.1 Adult Behaviour in Age 4 settings by category.
The most commonly engaged in adult behaviour that was observed in Age 4 settings was teaching behaviour (28.7 %), which was closely followed by routine (23.3 %) and participation behaviour (22.5 %). Teaching behaviour included behaviour such as giving or receiving information or knowledge, eliciting an action or providing feedback. The next most commonly observed adult behaviour was child management, which occurred around one
tenth of the time (12.3 %). Child management behaviour included establishing/reminding children of the rules, intervening physically/verbally, calling for attention or giving/refusing permission. A small percentage of the observed adult behaviour involved nurturance (2.2 %). Nurturing behaviour was characterised by affectionate and friendly behaviour and the provision of reassurance and support. Some Adult Behaviour was further sub-categorised across other categories; listening and directive. Adult listening behaviour could be observed in the AB Teaching category and it is noteworthy that it was found to occur only 1.6 per cent of the time while an adult was teaching. Examples of teaching-related listening behaviour include; listening to questions related to teaching; listening to the child’s comments; listening to the child’s response. See Appendix 2 for a definitive list of listening behaviours. Sub-analysis of the AB Teaching category indicated that 69.2 % of all observed teaching behaviour could be classified as directive. The directive Adult Behaviour analysis is drawn from the AB Teaching category, classifications include giving information or knowledge intended to teach, giving demonstrations, and all classifications are characterised as being adult rather than child-led. Taken together, the findings on AB Teaching, AB Listening and AB Directive categories paint a picture of predominantly adult-led settings, where adults tended to ask for information relating to learned concepts, provide instructions and demonstrate for children but were less likely to listen to children or allow children to direct proceedings. They echo the findings reported in Tables 6.6 and 6.8 and indicate that early childhood education and care settings at the time of date collection when the sample were Age 4 (1994) were characterized by more adult-centred teaching, fewer child-led opportunities, lower likelihood of language activities or interaction between children and teachers in small groups or individually and more time spent in whole group situations, generally.
6.4.4 Similarities and differences between current sample at Age 4 and missing sample at Age 4

In order to determine the comparability of the current sample to the original, more representative sample, tests of differences were done between the Age 4 sample of the PhD research study (n=110) and the original Age 4 IEA Preprimary Project sample (n= 396). No between group differences were found in the case of the cognitive, language, adult behaviour, management of time, or child activities variables. The lack of difference between the Age 4 sample and the original whole IEA Primary sample in both the child scores and setting environment scores indicates that the Age 4 PhD sample matched the whole sample, therefore providing some support for the generalisability of outcomes relating to the Age 4 PhD sample.

6.5 Age 7 Cognitive, Language and Social/Emotional Development

The cognitive development measure assessed children’s knowledge and skills across five different areas; spatial relations, quantity, time, memory and problem solving. Three measures looked at children’s academic skills in the areas of mathematics, reading comprehension and science. The mathematics measures examined children’s addition, subtraction, multiplication and division skills. The science measure looked at scientific concepts such as temperature, rain cycle, estimation, measurement, planets and soil. The items on reading comprehension included picture, story and sentence comprehensions tasks. The language development measure assessed children’s expressive and receptive language skills. Social development was self-rated by children and included perceived cognitive competence, perceived maternal acceptance, perceived peer acceptance and locus of control.
The findings for each aspect of social development and the combined overall social development are presented in Table 6.11.

**Table 6.11**

*Mean cognitive, language and social development at Age 7*

<table>
<thead>
<tr>
<th>Age 7 Variable</th>
<th>Scale Min- Max</th>
<th>N</th>
<th>M          (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child Development</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cognitive and Language Development</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive scaled score</td>
<td>104</td>
<td>104</td>
<td>-.007 (0.91)</td>
</tr>
<tr>
<td>Language scaled score</td>
<td>104</td>
<td>104</td>
<td>-.311 (0.79)</td>
</tr>
<tr>
<td>Cognitive score</td>
<td>0-57</td>
<td>110</td>
<td>41.42 (6.9)</td>
</tr>
<tr>
<td>Language score</td>
<td>0-43</td>
<td>110</td>
<td>31.27 (5.5)</td>
</tr>
<tr>
<td>Maths score</td>
<td>0-35</td>
<td>108</td>
<td>18.34 (6.3)</td>
</tr>
<tr>
<td>Reading Comprehension score</td>
<td>0-37</td>
<td>108</td>
<td>27.68 (6.2)</td>
</tr>
<tr>
<td>Science Score</td>
<td>0-31</td>
<td>108</td>
<td>22.41 (5.6)</td>
</tr>
<tr>
<td><strong>Social and Emotional Development</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social scale score</td>
<td>0-48</td>
<td>106</td>
<td>39.13 (5.2)</td>
</tr>
<tr>
<td>Locus of control</td>
<td>0-13</td>
<td>106</td>
<td>7.70 (1.8)</td>
</tr>
<tr>
<td>Peer acceptance</td>
<td>0-12</td>
<td>106</td>
<td>9.98 (2.0)</td>
</tr>
<tr>
<td>Maternal acceptance</td>
<td>0-16</td>
<td>106</td>
<td>11.98 (2.5)</td>
</tr>
<tr>
<td>Cognitive Confidence</td>
<td>0-20</td>
<td>106</td>
<td>17.39 (2.1)</td>
</tr>
<tr>
<td>Academic motivation (teacher-rated)</td>
<td>8-32</td>
<td>99</td>
<td>25.15 (5.4)</td>
</tr>
<tr>
<td>Academic potential (teacher-rated)</td>
<td>4-12</td>
<td>98</td>
<td>9.6 (2.4)</td>
</tr>
</tbody>
</table>
6.5.1 Findings on Age 7 cognitive and language development.

Out of a maximum possible score of 57 points, the sample scored a mean of 41.42, which indicated a moderate to high overall level of cognitive competence in the sample on a whole. Similarly, the mean Age 7 language score of 31.23 was closer to the maximum score of 43 than to the minimum possible score of 0, therefore indicated a moderate overall outcome for language development in the sample at age seven.

6.5.2 Age 7 academic outcomes.

The mean score for Maths at Age 7 was 18.34 in the whole sample, which was in the medium range in comparison to the maximum possible score of 34. This is likely to relate to the presence of multiplication and division type problems on the scale, which were at the time of data collection, only introduced in the 1st and 2nd class curriculum in Ireland in the form of equal grouping (Hayes & Kernan, 2001). Reading comprehension ($M = 27.68$) at Age 7 was moderate to good overall and just ten points short of the maximum score. Overall, the whole sample demonstrated a relatively high level of science knowledge at Age 7, with a mean score of 22.41, which was closer to the maximum end of the scale.

6.5.3 Age 7 social development scores.

The mean overall social acceptance score of 39.13 was closer to the maximum of the scale (Max = 48) than the minimum, indicating that overall, the Age 7 sample had a moderate to high level of cognitive competence and peer- and maternal acceptance as rated by themselves. Children felt quite well accepted by peers ($M = 9.98$, Max =12), a moderate to high level of maternal acceptance ($M = 11.98$, Max =16) overall and quite a high level of confidence in their own cognitive ability ($M = 17.39$, Max = 20). The final child-rated social scale was a
measure of their locus of control, which had a maximum of 13 points, indicating a high level of internal control. On average, children scored a mid-point score of 7.7, indicating neither a strong internal or external locus of control across the whole sample.

Teacher Rating

Teachers rated the sample positively overall in terms of academic motivation and potential. The mean score of 8.75 indicated that teachers regarded the academic potential of the sample to be in the moderate to good range. Their rating of the children’s academic motivation ($M = 25.15$) was also higher than the midpoint on the scale and indicated a moderate to good level of academic motivation in the sample at Age 7. At Age 7, participants scored moderately to good on most Age 7 measures, indicating a general competence across the areas of cognitive, language, academic and social development. There was some diversity in scoring, however, which will be further explored in the modelling of Age 7 and Age 16 outcomes (see Section 6.11).

6.5.4 Similarities and differences between current sample at Age 7 and whole Age 7 sample.

In order to determine the comparability of the current sample to the original, more representative sample, tests of differences were done between the Age 7 sample of the PhD research study (n=110) and the whole Age 7 IEA Preprimary Project sample (n =374). Between group differences were found in the case of the cognitive, language, maths, reading comprehension and science variables. The PhD study Age 7 sample significantly outperformed ($p<.05$) the original Age 7 sample of 374 on the cognitive ($M = 41.42$ compared to $M =39.25$ in the original sample), language ($M =31.27$ compared to $M = 29.15$), maths ($M = 18.34$ compared to $M = 16.54$), reading comprehension ($M = 27.68$ compared to $M = 218$
$M = 25.49$) and science measures ($M = 22.41$ compared to $M = 21.05$). Interestingly, there were no differences between the PhD sample and the original sample in terms of self-rated social skills and competencies, which means that any differences between the groups that may or not emerge at later points in the research are unlikely to be accounted for by Age 7 social skills alone, if at all. Overall, this provides further confirmation that the PhD sample consists of children who performed better in educational contexts at Age 7 but also indicates that although the children performed better than the original sample on cognitive, language and academic tasks, they actually felt no different socially or emotionally from the children in the original sample, whether it be their rating of peer and maternal acceptance, locus of control and cognitive competence. Given the proliferation of research that links higher levels of social and behavioural skills to better learning and educational outcomes, social development will be considered in the modelling of Age 7 and Age 16 educational outcomes to determine if the link has been mirrored in this study.
6.6 Descriptive Statistics for the Sample at Age 16

Tables 6.12 and 6.13 describe the sample at Age 16 in terms of their gender, year of schooling, school designation and geographical location.

Table 6.12

Demographic Profile of Age 16 Sample

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>58</td>
<td>52.7</td>
</tr>
<tr>
<td>Male</td>
<td>52</td>
<td>47.3</td>
</tr>
<tr>
<td><strong>School year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior Certificate</td>
<td>28</td>
<td>25.5</td>
</tr>
<tr>
<td>Transition Year</td>
<td>19</td>
<td>12.3</td>
</tr>
<tr>
<td>5th Year</td>
<td>42</td>
<td>38.2</td>
</tr>
<tr>
<td>Leaving Certificate Applied</td>
<td>4</td>
<td>3.6</td>
</tr>
<tr>
<td>Left school</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>School status not supplied</td>
<td>10</td>
<td>9.1</td>
</tr>
<tr>
<td><strong>School Status (primary and secondary)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DD primary and DD secondary schools</td>
<td>18</td>
<td>16.4</td>
</tr>
<tr>
<td>DD primary and NDD secondary school</td>
<td>19</td>
<td>17.3</td>
</tr>
<tr>
<td>NDD primary and NDD secondary school</td>
<td>53</td>
<td>48.2</td>
</tr>
<tr>
<td>NDD primary and DD secondary</td>
<td>12</td>
<td>10.9</td>
</tr>
</tbody>
</table>

The Age 16 sample consisted of 110 participants, 52 of whom were male and 58 of whom were female. The participants ranged in age from 16 years of age and 18 years and 2 months at the time of the data collection with a mean age of 17.1 years. Although the mean age suggests that the more appropriate name for the PhD phase of the research would be Age 17 rather than Age 16, it is argued that the name is intended to reflect the age that corresponded to the sample being in the third year of secondary school (when students are usually aged 16)
and the fact that Junior Certificate results (an examination from the third year of secondary school) are used as an outcome in this research. Seventy-four of the participants attended a non-designated-disadvantaged secondary school; while 30 participants attended a designated disadvantaged school, (six participants did not specify which secondary school they were attending). The year of schooling of the participants varied, although all had completed their Junior Certificate at the time of data collection (Table 6.12), which formed the basis for the decision to request that participants share their Junior Certificate results with the researcher.

From Table 6.12, it may be seen that the majority of participants were in 5th year in secondary school in the school year just before the time of sampling, while the next largest group had been in their Junior Certificate year\(^4\). A minority had left school and 10 respondents failed to specify their school status at the time. Of those in the sample who were in a DD school or preschool at Age 4, 16.4 % were also in a DD school at Age 16 and 17.3 % had moved to a NDD school at Age 16. The NDD group was most persistent in carrying the Age 4 school designation through to Age 16, with 48.2 % of the sample attending NDD preschool or primary schools and NDD secondary schools. A small percentage of the sample made the change from a NDD primary school to a DD secondary school (10.9 %).

\(^4\) Participants were asked to “Tick the box beside the phrase that best describes what you did for the school year just gone by?”
Over 24% of the sample was based in Dublin, while 12.7% was located in Cork (Urban). This is in line with the general population distribution in Ireland at time of writing. Smaller percentages of the sample were spread across urban locations in Louth (6.4%), Waterford (6.4%), Wicklow (5.5%), and Mayo (urban) (4.7%). There was a spread of the remaining participants across a range of locations meaning, that overall, there was at least one participant from 19 of the original 23 counties from which the participants had first been drawn. The counties that were no longer represented were Cavan, Monaghan, Longford and
Offaly, which, given the centralised nature of the Irish education system, is not of critical importance for the interpretation of results.

6.7 Age 16 School and Extra-curricular Activities

To reflect the increasing autonomy of adolescents, participants were asked to provide information on their activities within and outside of school. Their frequency of engaging in these activities is described in Table 6.14 and the proportional differences between engaging and not engaging in each activity is discussed, where significant.
### Table 6.14

*Participation in school-based and extra-curricular activities at Age 16*

<table>
<thead>
<tr>
<th>Activity</th>
<th>N</th>
<th>Yes %</th>
<th>No %</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was on a sports team</td>
<td>91</td>
<td>48.4</td>
<td>51.6</td>
<td>0.10</td>
<td>.753</td>
</tr>
<tr>
<td>Was active in school organisations</td>
<td>91</td>
<td>40.6</td>
<td>59.3</td>
<td>3.18</td>
<td>.075***</td>
</tr>
<tr>
<td>Read newspaper at least 3 times a week</td>
<td>91</td>
<td>31.9</td>
<td>68.1</td>
<td>11.97</td>
<td>.001**</td>
</tr>
<tr>
<td>Talked to parents about career plans</td>
<td>91</td>
<td>81.3</td>
<td>18.7</td>
<td>35.70</td>
<td>.000***</td>
</tr>
<tr>
<td>Did Honours Maths</td>
<td>91</td>
<td>49.5</td>
<td>50.5</td>
<td>0.11</td>
<td>.917</td>
</tr>
<tr>
<td>Got an award or prize for achievement</td>
<td>91</td>
<td>51.6</td>
<td>48.4</td>
<td>0.10</td>
<td>.753</td>
</tr>
<tr>
<td>Read for pleasure</td>
<td>91</td>
<td>48.4</td>
<td>51.6</td>
<td>0.10</td>
<td>.753</td>
</tr>
<tr>
<td>Group membership outside school</td>
<td>91</td>
<td>33</td>
<td>67</td>
<td>10.56</td>
<td>.001**</td>
</tr>
<tr>
<td>Talked to teacher about career plans</td>
<td>91</td>
<td>42.9</td>
<td>57.1</td>
<td>1.86</td>
<td>.173</td>
</tr>
<tr>
<td>Had so much to drink, could not remember things</td>
<td>91</td>
<td>10.9</td>
<td>89.1</td>
<td>55.40</td>
<td>.000***</td>
</tr>
<tr>
<td>Trouble keeping up in school</td>
<td>91</td>
<td>13.2</td>
<td>86.8</td>
<td>49.33</td>
<td>.000***</td>
</tr>
<tr>
<td>Used drugs</td>
<td>91</td>
<td>9.9</td>
<td>91.1</td>
<td>59.56</td>
<td>.000***</td>
</tr>
<tr>
<td>Had attendance problems</td>
<td>91</td>
<td>6.6</td>
<td>93.4</td>
<td>68.58</td>
<td>.000***</td>
</tr>
<tr>
<td>Expelled or suspended</td>
<td>91</td>
<td>4.4</td>
<td>95.6</td>
<td>75.70</td>
<td>.000***</td>
</tr>
<tr>
<td>Had disciplinary problems in school</td>
<td>91</td>
<td>9.8</td>
<td>90.1</td>
<td>58.56</td>
<td>.000***</td>
</tr>
<tr>
<td>Extra help because of low marks</td>
<td>90</td>
<td>16.7</td>
<td>83.3</td>
<td>40.00</td>
<td>.000***</td>
</tr>
<tr>
<td>Used a computer for 10 or more hours per week</td>
<td>91</td>
<td>37.4</td>
<td>62.6</td>
<td>5.81</td>
<td>.160*</td>
</tr>
<tr>
<td>Thought seriously about dropping out of school</td>
<td>91</td>
<td>8.8</td>
<td>91.2</td>
<td>61.81</td>
<td>.000***</td>
</tr>
</tbody>
</table>

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

The sample responded to a statement asking whether they engaged in a number of different educational, school and extracurricular activities in the school year just past. There were significant differences in the proportions who answered “Yes” and “No” on a number of items. A significantly higher proportion indicated that they were not involved in school
activities (59.3 %) than those who were (40.6 %). There were no significant differences in the proportion of the sample that did Honours Maths (49.5 %) as compared to those who did not take Honours Maths (50.5 %). Similarly, the sample was roughly equally divided between those who received an award or prize for a recent achievement (51.6 %) and those who did not (48.4 %). About half of the sample reported reading for pleasure (48.4 %) and being on a school sports team (48.4 %). Although a significant minority, at least a third of the sample was active in school organisations, (40.6 %) or non-school organisations (33 %) and read a newspaper regularly (31.9 %). Small proportions of the sample reported experiencing negative activities such as having disciplinary problems in school (9.8 %), being expelled, or suspended (4.4 %), drinking excessively (10.9 %), drugs misuse (9.9 %), or having attendance problems (6.6 %). These proportions differed significantly from the majority of the sample indicating that the sample was more likely to experience and participate in positive activities than negative activities.

6.8 Social and Emotional Development at Age 16

Table 6.15 reports on the sample at Age 16 in terms of the social and emotional development as measured by the Individual Protective Factors Index, which also provides an overall measure of Resilience. It also provides a measure of the relationship between the sample and the ecological contexts of school, home and neighbourhood environment. The summed scores for their school and extracurricular activities are reported also.
Table 6.15
Mean social scores for the sample at Age 16

<table>
<thead>
<tr>
<th>Measure</th>
<th>Scale Min-Max</th>
<th>N</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPFI School</td>
<td>6-24</td>
<td>110</td>
<td>20.07 (2.98)</td>
</tr>
<tr>
<td>IPFI Family</td>
<td>6-24</td>
<td>110</td>
<td>18.63 (3.00)</td>
</tr>
<tr>
<td>IPFI Pro-social norms</td>
<td>6-24</td>
<td>110</td>
<td>19.13 (2.41)</td>
</tr>
<tr>
<td>IPFI Self concept</td>
<td>6-24</td>
<td>110</td>
<td>20.81 (17.41)</td>
</tr>
<tr>
<td>IPFI Self control</td>
<td>6-24</td>
<td>110</td>
<td>17.69 (3.03)</td>
</tr>
<tr>
<td>IPFI Positive outlook</td>
<td>6-24</td>
<td>110</td>
<td>20.02 (2.40)</td>
</tr>
<tr>
<td>IPFI Self efficacy</td>
<td>7-28</td>
<td>110</td>
<td>23.40 (2.15)</td>
</tr>
<tr>
<td>IPFI Assertiveness</td>
<td>6-24</td>
<td>110</td>
<td>18.61 (2.50)</td>
</tr>
<tr>
<td>IPFI Confidence</td>
<td>6-24</td>
<td>110</td>
<td>19.99 (2.41)</td>
</tr>
<tr>
<td>IPFI Cooperation/Contribution</td>
<td>6-24</td>
<td>110</td>
<td>19.19 (2.33)</td>
</tr>
<tr>
<td>IPFI Social Bonding Subscale</td>
<td>18-72</td>
<td>110</td>
<td>57.79 (6.45)</td>
</tr>
<tr>
<td>IPFI Personal Competence Subscale</td>
<td>25-100</td>
<td>110</td>
<td>79.85 (6.98)</td>
</tr>
<tr>
<td>IPFI Social Competence Subscale</td>
<td>18-72</td>
<td>110</td>
<td>57.85 (5.71)</td>
</tr>
<tr>
<td>IPFI Total Resilience</td>
<td>61-244</td>
<td>110</td>
<td>195.49 (16.36)</td>
</tr>
<tr>
<td>Family supervision</td>
<td>0-4</td>
<td>108</td>
<td>2.65 (1.16)</td>
</tr>
<tr>
<td>Family interaction</td>
<td>4-16</td>
<td>109</td>
<td>10.51 (2.04)</td>
</tr>
<tr>
<td>Neighbourhood environment</td>
<td>7-28</td>
<td>110</td>
<td>22.10 (2.65)</td>
</tr>
<tr>
<td>Positive Age 16 Activities</td>
<td>0-9</td>
<td>109</td>
<td>5.28 (2.46)</td>
</tr>
<tr>
<td>Negative Age 16 Activities</td>
<td>0-10</td>
<td>109</td>
<td>1.45 (1.67)</td>
</tr>
<tr>
<td>Attitude to school</td>
<td>18-72</td>
<td>109</td>
<td>53.16 (6.95)</td>
</tr>
</tbody>
</table>

Across the Individual Protective Factors Index subscales and overall resilience score, the sample tended towards the maximum scores for the sample, indicating better social and emotional skills in areas such as Confidence ($M = 19.99$), Self-efficacy($M = 23.40$), and Positive outlook ($M = 20.02$). Measures of interaction between the family and participant...
(encapsulated in the meso-system) scores tended to be slightly lower, although still nearer the maximum score for the scale as opposed to the minimum. The mean of 18.63 for the IPFI Family subscale indicated that the sample overall had a positive relationship with their family, and included items such as relating to their parents positively and feeling supported by them as well as an overall sense of belonging to their family. The Family Interaction and Family Supervision subscales measured the degree to which the participants had regular and positive family interactions and the degree to which their parents had, and maintained, expectations for their behaviour and schoolwork. The mean of 10.65 for Family Interaction indicates that the sample felt a moderately positive level of interactions with their family. It is interesting to note that the score for Family Supervision ($M = 2.65$), was far closer to the maximum of the scale, indicating that the sample were more likely to feel that their family had clear rules and expectations for their behaviour rather than for them to feel that they had positive relationships with their family. The microsystem of the participants’ neighbourhood was measured by the mean neighbourhood environment score ($M = 22.10$), indicating that the sample tended to feel a positive sense in relation to their neighbourhood environment, overall. The microsystem of the school environment was captured through the attitude to school measure ($M = 53.16$) and the sample tended to have a moderate to good attitude to school, overall. Their level of engagement with the school environment and involvement with their family and communities was measured by proxy using summed scores for the activity items in Table 6.15. The sample were engaged in an average of 5.26 school, home and extra-curricular activities (as itemised in Table 6.15) that could be classified as positive and an average of 1.45 activities that could be classified as negative activities. This indicates a higher level of participation and engagement in positive Age 16 activities and a lower level of participation in risky behaviors or fewer negative experiences. Overall, the Age 16 sample has
a high sense of internal resilience and social skills, positive levels of participation and engagement within and outside of school and generally positive relationships with their families, albeit characterised by a high level of parental supervision, particularly in relation to school.

6.9 Junior Certificate Outcomes for the Age 16 Sample

For the first three years of secondary school, students must study subjects in preparation for the Junior Certificate examination, the State examination taken at the end of the third year of Junior Cycle, when students are 15 or 16 years of age. Subjects are normally studied at either Higher or Ordinary Level, although three subjects, Irish, English and Mathematics, can be studied at Foundation Level. The results for the current sample are presented in Tables 5.16 to 5.21 for the most commonly taken compulsory Junior Certificate subjects; English; Maths; Irish; Science; History and Geography. The tables include the most recently available national average scores on the same test and the results of t-tests between sample and national results are presented to provide a point of comparison between the current sample and the national average.
Table 6.16
Comparison of Junior Cert. English Grades between the Sample and National Sample

<table>
<thead>
<tr>
<th>English Grade</th>
<th>Sample</th>
<th>National Sample (2014)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>A, Higher Level</td>
<td>16</td>
<td>14.7</td>
<td>4,334</td>
<td>7.4</td>
</tr>
<tr>
<td>B, Higher Level</td>
<td>30</td>
<td>27.5</td>
<td>11932</td>
<td>20.4</td>
</tr>
<tr>
<td>C, Higher Level</td>
<td>24</td>
<td>22.0</td>
<td>17473</td>
<td>29.8</td>
</tr>
<tr>
<td>D, Higher Level</td>
<td>14</td>
<td>12.8</td>
<td>9921</td>
<td>16.9</td>
</tr>
<tr>
<td>A, Ordinary Level</td>
<td>1</td>
<td>0.9</td>
<td>849</td>
<td>1.4</td>
</tr>
<tr>
<td>B, Ordinary Level</td>
<td>6</td>
<td>5.5</td>
<td>4206</td>
<td>7.2</td>
</tr>
<tr>
<td>C, Ordinary Level</td>
<td>15</td>
<td>13.8</td>
<td>6002</td>
<td>10.2</td>
</tr>
<tr>
<td>D, Ordinary Level</td>
<td>2</td>
<td>1.8</td>
<td>2632</td>
<td>4.5</td>
</tr>
<tr>
<td>Fail</td>
<td>1</td>
<td>0.9</td>
<td>1219</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>109</td>
<td>100.0</td>
<td>58571</td>
<td>100</td>
</tr>
</tbody>
</table>

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

The most common grade obtained in English in the whole sample was a Higher Level B, closely followed by a Higher Level C. However, the next most common grades were Ordinary Level C and D, indicating two separate attainment groups. When compared to the most recently available national statistics (State Examinations Commission, 2014) across the same grades on the Junior Certificate, there was a similar pattern observed with the most common grades within Higher and Ordinary levels being B and C. The percentage of those who received a Higher Level A (14.7 %) in the whole research sample was significantly higher compared to the national sample (7.4 %), t(58,571) = 2.91,  p<.01. There was no statistically significant difference between the proportions that received a higher level B grade in the research sample. Moreover, this trend was mirrored for each of the remaining grades, indicating a broad similarity between the current sample and the national sample, with
the exception of the significantly better performance of the sample on higher level English A grade.

Table 6.17

Comparison of Junior Cert. Irish Grades between the Sample and National Sample

<table>
<thead>
<tr>
<th>Irish Grade</th>
<th>Sample</th>
<th>National Sample (2014)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>A, Higher Level</td>
<td>11</td>
<td>10.5</td>
<td>3325</td>
<td>6.5</td>
</tr>
<tr>
<td>B, Higher Level</td>
<td>22</td>
<td>21.0</td>
<td>9574</td>
<td>18.5</td>
</tr>
<tr>
<td>C, Higher Level</td>
<td>15</td>
<td>14.3</td>
<td>10,462</td>
<td>20.3</td>
</tr>
<tr>
<td>D, Higher Level</td>
<td>6</td>
<td>5.7</td>
<td>4643</td>
<td>8.9</td>
</tr>
<tr>
<td>A, Ordinary Level</td>
<td>5</td>
<td>4.8</td>
<td>823</td>
<td>1.6</td>
</tr>
<tr>
<td>B, Ordinary Level</td>
<td>23</td>
<td>21.9</td>
<td>7289</td>
<td>14.1</td>
</tr>
<tr>
<td>C, Ordinary Level</td>
<td>12</td>
<td>11.4</td>
<td>9,086</td>
<td>17.6</td>
</tr>
<tr>
<td>D, Ordinary Level</td>
<td>2</td>
<td>8.6</td>
<td>4,520</td>
<td>8.8</td>
</tr>
<tr>
<td>Fail</td>
<td>2</td>
<td>1.9</td>
<td>1879</td>
<td>3.6</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>100.0</td>
<td>51,601</td>
<td>100</td>
</tr>
</tbody>
</table>

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

At Higher Level and Ordinary level in the whole sample, the most common grades obtained in Junior Cert. Irish were B and C, which compares similarly to the national statistics at both levels. The research sample had a significantly higher percentage of students who received an Ordinary Level A grade in Irish (4.8 %) compared to the national sample (1.9 %), $t(51,601) = 2.61$, $p<.05$. The research sample also had a significantly higher percentage of students who received an Ordinary Level B grade in Irish (21.9 %) compared to the national sample (14.1 %), $t(51,601) = 2.29$, $p<.05$. Overall, there were some differences between the research and national sample in terms of Irish Junior Cert Ordinary level grades but the samples were well-matched on the higher attainment grades of Higher Level A, B and C.
Table 6.18
Comparison of Junior Cert. Maths Grades between the Sample and National Sample

<table>
<thead>
<tr>
<th>Maths Grade</th>
<th>Sample</th>
<th>National Sample (2014)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, Higher Level</td>
<td>12</td>
<td>3,428</td>
<td>2.16</td>
<td>.03*</td>
</tr>
<tr>
<td>B, Higher Level</td>
<td>20</td>
<td>9,100</td>
<td>0.64</td>
<td>.51</td>
</tr>
<tr>
<td>C, Higher Level</td>
<td>15</td>
<td>10,861</td>
<td>1.44</td>
<td>.14</td>
</tr>
<tr>
<td>D, Higher Level</td>
<td>15</td>
<td>7,209</td>
<td>0.31</td>
<td>.76</td>
</tr>
<tr>
<td>A, Ordinary Level</td>
<td>4</td>
<td>1,514</td>
<td>0.64</td>
<td>.52</td>
</tr>
<tr>
<td>B, Ordinary Level</td>
<td>19</td>
<td>7,983</td>
<td>0.98</td>
<td>.32</td>
</tr>
<tr>
<td>C, Ordinary Level</td>
<td>12</td>
<td>8,489</td>
<td>1.16</td>
<td>.24</td>
</tr>
<tr>
<td>D, Ordinary Level</td>
<td>4</td>
<td>4,954</td>
<td>1.87</td>
<td>.06</td>
</tr>
<tr>
<td>Fail</td>
<td>7</td>
<td>2,954</td>
<td>1.01</td>
<td>.31</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>108</td>
<td>56,084</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

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

In the whole sample for Maths, the most common grades attained at Higher Level was a B (18.5 %), which was followed by both D (17.6 %) and C (13.9 %). There were one statistically significant proportional differences between the current sample and the 2014 national sample on the Junior Certificate Higher Level A Grade only, t(56,084) = 2.16, p < .05. This indicates that the current sample compared similarly to the most recent national sample in terms of their Maths scores on all bar one grade.
The most common grade obtained in the whole sample for Junior Cert Science was Higher Level B (29.9 %), which was followed in equal measure by Higher Level A (15.5 %) and Higher Level C (15.5 %). The research sample had a significantly higher percentage of students who received an Higher Level A grade in Science (15.5 %) compared to the national sample (8.8 %), \( t(54, 753) = 2.36, \ p<.05 \). A significantly higher percentage of students from the current sample (7.2 %) failed their Junior Cert Science exam compared to the national sample (2.3 %), \( t(54,753) = 3.20, \ p<.001 \). This comparatively high failure rate is noteworthy in the current sample and is the one of the highest failure rate across any of the subjects examined here. Overall, the research sample tended to be better than the national sample at Higher Level (significantly higher percentage of A grades and significantly fewer C grades) but also had a significantly higher percentage of students who failed science compared to the national sample.
Table 6.20
*Comparison of Junior Cert. Geography Grades for the Research Sample to National Sample*

<table>
<thead>
<tr>
<th>Geography Grade</th>
<th>Sample N</th>
<th>Sample %</th>
<th>National Sample N</th>
<th>National Sample %</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, Higher Level</td>
<td>18</td>
<td>17.5</td>
<td>4,031</td>
<td>6.9</td>
<td>4.19</td>
<td>.00 ***</td>
</tr>
<tr>
<td>B, Higher Level</td>
<td>22</td>
<td>21.4</td>
<td>14,720</td>
<td>25.2</td>
<td>0.88</td>
<td>.37</td>
</tr>
<tr>
<td>C, Higher Level</td>
<td>34</td>
<td>33.0</td>
<td>15,095</td>
<td>25.8</td>
<td>1.66</td>
<td>.09</td>
</tr>
<tr>
<td>D, Higher Level</td>
<td>8</td>
<td>7.8</td>
<td>10,782</td>
<td>18.5</td>
<td>2.70</td>
<td>.01 *</td>
</tr>
<tr>
<td>A, Ordinary Level</td>
<td>4</td>
<td>3.9</td>
<td>756</td>
<td>1.3</td>
<td>2.32</td>
<td>.02 *</td>
</tr>
<tr>
<td>B, Ordinary Level</td>
<td>5</td>
<td>4.9</td>
<td>3,237</td>
<td>5.5</td>
<td>0.26</td>
<td>.78</td>
</tr>
<tr>
<td>C, Ordinary Level</td>
<td>8</td>
<td>7.8</td>
<td>2,970</td>
<td>5.1</td>
<td>1.24</td>
<td>.21</td>
</tr>
<tr>
<td>D, Ordinary Level</td>
<td>2</td>
<td>1.9</td>
<td>1,547</td>
<td>2.6</td>
<td>0.45</td>
<td>.66</td>
</tr>
<tr>
<td>Fail</td>
<td>2</td>
<td>1.9</td>
<td>2,640</td>
<td>4.5</td>
<td>1.27</td>
<td>.21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>103</strong></td>
<td><strong>100</strong></td>
<td><strong>58,418</strong></td>
<td><strong>100</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

The most common grade achieved in the sample for Junior Certificate Geography was Higher Level C (33 %), followed by Higher Level B (21.4 %) and then Higher Level A (17.5 %). There were some statistically significant differences between the current sample and the research sample in terms of the percentage of students receiving each Junior Cert Geography grades. The research sample has a significantly higher percentage of students who received a Higher Level A grade in Geography (17.5 %) compared to the national sample (6.9 %), \(t(58,418) = 4.19, p<.001\). The national sample had a significantly higher percentage of students who received a Higher Level D grade in Geography (18.5 %) compared to the research sample (7.8 %), \(t(58,418) = 2.70, p<.05\). Therefore the research sample performed better overall than the national sample in terms of Geography outcomes given that they were significantly more likely to obtain the best possible grade and significantly less likely to receive a Higher Level D grade.
Table 6.21
Comparison of Junior Cert. History Grades for the Research Sample to National Sample

<table>
<thead>
<tr>
<th>History Grade</th>
<th>Sample</th>
<th>National Sample (2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>A, Higher Level</td>
<td>24</td>
<td>23.8</td>
</tr>
<tr>
<td>B, Higher Level</td>
<td>22</td>
<td>21.8</td>
</tr>
<tr>
<td>C, Higher Level</td>
<td>19</td>
<td>18.8</td>
</tr>
<tr>
<td>D, Higher Level</td>
<td>9</td>
<td>8.9</td>
</tr>
<tr>
<td>A, Ordinary Level</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>B, Ordinary Level</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>C, Ordinary Level</td>
<td>13</td>
<td>12.8</td>
</tr>
<tr>
<td>D, Ordinary Level</td>
<td>5</td>
<td>4.9</td>
</tr>
<tr>
<td>Fail</td>
<td>6</td>
<td>5.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>101</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

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

The sample performed well overall on Junior Certificate History with the most commonly achieved grades being Higher Level A (23.3 %), B (21.8 %) and C (18.8 %). The research sample has a significantly higher percentage of students who received a Higher Level A grade in History (23.8 %) compared to the national sample (11.5 %), $t(54,731) = 3.86, p < .01$. It is interesting to note that the research sample and the national sample had more than a five percent failure rate, however, which tends to be lower for many other Junior Certificate subjects. Overall, the research sample was quite well-matched to the national sample, differing only in favour of the research sample in terms of percentage of Higher Level A grades.
When asked about their level of educational aspiration, the sample were most likely to aspire to holding a Masters (Level 9) qualification (27.3 %), which was followed by a degree (22.7 %), certificate/diploma (21.8 %) and then by doctorate (12.7 %). Twelve percent of the sample aspired to a leaving certificate (secondary school level) of education and one participant did not aspire to anything higher than their current qualification.

**Summary**

The findings on Junior Certificate outcomes for the whole sample indicate that the research sample was well matched to the most recently available data on national outcomes, in the main. Where differences occurred, these differences tended to be in favour of the research sample, with higher percentages of the sample doing better in the top grades in English, History, and Science than in the national comparative sample. This finding is in line with the earlier analysis on the sample as it compared to the missing sample, which indicated a trend towards higher attainment in the participating sample at Ages 4 and 7 when compared to those who did not participate. Moreover, it is interesting to note that the research sample had
a comparatively high (albeit non-statistically significant) failure rate in Maths and Science (6.5% and 7.2%) when compared to the national sample. The importance of these subjects for STEM careers will be discussed and the possible reasons for such a trend explored in the next chapter. The better than average Junior Certificate grades in some subjects echo the finding of better Age 4 and Age 7 child and family demographics outlined in that section and indicates that the current sample, as a whole, may reflect a better performing academic group, precisely because of the differences that existed between them and study-leavers i.e. different family socioeconomic backgrounds and developmental status At Age 4 and Age 7. However, it is important to note, that broadly, the Junior Certificate outcomes of the sample are not statistically significantly different from the national comparative data on many subjects and across many grade levels, indicating that the findings of the research may be more nationally representative than originally thought, sample bias notwithstanding.

6.10 Modeling of Age 7 Outcomes: Predictors of Age 7 Cognitive, Language and Social Outcomes

The following Age 7 outcomes were modeled as a function of Age 4 predictors using linear multiple regression analysis for the purposes of the PhD research;

- Age 7 Cognitive development
- Age 7 Language development
- Age 7 Reading score
- Age 7 Maths score
- Age 7 Science score

The predictors were selected because of the design of the study (Age 4 scores), evidence of their association with child development in either this study or in the research literature (i.e.
sex, Management of Time Academic, Management of Time Whole Group, Adult Behaviour Teaching, maternal education). The multiple regression analyses were conducted to investigate what aspects of children’s development, early education experiences and family background predicted their Age 7 outcomes as these outcome measures were continuous. As a stepwise approach is considered best for exploratory purposes and as it is suited to model building, this approach was utilised in the construction of multiple regression models (Norusis, 1990).

Table 6.23
Linear Regression Model Predicting Age 7 Language Outcomes

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.00</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>Age 4 cognitive scale score</td>
<td>0.34</td>
<td>0.07</td>
<td>.43***</td>
</tr>
<tr>
<td>MOT Academic</td>
<td>0.01</td>
<td>0.00</td>
<td>.29*</td>
</tr>
<tr>
<td>MOT Whole Group</td>
<td>-0.01</td>
<td>0.00</td>
<td>-.28**</td>
</tr>
<tr>
<td>AB Teaching</td>
<td>-0.01</td>
<td>0.00</td>
<td>-.22*</td>
</tr>
</tbody>
</table>

Note: $R^2 = 0.33$. *$p < .05$ **$p < .01$ ***$p < .001$

$B$ = regression co-efficient, $SE B$ = standard error of the regression co-efficient, $β$ = standardized regression co-efficient

Three predictors predicted the Age 7 language score. In the final model, the standardised beta value of .43 indicated that as Age 4 language scores increased by one standard deviation, Age 7 language scores increased by .43 standard deviations. The value of the standardised beta for the Management of Time Academic variable indicated that that variable increased by one standard deviation ($SD = 18.39$), there was a corresponding .29 standard deviations ($SD = 0.74$) increase in the Age 7 standardised language score. Academic activities in the Observations subsystem are classified as including reading, writing, maths, physical and social science (See Table 6.7 for more information). As the label suggests, academic activities are commonly found in typical school curricula and usually relate to teachable concepts and
expected standards for children’s knowledge base. An 18.39 point rise in the amount of time that was proposed for academic activity was associated with a statistically significant (at the 5 \% significance level) 0.25 increase in the Age 7 language standardised score.

It was found that the amount of time that educators proposed was spent on Whole Group activities, negatively predicted Age 7 standardised language scores. Whole group activities were those in which all children in the room participated at the same time and without being divided into smaller groups, working alone or one-to-one with an educator. Where teachers proposed that more time was spent in whole group activities at Age 4, significantly lower scores were found on the Age 7 standardised language score. When whole group activity increased by one standard deviation (SD = 21.02), there was a significantly related 0.21 point decrease on the Age 7 standardised language score. This suggests a link between structure of the learning environment and longer term language outcomes, which implies for the current sample, that children may have fared worse in terms of their language development because of a lack of one-to-one interaction with each other/and or with their teacher. Finally, the Adult Behaviour Teaching variable also negatively predicted the Age 7 language scores in the sample. Teaching behaviour included behaviour such as giving or receiving information or knowledge, eliciting an action or providing feedback (see Table 6.9 for more information). When Teaching behaviour increased by one standard deviation (SD = 20.62), there was a corresponding 0.16 point reduction in the Age 7 standardised language score. This implies that the more time a teacher spent in behaviour that could be classified as teaching behaviour rather than participatory, nurturing etc., the worse children did in terms of their language development at Age 7.
This model suggests that for the current sample, children’s language development at Age 7 is based on their Age 4 cognitive development as well as the types of activities that teachers planned for them in their Age 4 classrooms. It also seems, however, that the setting and group context in which activities occurred for four years olds may also have been important; children had significantly lower language scores at Age 7 if they were taught more often in whole rather than partial group or one-to-one learning situations. Moreover, the teaching style of their teacher/educator was of almost equal importance, such that a “traditional” teaching style predominated by eliciting information and the giving and receiving of answers, negatively predicted language development. These findings have been mirrored in international studies and will be discussed in greater detail in Chapter 7.

Table 6.24
Linear Regression Model Predicting Age 7 Cognitive Outcomes

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>49.04</td>
<td>2.60</td>
<td></td>
</tr>
<tr>
<td>Age 4 cognitive scale score</td>
<td>2.36</td>
<td>0.69</td>
<td>.33**</td>
</tr>
<tr>
<td>MOT Academic</td>
<td>0.09</td>
<td>0.04</td>
<td>.26*</td>
</tr>
<tr>
<td>MOT Whole Group</td>
<td>-0.97</td>
<td>0.03</td>
<td>-.32**</td>
</tr>
<tr>
<td>AB Teaching</td>
<td>-0.08</td>
<td>0.03</td>
<td>-.24*</td>
</tr>
</tbody>
</table>

Note: $R^2 = 0.25$. * $p < .05$ ** $p < .01$ *** $p < .001$

In the final model, the standardised beta value of .33 indicates that as the Age 4 cognitive scale score increased by one standard deviation, there was a .33 standard deviations ($SD = 6.45$) increase on the Age 7 cognitive raw score ($F(1, 88) = 7.13, p < .001$). Therefore, Age 4 cognitive scores positively predicted Age 7 cognitive outcomes in the sample and one standard deviation rise on the Age 4 cognitive standard score was related to a 2.13 rise on the Age 7 cognitive raw score. The value of the standardised beta for the Management of Time
Academic variable indicated that that variable increased by one standard deviation ($SD = 18.70$), there was a corresponding .26 standard deviations increase in the $Age 7$ cognitive score. Academic activities in the Observations subsystem are classified as including reading, writing, maths, physical and social science (See Table 6.7 for more information). As the label suggests, academic activities are commonly to be found in typical school curricula and usually relate to teachable concepts and expected standards for children’s knowledge base. An 18.7 point rise in the amount of time that was proposed for academic activity was associated with a statistically significant (at the 1 % significance level) increase in the $Age 7$ cognitive score of 1.68 points. It was found that the amount of time that educators proposed was spent on whole group activities, negatively predicted $Age 7$ cognitive scores. Where teachers proposed that more time was spent in whole group activities at $Age 4$, significantly lower scores were found on the cognitive score at $Age 7$. When whole group activity increased by one standard deviation ($SD = 21.23$), there was a significantly related 2.10 point decrease on the $Age 7$ cognitive score. This suggests a link between structure of the learning environment and longer term cognitive outcomes, which implies that these children may have fared worse cognitively because of a lack of one-to-one interaction with each other/and or with their teacher. Finally, the Adult Behaviour Teaching variable also negatively predicted the $Age 7$ cognitive scores in the sample. Teaching behaviour included behaviour such as giving or receiving information or knowledge, eliciting an action or providing feedback (see Table 6.9 for more information). When Teaching behaviour increased by one standard deviation ($SD = 20.84$), there was a corresponding 1.55 point reduction in the $Age 7$ cognitive score. This implies that the more time a teacher spent in behaviour that could be classified as teaching behaviour; the worse children did in terms of cognitive outcomes at $Age 7$. This model, although accounting for a modest amount of variance, creates a picture, in which,
children’s cognitive development at Age 7 is a function of their Age 4 cognitive development as well as the types of activities that teachers planned for them in their Age 4 classrooms. It also seems, however, that the setting and group context in which activities occurred for four years olds may also have been important; children were likely to do worse cognitively at Age 7 if they were taught more often in whole groups and if their educator had a predominantly traditional teaching style rather than a more participatory or nurturing teacher style. Therefore, while doing appropriate academic activities made a positive difference to their cognitive development, the group structure in which such activities were done and the style of their educators mattered almost as much. These findings have been mirrored in international studies and will be discussed in greater detail in Chapter 7.

Table 6.25

Linear Regression Model Predicting Age 7 Maths Outcomes

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>19.14</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Age 4 cognitive scale score</td>
<td>3.41</td>
<td>0.61</td>
<td>.51 ***</td>
</tr>
<tr>
<td>Sex</td>
<td>-2.38</td>
<td>1.10</td>
<td>-.20 *</td>
</tr>
</tbody>
</table>

Note: R² = 0.29. * p < .05 ** p < .01 *** p < .001

B = regression co-efficient, SE B = standard error of the regression co-efficient, β = standardized regression co-efficient

In the final model, the standardised beta value of .51 indicates that as the Age 4 cognitive scale score increased by one standard deviation (SD = 0.90), there was a .51 standard deviations (SD = 6.04) increase on the Age 7 Maths score (F (1, 88) = 17.54, p<.001). Therefore, a 0.90 increase in cognitive scores was associated with a 3.08 increase in Age 7 Maths score in the sample. Sex was dummy coded as 0 for male and 1 for a female. As the beta value has a negative value (B = -2.38), the overall maths score decreases as the sex variable changed from male to female. This means that boys performed significantly better
than girls on Age 7 maths scores. This model indicates that both Age 4 cognitive development and being a boy significantly predicted better Age 7 Maths outcomes in the sample.

Table 6.26
Linear Regression Model Predicting Age 7 Reading Competence

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>20.11</td>
<td>2.31</td>
<td></td>
</tr>
<tr>
<td>Maternal education (in years)</td>
<td>0.48</td>
<td>0.17</td>
<td>.25**</td>
</tr>
<tr>
<td>Age 4 cognitive scale score</td>
<td>1.53</td>
<td>0.74</td>
<td>.22*</td>
</tr>
<tr>
<td>Age 4 language scale score</td>
<td>2.68</td>
<td>0.91</td>
<td>.32**</td>
</tr>
</tbody>
</table>

Note: $R^2 = 0.35$, * $p < .05$ ** $p < .01$ *** $p < .001$

$B =$ regression co-efficient, $SE B =$ standard error of the regression co-efficient, $\beta =$ standardized regression co-efficient

Maternal education (when child was four), and Age 4 cognitive and language development all positively predicted Age 7 Reading Comprehension. In the case of maternal education, a 3.29 year rise (one standard deviation) increase was equivalent to a 0.25 standard deviation increase ($SD = 6.23$) on the reading comprehension scale. Similarly, a .90 (one standard deviation) increase in the Age 4 cognitive scale predicted a 0.22 standard deviation ($SD = 6.23$) increase on the Age 7 Reading Comprehension scale, which was equivalent to 1.37 point increase in reading comprehension. A one standard deviation increase in the Age 4 language scale score ($SD = 0.73$) predicted a 0.32 standard deviation increase in the reading comprehension score. This was equivalent to an increase in reading comprehension of 1.99.

This finding indicates that in the current sample, Age 7 reading comprehension was predicted by family and child factors, rather than Age 4 school or preschool factors. Please see Chapter 7 for further discussion.
Table 6.27
Linear Regression Model Predicting Age 7 Science Ability

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>20.08</td>
<td>2.13</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>-3.54</td>
<td>0.96</td>
<td>-.33***</td>
</tr>
<tr>
<td>Maternal education (in years)</td>
<td>0.31</td>
<td>0.15</td>
<td>.19*</td>
</tr>
<tr>
<td>Age 4 cognitive scale score</td>
<td>2.48</td>
<td>0.54</td>
<td>.41***</td>
</tr>
</tbody>
</table>

Note: $R^2 = 0.34$, * $p < .05$ ** $p < .01$ *** $p < .001$

$B = \text{regression co-efficient, } SE\ B = \text{standard error of the regression co-efficient, } \beta = \text{standardized regression co-efficient}$

*Age* 7 Science Ability was positively predicted by sex of the participant, years of maternal education when child was four and by *Age 4* child cognitive score. Sex was dummy coded as 0 for male and 1 for a female. As the beta value has a negative value ($B = -3.54$), the Science Ability score decreased as the sex variable changed from male to female. This means that boys performed significantly better than girls on the *Age 7* Science ability scale. In the case of maternal education, a 3.29 year rise (one standard deviation) increase was equivalent to a 0.19 standard deviation ($SD = 5.44$) increase on the Science Ability scale, which was equivalent to an increase of 1.03 points on the scale. A one standard deviation increase in the *Age 4* cognitive scale score ($SD = 0.90$) predicted a 0.41 standard deviation increase in the science ability score. This was equivalent to an increase in reading comprehension of 2.23 points on the science ability scale. This model indicates that *Age 7* science ability was significantly predicted by being a boy, having a better educated mother (at *Age 4*) and by the child’s own cognitive ability at *Age 4*.

**Summary**

The models indicated that for the PhD sample, *Age 4* characteristics, experiences and activities did predict *Age 7* outcomes. Maternal education was an important predictor of some outcomes and the types of activities planned by teachers in early years settings, their
interaction with the participants and the grouping structure within which learning took place at Age 4 predicted cognitive and language outcomes at Age 7.

6.11 Linear Regression Models Predicting Age 16 Social Outcomes

Consistent differences emerged in exploratory analyses between those who achieved high Junior Certificate marks and those who did not. These differences relate to Age 4 and Age 7 cognitive and language development, family background, academic potential at Age 7, attitude to school at Age 16 and positive activities at Age 16. Without exception, these differences favoured the high attainment group, with significantly higher scores in evidence on each of the above variables for at least some of the six core Junior Certificate subjects. Across all six subjects covered, five variables emerged consistently for significant between-group differences and these variables have long been identified in the research literature as being predictive of educational outcomes. These variables were;

- Age 7 language development;
- Age 7 cognitive development;
- Mother’s education level in years (when participant was aged four);
- Attitude to school on both IPFI and other scale (when participant was aged 16);
- Number of positive Age 16 activities.

The five variables listed above were therefore included in final logistic regression modelling of individual subject results and added to them were the variables that differed statistically significantly between the high attainment and low attainment groups for each given Junior Certificate subject.
These additional *Age 16* outcomes were modeled as a function of *Age 4*, *7* and *16* predictors using linear multiple regression analysis or binary logistic regression analysis as appropriate;

- *Age 16* Attitude to School
- *Age 16* Number of Positive Activities
- *Age 16* individual Junior Certificate outcomes

The multiple linear regression analyses were conducted to investigate what aspects of children’s development, experiences and family background predicted their *Age 16* school attitude and resilience outcomes as these outcome measures were continuous. Given that academic results on the Junior Certificate examinations were categorised according to grades (A to Fail) and level (Higher and Ordinary), logistic regression was used to construct models predicting the outcomes. As a stepwise approach is considered best for exploratory purposes and as it is suited to model building, this approach was utilised in the construction of both multiple and logistic regression models (Norusis, 1990).

### Table 6.28
*Linear Regression Model Predicting Age 16 Attitude to School*

<table>
<thead>
<tr>
<th></th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>10.92</td>
<td>4.88</td>
<td></td>
</tr>
<tr>
<td>Maternal Education</td>
<td>0.34</td>
<td>0.16</td>
<td>.16*</td>
</tr>
<tr>
<td>IPFI Self Control Scale</td>
<td>1.01</td>
<td>0.18</td>
<td>.45***</td>
</tr>
<tr>
<td>IPFI Assertiveness Scale</td>
<td>1.08</td>
<td>0.21</td>
<td>.39***</td>
</tr>
</tbody>
</table>

Note: $R^2 = 0.45$. * $p < .05$ ** $p < .01$ *** $p < .001$

$B$ = regression co-efficient, $SE B$ = standard error of the regression co-efficient, $\beta$ = standardized regression co-efficient

---

*5 This was a binary variable grouped as High attainment which represented a Higher Level A or B and Low Attainment which represented any grade lower than that.*
In the final model the standardised beta value of .16 indicates that as years of maternal education increased by one standard deviation ($SD = 3.32$ years), there was a .16 standard deviations ($SD = 7.15$) increase on the attitude to school scale ($F (1, 103) = 26.96, p<.001$). This means that when maternal education increased by 3.32 years, there was a 1.1 point increase on the attitude to school subscale. This difference approached significance at the .05 significance level and reflected a trend whereby higher levels of maternal education when a child was aged four, predicted a more positive attitude to school when the child was sixteen. The value of the standardised beta for the IPFI Self Control subscale indicated that as self-control increased by one standard deviations ($SD = 3.23$), there was a corresponding .45 standard deviations ($SD = 7.15$) increase on the attitude to school scale. Therefore, a 3.23 point rise on the self-control subscale was associated with a statistically significant (at the 1% significance level) 3.21 point rise on the attitude to school scale. Finally, in relation to the IPFI Assertiveness subscale, a one standard deviation ($SD = 2.58$) increase in assertiveness was significantly related to a .39 standard deviation increase on the attitude to school scale. When assertiveness increased by 2.58 points, there was a corresponding 2.8 point increase on the school attitude scale, which was significant at the one per cent significance level. The final multiple regression model explains 45% of the variance in the model and indicates that Age 16 social development measures such as higher levels of self-control and assertiveness significantly predicted better attitude to school for this subsample of Irish young people.
Table 6.29
Linear Regression Model Predicting Age 16 Positive Activities

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-3.38</td>
<td>1.92</td>
<td></td>
</tr>
<tr>
<td>Age 7 Language Score</td>
<td>0.71</td>
<td>0.32</td>
<td>.22*</td>
</tr>
<tr>
<td>Age 7 Academic Motivation</td>
<td>0.13</td>
<td>0.05</td>
<td>.28*</td>
</tr>
<tr>
<td>Age 16 School Attitude</td>
<td>0.10</td>
<td>0.03</td>
<td>.29**</td>
</tr>
</tbody>
</table>

R² = .30, *p < .05 **p < .01
B = regression co-efficient, SE B = standard error of the regression co-efficient, β = standardized regression co-efficient

All three predictors positively predicted the number of positive activities at Age 16. In the final model, the standardised beta value of .22 indicated that as Age 7 language scores increased by one standard deviation (SD = 0.75), there was a .22 standard deviations (SD = 2.44) increase in the number of Age 16 positive activities. This means that as Age 7 language scores increased by 0.75 points, there was a 0.54 point increase in the number of positive Age 16 activities. This difference was significant at the 5% significance level and indicated that higher Age 7 language scores significantly and positively predicted the number of positive activities at Age 16. The value of the standardised beta for the Age 7 Academic Motivation scale indicated that as teacher-rated academic motivation increased by one standard deviation (SD = 5.56), there was a corresponding .28 standard deviations (SD = 2.44) increase in the number of Age 16 positive activities. Therefore, a 5.56 point rise on the Academic Motivation scale was associated with a statistically significant (at the 5% significance level) 0.68 rise in the number of positive activities and events at Age 16. A one standard deviation (SD = 7.17) increase on the Attitude to School scale was significantly related to a .29 standard deviation increase in the number of positive activities events at Age 16. When attitude to school increased by 7.17 points, there was a corresponding 0.71 point increase in the number of positive Age 16 activities, which was significant at the one per cent significance level. The final outcome model indicates that some Age 7 variables have persisted through to Age 16 in
by predicting the frequency of engaging in *Age 16* positive activities. Both *Age 7* language development and *Age 7* academic motivation positively and significantly predicted frequency of engaging in positive activities at *Age 16*. In addition, a positive attitude to school at *Age 16* positively and significantly predicted frequency of engaging in positive activities at the same age.

### 6.12 Logistic Regression Models Predicting Junior Certificate Outcomes

As Junior Certificate outcomes scores are not continuous, it was not possible to use linear multiple regression techniques to create outcome models as had been possible with other *Age 16* outcome variables. Therefore, for each Junior Certificate subject of interest, binary logistic regression was used to examine predictors of Junior Certificate success. Junior Certificate grades were collapsed into two categories; one representing the uppermost two grades attainable in the Junior Certificate examination (i.e. a Higher Level A or B); and one presenting all other lesser grades. The first category was entitled “High Attainment” to reflect that all members of this group had achieved superior grades and the latter was entitled “Lower Attainment” to reflect that members of this group had achieved grades lower than a Higher Level A or B. This categorisation was used based on the focus of the research i.e. the identification of predictors of academic success within an Irish context. The high attainment category is a proxy for academic success in a given subject while all those in the lower attainment category received grades that were average, at best and very poor, at worst.
Table 6.30
Binary Logistic Regression Model Predicting High Attainment in Maths

<table>
<thead>
<tr>
<th>Included</th>
<th>B (SE)</th>
<th>95% CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Constant</td>
<td>-14.49 (3.34)</td>
<td>1.14</td>
</tr>
<tr>
<td>Maternal education (years)</td>
<td>0.35** (0.11)</td>
<td>1.05</td>
</tr>
<tr>
<td>Age 7 Maths score</td>
<td>0.15** (0.05)</td>
<td>1.04</td>
</tr>
<tr>
<td>IPFI school subscale</td>
<td>0.27* (0.12)</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Note R² = .29 (Hosmer and Lemeshow), .28 (Cox & Snell), .41(Nagelkerke). Model χ²(1) = 31.80, p < .001.

A test of the model with all predictors against a constant-only model was statistically significant, χ²(1) = 31.80, N = 101, p < .001, indicating that the predictors reliably distinguished between High Attainment and Lower Attainment in Junior Certificate Maths. The overall classification success rate was 82.2 %, which exceeded the probability of correct classification. Table 6.30 shows regression coefficients, standard error, odds ratios and confidence intervals for odds ratio for each of the predictors. The odds ratio indicates that, as years of maternal education increased by one unit (i.e. one year), the odds of being in the High Attainment group were 42 % higher. Moreover, for every one unit increase on the Maths ability measure at Age 7, the odds of being in the High Attainment group were 17 % higher. Finally, for every one unit increase on the attitude to school scale (where each increase indicates a better attitude to school as measured at Age 16), the odds of being in the High Attainment Maths group were 31 % higher. This is an indication that family and developmental factors from both Age 4 and Age 7 distinguish between Higher and lower Maths academic outcomes at age sixteen. Moreover, attitude to school at Age 16 distinguished between those in the sample who attained higher and lower grades in Maths at Age 16.
Table 6.31
*Binary Logistic Regression Model Predicting High Attainment in English*

<table>
<thead>
<tr>
<th>Included</th>
<th>B (SE)</th>
<th>95 % CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-8.01</td>
<td>1.15 1.40 1.71</td>
</tr>
<tr>
<td>Maternal education (years)</td>
<td>0.34**</td>
<td>0.34 0.10 1.15 1.40 1.71</td>
</tr>
<tr>
<td>Number of positive activities (Age 16)</td>
<td>0.59***</td>
<td>0.59 0.13 1.35 1.75 2.26</td>
</tr>
</tbody>
</table>

Note $R^2 = .44$ (Hosmer and Lemeshow), .34(Cox & Snell), .46(Nagelkerke). Model $\chi^2(1) = 42.19, p< .001$.

A test of the model with both predictors against a constant-only model was statistically significant, $\chi^2(1) = 42.19, N = 102, p<.001$, indicating that the predictors reliably distinguished between High Attainment and Lower Attainment in Junior Certificate English. The overall classification success rate was 76.5 %, which exceeded the probability of correct classification. Table 6.31 shows regression coefficients, standard error, odds ratios and confidence intervals for odds ratio for each of the predictors. The odds ratio indicates that, as years of maternal education increased by one unit (i.e. one year), the odds of being in the High Attainment group were 40 % higher. Finally, for every one unit increase in the number of positive Age 16 activities, the odds of being in the High Attainment English group were 75% higher. Therefore, positive activities and maternal education distinguished between those who received an A or B grade in Junior Certificate English and those who did not.
Table 6.32

Binary Logistic Regression Model Predicting High Attainment in Irish

<table>
<thead>
<tr>
<th>Included</th>
<th>B (SE)</th>
<th>95% CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-11.47 (3.16)</td>
<td>1.10, 1.24, 1.53</td>
</tr>
<tr>
<td>Number of positive activities(Age 16)</td>
<td>0.21* (0.11)</td>
<td>1.10, 1.24, 1.53</td>
</tr>
<tr>
<td>Age 16 Neighbourhood Environment</td>
<td>0.14* (0.06)</td>
<td>1.01, 1.15, 1.29</td>
</tr>
<tr>
<td>Reading Ability Age 7</td>
<td>0.15** (0.05)</td>
<td>1.05, 1.17, 1.30</td>
</tr>
</tbody>
</table>

Note $R^2 = .24$ (Hosmer and Lemeshow), .21(Cox & Snell), .30(Nagelkerke). Model $\chi^2(1) = 24.35$, $p< .001$.

A test of the model with the predictors against a constant-only model was statistically significant, $\chi^2(1) = 24.35$, N= 91, $p<.001$, indicating that the predictors reliably distinguished between High Attainment and Lower Attainment in Junior Certificate Irish. The overall classification success rate was 76.5 %. Table 6.32 shows regression coefficients, standard error, odds ratios and confidence intervals for odds ratio for each of the predictors. For every one unit increase in the number of positive Age 16 activities, the odds of being in the High Attainment Irish group were 24 % higher. For every one unit increase on the Age 7 reading ability scale, the odds of being in the high attainment Irish category were 17 % higher. Finally, for every one unit increase on the Age 16 neighbourhood scale (where higher scores indicate better quality of neighbourhood environment), the odds of being in the high attainment Irish group increased by 15 %. Therefore, reading ability at age seven, neighbourhood environment at age sixteen and positive activities distinguished between those who received an A or B grade in Junior Certificate Irish and those who did not. Some caution is advised in interpreting this model as classification accuracy differed by more than the recommended amount between the training and holdout sample during model cross-validation.
However, it is interesting to note that, unlike the other binary regression models, years of maternal education does not predict higher attainment in Junior Certificate Irish. This is possibly related to the status of Irish as a declining language, which is in decline among the higher- and the lower-educated universally and which has been the subject of much national debate. Post hoc tests indicated that there was a significant difference between higher and lower Irish attainment groups in terms of neighborhood environment, such that those who scored better in Junior Certificate Irish lived tended to have higher overall environmental quality compared to those in the lower attainment group. Neighbourhood quality contained items that dealt with positive and negative features of neighbourhood environments and those in the high attainment Irish group tended to live in environments that had significantly fewer negative neighbourhood events, including open drug use, arrest of individuals, fighting and where children were more likely to play sports openly (all $p < .05$). It is suggested that in the above model, higher scores on the neighbourhood environment subscale may be taken as a proxy for better family economic resources at Age $16$, given that better-resourced families tend to be able to afford to live in neighbourhoods with higher environmental quality. It is suggested that higher quality neighbourhoods predict better Irish outcomes because the families that live in such neighbourhoods are more likely to be better placed to support their child to do well in Irish. Better neighbourhoods are less likely to expose children to educational risks such as crime, poverty, drug use and early school leaving. Therefore, it is clear that this support is not linked to having a better educated mother but rather suggests a mother who lives in a nice area and in spite of her own understanding and abilities in Irish, may have the resources both economic and psychologically to support her child to do well in Irish. This finding can be anecdotally supported by ample evidence of middle and upper class
parents sending their children to learn Irish over the summer in “Irish college” or the Gaeltacht, in addition to “grinds” lessons after school. These educational supports are most common in subjects of which parents have little or weak content knowledge (such as Irish), which again is supported by the lack of a link between maternal education and high attainment, as was found in the other models.

Table 6.33
Binary Logistic Regression Model Predicting High Attainment in History

<table>
<thead>
<tr>
<th>Included</th>
<th>B (SE)</th>
<th>95 % CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-10.42 (1.9)</td>
<td>Lower 1.06 Upper 1.60</td>
</tr>
<tr>
<td>Maternal education (years)</td>
<td>0.26* (0.11)</td>
<td>Lower 1.06 Upper 1.60</td>
</tr>
<tr>
<td>Age 7 reading ability score</td>
<td>0.16** (0.43)</td>
<td>Lower 1.17 Upper 6.25</td>
</tr>
<tr>
<td>Number of positive activities(Age 16)</td>
<td>0.33** (0.12)</td>
<td>Lower 1.10 Upper 1.77</td>
</tr>
</tbody>
</table>

Note $R^2 = .33$ (Hosmer and Lemeshow), .36(Cox & Snell), .48(Nagelkerke). Model $\chi^2(1) = 41.55, p<.001$.

A test of the model with all three predictors against a constant-only model was statistically significant, $\chi^2(1) = 41.55, N = 93, p<.001$, indicating that the predictors reliably distinguished between high and low attainment in History. The classification success rate was 77.4 %.

Table 6.33 shows regression coefficients, standard error, odds ratios and confidence intervals for odds ratio for each of the predictors. The odds ratio indicates that, as years of maternal education increased by one unit (i.e. one year), the odds of being in the High Attainment group were 30 % higher. Moreover, for every one unit increase on the reading ability scale at Age 7, the odds of being in the High Attainment group were 18% higher. Finally, for every one unit increase in the number of positive activities, the odds of being in the High Attainment Maths group were 39% higher. Therefore, maternal education, reading ability and positive activities at age sixteen distinguished between those who received high grades in Junior Certificate History and those who received lower grades.
Table 6.34
Binary Logistic Regression Model Predicting High Attainment in Science

<table>
<thead>
<tr>
<th>Included</th>
<th>B (SE)</th>
<th>95% CI for Odds Ratio</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower</td>
<td>Odds</td>
</tr>
<tr>
<td>Constant</td>
<td>-7.97</td>
<td>1.01</td>
<td>1.22</td>
</tr>
<tr>
<td>(1.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal education (years)</td>
<td>0.20*</td>
<td>1.17</td>
<td>2.63</td>
</tr>
<tr>
<td>(0.11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 7 language score</td>
<td>0.97*</td>
<td>1.00</td>
<td>1.04</td>
</tr>
<tr>
<td>(0.43)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude to school scale</td>
<td>0.08*</td>
<td>1.00</td>
<td>1.04</td>
</tr>
<tr>
<td>(0.12)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note $R^2 = .16$ (Hosmer and Lemeshow), .19(Cox & Snell), .26(Nagelkerke). Model $\chi^2(1) = 18.27, p < .001$.

A test of the model with all predictors against a constant-only model was statistically significant, $\chi^2(1) = 18.27, N = 85, p < .001$, indicating that the predictors reliably distinguished between High Attainment and Lower Attainment in Junior Certificate Science. The overall classification success rate was 68%. Table 6.34 shows regression coefficients, standard error, odds ratios and confidence intervals for odds ratio for each of the predictors. The odds ratio indicates that, as years of maternal education increased by one unit (i.e. one year), the odds of being in the High Attainment group were 22% higher. Moreover, those with higher language scores were 2.6 times more likely to be in the High Attainment group. Finally, for every one unit increase on the school attitude scale, the odds of being in the High Attainment Maths group were 4% higher. Therefore, maternal education, language development at age seven and attitude to school at age sixteen distinguished between those participants who received an A or B grade in Junior Certificate Science and those who did not.
Table 6.35  
Binary Logistic Regress Model Predicting High Attainment in Geography

<table>
<thead>
<tr>
<th>Included</th>
<th>B (SE)</th>
<th>95% CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-10.11 (2.19)</td>
<td>Lower: 0.00</td>
</tr>
<tr>
<td>Maternal education (years)</td>
<td>0.35** (0.11)</td>
<td>Lower: 1.15</td>
</tr>
<tr>
<td>Reading Ability Age 7</td>
<td>0.17** (0.58)</td>
<td>Lower: 1.05</td>
</tr>
</tbody>
</table>

Note $R^2 = .36$ (Hosmer and Lemeshow), .30(Cox & Snell), .41(Nagelkerke). Model $\chi^2(1) = 33.87, p< .001$.

A test of the model with both predictors against a constant-only model was statistically significant, $\chi^2(1) = 33.87, N = 81, p<.001$, indicating that the predictors reliably distinguished between High Attainment and Lower Attainment in Junior Certificate Geography. The overall classification success rate was 75%. Table 6.35 shows regression coefficients, standard error, odds ratios and confidence intervals for odds ratio for each of the predictors. The odds ratio indicates that, as years of maternal education increased by one unit (i.e. one year), the odds of being in the High Attainment group were 42% higher. Finally, for every one unit increase in Age 7 reading ability, the odds of being in the High Attainment Geography group were 18% higher. Thus, maternal education level and reading ability at age seven distinguishes between those participants who attained an A or B grade in Junior Certificate Geography and those who attained a lower grade.

Summary of Findings on Logistic Regression

Maternal education (when child was Age 4) was important in distinguishing between High Attainment and Lower Attainment in Junior Cert. outcomes. This finding echoes international findings on the pervasiveness of maternal education effects and indicates that for the current
sample, this effect persisted over a twelve-year period. A positive attitude to school and
greater frequency of activities that promote learning and increase well-being were also found
to be significant predictors in many of the logistic regression models. This indicates that what
students did, as well as how they felt about school, were important in predicting academic
success and points to the importance of extra-curricular resources as well as emotional
supports for young people. Although no child variables from Age 4 phase persisted in the
models, some Age 7 variables did. Age 7 Maths Ability predicted High Attainment in Junior
Certificate Maths, which indicates persistence of a relationship over a 9 year period for the
current sample of children. This finding is important in light of the current debate on the
Maths curriculum and, although generated from a small sample, echoes international findings
on the importance of early development and education for later educational outcomes. It was
also interesting to note that children’s ability to read at Age 7 predicted better Junior
Certificate outcomes in subjects such as Irish, History and Geography. The implications of
these and the other findings will be discussed in greater detail in Chapter 7.

**Overall Summary**

The results indicate that the adults (parents and educators) in the lives of four year olds can
determine their long-term outcomes. Whole group teaching and adult-centred teaching rather
than child-centred teaching style in the early years can negatively affect children’s outcomes
in the short and longer term. Maternal education was a strong positive predictor of Age 16
outcomes across most subjects. This provides support for the notion of maternal education as
an intervention in, and of, itself. Better attitude to school at Age 16 predicted better Maths and
Science outcomes, which underlines the importance of engaging young people, particularly
for the more traditionally “difficult” subjects. Involvement in extra-curricular activities is also
supportive for many academic outcomes, which emphasizes the importance of a school/life balance for young people. The implications of these and the other main findings will be discussed in greater detail in Chapter 7.
CHAPTER 7
DISCUSSION AND CONCLUSIONS

“Children’s educational achievement and aspirations are both indicators for their well-being today and their future life chances”, according to a recent European Commission report (2014, p.72). This thesis has concerned itself with the academic outcomes of a sub-sample of the national IEA Preprimary Project database by tracking them, as they moved from the early education and care system into the school system, became established and then prepared to leave secondary school to embark on adult life. Their academic outcomes were chosen as a focus, both because it accommodated itself well within the framework of the original IEA Preprimary Project data, and also because positive educational outcomes continue to be a concern for policy-makers and researchers. In particular, the thesis adds richness to the annual data on academic outcomes that is released by the Department of Education in the form of Junior Certificate results by providing an interpretative layer to the league tables reported within the press. In doing so, it positions the Person-Process-Context-Time (PPCT) structure as being indispensable for the consideration of developmental questions and through its conceptual framework posits and tests aspects of the nested layers of home, educational setting, policy and cultural contexts that are key for academic outcomes.

The data presented in this thesis were collected in the period spanning thirteen years from 1994 to 2007. The discussion will seek to identify what the main findings mean, the value of such findings to the policy and research context and why they are important in an Irish and international context. The research question seeks to identify and explain the predictors that contribute to Age 7 and Age 16 academic outcomes in the current sample (N=110), within the contexts of home and school. In line with the conceptual framework of the research, the
findings and discussion will be framed within and across the layers of Bronfenbrenner’s ecosystem as relevant. They will be discussed with reference to the current and changing national and international research and policies that coincided with the collection of data and the development of the sample from children attending early education settings to young people completing state examinations for secondary school. This chapter builds on the earlier presentation of the research findings, drawing the current and previous policy into sharp contrast and leading to the positioning of research, policy and practice implications and recommendations that have relevance for today.

7.1 Academic Outcomes within Bronfenbrenner’s Bio-ecological Model

The Age 7 and Age 16 academic outcomes presented in this thesis will be discussed through the framing context of the bio-ecological model, which in turn is used as a framework for organisation and positioning of the policy, research and practice implications of the findings of the thesis. As discussed in Chapter 2, the microsystem contains the systems with which a child has a direct relationship and are those environments immediately surrounding the child as they grow and develop. Within the microsystem, direct social interaction occurs with the social agents who represent the many environments that may exist within a microsystem. Individuals co-construct the environment within the microsystem as they experience direct interaction with others within the microsystem, while also contributing to the construction of such an environment through their own intrinsic qualities, genetics and behaviour. In the conceptual framework of the current study, the microsystem is represented by the child’s key environments of home, early education and school setting and how the interactions therein are influenced by their existing development (what they bring to their relationships), as well as the relationship that the child and young person has directly with the other people in their life,
including teachers, parents and peers. The mesosystem encapsulates the interplay between the microsystems in the child’s life. The macrosystem reflects the policy context which framed and contributed to the findings of the research and the chronosystem reflects the development of the participants as they transition from educational settings and grow older, in addition to the rapidly changing and developing education policy context in Ireland over the last twenty years.

7.2 Maternal Education (when child was 4) as a Predictor of Age 7 and Age 16

Educational Outcomes

The cultural determination of maternal education is encapsulated in the macro-level within Bronfenbrenner’s bio-ecological model but is arguably much more important for the development of a child at the micro-level (how maternal education as a characteristic of the mother becomes a significant element of a child’s home microsystem) than other macro-level factors. This is due to the fact that inherent in the relationship between mother and child is the power of the birth experience and a resultant life-long interest on a mother’s part in sustaining her child’s life and having it flourish. This maternal interest may be reflected in the personal relationship between mother and child but also radiates out into other levels as the mother and child interact with the wider community, state institutions and society on a whole. Therefore, it is important to consider who mothers are as well as what they do when considering the impact that they can have on the life of their child. In the current research, maternal education (when the participants were aged four) predicted Age 7 and Age 16 academic outcomes. It predicted Age 7 reading and science attainment. It also predicted better grades in the majority of Junior Certificate subjects examined and predicted a better Age 16 attitude to school. These findings echo international studies that have established a link between maternal education.
and children’s academic outcomes from before children begin formal schooling throughout their education experiences until they leave the formal school system (Sirin, 2005). Chevalier et al. (2010) argue that the effects of maternal education are stronger than the effects of paternal education because mothers tend to be the main caregiver, particularly when children are young and this model is certainly still true in Ireland, albeit to a lesser extent than before (Russell et al., 2006; Russell, Watson & Banks, 2011).

At a national level, the Growing Up in Ireland (Williams et al., 2009) research found that there was a clear relationship between maternal education and academic performance (reading and maths) at age nine – children whose mothers were less well educated were more likely to be in the lowest quintile than children of graduate mothers. Furthermore, they were much less likely to be in the highest reading quintile than the children of graduates. In the age 13 cohort follow up, higher levels of maternal education predicted better attitude to school; more positive teacher-student interactions and meant that children were less likely to receive detention in school (Growing Up in Ireland, 2012). These findings echo the persistence of maternal education as a predictor of academic outcomes in the current study, although the age range of the participants in this thesis stretches beyond the currently available national data (age 13) from the Growing Up in Ireland research. Certainly, international researchers have found that the positive association continues into later adolescence, manifesting itself in positive links between maternal education and school completion and college enrolment (Choi, Raley, Muller & Riegel-Crumb, 2008). The findings from later cohorts of the Growing Up In Ireland research should make it possible to identify if the trend identified in the current research is mirrored at a large-scale national level. Some researchers have established causal effects of maternal education, through the use of adoptive studies (Haegeland, Kierkeboen,
Raaum & Salvanes, 2010; Plug, 2004), twin studies (Bingley, Christensen & Jensen, 2009), changes in compulsory schooling laws (Black, Devereux & Salvanes, 2005) and isolating changes in mother’s education levels once they have already had some children (Harding, 2014; Magnuson, 2007; Magnuson et al., 2009). The implications for later life well-being, financial independence and access to the labour market are well-established. Children whose parents (and more particularly mothers) are less well-educated are more likely to underperform in the education system and this may have a knock-on effect for the rest of their lives. As this thesis concerns itself with identifying the pathways or concentric layers that contribute to positive academic outcomes, it is valuable to consider the specific mechanisms at play within the bioecological model on a level-by-level basis, starting first with a discussion of how maternal education is likely to have predicted outcomes in the current thesis and reflecting on the means by which it transmitted itself across levels to influence outcomes in the short- and longer term.

7.2.1 The mechanism by which maternal education predicts educational outcomes.

In order to understand why, and how, maternal education predicts positive academic outcomes, it is necessary to consider what exactly better educated mothers do and how this varies as children grow and develop. Harding, Morrison and Hughes (2015) suggest a model whereby, “maternal education increases mothers’ access to human, cultural, and social capital and that these forms of capital are then used by mothers in a variety of ways to promote their children’s academic outcomes” (p. 62). This suggests a focus on parenting practice (microsystem), but allows for maternal education to be considered as cross-cutting, within and across the interlinking layers of Bronfenbrenner’s ecological model, where child and mother interact directly with each other, but which includes interactions that are also played
out across the mesosystem, macro- and exo-systems (Bronfenbrenner and Morris, 2006). The model presented by Harding et al. (2015) suggests that maternal education impacts on maternal human capital, which allows mothers to have knowledge, cognitive flexibility, language-, problem-solving and information-gathering skills that create positive parenting mechanisms such as language use and the creation of a high quality home-learning environment. It follows that the proximal experiences of their children in relation to these mechanisms are positive for the child and have a positive effect on their academic development. One such proximal experience, which has been long linked to better reading performance for children, is maternal reading with children and maternal language use (Baumann & Duffy, 1997; Piasta, Justice, McGinty & Kadaverek, 2012). Davis-Kean (2005) found that parental education influenced children’s academic achievement through provision of stimulating appropriate home learning environment activities. Appropriate home learning activities included reading with the child and this was found to be directly related to parents’ years of education and also was directly related to children’s achievement. It is likely that this explains why having a better educated mother predicted Age 7 reading ability in the current study, given that many studies have identified a link between maternal education and frequency of engaging in educational achievement focused activities such as reading (Smith, Brooks-Gunn & Klebanov, 1997). Better educated mothers are more likely to participate in achievement-oriented activities such as reading and to supply resources to help their children develop, which helps to explain why maternal education also predicted this outcome when children were seven. Rodriguez & Tamis-LeMonda (2011) found that the quality of the home learning environment differed by level of parental education, with better educated parents over-represented in the higher quality home learning environment groups. Taken together, these research studies, coupled with the findings on Age 7 reading outcomes demonstrate that
mothers directly influence their children’s outcomes by being actively involved in certain types of educationally supportive activities and it is suggested that maternal education was a proxy for such processes in the current study.

Lind (2000) identified three ways that children can learn from science; through structured activities that are planned and guided by the adults; through informal learning opportunities that are identified and developed by adults as a result of a naturalistic event or development and through those spontaneous activities that children initiate themselves as they go about their day. The *Age 7* science measures used in the current research included questions about scientific concepts and scientific language, which also have been shown to be supported by appropriate home learning activities such as discussion, experimentation and resource provision. Taken with the findings from this study, it is possible that those mothers who were better educated were more likely to accept and build on naturalistic events and respond to their children’s spontaneous interest in science and that these behaviours predicted *Age 7* science outcomes. The reasons why maternal education did not predict *Age 7* cognitive, language or maths development are not so easy to isolate. It is possible that the reading and science scales, being narrowly defined, picked up the influence of the mother engaging explicitly in educationally focused home learning outcomes such as reading with their child or discussing science and nature concepts with their child, which the other scales did not, given that they measured less “teachable” topics such as cognitive and language development. Research has suggested that high scores are more likely on outcome measures that are easily mastered within shorter period of time or if the outcomes are ‘more teachable’ (Kohn, 2000; Puma et al., 2005). The value of parents reading to children is generally long established in the public consciousness and demonstrated through the popularity of
intervention programmes (Lonigan & Whitehurst, 1998; Hargrave & Senechal, 2000; Snowling & Hulme, 2011) targeting increased frequency of home reading (Holdaway, 1979; Bus, van Ilzendoorn & Pellegrini, 1995; Scollon & Scollon, 1981; Sulzby & Teale, 1991; Nickse 1990). However, this is less true for the area of mathematics (Maher, 2007). Anthony and Walshaw (2009b) comment, “Parents know what it means to read with children, yet they are often unclear about what it means to do mathematics” (p. 161). This desire of parents to know more in order to support their children’s maths development is independent of factors such as socioeconomic background according to Anthony and Walshaw (2007). Parental knowledge on utilising appropriate maths activities to benefit their children tends to be more limited (Beningno & Ellis, 2004; Vandermaas-Peele et al., 2012) or focused on aspects such as number sense rather than measure, for example (Schwarchuk, 2008). Moreover, many parents may require support to address their own lack of confidence in their own understanding of mathematics (Muir, 2012). This relates to the macro-level, with parents and adults in general reporting anxiety and lack of familiarity with mathematics, which often harks back to their own negative experiences of trying and failing to learn maths in school (Dossel, 1993; Chinn, 2009; Uusimaki & Nason, 2004). Further implications of the findings on maths outcomes are discussed and expanded upon in Section 7.4.1. Sylva et al. (2004) found that what parents do with their child to create a positive home learning environment is more important for aspects of their intellectual and social development than parents’ social class or education. Parent child interactions that focus on the process of learning rather than the product are more effective according to Pomerantz, Moorman and Litwack (2007). The lack of a predictive relationship between maternal education and child cognitive, language and maths outcomes at seven could be due to the fact that better educated parents concern themselves more with the learning experiences that are weighted towards a product such as
being able to read, or understanding concepts rather than taking a more holistic approach and targeting softer skills such as thinking and communication, which are picked up on measures of cognitive and language development. Thus, the mothers of the participants in this thesis should be viewed through Bronfenbrenner’s lens also; at the micro-level they have characteristics which include their years of education, yet how this education or lack thereof contributes to their child’s developmental outcomes depends on the additional factors at multiple layers of the ecological model.

7.2.2 Maternal education and its relationship to child academic outcomes at the meso- and macro-level.

Being educated and passing the power of this education on to a child requires a mother to possess general knowledge about the world and to be able to reflect on, and use, this knowledge in complex and reflective ways. She needs to act on her understanding that it will help her child to develop if she uses language activities and positive home learning environment activities (reading, singing, artistic activities) on a regular basis. However, it is also important that she is educated to have such an understanding, in the first place. At the mesosystem level, maternal education facilitates the transmitting of culture to the child (from the macro-level) in the form of the mother’s own preferences for education and career paths; involvement in the school system and modelling of interactions with gatekeepers and professionals within school systems. The interplay between the mother, child and these systems mean that the child should be more at ease within the school system, be able to employ behaviours that are valued by gatekeepers within the school system and will then reap the rewards of participating in the system through the attainment of positive academic outcomes. Harding et al. (2015) propose that better educated mothers have access to a social
network that facilitates educational achievement for the child through access to information on tutors, the best schooling options and positive educational role models.

The multiplicity of facets within maternal human capital as represented by Bronfenbrenner’s ecological model underline just how important it may be to intervene at the maternal education level rather than intervene later to tackle just one strand of the maternal experience. Many interventions attempt to tackle aspects of maternal human capital at the microsystem level only; intervening to improve mother’s use of language activities (Landry, Smith, Swank & Gutentag, 2008; Girolametto & Weitzman, 2006; Kashinath, Woods & Goldstein, 2006) with their child or teaching them how to solve parenting problems (Barlow, Smailagic, Huband, Roloff & Bennett, 2014; Webster-Stratton & Bywater, 2014). Such programmes have had varying degrees of success and similar versions have been plentiful in Ireland (Griffin, Guerin, Drumm & Sharry, 2010; Hand, McDonnell, Honari & Sharry, 2013; Happy Talk, 2014; Harvey, 2014; McGilloway et al., 2009; Bleach, 2015; McGilloway et al., 2012; Hayes, Siraj-Blatchford, Keegan & Goulding, 2013). The main shortcoming, in spite of any success, is that the targeted nature fails to capture the complexity of the factors that are at play within all levels of Bronfenbrenner’s ecosystem when it comes to understanding the mechanisms by which maternal education is translated into academic outcomes for children and young people. More often than not, they are targeted towards disadvantaged families, who require more than a simple targeted intervention to tackle the range of problems that they face. Funding has tended to favour individualised evidence-based programmes rather than integrated systems approaches, the latter of which would be sustainable beyond the life of the programme and evaluation stage. Moreover, such interventions are often pilot or experimental programmes that are difficult to scale up to a universal level or whose results
may not provide the evidence for such a scaled-up investment. Investing in mothers before
they have the need for such intervention programmes would seem to be a logical argument, in
addition to consideration of the forms and duration of such an investment.

7.2.3 Maternal education level-how much education matters?
Magnuson and McGroder (2001) suggest that even small increases in parental education for
mothers can have make a positive difference to children’s educational outcomes. Research
suggests that even some education versus none provides mothers with a degree of human
capital that promotes positive development of their children. World Bank research (Andrabi,
Das, Ijaz Khwaja, 2009) in Pakistan found that mothers with very low levels of education,
were more likely to spend time doing school-work and non-school related educational
activities with their children than mothers who had no formal education at all. Moreover, their
children were better at mathematics and English than the children whose mothers had no
education, while still being below average. These higher educated mothers were not well-
educated ($M=1.34$ years) but the authors posited that even their minimal level of education
was enough for them to transmit and act on their awareness of the importance of education to
their children. Even within the context of a developing country with its associated risks of
child labour, lack of access to schooling and poverty, some maternal education versus none
predicted children’s English and mathematics attainment and this benefit seems to have been
transmitted through the activities that even marginally better educated mothers participated in
with their children, in the absence of a formal schooling system.

In the current study, an increase of circa three years in maternal education predicted that
children would perform significantly better in science and reading at age seven. This was
the difference between a mother being educated to Leaving Certificate (secondary school) level only, which was the average for the sample \((M = 13.3\) years) and a mother who went on to have a third-level education, which applied to about 20 per cent of the sample. In the United States Duncan, Magnuson, Kalil & Ziol-Guest (2012) report more than a 0.5 standard deviation difference in test scores of children whose parents have a college degree and children whose parents have a high school degree only. Being educated to college level could have made mothers more likely to understand the importance of doing educationally supportive activities such as reading on a frequent basis with their child. The Growing Up in Ireland research (2012) found significant differences in the attitude to school and frequency of positive teacher-child interactions which differed by level of maternal education. Children who had a mother with a degree level qualification or higher had a more positive attitude to school and reported more positive teacher-student interactions than those who had mothers with lower education levels. Conversely, if mothers had a lower secondary level of education or less, their children reported a greater frequency of negative teacher-student interactions, a worse attitude to school and a greater likelihood of receiving detention. This is national evidence which supports the findings in the current study; that there is a protective power for children of having a mother who is educated to third-level. This protection makes itself evident in the young people’s increased likelihood to engage positively with their teachers and to like school (both replicated in the Age 16 attitude to school outcome model in the current study) instead of disengaging from their teachers and receiving reprimands for their behaviour.

Maternal education did not predict the likelihood of participating in educationally supportive Age 16 activities such as participating in a team, winning an award or reading for pleasure,
however. The *Age 16* participants reported a high level of parental supervision, however, particularly in relation to items such as doing homework and not staying out late. This implies that mothers can, through their education, influence how their children feel about school and education but that they have less of an influence over young people’s activities and hobbies as children grow up. This reflects the growing autonomy of sixteen year olds in many areas of their lives but also underlines the fact that mothers are still bound up in their children’s education while they are still in school. The findings suggest that better educated mothers transmit a better attitude to school and learning to their adolescent children, even if they have less influence over what they do in their free time.

In addition, in the *Age 16* sample, maternal education (measured when the child was four) predicted better grades in the state Junior Certificate examinations in all (English, Maths, History, Geography and Science) bar one (Irish) of the subjects examined. Every extra year of maternal education meant that a participant was between 22% and 42% more likely to score an A or B grade in a Junior Certificate subject. This is an indication of the strength and power of maternal education through Bronfenbrenner’s chronosystem, which largely predicted positive educational outcomes over a nine year period and accounted for more of the variance than the other predictors identified in the regression models. Given the similarity between the current sample and the national sample on Junior certificate grades and the homogeneity of the educational system, there is evidence that this finding is generalizable to the wider Irish population of young Irish people.

Unlike the other binary regression models, years of maternal education did not predict better outcomes in Junior Certificate Irish, alone. This exception creates a stronger argument for the validity of the finding in relation to the predictive power of maternal education for the other
subject areas. This lack of a predictive relationship between maternal education and Irish is most probably related to the status of Irish as a declining language (Hindley, 1991; O’Riagain & O’Gliasain, 1984; Bradley, 2014), which has been in decline among the better educated and less well-educated, and the subject of much national debate (McDonald, Irish Independent, May 30th, 2015). Maternal education did not predict Irish language outcomes for the Age 16 sample. A recent report from state agency Údarás na Gaeltachtachta (2014) found that the use of the Irish language as the primary dialect is in decline and may not be used anywhere in the country by 2025. Census findings revealed that 1.77 million (41.4%) people said that they could speak Irish in 2011. However, there is evidence of a discrepancy between reported Irish ability and actual use of the language, with only 1.8% of the population indicating that they used the language daily outside of the education system and a further 2.6% responding that they use Irish on a weekly basis only (Central Statistics Office, 2012). Proficiency in the Irish language, at any age, is less likely to be related to education level and far more likely to be predicted by living in a Gaeltacht (all-Irish speaking) area. For those not living in Gaeltacht areas, any networks of Irish speakers are widely dispersed, and students of the language have few opportunities to practice the language in real communicative settings outside of school (Murtagh, 2007).

Therefore, as the census figures on usage of the Irish language suggest, a large proportion of Irish parents (and by inference, Irish mothers) are unlikely to be in a position to help their children to develop the Irish language, and are far more likely to recall their own unfortunate experiences at trying and failing to learn the language during their own school days (Kavanagh & Hickey, 2013). Harris and Murtagh (1988) found that attending an all-Irish (immersion) primary school was the strongest predictor of Irish language proficiency in
children (aged 7 to 12), even if children experienced no Irish language at home. Indeed, Coady & O’ Laoire (2002) identified the fact that schools rather than the home environment are the main vehicle for increasing the use of Irish in the population. Kavanagh and Hickey (2013) found that even parents who had chosen to send their child to an Irish immersion primary school reported barriers to their involvement in their child’s learning of Irish including; embarrassment and anxiety at the prospect of speaking the language in public and negative associations with the language due to their own experiences learning it while they were in school. At the macro-level, the fact that Irish is a compulsory subject, which must be passed in order to pass state examinations, likely contributes to the high levels of anxiety reported in such studies and supported by the current findings. Even at primary school level, some parents reported that they were less likely to engage in home learning activities to promote Irish language development due to a combination of factors including; their own perception of a lack of proficiency; difficulties with pronunciation; that they were reluctant to be corrected by their child and that their children associated the Irish language with school and therefore did not want to engage in such activities at home.

7.2.4 Implications of maternal education findings on Age 16 outcomes.

Cerneiro, Meghir & Parey (2010, p. 35) comment that, “Programmes which manage to increase mothers’ schooling are likely to be important not only for mothers now but also for their future children, and should be designed and judged with this in mind.” There are a number of ways in which maternal education can be increased but the most far-reaching of these include education policies that provide everybody (including those who will later be mothers) in the education system with sound skills and knowledge and ensure the completion (and engagement in) secondary school (upper secondary) and third-level education for all.
Moreover, educational policies can also intervene at a later stage to offer a second chance to those who did not complete their formal education first time around, which would increase their human capital and help ensure that the often negative effects of a lack of education (poverty; unemployment, low-paid or part-time employment) would be ameliorated. The participation of children in early childhood education, for example, can reignite a mother’s interest in her own education. It is not too late to intervene when parents are already parents, although it is preferable to reduce the need for intervention in the first place.

In an Irish policy sense, the second-chance at education option would require a move away from the predominantly back-to-work model of adult education to one which uses a human capital model when considering the education of mothers. Emphasis should be on increasing maternal education for its own sake, rather than as a means of keeping unemployed mothers occupied, preparing them for the workplace (vocational model) or undertaking parent training. The mother as primary caregiver is prevalent in the traditional Irish model of the family, and means that although women received equal labour rights from the 1970s onwards, they faced (and continue to face) the barrier of childcare when they seek to join or rejoin the labour market once they become mothers (Russell et al., 2006; Russell et al., 2011). Kirby (2008) has argued that social science issues such as education or family policies have occupied a marginal position in Ireland, where their relevance has often been underestimated and misunderstood. The fact that Irish ECEC policy has developed as a pragmatic response and aid to economic growth rather than as a result of rights-based education philosophical stance, elucidates many of the issues central to Irish policy-making. Since Irish women began to enter the workplace en masse, the policy focus has been on ensuring that women in
Ireland can take up employment, rather than be educated in order to ensure that they are in control of their employment destiny while also providing for their families.

The offerings by the Department of Social Protection have been criticised for the poor-quality and narrow range of training and education they offered (McGuinness, O’Connell & Kelly, 2014). This criticism became more pointed during the recent years of economic collapse, when many highly educated people found themselves unemployed and being offered training options which did not reflect their past experience or qualifications. These options offered them little chance of developing their skills to meet the needs of a changing market-place (Bergin, Kelly & McGuinness, 2015). The past reliance on manual labour internships, which had been so effective at providing education which would ensure employment in the building boom, was and is, no longer so relevant.

In spite of the ongoing criticism from within Ireland, it took the IMF troika to change Irish welfare policy, through its memorandum of understanding, which stated that welfare spending needed to be cut by €750 million in the first year of the IMF bailout. Policy changes include the transformation of old-style dole offices to public employment offices, with tailored job-assistance and individualised progression plans. Long-term unemployed are now required to take up training or education options or face having their payments taken away. The disbandment of the Vocational Educational Committees and Fás scheme led to the publication of the Education and Training Boards Bill (2012), which aimed to better integrate skills and training into education through the formation of 14 Education and Training Boards. For the first time, policy focused on developing the literacy and numeracy skills of those who need it, which has been advocated by the World Bank as a key content of any education programme, particularly in advance of considering vocational training. This is a move
towards a rights-based adult education policy, which seeks to ensure those with numeracy and literacy problems can overcome those problems in order to be more equal participants in the education and employment systems, instead of condemning them to unskilled labour and unemployment. OECD (2013) research has established that lower literacy is linked not only to lower educational levels but also to a range of inequalities including being left behind in changing modern economies; having a lower income, poorer health, and lower civic engagement. On the other hand, societies that manage to upskill and educate individuals, improving standards over the space of a generation in some cases, have established systems that combine high-quality initial education with opportunities and incentives for the entire population to continue to develop proficiency in reading and numeracy skills.

There is still a danger in Ireland of individuals being shoe-horned into training courses that meet the needs of the trainer rather than the needs of the economy, let alone the needs of the individual. An effective adult education policy can achieve all three aims if properly implemented and if adult education and most other public policies are considered in a rights-based way. If adults are afforded the right to continue their education, and to receive state support in doing so, they are more likely to choose an area of education that interests them. This will increase their likelihood of gaining employment in that area, which will lead to economic stability for the individual and (should they have one) their family. Given the established links between maternal education and educational outcomes up until Age 16 in this study, the intergenerational effects of maternal education should be at the forefront of policy-making, precisely because it can be protective for the mother and her children. If the argument for well-being and better life outcomes is not convincing enough, the fact that Irish family units containing mothers and children only currently make up 30 % of all family units
in the state (Census of Ireland, 2011) should be an added incentive, particularly if it is considered that those children will, through the passage of time, be the parents of the future. Interventions that seek to improve academic outcomes of children and young people should consider the value of adopting models that will address the maternal experience across many layers of Bronfenbrenner’s bio-ecological model at once, rather than individual and targeted aspects of the mother-child experience in a sequential or piecemeal manner.

If the continuation of the Irish language is to be achieved, for example, it may be necessary to support mothers to support their children to learn Irish, firstly through the creation of positive and supportive educational experiences when mothers are still in school and secondly through strategies that work at the mesosystem level to encourage involvement of parents in Irish language teaching as their child learns the language. Policies that encourage parents to engage with their children’s learning of Irish are in line with best practice in relation to bridging the gap between home and school and established knowledge on the value of parental involvement in promoting developmental outcomes. De-mystifying the Irish language for parents and children through educators emphasising the importance of informal and fun language activities such as magazines, cartoons or television soaps is one approach which could support the development of the Irish language, nationally. The availability of English subtitles for those watching Irish language television or availability of homework or books in both English and Irish would also encourage parents to stay involved and engaged with their child’s learning. Schools could also encourage parents to talk about their Irish homework in English, even if they do not understand the full content as this helps a child or young person to feel valued and close to their parent, regardless of whether or not a parent is able to help them with the homework. Future research on maternal education in Ireland should build on
and utilise findings from the various cohorts of the *Growing up In Ireland* study to determine if, in line with other countries, maternal education continues to predict and protect children and young people academically throughout the life course.

### 7.3 The Contexts within which Children Learn at Age 4

Moving away from the immediate child-mother dyad and its cross-cutting influence across the bio-ecological model, leads to a focus on another key predictor of academic outcomes that also begins within the microsystem. The direct relationships that occur in early years and school settings are recognised as being key for development (Guralnick et al., 2006; Siraj-Blatchford et al., 2002; Tizard & Hughes, 1984; Hendricks & Weissmann, 2006). The reasons are twofold; the early years environment is where children spend a significant proportion of their life (superseded only by the home environment) (McGinnity et al., 2013; McGinnity et al., 2015) and positive interactions have been established in the theoretical (Vygotsky, 1978; Bronfenbrenner, 1996); research (Siraj-Blatchford, 2002) and public consciousness as being crucial for learning and development in the early years. That three and four year olds spend a significant portion of their waking life in non-parental childcare is certainly true in Ireland today (uptake of free preschool year is over 95%) and McGinnity et al. (2015) report a mean of 23.4 hours per week spent in childcare for the average three year old. It was also beginning to be true to a lesser extent at the time of data collection in 1994 (settings were selected on the basis that at least 20% of 4 year olds were attending such settings) as 25 % of mothers whose youngest child was 3-9 years old were in employment (Hayes, O’Flaherty & Kernan, 1994). Interactions include the direct exchanges that an individual learner has with their educators and how they as individuals react and relate to these educational experiences. The mesosystem is reflected in the relationships that a child’s family has with the school, the
interplay between extracurricular activities and schoolwork, or how the child as an individual learner relates to other microsystems within the classroom such as the planning of whole group or small group activities. The macrosystem is reflected in government educational policy decision such as ratios, strategies and curriculum, all of which have some level of influence over how the children in the current sample and by inference, all children in Ireland, learn and develop within the educational system. The relationship between early learning environments and Age 7 and Age 16 academic outcomes is outlined in Section 7.3.1. Bronfenbrenner’s chronosystem provides an added frame for the discussion, encapsulating as it does, the shifts in educational policies that have occurred since data collection began with the Age 4 cohort in 1994.

7.3.1 Structure of the Age 4 early years learning environment.

The social groupings within which young children learn are recognised as being important for what and how much they learn (Hendricks & Weissmann, 2006; Hohmann, Barnett & Weikart, 1979; Hohmann & Weikart, 1995; Katz, 1995; Wasik, 2008; Weikart, Rogers, Adcock & McClelland, 1971). Montie et al. (2007) found that Age 7 cognitive outcomes for the eleven-country cross-nation report on the IEA Preprimary Project (of which the Age 4 and Age 7 sample in the current research are a sub-sample) were negatively related to Age 4 whole-group activities in countries where adult-centred teaching predominated. Learning in a predominantly whole-group structure when children were aged four also negatively predicted the Age 7 cognitive and language development for the current sample. This finding replicates the findings in the cross-national IEA report and provides added weight to the relevance and validity of the findings in this thesis.
In this thesis, adults working with children proposed that 78.39% of Age 4 activities occurred in whole group situations. This whole-group approach also tallied with a predominance of Age 4 adult-centred behaviours (28.7%), which also negatively predicted Age 7 cognitive and language outcomes. In addition, of the Age 4 teaching behaviours observed, the majority of behaviours could be classified as directive (69.2%). A minority of time was planned for partial or small group activities (21.6%). At the time of data collection with the Age 4 sample (1994), the children were either in early childhood settings or the first year of primary school. In the early years settings, the macro-level reflected the fact that there was no prescribed early years curriculum that staff were required to follow and to this day that there are still no statutory curricular requirements, although those settings in receipt of funding for the Free Preschool Year must engage with Aistear as a condition for their funding. The macro-level for those in primary schools encapsulated the Irish Primary school curriculum, which was subsequently revised in 1999. Given the lack of clear guidance in early years settings and the use of the unrevised curriculum in primary school settings, the fact that whole-group activities predominated in 1994 in preschool and primary settings is not surprising. In fact, ten years later and in spite of a revised primary curriculum being drawn up five years previously, the OECD Thematic Review on Early Education (2004) criticised Ireland for its predominantly didactic approach towards development and learning in the primary infant classrooms. Irish researchers have also echoed this finding, reporting over and again, that, in infant classes, teachers have an expectation that children sit quietly in large groups for long periods of time instead of allowing for playful, child-led experiences away from formal desk-based learning (Eivers et al., 2010; Grey & McGettigan, 2011; Moloney, 2011). Other researchers (Dunphy, 2009; Eivers et al., 2010) found that Maths textbooks were commonly used in the majority of infant classrooms surveyed, depriving children of the opportunity to
be engaged in playful learning experiences, integrated across subject areas, and in spite of an emphasis in the revised curriculum on integrated learning.

When adults plan predominantly whole-group activities for four year olds, it points to a presumption on the part of the adult, that all children are similar, with similar interests, abilities and experiences. It reflects a pedagogical approach that is the antithesis of current knowledge on best practice in terms of noticing, seeking, building and reflecting on children’s emergent interests and age- and stage-related development. Where whole-group planning and practice predominates, children risk being left behind and are certainly not the centre of their learning experience and development. Nowadays, many curricular frameworks recognise smaller group or individual or paired activities as being developmentally supportive to children (Epstein, 2007; Malaguzi, 1993; New Zealand Ministry of Education, 1996; NCCA, 2009). Research supports the validity of these findings (Camilli et al., 2010; Diamond, Barnett, Thomas & Munro, 2007; Pianta et al., 2009; Schweinhart et al., 2005). Indeed, this is true for human learning in a general sense, even CPD courses and university courses recognise the value of a mix of small group, individual and whole-group learning, for engaging the learners’ interests, allowing the sharing of personal experience and the joint creation of new learning and new meaning. The implications of predominantly whole-group activities and the constraints it creates for the adult-child and child-child relationships warrant further consideration and will be expanded upon on Section 7.3.2.

### 7.3.2 Adult-centred teaching within a predominant whole-group structure.

As far back as the 1980s, researchers found that child linguistic competence was directly related to the role that teachers play in dialogue (Tizard & Hughes, 1984; Wells, 1984, 1986).
They found that the educators adopted an approach in which teachers’ talk dominated in the setting, made many requests and asked a lot of questions, all of which resulted in children speaking mainly only to comply with requests or answer questions. These findings are echoed in this thesis; in addition to teaching mainly in whole-group situations, educators adopted a directive or adult-centred teaching approach the majority of the time. Moreover, their teaching style could mainly be described as being directive rather than participative or nurturing. The proportion of time children spent verbalising tallied almost exactly with the amount of time children’s responses were recorded as being in unison for the majority of the group of children, indicating that talk in the setting was predominated by adult planning and questioning and less likely to reflect children’s emergent and individual interests or spontaneous utterances.

In a similar vein to the research findings reported by Tizard and Hughes (1984) and Wells (1986), a more dominant and directive teaching style had a negative relationship to children’s Age 7 language development in the current thesis. It also negatively predicted Age 7 cognitive development. As Early et al. (2010) note, whole-group activities tend to be didactic because that is the easiest type of activity to implement to a whole group. Indeed, the work of Tizard and Hughes and Wells acknowledged that macro-level factors such as adult: child ratios were partly accountable for the teachers’ over-reliance on a directive teaching style but they also recognised the important role that pedagogical approach played in determining educator behaviour. Wells (1984, 1986) advocated a more child-centred pedagogical approach, with a desire to know children, “by listening to what they have to say; by attending in the tasks they engage in, to the meaning that they make” (p.101). In a similar vein, Tizard and Hughes spoke of harnessing the interest and curiosity that children show at home, particularly by a
movement away from questioning, which they found tended to result in one-word answers from the children, thus closing off conversational pathways. Once again, the findings from the current thesis exemplify the importance of considering the nested nature of child experience and development; children bring their individual interests and home experiences with them to their early educational setting and interact with the educators they meet there in ways that can either limit or promote their development, depending on the experiences and attitudes and strategies that the educator carries with them. This latter consideration; the relevance of the pedagogical approach of the educator for the academic development of children bears further exploration, given the implications it has for what the child hears, sees and experiences on a daily basis in an early childhood setting.

7.3.3 Planning and pedagogy.

This thesis found that *Age 7* cognitive and language development was positively predicted by the amount of time that educators proposed would be spent on academic activities. This was measured by the Management of Time instrument in the IEA observations system. It means that the amount of time that educators spent formally planning to impart academic knowledge to their children positively predicted the cognitive and language development of the children by age seven. This variable should be considered a proxy for aspects of an educator’s pedagogical approach. It reflects what a teacher sees as important for pedagogical content, rather than actually measuring the frequency of such pedagogical activities. Therefore, it is located in the meso- rather than the microsystem and underlines the interplay between an educator’s pedagogical approach and children’s development, through the medium of the activities that the educator planned. This finding emphasises the importance and protective power of pedagogy in and of itself. Research suggests that experiencing appropriate activities
is important for children’s development but it may be equally important that those activities are meaningfully planned and the reason for their implementation is understood and considered by educators (Burchinal et al., 2010; Marcon, 2002; Montie et al., 2006; Siraj-Blatchford and Sylva, 2004). Margaret Donaldson (1978) summarises it as follows, “teachers need to be clear not only about what they would like children to become under their guidance but about what children are actually like when the process is begun” (p. 15). The question of children’s existing and expected development and experience when they begin school or preschool is important for educators to consider. While it would seem an obvious presumption that educators should have a clear understanding of what research and best practice identifies in relation to what should be expected of children as they move through each stage of the education system, research has found that this is not always the case (Hughes, 2013; Sylva et al, 2004). Hughes (2013) found that many primary teachers and principals subscribed to a language-deficit model, which laid the blame for children’s perceived language deficiencies (unable to listen; silence; using gestures or sounds; and incomplete sentences), squarely at the door of their home environment, particularly for children from poor and disadvantaged families. This deficit model meant that they failed to have positive expectations of the children’s existing language capabilities and often wrongly attributed meaning to them e.g. believing a child had no language because they did not answer questions in a whole group context, rather than creating situations for the child to illustrate their language development in smaller group, more informal and less daunting contexts. Such research illustrates the tension inherent in the “ready schools versus ready children” debate, which has gained considerable traction in recent years. Many experts call for a move away from child readiness as measured along a narrow range of predictors evidencing compliance with standardised testing to a model that puts the burden of readiness
on the ecological systems surrounding the developing child; the community, family and school (Pretti-Frontczak, 2014; Ring et al., 2016).

The findings in the current thesis also imply that implementing an emergent child-centred curriculum should not equate to the derogation of an educator’s role in teaching and imparting knowledge and concrete skills (Fantuzzo, Gadsden & McDermott, 2011; Diamond et al., 2007; Reynolds, 2000). In line with Donaldson’s contention, educators should include children’s interests in their planning while also building on children’s existing and prior knowledge. Much of the debate surrounding a skills-based direct-instruction curricular approach versus a child-centred, action-based model has centred on the importance of developing children’s learning processes versus teaching them conventional content and skills, which is in essence the process versus content debate (Schwarz & Copeland, 2015). According to Schwarz and Copeland, there is an issue with diametrically opposing process and content because, “in essence for the learner, there is no process without content, there is no content without process” (p. 20). Within child-centred curricula therefore, there is still room for teachers to engage in direct instruction, wherein children acquire the knowledge and/or skills that they want or need as they pursue programme activities. Educators can help children to acquire skills by making their learning explicit through supporting them to recognise and develop skills that occur in response to their interests, and by providing the language that helps makes these skills concrete for them as learners. International research focusing on pedagogy supports this; the EPPE study found that effective (in terms of children’s positive outcomes) pedagogy necessarily includes some adult-child interaction traditionally associated with the term “teaching” through the provision of an instructive learning environment and teaching of learned concepts, as long as it is done in small group
situations that allow for a joint construction of meaning (Siraj-Blatchford et al., 2002). The models in the current research on cognitive and language development neatly exemplify this point; children did better if their educators had an awareness of what pre-academic activities were important to support children’s learning and development and if they explicitly planned for this. However, child activities tended to correspond quite neatly with teacher’s prior plans, meaning that little space was left for activities to be spontaneous and lead by children’s emergent interests or teachable moments. The benefit of the educators’ curricular content knowledge may have been tempered by an over-reliance on directive teaching behaviours and a failure to implement plans in smaller or individual group situations, which would have allowed for joint construction of meaning, and by inference, stronger cognitive and language gains.

7.3.4 Implications of the findings on whole group teaching, adult behaviour and pedagogical approach.

When the question of whole-group teaching in primary school arises, primary school teachers tend to counter criticisms of the passive learning that whole-group teaching implies by calling for better teacher-child ratios in the infant classes, in particular, which locates the solution to whole-group teaching at the macro-level only (INTO, 2012; 2013). Devine et al. (2013) reported that one of the reasons Irish primary school teachers provided for not using active models of learning in small or individual contexts was concerns over classroom discipline, particularly in disadvantaged schools. The power to improve ratios resides at the macro-level certainly, and although more remote from children, is still recognised to have an impact on their development, particularly in the case of higher ratios, which have been found to impact development and better outcomes for children (McGurk, Mooney, Moss & Poland, 1995).
The level of that impact depends on additional factors surrounding the child at the other levels of the ecosystem, however; their existing development and relationships with their caregivers (micro); the other children surrounding them in the service (meso); how their parents engage with the service and vice versa (meso); presence and type of curriculum (macro); the training and professionalisation of the adults who work in their settings (macro) and other macro-level government and policy factors (Munton et al., 2002). Therefore, providing favourable adult: child ratios is no guarantee of positive developmental outcomes, unless it is considered in conjunction with a suite of other measures that will support the child’s development across the interlinking layers of the bio-ecological model.

Small group activities are encouraged by experts in the field because they allow for meaningful interactions between adults and children and between children and children to support and stimulate learning (Hendricks & Weissmann, 2006; Hohmann, Barnett & Weikart, 1979; Hohmann & Weikart, 1995; Katz, 1995; Wasik, 2008; Weikart, Rogers, Adcock & McClelland, 1971). They are not merely a more efficient way of managing classroom discipline, however. Ratio restrictions notwithstanding, planning predominantly didactic activities can be an easy option for educators who are less skilled at individualisation of planning for learning and less confident at scaffolding the learning experience by becoming a joint participant (Early et al., 2010). In the current thesis, whole-group teaching and adult-directed teaching predominated in the early years settings also, which benefitted from more favourable ratios than the infant classes of primary school. Some reports have identified the possibilities of really high-quality practice in classrooms with high ratios (Murphy, 2005; Walsh et al., 2006), demonstrating that pedagogical approach can outweigh the challenges posed by ratios. Indeed, some Irish researchers (Devine et al., 2013; McCoy,
Smyth, & Banks, 2012) have found that active and constructivist models of learning are more common in the classrooms of younger and less experienced teachers, which suggests that pedagogical approach and attitude, most likely mediated by recent changes in Initial Teacher Education programmes, can supersede the difficulties posed by ratios in primary classrooms. The power of pedagogy to transcend the macro-level factors such as ratios warrants further consideration in light of the findings on the link between how adults planned and how children developed in this thesis.

7.3.4.1 *Aistear Curriculum framework as a means of addressing pedagogical concerns identified in current research.*

The results presented in this thesis illustrate that neither the infant teachers nor early years educators whose practice and pedagogy was examined in 1994 were providing curriculum, practice or pedagogy that could be defined as emergent. Teachers and early years educators interacted with children primarily in whole groups and much of the education behaviour observed was described as directive and adult-centred rather than child-centred. Over twenty years later, it still remains questionable as to whether appropriate practice, curriculum or pedagogy are implemented in early years settings or primary school classrooms to the degree that international research would suggest is warranted. Inextricably bound up with the area of pedagogy is the question of the education level of the educators, the content of their education courses and the ease with which their education can be transferred into practice. The new requirement, under the National Literacy and Numeracy Strategy, for a more general upskilling across the ECEC sector, and provision of government financial support to achieve that should mean that, at the very least, early years educators are not starting from as low a base as they were in
1994, when there was no requirement for training of any kind for those working with children in early years settings. Almost 40% of the original Age 4 sample of early years educators had not attended any type of training programme, in contrast to the undergraduate degree that almost all of the primary teachers in the sample had completed. The pace of upskilling in the early years sector remains slow and would benefit from the provision of incentives for educators to upskill, in the form of pay and conditions aligned to the primary sector. However, increased or degree level training is not necessarily a guarantee that the high quality early educational experiences will be delivered in practice, as illustrated by the findings for the primary sample in the current thesis. Education of educators should be considered as one of a suite of measures to ensure children are offered opportunities to learn in ways that meet their needs and interests, and is contingent on the availability of suitable course content and governmental policies (curricular, CPD opportunities, resourcing) that take cognisance of this. As Aistear has been developed specifically to ensure high quality learning experiences for children from birth to six, its implementation should benefit all children attending and transitioning from early years settings to school settings in Ireland. On paper, the content and design of Aistear exemplifies research on best practice internationally (child-centred, play-based; holistic and integrated), which does everything to suggest it should have positive outcomes for its target population (children from birth to six). Many commentators have identified the power of Aistear as a unifying mechanism to ensure curriculum continuity for all children from birth to six (O’Kane & Hayes, 2010; Ring et al., 2016). As Bleach (2011) notes, ease of implementation of Aistear is contingent on pedagogical and content knowledge about what, how and why children should learn. It is also contingent on
macro- and meso-level contributors to quality such as existing curricula or curricular frameworks, time offered for CPD and planning and career stability, pay and conditions.

7.3.4.1.1 Towards Aistear as a unifying mechanism for quality (birth to six)

In contrast to the situation in 1994, materials that offer all educators the opportunity to engage with and develop an integrated curriculum now exist. The ongoing development of the *Aistear Siolta* Practice Guide (NCCA, 2015) could strengthen and build on existing use of *Aistear*, particularly through the development of self-evaluation tools for educators which are aligned to seven Pillars of Practice, themselves aligned with key areas for quality ECEC experience (Foundations of Curriculum; Environments; Interactions; Partnership with Parents; Play; Transitions and Planning and Assessing). The integrated nature of ECEC curricula is emphasised through the presence of indicators on self-evaluation tools across multiple pillars (e.g. the value of small group, paired or individual play groupings is emphasised in the Interactions Pillar, the Planning Pillar and the Play Pillar). The Foundations of Curriculum and Planning and Assessing Pillars contain material that facilitates consideration by educators of the image of the child and to plan a vision for the children in their educational settings. Through the posing of reflective questions in the self-evaluation tools, it is possible to emphasise to educators that it is not simply enough to plan the type of content that they would like children to learn (as the adults in the current study did) but also to consider the social groupings within which such content should be delivered. The degree to which the newly developed materials and resources can be utilised to the benefit of children in early education and primary settings depends on a number of macrosystem factors such as continued and extended funding of ECEC settings, funding for nationally and universally accessible supports for quality development, in addition to the continuing upskilling of the ECEC sector under the Workforce Development Plan. Central to
the success of *Aistear* will be the degree to which it is possible to implement it universally or in a mainstream manner. It is also important to ensure that the content of undergraduate and postgraduate training courses for early years educators and primary teachers makes use of the content developed in relation to *Aistear* and *Síolta*. Providing educators of the under-sixes with a clear and consistent message as they train will also be a key feature in the future success of their implementation, which ultimately will benefit children most of all.

7.4 **Child-level Predictors of Age 7 Academic Outcomes**

The microsystem within Bronfenbrenner’s model also incorporates personal traits and characteristics and genes, which may have an impact on how an individual relates to and develops within all other systems.

7.4.1 **Gender differences in science/maths at Age 7.**

One of the most studied variables in all realms of human science is sex differences and the potential that these differences have to explain many aspects of human behaviour and development. The findings on sex differences will be discussed here, with reference to the relevant layers of Bronfenbrenner’s ecosystem. In the current sample, being a boy meant having better *Age 7* Science and Maths outcomes. Such results are important if it is considered that at the macro-level, mathematics and science are generally regarded as a gateway to employment in well-paying and prestigious science, technology, engineering, and mathematics (STEM professions) (Ceci & Williams, 2007; Ceci, Williams, & Barnett, 2009; Halpern et al., 2007). Many international studies of boys in middle childhood echo the current research in relation to maths attainment (Davies & Brember, 1999; Geary, 1996; Sammons et al., 2008; Stoet & Geary, 2012). There have been many reasons put forward to explain the
finding but it is likely that as Geary says, “the final word on the existence of gender differences in mean mathematics scores and in variability in these scores has yet to be uttered” (p. 94). What seems reasonable to state is that, at the very least, there are some gender differences in maths achievement, sometimes in favour of girls and more often in favour of boys, depending on factors such as the measurements used or age and with boys tending to be over-represented at higher percentiles (Geary, 1996). In Ireland, many reports echo the international findings on gender differences and educator anxiety in relation to maths. While large scale national studies tended not to find significant gender differences overall, they do find that boys outperform girls at higher percentiles and are significantly more confident about their maths abilities than girls (Educational Research Centre, 2006). The result from the Age 9 Cohort of the National longitudinal study Growing Up in Ireland (Williams et al., 2009) also found evidence of a gender gap in maths performance. They found significantly higher maths performance levels among boys than girls; with significantly more boys being represented in the top quintile. Why such differences occur has been much researched and the answer seems to lie in the interplay between the interlinking levels of Bronfenbrenner’s ecosystem. Campbell (2013) found that teachers of seven year olds tended to hold biased judgements of maths ability in favour of boys. This stereotyping could be due to personal experience of some boys outperforming girls in their classrooms (Burgess & Greaves, 2009) or could also reflect a wider societal stereotyping of boys and men along traditionally male career paths, which rely heavily on maths and science proficiency. Other researchers (Beilock, Gunderson, Ramirez & Levine, 2010) have found that having female educators who are maths-anxious, disproportionately affects girls over boys when children are aged seven or eight. Maths-anxiety is more common among females (Goetz, Bieg, Lüdtke, Pekrun & Hall, 2013; Gresham, 2007) than males. In classrooms where female
teachers displayed fear and anxiety about maths, girls were more likely to endorse the stereotype that “boys are better than girls at maths” and more likely to have lower maths achievement than boys (Beilock et al., 2010).

Social learning theory proposes that sex differences can be acquired through identification with and modelling of the behaviours of those of the same gender (Perry & Bussey, 1979). Certainly, girls are more socially sensitive and aware than boys during middle childhood (Ruble & Nakamura, 1972; Ladd, 1999, Rudolph & Karen, 2006). They, like all children, model behaviours of those of the same gender that they believe to be gender-typical and appropriate (Perry & Bussey, 1979). This social awareness may mean that girls, in primary school, are more likely to be influenced by their teachers’ anxieties and by societal mores than their male classmates. The presence or indication of maths anxiety in educators may confirm for young girls a societal stereotype about girls’ math ability and transmit it through their developing and more highly developed social and behavioural skills (Hembree, 1990). This is not a direct microsystem relationship as the female teacher does not directly and purposely influence her students’ maths anxiety, rather she transmits a cultural stereotype indirectly to her female students through exhibition of her own anxieties and female students may be more attuned to picking up and internalising the stereotype than male students are. If true, this explanation is concerning if it is considered that in Ireland, the vast majority of early years educators and primary school teachers are female (DES, 2012). The feminisation of education, particularly in the primary sector has been identified as a concern by national commentators (Drudy, Martin, Woods & O’Flynn, 2005; Drudy, 2008). In a national Department of Education and Skills (DES) Inspectorate survey of newly qualified teachers
(2005), almost thirty percent of newly qualified teachers reported themselves to be poorly prepared to teach Mathematics, in contrast to English (12 %) and Irish (16 %). An evaluation by the DES Inspectorate (2005) identified weakness at a whole school level in planning for mathematics education, in addition to teacher and classroom-based planning weaknesses. A key difficulty for teachers lay in integrating the learning from mathematics across other curricular areas. Suggestions in a national review of primary education (DES, 2002) included supporting teachers to be better prepared for teaching mathematics in schools through the introduction in colleges of education of a professional mathematics course, with the objective of improving students’ competence in the subject and developing their teaching skills. Similarly, in the early years sector, a smaller scale Irish study found that scores for quality of the maths and science ECEC environment and practice, as measured by the Early Childhood Environment Rating Scale-Extension were in the minimal range (Hayes, Siraj-Blatchford & Keegan, 2011).

International research confirms that early years educators and teachers tend to lack confidence when implementing and planning maths activities with children (Copley, 2004; Copley & Padron, 1999; Farran, Silveri & Culp, 1991). Lee (2010) identified a lack of what he termed pedagogical content knowledge (PCK) when it came to educators having the necessary knowledge to plan, teach and engage appropriately with children in relation to mathematical concepts. If this lack of PCK, in addition to a stereotype-driven, female-to-female transmittance of anxiety in relation to maths, is held to be true, then this could account for the differential attainment of boys and girls in maths and (by inference science), in the current Age 7 sample.
7.4.2 Implications of gender difference findings.

The National Literacy and Numeracy Strategy sets out a number of objectives in relation to improving children’s numeracy skills and development across early years, primary and post-primary settings. Early years education is currently delivered in early years settings and the infant classes of primary school, which is a governmental decision accommodated within the macrosystem that influences how and where children learn in Ireland. The compulsory school starting age is six, but half of four year olds and nearly all five year olds attend state-funded primary schools under the auspices of the Department of Education, where they are educated by graduate primary school teachers. The difficulties inherent in this divide are underlined by the strategy, which for the ECEC sector sets down more minimal objectives in relation to ensuring, “that the training and education courses completed by those entering the ECCE workforce include units on both content and pedagogical knowledge in literacy and numeracy” (p.29). The other objectives focus on the gradual upskilling of staff involved in the delivery of the Free Preschool Year (ECCE scheme) and the setting of a formal qualification in literacy and numeracy for leaders in ECEC settings only and the linking of higher capitation to higher qualifications. These objectives highlight the fact that the pace of upskilling in the early education sector is slow and some may even opt not to upskill, provided that they leave the sector within a set timeframe. Essentially, they reflect the low base from which the ECEC sector and the National Workforce Development Plan is developing in the absence of an explicitly articulated and funded policy and suggest that there may be a long way to go before all children receive a consistent educational experience from birth to six.
By contrast, primary teachers have been operating from a reasonably strong qualifications base for many years but, crucially, are still having difficulty in transmitting these training and qualifications into strong mathematical outcomes for all children in spite of funding being made available for CPD and training. The strategy seeks to lengthen and improve the content of initial teacher training to ensure that teachers are equipped to support children’s literacy and numeracy. Recent research indicated that only a third of primary teachers engaged in any form of mathematics CPD in the previous two years, which was less than the international average (Clerkin, 2013). Their uptake of science-related CPD was even lower, ranging between ten and 25% for different curricular areas and considerably below the international average. Unsurprising then, that Clerkin found that Irish primary school pupils are significantly more likely to be taught by a teacher who is only somewhat confident in teaching science (59% in Ireland compared to 41% across all TIMSS countries). Under the National Literacy and Numeracy Strategy, prospective teachers will be required for the first time to demonstrate satisfactory literacy and numeracy teaching skills as part of the assessment of their practice placement. Existing teachers will be required to undertake more focused and intensive CPD on literacy and numeracy and the quality and accreditation of such CPD courses will be carefully monitored. However, the 20 hours per year allotment is still considerably lower than the provision in countries recognised as having strong educational systems such as Singapore (100 hours; Chin et al., 2012), Korea (180 hours; Cho, Kim, Kim & Rim, 2012) and Finland (at least 3 full days; Kupari & Vettenranta, 2012). The current research supports the call from Eivers et al. (2010) and Clerkin (2013) that the key requirements for CPD are assessed at a school and individual teacher-level in order to ensure that CPD provision is tailored to the participants who need it most and who, by inference, will benefit most from its provision.
Implementing an anti-bias curriculum is a way of counteracting the transmittance of societal stereotypes in relation to gender roles. This requires that educators are conscious of, and explicitly plan for children based on their differences (including gender), rather than similarities. Providing books, toys and pictures of girls and boys involved in non-stereotypical activities is a first step in showing children that there are possible futures for themselves that are not narrowly characterised along gender lines. The Identity and Belonging theme of the *Aistear* curriculum framework draws explicit attention to the encouraging of non-stereotypical behaviours and it is mentioned under an item on the Interactions Self-evaluation tool of the *Aistear Siolta* Practice Guide. If educators plan for, engage in and extend children’s non-stereotypical play, this can also be a powerful force for ensuring children develop into competent young people who have the confidence to follow their interests regardless of gender stereotyping. Equipping educators (of both sexes) to explain the value of non-stereotypical play and resources to parents will help ensure a cascading of the understanding and learning into the wider society, to the ultimate benefit of all children into the future. However, it is likely that it will take more than making educators aware of an anti-bias approach to make a change. While the Guidelines on Equality and Diversity provide information to early years educators on what to be aware of in relation to gender stereotyping, there is room for a national programme of CPD for educators and teachers to affect a national change. A national information campaign targeted at parents would also help to ensure consistency between the home and early years environments and a more seamless bedding-in of anti-bias practice.

In a report published by the Educational Research Centre (ERC) Shiel, Kavanagh and Miller (2014) found that for the first time in 30 years, scores on standardised assessments of literacy
and mathematics in 8 year olds increased significantly on previous years, outstripping the initial targets set in the National Strategy. The aspects of the strategy that had already been implemented centred on school-based changes such as an increase in the allotment of time to literacy and numeracy, setting of targets and reporting of results to parents, in addition to CPD for teachers and the appointment of staff in schools with responsibility for literacy and numeracy (DES, 2011). This provides support for the efficacy of the already-implemented aspects of the strategy in affecting national change, but also underlines the need to review targets in light of the findings on gender differences discussed here, in order to ensure that such unprecedented improvements are sustained.

7.5 Persistence of Age 7 Predictors through to Age 16

In this thesis, maternal education (when child was aged four) was the only Age 4 predictor that persisted through to Age 16. That is not to suggest, however, that Age 4 factors and experiences do not relate to Age 16 academic outcomes. The interplay intrinsic in the bi-ecological model offers a mechanism for explaining how and why Age 4 experiences matter for later academic development. Through a chain of prediction, Age 7 developmental outcomes were predicted by Age 4 predictors. Under Bronfenbrenner’s chronosystem these two levels are bound closely together by virtue of being three years apart. In turn, Age 7 outcomes predicted Age 16 outcomes because the Age 7 predictors were more proximal to Age 16 outcomes than Age 4 outcomes were. However, the Age 7 predictors, had, in turn been predicted by experiences and demographic variables at the Age 4 level. This reflects Bronfenbrenner’s chronosystem, in that children transition from early education settings, through the later years of primary school and onward into secondary school. The chronosystem presupposes that time is intrinsic to development, and also allows for temporal
shifts or events to contribute to development in their own right. It emphasises the essential connectedness of human development and illustrates that the power is unleavened or bolstered by the passage of time; depending on the predictor, its proximity to an individual and the proximity of other surrounding contexts.

7.5.1 Age 7 Maths ability as a predictor of Age 16 maths outcomes.

Better maths attainment in the Junior Certificate exam was positively predicted by Age 7 maths ability. As previously discussed, Age 7 maths ability was predicted by being a boy and by Age 4 cognitive development. This illustrates the interlinking nature of learning and development across the lifespan and within and across Bronfenbrenner’s levels. The fact that Age 7 Maths ability persisted over nine years to predict better Age 16 Maths outcomes underlines the value to young people of ensuring that educators are equipped with the pedagogical content knowledge to ensure that all children engage with and understand maths. The relationship implies that disengagement with mathematics in early childhood can have lasting effects for later attainment, which by inference will preclude those involved from having well-paid and rewarding careers in new and developing industries which value and require high levels of maths competence. The fact that recent national research has found gains for the first time in maths and literacy scores in middle childhood is heartening (Shiel, Kavanagh & Miller, 2014) and may be evidence of the first positive effects of the National Literacy and Numeracy Strategy. The findings in the current study, suggest that such results need to be replicated year on year, if young people are to be supported to have positive academic outcomes and accordingly, fulfilling and rewarding careers in the STEM sector.
7.5.2 *Age 7* language development and *Age 7* reading ability as predictors of *Age 16* academic outcomes.

Language development, in particular, is recognised as being important for academic outcomes in later life (Bishops & Adams, 1990; Conti-Ramsden et al., 2001; Leitao & Fletcher, 2004). The persistence of the effects of language development from seven to sixteen are in line with international research on the importance of developing children’s language and where necessary, resolving language difficulties before they begin to become entrenched. *Age 7* language development predicted better attainment in Junior Cert Science and likelihood of participating in educationally supportive activities at *Age 16*. The higher participants scored on *Age 7* reading competence, the more likely they were to score an A or B in Junior Certificate Irish, History and Science. Reading ability in early to middle childhood has been found to be predictive of academic activities through later childhood and into adolescence (Claessens, Duncan, & Engel, 2009; Duncan et al., 2007; Snow, Porsche, Tabors & Harris, 2007). These findings are significant for the educational attainment of children and adolescents but also because some studies have found that lower scores in reading in early to middle childhood mean lower likelihoods of working toward or being in a rewarding career by age 20 (Wylie & Hodgen, 2011). In a large-scale meta-analysis, Mol and Bus (2011) found a upward spiral of causality in relation to reading development i.e. children who were more proficient in comprehension and technical reading and spelling skills read more and because of more print exposure, their comprehension and technical reading and spelling skills improved more with each year of education. In addition, they found that those who were better readers performed better academically in adolescence. This emphasises the importance of foundational skills, which contribute to academic outcomes in adolescence and smooth transitions across life stages and institutional changes within the educational system.
7.5.3 Implications of persistence of language and reading predictors through to Age 16.

The fact that Age 7 reading scores predicted better Age 16 scores in Irish, History Science and Geography only is worthy of further consideration. The strongly text-heavy, essay-writing nature of the Junior Certificate Irish and History syllabus may help to explain why Age 7 reading ability mattered so much to achieving better outcomes in these subject areas. Indeed, the Junior Certificate Science syllabus that was in place at time of data collection presented material as, “a list of content (facts, definitions, laws, lists of properties, etc.)…, there was no explicit indication of the desired learning outcomes to be associated with this content” (NCCA, 2006, p. 6). Moreover, in their review of the syllabus, the NCCA changed the syllabus to have an “increased emphasis on scientific investigation and on the application of science process skills through student activities” (p. 7) in a move away from what many critiqued as rote learning of the definitions and answers that the course once required. Therefore, it is unsurprising that Age 7 language and reading ability predicted better scores on Junior Certificate Science. It is likely that better language skills and reading ability was a strong asset to students of Junior Certificate Science, in understanding and learning off facts, laws, definition and lists of properties. Similarly, in spite of its emphasis on non-literacy based skills such as map-reading, fieldwork and investigation, the Junior Certificate Geography syllabus assessed learning primarily through short and long written answers, which are supported by having strong reading and writing skills. This also implies that children who have entrenched reading difficulties that develop or sustain into middle childhood may not perform as well in subjects such as science due to the over-reliance of the science curriculum on literacy-based skills in place of a curriculum that emphasises enquiry, experimentation and reasoning-based assessments.
7.5.4 Academic motivation at Age 7.

Higher levels of engagement in Age 16 academically-protective activities were predicted by Age 7 teacher rating of academic motivation. The protective power of positive teacher-child relationships in middle childhood is supported by the finding on academic motivation. This illustrates interaction between the micro and meso-level, i.e. the influence and pervasiveness of the effect on the seven year old child of having a teacher who rated them as academically motivated and the fact that such a positive rating reflects a positive educational experience for the child. Children who had teachers who rated them as academically motivated at age seven, were more likely to engage in educationally supportive curricular and extra-curricular activities such as reading for pleasure, discussing their career plans, winning awards for achievement, being an active member of a sports team or school organisation. These activities will be discussed in greater detail in the coming section.

7.6 Age 16 Activities, Attitude to School and Junior Certificate Outcomes

Research has established that extra-curricular activities and protective life activities may be important for ensuring positive educational outcomes for young people, provided the activities are reasonably varied, offer opportunities for young people to develop a sense of mastery and autonomy and most importantly, provided they allow sufficient time for a young person to carry out their educational work in tandem with these activities. In the current study, the survey contained questions about extra-curricular activities that were mainly school-oriented and educationally supportive. Greater frequency of positive life events and educationally supportive activities positively predicted Age 16 academic outcomes in two subjects; English and History. The most common educationally supportive activities reported in the sample were; talking to their parents about their career plans (81.3 %); receiving an
award or a prize for an achievement (51.6 percent); reading for pleasure (48.4 %), being part of a sports team (48.4 %); talking to a teacher about their career (42.9 %) and being active in school organisations (40.6 %). The average number of positive life events experienced in the sample was 5.28, meaning that a range and variety of the listed most frequent events are likely to have contributed to the positive academic outcomes. Notably, these events reflect the interlinking layers of Bronfenbrenner’s model of development, with predictors being drawn from the micro- and meso-level, in addition to an emphasis on process or the interactions between levels. Once again, as in the Age 7 results, it emphasises the importance of interested adults and engaged adults for young people and indicates that even the simple act of an adult (parent and/or teacher) showing an interest in a young person’s future through discussion of career options can be academically protective for them in certain subject areas.

The micro-level is reflected through the young person’s own achievements and sense of belonging and mastery, both on the sports field, in the classroom (Higher Level Maths) and through their derivation of pleasure from reading. The mean number of events echoes the findings presented in the research of Knifesend and Graham (2012), who found that a moderate amount of extra-curricular activities could support educational outcomes, rather than a large amount, which can have a negative effect on outcomes by leaving young people “time-poor” when it comes to spending time on academic work, in addition to spending time on their activities.

Reading for pleasure has been identified as being a protective and academically stimulating activity throughout the life cycle and it is noteworthy that in the current study, it was among the protective adolescent activities likely to predict academic outcomes at Age 16 but only in
English and History. This is most likely related to the fact that, at Junior Certificate, the English and History examination rely more on textual comprehension, written language skills and vocabulary than other subjects, which tend more towards multiple choice or short answer requirements. Research has found that reading for pleasure predicts better reading, writing, comprehension and vocabulary, in addition to increasing general knowledge and educational attainment (Cunningham & Stanovich, 1998; OECD, 2002; Mol & Bus; Wylie & Hodgen, 2011). This, coupled with the findings from the current sample, points to the importance of promoting an interest in books from a young age and given that research finds that reading for pleasure can protect children from all backgrounds, a sound and effective language and literacy strategy should promote and encourage this. It is also possible that outcomes in English and History are related to the Junior Certificate curriculum on these subjects, which has been criticised for being too narrowly-focused and prescribed and allowing less space for individual learner interests in place of a teaching-to-the test approach. Taking part in educationally-focused activities, including reading for pleasure and discussion about career aims all reflect an engaged and able learner, who is equipped to perform well on prescribed and narrowly defined tests, as well as to learn off poems, facts and dates, which predict better performance in subjects such as English and History.

7.6.1 Policy, practice, and research implications of Age 16 predictors of academic outcomes

The interplay intrinsic in the bio-ecological model has provided a context for considering how Age 4 predictors matter for Age 7 predictors and in turn how Age 7 predictors go on to influence Age 16 predictors. In the midst of this, maternal education has a predictive power for Age 16 academic outcomes. At the macro-level, the bio-ecological model may also offer a
solution to the challenges experienced by those interacting with the educational system through an integrated policy focus towards provision of actions that can apply across the learning journey regardless of whether that journey takes place in early years, primary and secondary school settings. The findings discussed in relation to the current sample at Age 4, 7 and 16 have unearthed similarities across educational settings with similar implications for practice and pedagogy. Relationships with educators are key for positive academic outcomes but also depend on curricular factors such as suitability of content and consideration of the existing and emergent interests of learners. Engagement with learners is reliant on the pedagogical approach of the educators, the learner’s motivation and attitude to school and learning (which reflects earlier educational experiences) and also the access of educators to relevant training and CPD. Curricular continuity between early years and primary school settings, offered by Aistear is one way to smooth the transition from Age 4 to Age 7, while also ensuring that supportive practice identified in the research such as small-group learning, child-centred teaching and play-based approaches are implemented. Although there is no framework offering curricular continuity between primary and secondary schools, the concerns that children have about that transition are often strikingly similar to the concerns that children have about transition to primary school (O’Toole, Hayes & Mhic Mhathúna, 2014). The pedagogical principles that apply to Aistear are equally relevant to the secondary school system including; equality and diversity; the adult’s role; relevant and meaningful experiences and the role of parents, family and community. Person-centred educational policies such as those adopted in Finland, based on equity, flexibility, creativity, teacher professionalism and trust (Sahlberg, 2007) ensure that learners’ interests drive learning. The presence at the policy level of a shared vision for education as a public service, first and
foremost, would ensure that education policies meet the need of Irish citizens to learn in a seamless way in order to live fulfilling and rewarding lives.

Some of the required actions have already been recognised in the National Literacy and Numeracy Strategy that aims to support literacy and numeracy development across multiple sectors of the educational system (at the early years, primary and post-primary). It aims to foster and develop a love of reading in children and young people, in addition to raising national standards. As part of the strategy, continuing professional development for educators emphasises the importance of a pedagogical approach that accommodates the personal interests of learners, while also taking opportunities to develop literacy and numeracy in a cross-curricular way, not simply in allotted time portions and in the subject areas of Maths and English only. There are also planned and ongoing reforms to existing curricula. Given that teachers have been acknowledged to be pedagogically traditional (Walsh, 2016) and to have difficulties in implementing aspects of effective curricula such as active learning (Devine et al., 2013) and collaborative practice (Clerkin, 2013), a focus on implementation in practice is advised. Partnership between the home and learning environment is also recognised as being important in a bid to raise standards and ensure that practice is responsive to individual learners. In secondary schools this involves ensuring that the materials provided to promote and develop literacy reflect the multiplicity of interests that young people (including boys) can have. Particular attention should be paid to providing both literary and non-literary resources, in both digital and non-digital formats. The findings on Junior Certificate outcomes discussed in the current research lead to similar recommendations to Smyth’s (2009) national longitudinal research on Junior Certificate outcomes. Specifically,
the findings on the link between reading and language development at Age 7 and Age 16 outcomes imply a need for different forms of assessment to prevent the narrowing of educational experience along exam preparations lines only, in addition to using diverse and engaging teaching methods even within the existing system to allow students of differing abilities to participate and engage with the curricular content that is meaningful and accessible for them. The need for similar actions in the early education and primary sector has been underlined by the results described in this thesis and addressed at a macro-level through the development of Aistear. However, as previously discussed, the pace of reform in the educational sector has been slow and practice is still catching up with policy, while also being hindered by sectional interests, piecemeal implementation and economic change. At the macro-level, the work of the National Council for Curriculum and Assessment should continue its work on curricular integration, with an emphasis on smoothing the transition for children on an educational journey that traverses early childhood and adolescence. Mesosystem levels of support from the interactions with home, school and community context can help to ensure that the interactions that young people have within the education system are positive and specifically designed, first and foremost to meet their right to learn as an Irish citizen thereby providing strong foundations that individuals can build upon throughout their life.

**Conclusion**

Based on the literature presented in this thesis, along with the empirical findings, there is a value in considering the bio-ecological model as a research frame with which to develop policies and practice that are important for the academic development of children and young people, in Ireland. The model allows for the viewing of early childhood, primary and
secondary education practice, theory and policy through a lens that links the social processes within education environments to structural aspects, while also acknowledging the fact that such processes and structures are dynamic and bi-directional. Where direct relationships were absent in the current study, chains of prediction led through the developmental trajectory that coincides with participation in the early years, primary and secondary education systems. Foundations for positive academic outcomes were laid at each stage and depended on individual, family, educator and policy and time factors. Tackling aspects of the family environment, and early years, primary or secondary education experience will lead to better academic outcomes in the short-term for children and young people but only for the aspect that is explicitly targeted. In order to ensure more meaningful, lasting and effective academic benefits, the learning from the current study is that theory and practice at the micro- and meso-level should be coupled with or extended upon by the development of effective wraparound mechanisms at the macro policy level. This research thesis confirms the need for many of the policy changes that have been introduced since 1994 in the early years, primary and secondary education sectors. However, the similarity in its findings and the findings of more recent research confirms that policy change alone is not sufficient to affect a change in practice. This thesis argues that children, families and education settings should be supported by the development, integration and implementation of theory with rights-based policy and practice in order to ensure that children succeed in the Ireland of the today, while also ensuring that they are well equipped to succeed on a lifelong journey of learning and discovery.
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The child activities (CA) instrument is a timed interval observation measure that focuses on the activities and interactions of a target child in a preprimary setting or at home.

Duration of Observation

Observations of each target child should occur on two days, with at least 20 minutes per day of observation, divided into two 10-minute observations conducted at two different times of the child's day. The observer can complete the observation simultaneously with
Management of Time. A total of 40 minutes will be spent observing Child Activities for each target child during the two days.

**Scope of Observation**

The activities of the target child are the focus of the observation. In addition, the social context of each activity will be noted.

**Vantage Point of Observation**

Since this observation can be conducted simultaneously with Management of Time, the observer should position him/herself in a place where she/he can clearly see and hear the child(ren) and the main adult to be observed, while remaining unobtrusive. If it is necessary for the observer to move from one place to another, this should be done as quietly as possible.

**Scheduling of Observation**

The observation should be carried out in the morning. To avoid possible atypical situations, observations should not be carried out during arrival/departure of children. If the child's own home is a main setting, observations should also be conducted in the morning.

**Completing the Observation Form**

1. **To provide a context for the interpretation and coding of the activities that are checked on the observation form,** the scene of activity at the beginning of the observation should be identified in the space marked "Situation" at the top of the form. As an activity is entered on the form, the context of the activity should be noted in parentheses. Two examples: (1) Child pretends to read book. (Housekeeping area) (2) Child helps adult clear table. (Kitchen)

2. **To record the child's activity,** use the timed interval method of observation. To use this method, once every thirty seconds the observer records a brief description of the target child's activity (e.g., child is coloring with a red crayon, child builds with blocks) and indicates the accompanying social context and social origin. In between the recorded observations, the observer should continue to watch the target child in order to note social context correctly. (This type of observation will require the use
3. **To indicate verbalizations by the target child that occur during the observation period**, the observer should place a checkmark in the column labeled "T"--Talk.

4. **To indicate the social context of an activity**, use checkmarks and/or "+" symbols in the appropriate columns. In this section only, the observer may need to use multiple checkmarks and/or "+" symbols when indicating interaction or no interaction. (See further interacting instructions below).

<table>
<thead>
<tr>
<th>Definition</th>
<th>Description</th>
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<tbody>
<tr>
<td>WC = With one child</td>
<td>Target child is with one other child.</td>
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<tr>
<td>SG = Small group++</td>
<td>Target child is in a group of 2 to 6 children.</td>
</tr>
<tr>
<td>LG = Large group++</td>
<td>Target child is in a group of 7 or more children.</td>
</tr>
<tr>
<td>WA = With one or more Adult(s)</td>
<td>Target child is with one or more adult(s) or the adult(s) is in the room but not directly involved with the target child.</td>
</tr>
<tr>
<td>GR = Group response++</td>
<td>(See instructions below)</td>
</tr>
</tbody>
</table>

**Group Response:** Physical or verbal response in unison with all or most of the group. For example, if a group of children responds verbally to a teacher's question during an alphabet lesson, or if they produce similar gestures during a song or fingerplay, these behaviors would be considered group responses. **To indicate GR:** If the target child is participating in the group response, then place a "+" symbol in the (GR) column. If the target child is not participating in the group response, then place a checkmark in the (GR) column.

**To indicate the social context of an activity when there is no interaction with the target child,** use a checkmark in the appropriate column(s). This checkmark may indicate either the location of one or more adults and/or children in close enough proximity to the target child to supervise, observe, offer assistance, or become involved in the activity or **when the adult(s) is in the room but not directly involved with the target child.** For example, if the child is playing in a small group, a "T" should be placed in the SG (2-6) column; or if the child is playing by him/herself with the adult still in the room either nearby or across the room, a "T" should be placed in the WA column only.

**To indicate the social context of an activity when there is interaction with the target child,** use a "+" symbol in the appropriate column(s) to indicate the involvement of one or more adults and/or children in the target child's activity. For example, if a child is interacting with one child within a small group, a "+" should be
placed in the SG (2-6) column; or if the child is interacting with one child and one adult within a large group, a "+" should be placed in both the LG (7+) column and the WA column.

To indicate more than one type of social context for an activity, use multiple checkmarks and "+"s. For example, if a child is playing with two children in the middle of a large group, with an adult nearby, a “T” would be placed in the WA column, and a "+" in the LG column.

5. To indicate the social origin of an activity, use a checkmark in the appropriate column.
   AI = Adult Initiated++
   CS = Child Suggested (by another child)++ CI = Child Initiated (by the target child)++

++Definitions of social origin:

   Adult Initiated = The target child's activity is planned, selected, enforced, suggested, initiated, and/or encouraged by the adult; that is, the adult is involved in determining the child's activity and/or the child makes the final decision about his/her activity based on the adult's input. When the adult first directs/suggests the child’s activity, place a checkmark in the (AI) column for that 30-second mark. If the adult continues to direct/suggest the child’s activity or the child does the planned activity as the adult instructed, then the checkmark continues to remain in the (AI) column until the child changes the activity. For example, the adult instructs the child on how to make a puppet, then continues to tell the child where the pieces are placed, the observer would continue to place a checkmark in the (AI) column for the next 30-second mark; or the adult gives children directions on how to play a game and the children follow those instructions as they play the game, the observer would continue to place a checkmark in the (AI) column for the next 30-second mark. If the adult instructs the child on how to make a puppet and then allows the child to put the puppet together anyway he/she wants or if the adult planned a game but allows the children to play the game anyway they want, the observer would then place a checkmark in the (CI) column for the next 30-second mark.

   More examples of adult initiated activity: child sits up straight because the adult told him to; child listens to an adult tell him not to put his fingers in the glue; child writes his name on the paper according to the adult's instructions; child sits on the adult's lap after she asks, "Do you want me to look at the knee you hurt?"; child counts blocks because the adult asked, "Do you have enough blocks?"; child talk's to adult after adult says, "Would you like to talk about what happened?"; during an art
activity, child puts down a crayon and chooses a marker from different drawing materials just laid on the table by the adult; child cleans his room because the adult told him to; etc.

Child Suggested = The target child's choice of activity comes from ideas about tasks, materials, etc. mentioned by another child; that is, the target child makes the final decision about his/her activity based on another child's input. Some examples: target child follows another child to play in water table; child says she does not want to play when another child asks her to play cards; child joins other children singing in a toy microphone when they asked him if he wanted a turn; child goes to dress-up corner and gets fireman hat after another child says, "Let's pretend the house is on fire"; child stops riding her bike when older brother asks her to wait, etc.

Child Initiated = The target child chooses his/her own activities without direction from adults or other children. Some examples: child builds a truck in the block area; child pretends to serve food to another child; child tells adult about her new puppy; child asks adult to read a story; child paints a picture with two paintbrushes; child rides his bike around the block; child goes to the bathroom; child runs across the room pretending to be Batman; etc.

Using the Categories to Code Recorded Behaviors

Child Activities is a content-oriented instrument; the recommendations provided below for the coding of behaviors are based on this orientation.

1. **To code the child's activity when it is part of a more global activity** (such as stamping his/her name on his/her completed art project, writing his/her name on his/her number sheet, the coder should code the activity according to the content of the global activity (e.g., 022--Expressive/Arts and Crafts, 042--Preacademic/Numbers, respectively, for the examples given above).

2. **To code discussions that occur during the observation**, the observer should record the activity (e.g., child talks in group discussion), and continue to listen (if necessary) to determine the content (e.g., weather). Using this method, the discussion can then be coded according to its content (e.g., children and adult are discussing weather, code as 044--Preacademic: Physical Science/Environment; target child and adult are discussing reasons why the child's behavior was inappropriate, code as 073--Personal/Social - Discipline).

**To code activities when the context for the behavior is ambiguous**, the observer should note the behavior (e.g., child pushes another child), and continue watching to determine the context of the behavior (e.g., rough-housing). Using this procedure, the activity can then be coded according to the context (e.g., child pushes another child while they are playing roughly, code as 011--Physical/Gross Motor; child pushes another child in anger, code as
CHILD ACTIVITIES OBSERVATION SYSTEM

I. TALKING

Talking–The observer should use the following system for coding the child's verbalizations:

Talking that occurs within the context of an activity should be indicated on the observation form with a "T" in the talk column (T) and coded based on the activity in which the child is involved at the time the talking occurs. Talking that occurs in the absence of any other activity should be indicated with a "T" in the talk column and coded as Social Activities (072). For example, target child is coloring with a friend and asks him/her for a crayon; code as "022" (T); or target child is talking to her friend on the playground, they are not involved in any other activity; code this as "072" (T).

II. ACTIVITY CATEGORIES

A. Physical Activities--The child listens/watches, listens to instructions for, or participates in an activity involving physical movement.

   Code 011--Gross Motor--Active movement using legs, arms, head, and/or body. Such activities would include: running, climbing, jumping, swinging, swimming, rough-housing, throwing, sliding, riding a bike, baseball, soccer, football, leapfrog, ring-around-the-rosie, chasing games, hiding games, teasing games, calisthenics, gymnastics, using a trampoline, building with large wooden or plastic blocks, giant tinkertoys, crates, etc.++

   Code 012--Fine Motor--Active movement using hands, feet, fingers, toes. Such activities would include: stringing beads, sewing/lacing cards, table games, puzzles, peg boards, dice, playing with playdough, clay, sand, water, rice, or beans, sorting, arranging, handling small object building with legos, bristle blocks, other small blocks, small tinkertoys; doing woodworking, carpentry, etc.++

++NOTE: If these materials are used as props for dramatic play or in a manner not conforming to the rules or constraints, code the activity according to the manner in which the child is actually using them.

B. Expressive Activities--The child listens/watches, listens to instructions for, or participates in an activity which involves invention, self-expression, or role-play.
**Code 021**--Dramatic/Imaginative Play--Play-acting/pretending with or without adults, and with or without props (dress-up clothes, puppets, dolls, trucks/cars, etc.), such as playing policeman, pretending to be an actor, pretending to cook or clean, etc. In order for an activity to be coded in this category, it would include such things as setting a scene for the role play by rearranging materials/furniture, selecting props that may be used, discussion among the children about the roles, etc. If the child has been asked by the adult to do something (e.g., to walk like an elephant or hop like a bunny), the activity would be considered creative movement and thus would be coded as "011." But if the adult asked the child to pretend to be an elephant or bunny, the activity would be considered dramatic play.++

**Code 022**--Arts and Crafts--Use of creative materials to invent something or to express oneself such as painting, drawing, coloring, cutting, pasting, making collages, using ink and stampers, etc.++

**Code 023**--Music--Spontaneous or planned activities involving rhythm and/or music, such as singing, dancing, playing or learning to play instruments, listening to musical recordings, playing musical chairs, etc.++

"**NOTE**: If materials such as blocks, beads, game parts, paint brushes, tapes/tape recorders, musical instruments, etc., are being used for imaginative or dramatic play, code the activity in this category; if such materials are being used for construction, manipulation, art, etc., code the activity according to the actual use of the toys.

**C. Code 030**--Language/Storytelling--Activities involving listening to stories read or told by others, listening to stories narrated on a recording without a book, telling one's own stories, reciting fingerplays or nursery rhymes of a non-musical nature, playing language games, etc.

**D. Preacademic Activities--**The child listens/watches, listens to instructions for, or participates in an activity related to the learning of basic concepts and/or preacademic skills. If an activity involves computers, books, or storytelling, it should be coded according to the type of preacademic activity for which the material is primarily being used (e.g., listening to a story about chickens to learn about farm animals would be coded as "044;" listening to the same story for no specific purpose [i.e., "for fun"] would be coded in Language/Storytelling "030").

**Code 041**--Reading--Activities involving visual recognition/auditory discrimination of letters, and use of books, such as looking at books independently, attempting to sound out words, learning to look or looking at books right-side-up and in proper sequence (i.e., beginning to end), learning to "read" or "reading" in the direction of
the written language, following the words in a book while listening to the story narrated on a recording, forming letters with playdough, etc.

**Code 042**--Writing--Activities involving learning to use written language, such as learning to use writing utensils (e.g., holding a pencil/crayon correctly), copying and/or writing the letters/characters/numbers of the language, writing in the proper direction, writing one's name, etc.

**Code 043**--Number/Math Concepts--Activities involving the learning or use of numerical concepts, such as visual recognition of numbers, counting, number composition and/or decomposition, learning basic concepts such as size, shape, seriation, classification, and temporal and spatial relationships, etc.

**Code 044**--Physical Science/Environment--Activities that involve sensory exploration or examination of objects or materials, and/or which enhance the child's knowledge and understanding of the physical environment, such as using a microscope, smelling and describing different scents, feeling and comparing different textures, auditory discrimination games (except those involving letter sounds), planting one's own garden, simple science experiments, learning about weather, learning about pet animals, cardinal points (e.g., North, South, East, West), exploration of the environment, etc.

**Code 045**--Social Science/Environment--Activities involving learning about the community and community helpers, such as a trip to the firehouse, a visit to the school by a doctor or nurse, learning about families, etc.

**Code 046**--Others/Miscellaneous--Child listens/watches, listens to instructions for, or participates in a preacademic activity that is not included in one of the 6 categories listed above (e.g., memory games, calendar time, the national anthem, colors).

E. **Code 050**--Religious Activities--The child listens/watches, listens to instructions for, or participates in religious activities such as lessons, singing, praying, attending chapel, etc.

F. **Code 060**--Media-related Activities--The child listens/watches, listens to instructions for, or participates in activities involving various types of media, such as television, slides, filmstrips, movies/videotapes/DVD’s, video games, computer games, records/audio tapes/CDs, etc.“

**“NOTE**: When computer games are used as preacademic activities or when audio tapes are used for dramatic play, code the activity according to how the child is actually using the materials.

G. Personal/Social Activities--The child listens/watches, listens to instructions for, or participates in an activity essential to his/her physical or emotional health and well-being.
**Code 071**--Personal Care--Tasks involving attention to physical and bodily needs, such as toileting, washing hands or face, bathing, washing/brushing hair, brushing teeth, dressing, eating, sleeping, etc.

**Code 072**--Social Activities--Physical and/or verbal activities involving attention to one's behavior in relation to other children and adults, such as showing objects to others (e.g., show and tell), reporting your “news” (e.g., telling others about the park you visited last night), sharing materials, borrowing materials, seeking or giving help or information, planning or making decisions, talking to others, asking questions, making demands, carrying on a conversation, telling jokes, requesting permission to do something, conflict resolution, etc.++

+++NOTE: This category should be coded only if the child is not involved in another activity which can be coded.

**Code 073**--Discipline--Activities in which child carries out one or more behaviors or tasks in response to disciplinary action(s) imposed by an adult, such as sitting in "time out," being quiet, sitting at a table/desk and putting one's head down, choosing a different activity when unable to behave properly in current activity, going to principal's office, standing in the corner or hallway, participating in discussions with adult about misbehavior, etc.

H. Expressions of Emotion--The child listens to, watches or participates in physical and/or verbal communication of attitudes and/or feelings.

**Code 081**--Positive--Hugging, cuddling, seeking comfort, gentle touching, kissing, being kind, laughing, smiling, empathizing, sympathizing, saying one likes another's work or clothing, displaying pleasure or appreciation, etc.

**Code 082**--Negative--Screaming, pouting, fighting, crying, having a temper tantrum, being angry or frustrated, hitting, slapping, grabbing, biting, teasing in a derogatory manner, pushing or hurting others intentionally, making unfriendly or unpleasant comments to or about others, displaying displeasure or disapproval, etc.

I. Child Helper Activities--The child listens/watches, listens to instructions for, or carries out a task, with or without an adult, related to maintenance of the home or facility, smooth operation of daily activities, and/or performance of setting-related domestic or economic duties.

**Code 091**--Domestic Activities--Involvement in tasks such as meal preparation and/or clean-up, setting the table, gardening or tending to pets or other animals (when the garden or animals do not serve an economic purpose), shopping, participating in organizational or clean-up activities, preparing activities by taking out and distributing toys and/or materials, getting ready for naptime, etc.

**Code 092**--Economic Activities--Involvement in tasks that contribute to the income of the setting, such as tending animals, farming, selling, repairing, etc.
J. **Code 100--Transitional Activities**--The child is involved in purposeful movement directly toward an activity, object, person or place, or purposeful searching for something to do, such as going outside, looking for a dropped toy, getting something from backpack, or changing activities. Lining up to go somewhere or move to the next activity, or following in a line from one place or activity to another would also be considered transitional activities. This category differs from the Child Helper activity category (091, 092) in that a child involved in Transitional activities (100) is looking for something to do or moving between activities, whereas a child involved in Child Helper activities is clearly participating in an activity (e.g., feeding a pet) or preparing to participate in an activity (e.g., distributing materials for an art project).

K. **Code 110--Accidents**--The child does something unintentional, such as tripping, falling, spilling or dropping something, or knocking something over.

L. **Waiting/No Active Engagement**---The child does not appear to be doing any specific activity, but is instead appears to be uninvolved (i.e., not actively engaged) in an activity or task.

**Code 121--Waiting**--The child is inactively waiting for someone or something such as waiting for materials from the adult, waiting for a child to come play, sitting at the table waiting for the next activity, waiting for one's name to be called during attendance, waiting for turn in a game or activity, etc.

**Code 122--No Active Engagement**--The child is wandering aimlessly about with no evident purpose or goal, sitting or standing alone and unoccupied, pausing during an activity, staring out in space or out the window, playing with fingers, picking at clothing, looking around the room, etc.

III. **SOCIAL CONTEXT CATEGORIES**

- **WC = With one child**
- **SG = Small group (2 - 6 children)**
- **LG = Large group (7 or more children)**
- **WA = With one or more Adult(s)**
- **GR = Group response**

IV. **SOCIAL ORIGIN CATEGORIES**

- **AI = Adult**
- **Initiated**
- **CS = Child**
- **Suggested**

++See guidelines for explanations and/or definitions of these categories.
Date of Observation:
Number of adults present:
Number of children present:

Situation:

<table>
<thead>
<tr>
<th>Time</th>
<th>Child Activities</th>
<th>CODE</th>
<th>Talk</th>
<th>Social Context (Use T’s and/or +’s)</th>
<th>Social Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hr</td>
<td>Min</td>
<td>Sec</td>
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Appendix 2

IEA PREPRIMARPY PROJECT

ADULT BEHAVIOR
OBSERVATION SYSTEM
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ADULT BEHAVIOR OBSERVATION SYSTEM

Administration Guidelines

The adult behavior (AB) instrument is a timed interval observation measure that focuses on the primary adult (teacher or caregiver) in a preprimary setting or the child’s home.

Duration of Observation

One adult (i.e., teacher or caregiver) per setting should be observed, at least 30 minutes per day on 2 separate days. The observer can complete the observations simultaneously with Management of Time. The adult will be observed for a total of 60 minutes over two days.

Scope of Observation

All activities of the primary adult in the setting are the focus of the observation, regardless of whether or not a behavior directly involves the children.

Vantage Point of Observation

Since this observation can be conducted simultaneously with Management of Time, the observer should position him/herself in a place where s/he can clearly see and hear the main adult and the child(ren) to be observed, while remaining unobtrusive. If it is necessary for the observer to move from one place to another, this should be done as quietly as possible.
**Scheduling of Observation**

The observation should be carried out in the morning. To avoid possible atypical situations, observation should not be carried out during arrival/departure of children. If the child's own home is a main setting, observations should also be conducted in the morning.

**Completing the Observation Form**

1. **To provide a context for the interpretation and coding of the activities that are noted on the observation form**, the scene of activity at the beginning of the observation should be identified in the space marked "Situation" at the top of the form. For specific adult behaviors, the context should be noted when it is not obvious or when the observer considers the information useful for interpreting the behavior.

2. **To indicate the adult's activity**, use the timed interval method of observation. To use this method, the observer records a brief description of the adult's activity (e.g., Adult gives children pencils) once every thirty seconds. (This type of observation will require the use of some type of instrument to measure the timed intervals accurately, e.g., a watch with a second hand or a digital watch.)

3. In general, the primary adult will be the focus of this observation.

   a) **If there is more than one adult in the setting**, the observer should determine which adult is most responsible for directing the children's activities and/or interacts the most with the children and observe this adult. If the adults in the setting seem to be genuinely equal in terms of responsibility for directing activities and/or interaction with the children, the observer should randomly select one adult to observe.

   b) **If the main adult leaves the setting during the observation**, the observer should direct his/her attention to the second adult (SA) who seems most responsible for organizing and proposing activities to the child(ren). It is assumed that the primary adult is usually responsible for organizing the activities, even in his/her absence.

**Appendix 2**

**ADULT BEHAVIOR OBSERVATION SYSTEM**

**I. ACTIVITY CATEGORIES**

**A. TEACHING STRATEGIES**--Adult behaviors--verbal and/or nonverbal--that are intended to instruct, guide, inform, teach, assist, and/or otherwise encourage the child to participate in an activity or complete an activity already in progress.

   
   Giving/Receiving Information or Knowledge
**Code 111--Giving Knowledge/Information Intended to Teach--** The adult tells the child facts, concepts, functions of events, cause-effect relations, and other types of knowledge related to teaching. Explanations may be brief and simple, such as "This is a bee," "Apples grow on trees," etc. They may also be lengthy and more complex, such as "The leaves are changing colors because in autumn it gets colder and the days get shorter so there isn't enough sunlight or warmth for the leaves to stay green," "Bees fly from flower to flower to get pollen that they need for making honey in their beehive," etc. This category includes giving knowledge unsolicited by the child (e.g., as part of a planned lesson). (If the adult uses a physical demonstration in his/her explanation, the behavior would be coded as "121.")

**Code 112--Listening to Questions Related to Teaching--** The adult listens to the child ask a question about facts, concepts, functions of events, cause-effect relations and other types of knowledge related to teaching, such as when a child asks "Where do we get apples from?" or while reading a story about bees, the child asks the adult why bees like flowers, etc.

**Code 113--Giving Knowledge/Information Unrelated to Teaching--** The adult gives the child information he/she needs/wants to know that is unrelated to teaching or child management, such as "Your jacket is on your coat hook," "The older children will come back inside soon," "Your father will come to get you after naptime today," "The pencils are in the blue box," "Mommy will give you your medicine before lunch," etc. This category includes giving the child unsolicited information (e.g., reminding the child that the grandparent, rather than the parent, is coming to get him/her that day).

**Code 114--Listening to Questions Unrelated to Teaching--** The adult listens to the child ask for information he/she needs/wants to know that is unrelated to teaching or child management, such as when the child has asked where his older sister is, or when the child asks "What time is Daddy coming to get me today?" "Do you know where my coat is?" etc.

**Giving Demonstrations**

**Code 121--Giving Demonstrations--** The adult shows the child how to carry out a task or improve skills, provides a demonstration of the concepts or knowledge intended to be learned, or shows the child how something works, such as showing the child what to do next for an art project, showing the child how to use the telephone in case of emergency, showing the child how to place a pile of blocks in a row to practice counting, showing the child how to use a tape recorder, showing the child how to tie his/her shoes, showing the child how a flashlight works, showing the child how to use a computer, etc.

**Code 122--Listening to Child's Request for a Demonstration--** The adult listens to the child ask to be shown how to do something or how something works, such as when the child says "I'm finished with the glue; now can you show me how to put the sand on my paper?" "Please show me how this works," or when the child is trying to tie her shoes, "Show me how the string goes through the hole again," etc.

**Eliciting Information or Knowledge**
**Code 131**--Eliciting Information/Knowledge Related to Learned Concepts--The adult asks the child questions about facts, concepts, cause-effect relationships, and/or other types of knowledge the child has learned or is learning about, such as "How many children are here today?" "What color is this?" "Why do the leaves change color?" "Are all the blocks the same size?" "What day of the week is today?" "Will the seeds we planted grow if we don't give them any water?" etc. Such questions typically require responses that are clearly "correct" or "incorrect," such as the name of a color or shape, an explanation about why the leaves change color, or a simple "yes" or "no."

**Code 132**--Listening to the Child's Responses about Learned Concepts--The adult listens to the child's responses to questions about facts, concepts, cause-effect relationships, and/or other types of knowledge the child has learned or is learning about, such as when the child says "No, the plants won't grow without any water," or the child answers the adult's question about autumn leaves, etc.

**Code 133**--Eliciting Information/Knowledge Related to the Child's Own Thoughts and Ideas--The adult asks the child questions intended to encourage him/her to think about and express his/her own ideas, thoughts, or opinions, such as "What didn't you like about the farm you visited?" "Was the book you read with your mother a good book?" "What kinds of games do you like to play?" "Tell me what you did on your vacation," "Tell me why you don't like dogs," etc. These types of questions are intended to elicit the child's point of view rather than any response that is considered "correct" or "incorrect" by the adult.

**Code 134**--Listening to the Child's Responses about Thoughts/Ideas--The adult listens to the child's responses to questions intended to encourage him/her to think about and express his/her own ideas, thoughts, or opinions such as when the child says "I didn't like the farm because it smelled funny," "My picture is the best because it's pretty," "Dogs are big and loud and they bite," etc.

**Code 014**--Eliciting an Action or Behavior--The adult asks or tells the child to carry out a specific activity or task intended to demonstrate acquisition or improvement of skills, to encourage the child to improve skills, to encourage the child to try a new and/or unfamiliar activity, or to offer the child the opportunity to perform a specific task, such as "How would you draw a picture of a fish?" "Show the children how your new toy works," "Paint a picture with the finger paint instead of the watercolors," "Will you show me how you build a castle with the blocks?" "Show me another way to use this toy," "Would you like to pour the juice?" etc. (If the adult requests both information and action, the behavior would be coded in "014.") This category includes the adult asking or telling the child to do something, or calling the child’s name, but is not giving the child an order such as “Please, shut the door,” “Could you give this book to her,” “Take this painting and put it in on that table to dry,” “David,” etc. This category differs from Offering Choices "151" in that the adult may offer the child the opportunity to decide whether to do a single specific activity, rather than offering a selection of activities to choose from.

**Offering Choices**

**Code 151**--Offering Choices--The adult explains to the child what alternative activities are available, or asks the child if he/she would like to choose from a selection of activities, such
as "Would you like to do dance activities with Luisa, or an art project with Sofia?" "The climber is closed; you may play with a game, look at books, or listen to a record," "We aren't taking out the markers today, but you can color with crayons or chalk," etc. This category differs from Eliciting Action or Behavior "014" in that the adult is giving the child several activities to choose from, rather than offering just one behavior/activity that the child may choose to do or not do.

**Code 152**--Listening to the Child's Questions about Activities--The adult listens to the child ask questions about what his/her options are in choosing an activity, such as when the child asks if the climber is open during free activities, when the child asks which games can be played on the floor, when a child who arrives asks what activities he can do, etc.

**Encouraging Activity**

**Code 161**--Encouraging Activity--The adult encourages the child to continue working, to try again, to start over, and/or to persist until task is completed, such as helping the child focus on a task, saying "I'm sure you can draw a circle if you try again," "Would you like another piece of paper to start a new picture?" "You're almost finished--you only need three more red blocks," "That's okay. Try to do it again. I know you can do it," etc.

**Code 162**--Listening to the Child's Comments--The adult listens to what the child says about an activity in which he/she is involved and may need encouragement, such as when the child says "I can't draw a circle," "This is too hard," "I keep tipping over on the bike," etc.

**Code 171**--Providing Assistance or Clarification, and/or Suggesting solutions--The adult helps the child with an activity, clarifies a task for a child who is confused or hesitant, and/or suggests different approaches the child might use to resolve task-related problems, such as helping a child turn a puzzle piece to fit, holding child's paper still while he/she cuts or pastes, saying "You might be able to paint thin lines if you use a thinner paint brush," "Maybe you could use less glue," "Try pushing the bike with your feet if you can't reach the pedals," etc.

**Code 172**--Listening to the Child's Request for Assistance--The adult listens to the child ask for help with the problem he/she is having with a task, or for clarification of a task, such as when the child says "I can't ride the bike because I can't reach the pedals," "I can't get the last piece of this puzzle to fit," "What did you just say to do to make skinny lines with the paint?" etc.

**Providing Feedback**--The adult gives the child information about his/her performance, about expected consequences of task performance in relation to a standard of work, and/or about what the child might do to improve his/her task performance. This category may include involving the child in a joint analysis/evaluation of task performance.

**Code 181**--Giving Positive Feedback--The adult makes comments indicating praise or approval of task performance, such as telling a child how well he/she succeeded in reaching a standard, saying "That's a good one!" "I really like the way you followed the instructions for this
"I think this is a very nice picture. Do you like it?" "You worked hard writing your letters. Next time I'll give you the lined paper so you can practice writing in the lines," etc.

**Code 182--Giving Negative Feedback**--The adult makes comments indicating criticism or disapproval of task performance, such as talking with a child about how he/she might have improved his/her task performance, how he/she might be more cooperative in following instructions and/or concentrating on the task until finished, saying "I know you can do better than this," "Next time, listen more carefully and follow the instructions," "You were too busy fooling around and did not do a good job on your project," "You used too much glue again," etc.

**Code 183--Listening to the Child's Comments Related to Feedback**--The adult listens to the child's request for feedback, evaluation of his/her own work, or responses to the adult's feedback, such as when the child says "Do you like my picture?" "I don't really like this picture. I colored out of the lines," "I made a really good castle with the blocks all by myself!" "I was not fooling around!" "I tried to be more careful with the glue this time," etc.

**NOTE:** Feedback in this category applies only to the child's performance on tasks or activities; for feedback on the child's behavior, see category (D) Providing Feedback.

**B. PARTICIPATION/SHARED ACTIVITIES**--Adult behaviors in which the adult is a full participant in the child's activity or in which the adult chooses an activity to do together with the child.

**Code 211--Participation/Shared Activities**--The adult participates with the child, is an equal partner in play or chooses to join in various types of activities with the child. Examples of the types of activities that the adult and child may share together are gross motor (e.g., riding bikes, large scale construction, exercising), fine motor (e.g., playing table game, digging in sand, small scale construction), expressive (e.g., play-acting with props, coloring, singing), preacademic (e.g., reading, writing, counting), media (e.g., watching television, listening to music).

**Code 212–Listening During Participation/Shared Activities**--The adult listens to the child’s explanations or statements while they are engaged in a shared activity. Examples of this included: the adult listens to the child explain where the next block goes while they are building a fort, the adult listens to the child tell where the sand should be dumped while they are digging in the sand box, the adult listens to the next line of a song that the child offers, while eating lunch together the adult listens to the child tell a story.

**C. NURTURANCE/EXPRESSIONS OF AFFECT**--Adult's caregiving behaviors designed to maintain or influence the emotional or physical well-being of the child. Such behaviors include talking and listening to the child and asking questions in order to respond to the child's needs or behavior (e.g., asking child "Why are you crying?" when he/she is sad/upset, asking child "Is today the day you get your surprise toy?" when he/she is unusually excited).

**Engaging in Affectionate/Friendly Behavior**
**Code 311--Engaging in Affectionate/Friendly Behavior**--The adult engages in affectionate and/or warmhearted interactions with the child, with or without physical contact, such as hugging/kissing, cuddling child in one's lap, expressing interest in child and/or his/her activities/interests, smiling, bending down to the child's level to enhance interaction, making funny faces back and forth between child and adult, etc. This category also includes verbal interactions between the adult and child that are not covered by another category, such as telling jokes, making up stories, responding to the child's unsolicited remarks or attempts at conversation (e.g., child says that she just got a puppy and the adult tells the child about the puppy she had when she was little), etc.

**Code 312--Listening to the Child's Remarks Related to Affection/Friendly Behavior**--The adult listens to the child's requests intended to elicit affectionate or friendly behavior, or the child's remarks or attempts at conversation, such as when the child asks "Can I sit on your lap," "I want to give you a hug," "I just got a new puppy and he sleeps in my room!" (If the child is asking for a hug, etc. because he/she needs or wants reassurance or support, code as "321.")

**Giving Reassurance and Support**

**Code 321--Giving Reassurance and Support**--The adult engages in behavior intended to ease a child's discomfort, hurt, injury, anxiety, sadness, etc. and/or which indicates to the child that his/her feelings and behavior are valid, accepted, understood, and/or appropriate, such as cleaning and bandaging an injury, talking with the child about his/her feelings, cuddling a crying child, empathizing with a sick child, telling a child it's okay to be angry or sad, giving the child crayons and paper to make a special picture for his/her parent(s) when he/she misses one or both of them, etc.

**Code 322--Listening to the Child's Remarks Related to Reassurance and Supportive Behavior**--The adult listens to the child's requests for reassurance or support when the child is ill, injured, upset, unsure of him/herself, etc., such as when the child explains why he is angry, worried, sad, etc.; when a child says "Can I have a band-aid [bandage]?" "My stomach hurts," "I don't feel good," "I miss Mommy," etc.

**Code 033--Engaging in Neutral Behavior**--The adult's behavior is parallel to the child's activity, is neither positive nor negative in content, and does not include interaction with the child, but provides him/her with a sense of the adult's presence and availability, such as adult and child both watching television while the adult folds the laundry, adult and child both sitting on the couch reading different books, adult and child both working at a table, etc. This category differs from Category B “211 & 212" in that although the adult and child are in the same room and doing the same activity, no interaction occurs between them; thus the activity is not considered to be shared.

**Code 034--Engaging in Negative Affective Expression/Behavior**--The adult says or does something of a degrading, demeaning, hurtful, spiteful and/or otherwise negative nature directed at the child as a person, rather than at his/her behavior or task performance, or in which the adult ignores the child when he/she needs assistance, such as name-calling, humiliating the child, yelling at the child for no apparent reason, not attending to an injured child, ignoring a child's
attempts to show off a new object/outfit, ignoring an obviously distressed child, inflicting physical harm on child.++

Note: The definition of acceptable physical punishment will vary across cultures; therefore, each country should attempt to define what physical behaviors by the adult are acceptable or unacceptable for this category.)

D. CHILD MANAGEMENT--Adult behaviors intended to maintain order and an acceptable noise level, implement discipline, enforce rules, limit/guide/redirect undesirable behavior, and/or request that the child perform a specific task. Such behaviors include talking to children, asking questions, listening to children's questions, etc. (Requests in this category differ from requests in Category A in that Child Management refers to adult behaviors that control/manage the child's behavior/activities. In addition, the adult's behavior may involve a "power assertion" to force the child to cooperate.)

Establishing/Reminding Child of Rules

Code 411--Establishing/Reminding Child of Rules--The adult sets standards of behavior and/or explains to the child the type of behavior that is or is not expected/acceptable, such as "All of the children must wash their hands before snack," "Do we throw our coats on the floor like that when we take them off?" "It is not okay to jump off the stairs because you might get hurt," "You know the sand has to stay in the sandbox," "Walking on the flowers in the garden is not allowed," "You can't go outside until you have finished your work," "Let's play nicely," etc. This category also includes justification of rules.

Code 412--Listening to the Child's Comments about Rules or Acceptable Behavior--The adult listens to the child ask questions or make statements about standards and expectations of behavior, such as when a child says "Do I have to wash my hands, too? They're not dirty," "Why can't we jump off the stairs?" "We have to stay on the sidewalk or we might smush [crush] the pretty flowers," "Why do I have to do that?" etc.

Code 042--Verbal/Physical Intervention--The adult stops or restrains a child's undesirable behaviors, such as picking up a child and removing him/her from a problem situation, restraining a child's arms and/or legs to prevent injuries to him/herself or others when angry, saying "Be quiet!" "Stop throwing the blocks!" "Don't hit Krysia!" etc.

Giving an Order

Code 431--Giving an Order--The adult insists that the child carry out a task or activity or elicits a behavior from the child that is unrelated to the acquisition or improvement of skills, such as making a child wash his/her hands before eating lunch, telling the child to go to the bathroom, saying "Olivier, set the table!" "Give that toy to Bobby!" "Bring your picture here right now!" "Daniel, let Ethan go down the slide first," "Go get a tissue to blow your nose," etc. This category differs from Category (A) “014” in that the adult may use a "power assertion" or the tone of the adult’s voice is harsh to ensure that the child carries out the task. Also, this category differs from “042” in that the adult is not intervening to stop/prevent unacceptable actions.
Code 432--Listening to the Child's Response to an Order--The adult listens to the child's answer when told to do something, such as when the child says, "I don't want to!" "It's mine and I had it first!" "I can't reach the tissues," etc.

Code 044--Giving Permission--The adult permits the child to do what he/she wants to do, such as letting the child take out the toy he wants to play with, telling the child she can play in the sandbox if she takes her shoes off first, saying "Okay, we can take the bikes out today," "You can start drawing your pictures now," "Yes, you can go to your friend's house to play later," "You can go to the park with everyone else," etc.

Code 045--Refusing Permission--The adult does not permit the child to do what he/she wants to do, such as telling the child he can't take out his toys because it is clean-up time, saying "No, you may not go outside to play in the rain," "No, Vanessa, you can't have any more crackers," "The blocks are not for outdoor play, but you may use them in the block corner," etc. This category includes explaining the reason for refusing permission.

Code 046--Listening to the Child's Requests for Permission--The adult listens to the child ask for permission to do something or say he/she wants to do something for which he/she needs permission, such as when a child says "Can I play in the sandbox," "Can I play at Sheila's house?" "I want to go to the park, too," "Can I take these blocks outside?" "I want more crackers," etc.
Problem-solving/Conflict Resolution

**Code 471--Problem-solving/Conflict Resolution**--The adult assists the child with solutions for conflicts between children or between the child and adult and/or tells the child what options are acceptable or unacceptable as solutions to a conflict/problem, such as encouraging the child to tell the truth when he has done something wrong, suggesting the child get a second doll to play with instead of arguing over one doll, saying "Try using your words instead of hitting Joseph when he takes your toy and you want him to give it back," "This is a hard problem. What do you think you could do?" "Can you think of a better way to let me know you're angry instead of kicking me?" etc. This category also includes explanations about why a certain behavior is or is not acceptable as a solution to a problem.

**Code 472--Listening to the Child's Problem/Solution**--The adult listens to the child's description or explanation of his/her problem, conflict, or possible solutions to the problem or conflict, such as when the child says "He took my toy and he won't give it back," "I want to play with the doll, too, but she won't share it," "We could take turns playing with the truck," "I tried to tell him to share, but he won't listen," "I guess I could help her find the toy she wants," etc.

Providing Feedback**--The adult gives the child information about his/her behavior and its consequences. This category may include involving the child in a joint analysis/evaluation of the child's actions in relation to established expectations for behavior.

**Code 481--Giving Positive Feedback**--The adult makes comments indicating praise or approval of behavior, such as expressing appreciation for helping the teacher or another child, praising for sharing or using manners, saying "You did a good job sitting quietly for storytime," etc.

**Code 482--Giving Negative Feedback**--The adult makes comments indicating criticism or disapproval of behavior, such as talking with a child about cooperating with other children, saying "You know better than to do that," "You just broke a toy; can't you be more careful?" "Can't you sit still for even a few minutes?" "You shouldn't bang on the piano like that," "Vincent, are you playing nicely with Karl?" "Use that toy the right way or you'll have to put it away," etc.

**Code 483--Listening to the Child's Comments Related to Feedback**--The adult listens to the child's request for feedback, child's evaluation of his/her own behavior, or response to the adult's feedback, such as when the child says "Was I a good helper today?" "I sat very quietly during storytime," "I didn't break it; he was running and stepped on it," etc.

**NOTE:** Feedback in this category applies only to the child's behavior; for feedback on child's performance on tasks/activities, see Category (A) Providing Feedback. Also, when the feedback is part of a conflict resolution (e.g., "It's not okay to hit me when you want my attention; what could you do or say instead?") it should be coded in Category (D) “471”.

**Code 049--Calling for Attention**--The adult attempts to direct the child's attention to what he/she is doing or trying to do/say, such as quickly turning the lights off and on once to get...
child(ren) to look at adult, clapping hands loudly enough for everyone to hear, telling the children to come to storytime, saying "Please, children, can you listen to me," etc.

E. **Code 050--SUPERVISION**--Observation of the child's ongoing activities/behaviors in a supervisory manner, such as checking activity centers where children are playing/working, moving around the room to see that children are playing safely, watching children to make sure conflicts are resolved appropriately, watching a child from a distance, occasionally looking outside to check on child in the backyard at home, etc.

F. **Code 060--TRANSITIONAL ACTIVITIES**--Purposeful movement directly toward an activity, object, person or place, or purposeful searching for something to do, such as moving from the block area to the science corner, walking over to a toy to pick it up off the floor, moving towards two children who are fighting, looking for a pen that was dropped, etc.

G. **Code 070--ROUTINE ACTIVITIES**--The adult engages in planning and managerial activities related to daily operation of the setting, economic management of the setting, and scheduling of activities for the children. Examples include: meal preparation/clean-up, making business calls, paying bills, shopping, farming, selling (e.g., operating a stall at the market), preparing lesson plans and/or discussing lessons plans with other adults, determining the proportion of time for each activity, cleaning up activities, talking to parents to set up parent-teacher meetings, making appointments (e.g., to take child to doctor or dentist), taking attendance, leaving the room to get supplies, handing out materials and/or rearranges furniture as necessary for the children to participate in different types of activities, diapering a child, feeding children snack or lunch, finding dry clothing for a wet child, asking how many children need cups/napkins at snack, handing out sweaters to children before going outside, giving each child his/her toothbrush after meals/snacks, giving medicine, doing laundry, cleaning the setting, making repairs to the building/property, gardening, tending to pets or other animals (that do not serve an economic purpose), etc. The child may or may not be involved in carrying out these activities. This category included telling the child what will happen next (e.g., giving a 2-minute warning before clean-up).

H. **Code 080--PERSONAL ACTIVITIES**--Any peripheral or non-center/non-child related activities, such as drinking coffee/tea, making personal phone calls, combing hair, gossiping, tending to other personal business, leaving the room for breaks, leaving the setting.
ADULT BEHAVIOR OBSERVATION SYSTEM – FORM

Observer Name: [ ] Observer ID #: [ ] Date of Observation: [ ] Number of adults present: [ ] Setting Name: [ ] Setting ID#: [ ] Country Code: [ ] Number of children present: [ ] Site/Geographical Area: [ ] Site ID #: [ ]

Name of 1st Child: [ ] ID# of 1st Child: [ ] Sex of child being observed (circle one) male/female Birthdate of 1st Child: [ ] Ethnicity-1st Child: [ ]

Adult Name: [ ] Adult ID#: [ ] Sex of adult being observed (circle one) male/female

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Appendix 3

IEA PREPRIMARY PROJECT

MANAGEMENT OF TIME OBSERVATION SYSTEM

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MANAGEMENT OF TIME OBSERVATION SYSTEM

Administration Guidelines

The Management of Time (MOT) is a running record observational instrument that documents how the primary adult (teacher or caregiver) in a preprimary setting organizes or manages children’s time.

Duration of Observation

The MOT is intended to provide a complete picture of how the adult organizes the child(ren)'s time during a morning. The observer can conduct the MOT observation (1) simultaneously with Child Activities or Adult Behavior or on its own, (2) for two days, and (3) for a maximum of 3 to 3 ½ hours per day, if possible, or if this is not possible, for a minimum of 2 hours. Observations in a child's own home should be conducted for a minimum of two hours.

Scope of Observation

The focus of the observation is the adult's organization of the children's time. Each activity proposed by the adult will be noted, as well as the time of each change of activity. The group structure is also noted for each activity (i.e., whether the adult proposes the activity for the whole group, part of the group, a child with one other child or adult (joint), or one child alone).

Vantage Point of Observation

If this observation is conducted simultaneously with Child Activities or Adult Behavior, the observer should position her/himself in a place where s/he can clearly see and hear both the main adult and the children to be observed, while remaining unobtrusive. If it is necessary for the observer to move from one place to another, this should be done as quietly as possible.

Scheduling of Observation

As noted in the Duration section above, MOT can be completed simultaneously with the other observation instruments or on its own on two separate days. The observer may take short breaks to collect his/her thoughts, fill in details on the observation form, etc., during snack or when the proposed activity is “ongoing” (i.e., not likely to change quickly, such as outdoor free activities).

Completing the Observation Form

1. To indicate the time, the observer should note the beginning time and the time of each activity change.

2. To indicate the proposed activities, the observer should use one of the two following systems:
(a) Write only a description of each proposed activity on the observation form and code at a later time. An example: Write on form “Cutting and pasting to make a collage;” later, code as “022 - Arts and Crafts.”

(b) Write both the code and a brief description of each proposed activity on the observation form (i.e., code while observing). An example: Write on form: “012 - Fine Motor (building with legos).”

3. At the end of each observation period, the observer should record the time and write “end of observation” in the description column.

4. To indicate proposed simultaneous activities, the observer should use Category N (140--Mixed Activities). The observer should enter a single time in the time column to indicate that several activities are being proposed at the same time, and use one of the two following systems to note the activities:

(a) Write “Mixed Activities” and a description of each of the proposed activities on the observation form and code the category number later. For example: Write on form “Mixed Activities: microscopes, puzzles, large block play.”

(b) Write the code for Mixed Activities on the observation form; next to that, write the code and a brief description for each individual activity. For example: In the code column write “140” for Mixed Activities, and in the description column write: Physical Science--Environment/Fine Motor/Gross Motor for microscopes, puzzles, and large block play.

5. To indicate activities that overlap, or an activity that occurs within the time frame of another activity, the observer should use Category N (140--Mixed Activities), and note the resulting changes in activities and group structure. The observer should note (a) the time a second activity begins—reflecting an activity change to Mixed Activities, (b) which activities are overlapping and should be included in the description of Mixed Activities, (c) the time one activity ends while the other continues—reflecting an activity change from Mixed Activities to another category, and (d) the changes in group structure which occur as a result of the overlap. (Refer to examples given in #3 above).

For example, during snack time the adult proposes clean up as some children continue to eat, write “140” on the form in the code column for Mixed Activities, in the description and time columns write:

<table>
<thead>
<tr>
<th>Time</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td>071</td>
<td>Snack</td>
</tr>
<tr>
<td>9:20</td>
<td>140</td>
<td>Clean up /Snack</td>
</tr>
</tbody>
</table>

Once an activity has ended, no longer continue to record that activity. For example, a child is sleeping while other children are reading books and coloring. The child wakes up and joins the other children. In the code column write “140” for Mixed Activities, and in the description and time columns write:

<table>
<thead>
<tr>
<th>Time</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td>140</td>
<td>Nap/Reading</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Books/Coloring</td>
</tr>
</tbody>
</table>
In general, the primary adult will be the focus of this observation.

a) If there is more than one adult in the setting, the observer should determine which adult is most responsible for directing the children's activities and/or interacts the most with the children and observe this adult for MOT and AB. If the adults in the setting seem to be genuinely equal in terms of responsibility for directing activities and/or interaction with the children, the observer should randomly select one adult to observe. Do not observe two different adults, and the same adult needs to be observed for both the MOT and the AB observation systems.

b) If the main adult leaves the setting during the observation, the observer should direct his/her attention to the second adult (SA) who seems most responsible for organizing and proposing activities to the child(ren). It is assumed that the primary adult is usually responsible for organizing the activities, even in his/her absence. However, the observer may want to add "SA" next to an activity to indicate that an adult other than the primary one has proposed it (in the absence of the primary adult).

7. It is important that the observer focus only on what the primary adult proposes for the child(ren) to do, despite whether or not the child(ren) choose(s) to participate. If a child (or group of children) resists the suggested activities and engages in other activities, these other activities are not recorded because they were not proposed by the adult.

8. The observer should be alert for activities that seem to occur spontaneously, but are, in fact, familiar parts of the daily routine for the children and thus may not be explicitly introduced by the adult. For example, children may automatically begin to pick up their toys when a certain song is played. Or, they may go directly to the sinks to wash their hands after they take off their coats following outdoor play. These activities should be recorded on the observation form since it is clear that at some previous time, an adult proposed them, and the children have continued to engage in them on a regular basis.

9. To indicate group structure, the observer should place a checkmark in the appropriate column.

Whole Group (WG) = Activity proposed for all children

Partial Group (PG) = Activity proposed for at least 3 children, but not the whole group

Joint Activity (JA) = Activity proposed for 1 child and one additional person, either an adult or a child. (This category would also be used to code an activity involving the child and one adult in a home setting.)

Alone (A) = Activity proposed for one child
In addition, PG should be recorded in situations where subgroups of children are formed, either for an entire morning or a portion of a morning. For example, if a setting has a group of children ages 3 to 7 years old and, for part of the morning, the 3- and 4-year-olds are divided into a separate subgroup, all of the activities proposed for this subgroup should be recorded as PG—even though the activities were proposed for all members of the subgroup. Similarly, PG would be recorded during Mixed Activities when the children break into subgroups to participate in the suggested activities—even though the activities have been proposed for all the children. Also, if the group being observed is joined by another group, the observer should make a brief note of the change on the MOT form at the time the change occurs, but should not change the main entry at the top of the page regarding the number of children and adults present.

MANAGEMENT OF TIME OBSERVATION SYSTEM

I. ACTIVITY CATEGORIES

A. Action/Movement--The adult proposes an activity for the child(ren) to listen to, watch, or participate in, which primarily encourages active movement, promotes coordination, and/or involves learning or practicing a sport.

Code 011--Gross Motor--Active movement using legs, arms, head, and/or body. Such activities would include: running, climbing, jumping, swinging, swimming, rough-housing, throwing, sliding, riding a bike, baseball, soccer, football, leapfrog, ring-around-the-rosie, chasing games, hiding games, teasing games, calisthenics, gymnastics, using a trampoline, building with large wooden or plastic blocks, giant tinkertoys, crates, etc.

Code 012--Fine Motor--Active movement using hands, feet, fingers, toes. Such activities would include: stringing beads, sewing/lacing cards, table games, puzzles, peg boards, dice, playing with playdough, clay, sand, water, rice, or beans, sorting, arranging, handling small objects, building with legos, bristle blocks, other small blocks, or small tinkertoys, doing woodworking, carpentry, etc.

B. Expressive Activities--The adult proposes an activity for the child(ren) to listen to, watch, or participate in, which primarily encourages or allows for invention, self expression, or role play.

Code 021--Dramatic/Imaginative Play--Play-acting/pretending with or without adults, and with or without props, such as playing policeman, pretending to be an actor, pretending to cook or clean, etc. In order for a proposed activity to be coded in this category, it would include such things as setting a scene for the role play by rearranging materials/furniture, selecting props that may be used, discussion among the children about the roles, etc. If the children have been asked by the adult to do something (e.g., to walk like an elephant or hop like a bunny), the activity would be considered creative movement and thus would be coded as "011." But if the adult asked the child to pretend to be an elephant or bunny, the activity would be considered dramatic play.
Code 022--Arts and Crafts--Use of creative materials to invent something or to express oneself, such as painting, drawing, coloring, cutting, pasting, making collages, using ink and stampers, etc.

Code 023--Music--Activities involving rhythm and/or music, such as singing, dancing, playing or learning to play instruments, listening to musical recordings, playing musical chairs, etc.

C. Code 030--Storytelling/Language--Activities involving listening to stories read or told by others, listening to stories narrated on a recording without a book, telling one's own stories, reciting fingerplays or nursery rhymes of a non-musical nature, playing language games, etc.

D. Preacademic Activities--The adult proposes an activity for the child(ren) to listen to, watch, or participate in, which primarily promotes the learning of basic concepts and/or preacademic skills.

Code 041--Reading--Activities involving visual recognition/auditory discrimination of letters, and use of books, such as looking at books independently, attempting to sound out words, learning to look or looking at books right-side-up and in proper sequence (i.e., beginning to end), learning to "read" or "reading" in the direction of the written language, following the words in a book while listening to the story narrated on a recording, forming letters with playdough, etc.

Code 042--Writing--Activities involving learning to use written language, such as learning to use writing utensils (e.g., holding a pencil/crayon correctly), copying and/or writing the letters/characters/numbers of the language, writing in the proper direction, writing one's name, etc.

Code 043--Number/Math Concepts--Activities involving the learning or use of numerical concepts, such as visual recognition of numbers, counting, number composition and/or decomposition, learning basic concepts such as size, shape, seriation, classification, and temporal and spatial relationships, etc.

Code 044--Physical Science/Environment--Activities that involve sensory exploration or examination of objects or materials, and/or which enhance the child's knowledge and understanding of the physical environment, such as using a microscope, smelling and describing different scents, feeling and comparing different textures, auditory discrimination games (except those involving letter sounds), planting one's own garden, simple science experiments, learning about weather, learning about pet animals, cardinal points (e.g., North, South, East, West), exploration of the environment, etc.

Code 045--Social Science/Environment--Activities involving learning about the community and community helpers, such as a trip to the firehouse, a visit to the school by a doctor or nurse, learning about families, etc.

Code 046--Others/Miscellaneous--The adult proposes a preacademic activity for the child(ren) to listen to, watch, listen to instructions for, or participate in that is not included in one of the 6 categories listed above (e.g., memory games, calendar time, the national anthem, colors).
E. Code 050--Religion/Ethics--The adult proposes an activity for the child(ren) to listen to, watch, or participate in, that involves the learning of religious beliefs, traditions, or moral and ethical values.

F. Code 060--Media-related Activities--The adult proposes an activity for the child(ren) to listen to, watch, or participate in, which involves various types of media, such as television, slides, filmstrips, movies/videotapes/DVD’s, computer games, records/audio tapes/CD’s, etc. (Note: If media-related materials are proposed for specific content areas, code the proposed activities in the content area for which the materials are proposed (e.g., language/storytelling, dramatic play, number/math concepts).

G. Personal/Social Skills--The adult proposes an activity for the children to listen to, watch, or participate in, which is necessary for their physical or emotional health and well-being.

Code 071--Personal Care--Tasks involving attention to physical and bodily needs, such as toileting, washing/bathing, brushing teeth, dressing, eating, sleeping, etc.

Code 072--Social Skills--Physical and/or verbal activities involving attention to one's behavior in relation to others, such as conflict resolution, showing objects to others (e.g., show and tell), reporting your “news” (e.g., telling others about the park you visited last night), sharing materials, borrowing materials, seeking or giving help or information, planning or making decisions, learning about manners, learning about feelings, etc.

Code 073--Discipline--Activities in which adult requires child(ren) to carry out behaviors or tasks intended as disciplinary action(s), such as sitting in "time out," being quiet, sitting at a table/desk and putting one's head down, choosing a different activity when unable to behave properly in current activity, going to principal's office, standing in the corner or hallway, participating in discussions with adult about misbehavior, etc.

I. Domestic/Economic Activities--The adult proposes an activity for the child(ren) to listen to, watch, or participate in which is related to maintenance of the home or facility, and/or smooth operation of daily activities.

Code 091--Domestic Activities--Tasks related to meal preparation and/or clean-up, gardening or tending to pets or other animals (when the garden or animals do not serve an economic purpose for the setting), shopping, preparation and/or clean-up of activities, etc.

Code 092--Economic Activities--Tasks contributing to the income of the setting, such as tending animals, farming, selling, repairing, etc.

I. Code 100--Transitional Activities--The adult proposes movement toward an object, activity, person or place, related to a change from one activity to another, such as lining up/following in a line to go somewhere or move to another activity, looking for a lost/misplaced object, etc.

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L. Code 121--Waiting--The adult proposes that the child(ren) sit or stand without doing anything, such as standing and waiting quietly in line until all children have lined up, sitting on floor waiting for instructions from adult, waiting for adult to call name during attendance, waiting for the next activity, etc.

M. Free Activities--The adult does not propose a specific activity for the child(ren) to listen to, watch, or participate in. This category would also be used for the child in a home setting where the parent/adult often does not organize much of the child's time.

Code 131--Indoor Free Activities--The children are free to use any available materials in the classroom and are encouraged or allowed to make their own choices of activities.

Code 132--Outdoor Free Activities--The children are free to use any available materials outside on the playground and are encouraged or allowed to make their own choices of activities.

N. Code 140--Mixed Activities--The adult organizes or proposes several simultaneous activities from which the children may choose, or through which they are asked to progress (i.e., to rotate from one activity to the next). This category differs from Free Activities (see "131 and 132") in that the adult specifies exactly which activities and/or materials may be chosen, and therefore structures the children's time for them. An example of mixed activities might involve the adult preparing an art activity, setting up a climbing structure, and providing props for the children to play "grocery store." The children would then be able to engage in only those three activities organized by the adult.

Also, Mixed Activities should be coded when activities overlap or when one activity begins and ends within the time frame of another activity. This is particularly common with activities such as toileting, dressing, cleaning up. (See guidelines for additional instructions.) In home settings, a parent who asks the child to watch television or do a puzzle while she makes a phone call is suggesting Mixed Activities to the child.

I. GROUP STRUCTURE

Whole Group (WG) = Activity proposed for all children

Partial Group (PG) = Activity proposed for at least 3 children, but not the whole group

Joint Activity (JA) = Activity proposed for 1 child and one additional person, either an adult or a child. (This category would be used to code an activity involving the child and one adult in a home setting.)

Alone (A) = Activity proposed for one child
### MANAGEMENT OF TIME OBSERVATION SYSTEM--FORM

Date of Observation:  
Country Code:  
Number of adults present:  
Observer Name:  
Observer ID #:  
Number of children present:  
Setting Name:  
Setting ID#:  
Site/Geographical Area :  
Site ID #:  
Name of 1st Child:  
ID# of 1st Child:  
Birthdate of 1st Child:  
Ethnicity-1st Child:  
Sex of adult being observed  
Adult Name:  
Adult ID#:  
(circle one) male/female  

<table>
<thead>
<tr>
<th>Time</th>
<th>Code</th>
<th>Management of Time</th>
<th>Group Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hr</td>
<td>Min</td>
<td>Sec</td>
<td>Description</td>
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</table>
21st December 2005

Ms Siobhan Keegan
School of Social Sciences
DIT Mountjoy Square
Dublin 1

Re: Research Ethics Submission Ref. 24/05

Dear Siobhan,

I am pleased to inform you that the DIT Research Ethics Committee has granted ethical approval to your research project “The Impact of Early Educational Experiences at Age 4 and Age 7 on Outcomes at Age 15” (ref. no. 24/05).

Kind regards,

Raffaella Salvante
Office of Graduate Studies
Appendix 5

Q.1 Sex:(tick one)

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<tbody>
<tr>
<td>Male</td>
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<tr>
<td>Female</td>
<td></td>
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</table>

Q.2 What is your date of birth?

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<tbody>
<tr>
<td>D</td>
<td>D</td>
<td>M</td>
<td>M</td>
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<tr>
<td>Y</td>
<td>Y</td>
<td></td>
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</tr>
</tbody>
</table>

Q.3 (if applicable)
If you have left school, what age were you when you left?

Q.4 Tick the box beside the phrase that best describes what you did for the school year just gone by?

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<tbody>
<tr>
<td>Junior Cert.</td>
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<td>Transition Year</td>
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<td>5th Year</td>
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<tr>
<td>Leaving Cert.</td>
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<tr>
<td>Leaving Cert Applied (any year)</td>
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<tr>
<td>Early School Leavers Programme</td>
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<tr>
<td>FAS Course</td>
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<tr>
<td>Working full-time i.e. not in school</td>
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<tr>
<td>Apprentice in a trade</td>
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<tr>
<td>Apprentice in a trade</td>
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<tr>
<td>Unemployed and not in school</td>
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<tr>
<td>Other (give example)</td>
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</tbody>
</table>

THIS SCHOOL YEAR JUST GONE BY, I….. Finish this sentence by ticking all answers that apply to you;

- was on a school sports team
- was active in one or more school organisations
- had disciplinary problems in school
- read a newspaper at least 3 times a week
- talked to my parents about career plans
- was expelled or suspended in school
- needed extra help with a subject because of low marks
- had so much to drink I couldn’t remember things
- had trouble keeping up with my classes
- was an active member of a group outside school such as choir or dramatic or music group
- talked to a teacher about career plans
- had attendance problems in school
- talked to a careers guidance counsellor about career plans
- was arrested by the police
- talked to my parents about issues in the news
- used illegal drugs on more than two occasions
- talked to my parents about my career plans
- used a computer (PC, X-Box, Playstation) for 10 hours or more a week (not for school work)
- felt seriously depressed
- did Honours Maths
- thought seriously about dropping out of school
- saw someone get mugged or attacked
- got a reward or prize for some achievement
- read for pleasure
Q.6 Please fill in your Junior Certificate results by ticking in either the Higher or Ordinary level box beside the subject and then tick in the box under the relevant grade for each subject.
See example below:

*N/G stands for No Grade and applies if you failed a subject Please fill in your results below

<table>
<thead>
<tr>
<th></th>
<th>Higher</th>
<th>Lower</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>N/G</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
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<tr>
<td>Irish</td>
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<td>Other (specify)</td>
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<tr>
<td>Other (specify)</td>
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<td>Other (specify)</td>
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</tbody>
</table>
Q. 7 Here is a list of statements that apply to some people’s experience of going to school. You should think about how much you agree or disagree with each statement and then tick in the box under the answer that is closest to what you think. If you are no longer in school, think in the past tense about what school used to be like for you and answer the questions in the same way.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I try hard in school</td>
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<td></td>
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<tr>
<td>2. I like school</td>
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<tr>
<td>3. I get in trouble in school</td>
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<tr>
<td>4. I get bored in school</td>
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<tr>
<td>5. I am smart</td>
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<tr>
<td>6. School is important</td>
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<tr>
<td>7. I get good marks in school</td>
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<tr>
<td>8. When in school, I would rather be somewhere else</td>
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<tr>
<td>9. My classmates like me</td>
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<tr>
<td>10. I give up when schoolwork gets hard</td>
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<tr>
<td>11. I get along well with others</td>
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<tr>
<td>12. I do better in school than my classmates</td>
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<tr>
<td>13. I like myself</td>
<td></td>
<td></td>
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<tr>
<td>14. I do my homework</td>
<td></td>
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<tr>
<td>15. My teachers expect me to do well in school</td>
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<tr>
<td>16. I enjoy writing</td>
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<tr>
<td>17. I learn a lot at school</td>
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<tr>
<td>18. There are many things about school that I don’t like</td>
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</tbody>
</table>
### Q.8
Here is a list of things that are true in some families and not in others. Please tick “Yes” if each statement is usually true of your family and “No” if it is not.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The rules in our house are clear</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. I have a clear time when I have to be home</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. I have a regular time and place to do homework</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. My parents often do not know where I am.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. When I do something wrong, I don't know what my parents will do.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. I have regular chores/jobs to do at home (housework, babysitting, gardening, DIY etc.)</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### Q.9
Here is a list of things that happen in many areas. For each item on the list, you should think about how often it happens in the area in which you live, then you should tick in the box under the answer that is closest to what you think. You should choose

- All the time if it happens every day or almost every day
- Often if it happens once a week or so
- Sometimes if it happens less than once a week
- Never if it never happens

<table>
<thead>
<tr>
<th></th>
<th>All the Time</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I talk to my neighbours</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. I see people drinking alcohol on the street</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Someone gets robbed</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Someone offers me drugs</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. I see someone using drugs</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. Children play sports together</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7. I see the police arrest someone</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>8. I eat dinner in my friend’s house</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>9. People help each other out</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>10. Someone offers me alcohol</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>11. I see a fight</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Q.10  Here are some other things that happen in some families and do not happen in others. Please indicate whether these things happen in your family. If you do not live with your parents, think of the adult(s) that you live with when we ask about parents

<table>
<thead>
<tr>
<th></th>
<th>All the Time</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The whole family eats dinner together</td>
<td></td>
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<tr>
<td>2. Your parent(s) help you with your homework</td>
<td></td>
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<tr>
<td>3. You do something enjoyable with your parent(s)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>like go shopping, to the cinema, have a meal or a daytrip</td>
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<tr>
<td>4. Family members argue</td>
<td></td>
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<tr>
<td>5. You talk to your parent(s) about school</td>
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<tr>
<td>6. You feel close to your mother</td>
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<tr>
<td>7. You feel close to your father</td>
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</tbody>
</table>
Q.11 You are going to read a lot of sentences. For each of these sentences, you should think about how much you Agree or Disagree with this sentence—then you should tick in the box under the answer that is closest to what you think…

You should choose:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>if you agree very much with the sentence, almost all of the time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>if you sort-of agree with the sentence most of the time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>if you sort-of disagree with the sentence, most of the time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>if you definitely disagree with the sentence, almost all of the time</td>
<td></td>
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</tr>
</tbody>
</table>

<p>| 1. I can tell my parents the way I feel about things |   |   |   |
| 2. I like to see other people happy. |   |   |   |
| 3. Sometimes you have to physically fight to get what you want |   |   |   |
| 4. I will probably die before I am thirty. |   |   |   |
| 5. I will always have friends. |   |   |   |
| 6. I like to help around the house. |   |   |   |
| 7. I really want to get a college degree. |   |   |   |
| 8. I like the way I act. |   |   |   |
| 9. I get angry easily. |   |   |   |
| 10. I get along well with other people |   |   |   |
| 11. Being part of a team is fun. |   |   |   |
| 12. My family expects too much of me. |   |   |   |
| 13. People usually like me. |   |   |   |
| 14. Other people decide what happens to me. |   |   |   |
| 15. I think I will have a nice family of my own when I get older. |   |   |   |
| 16. If I disagree with a friend, I can tell them. |   |   |   |
| 17. Finishing secondary school is important. |   |   |   |
| 18. Sometimes I am ashamed of my parents |   |   |   |
| 19. I can be trusted. |   |   |   |
| 20. I am afraid my life will be unhappy. |   |   |   |
| 21. I like being around people. |   |   |   |
| 22. School is a waste of time. |   |   |   |
| 23. It is important to think before you act. |   |   |   |
| 24. Bad things happen to people like me. |   |   |   |
| 25. Helping others makes me feel good. |   |   |   |
| 26. My family has let me down. |   |   |   |
| 27. Following the rules is stupid. |   |   |   |
| 28. My life is all mixed up |   |   |   |</p>
<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. I do whatever I feel like doing</td>
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<tr>
<td>30. If I have a reason, I will change my mind</td>
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<tr>
<td>31. It is hard for me to make friends.</td>
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<td>32. I try hard to do well in school.</td>
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<td>33. I like to do things with my family.</td>
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<tr>
<td>34. Most people can be trusted.</td>
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<tr>
<td>35. I can do most things I try.</td>
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<td>36. If I study hard, I will get better marks.</td>
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<td>37. When I am angry, I shout at people.</td>
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<td>38. I think I can have a nice house when I grow up</td>
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<tr>
<td>39. If I don’t understand something, I will ask for an explanation</td>
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<tr>
<td>40. My friends respect me.</td>
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<tr>
<td>41. I always like to do my part.</td>
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<td>42. It is more important to play fair than to win.</td>
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<td>43. Sometimes I break things on purpose.</td>
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<td>44. I will probably never have enough money.</td>
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<td>45. I am often too embarrassed to ask questions.</td>
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<tr>
<td>46. I often feel lonely.</td>
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<tr>
<td>47. A lot of days I would rather not go to school.</td>
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<tr>
<td>48. There is some good in everybody.</td>
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<tr>
<td>49. When I try to be nice, people notice.</td>
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<tr>
<td>50. I hate being in front of a group.</td>
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<tr>
<td>51. It is important to do your part in helping at home.</td>
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<tr>
<td>52. If you work hard, you will get what you want.</td>
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<tr>
<td>53. I would like to quit school as soon as I can.</td>
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<tr>
<td>54. I enjoy talking with my family.</td>
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<tr>
<td>55. Helping others is very satisfying.</td>
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<tr>
<td>56. I like the way I look.</td>
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<tr>
<td>57. If I feel like it, I hit people.</td>
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<tr>
<td>58. To make a good decision it is important to think about what will happen afterwards.</td>
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<tr>
<td>59. I often disappoint people.</td>
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<td></td>
</tr>
<tr>
<td>61. I don’t like most people.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>61. I am responsible for what happens to me.</td>
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</tbody>
</table>
Q.12 When you think about your future career and education, how far do you think you will get?

- Junior Cert
- Leaving Cert
- Apprentice in a trade (plumber, carpenter, electrician, hairdresser, beautician etc)
- Unemployed
- Cert or Diploma in college
- University Degree
- Master’s Degree
- Doctorate (Ph.D. or M.D.)
- Other (give example)

Finish this sentence by ticking all answers that apply to you;

- fall in love
- end up in jail
- be very rich
- have addiction troubles
- invent/design a new product
- feel that my life is out of control
- win the lottery
- get away from my family
- be very successful
- have troubled relationships
- have a job that I don’t like
- become famous
- have friends that care about me
- claim unemployment benefit (the dole) for a long period of time

Please take a minute to check that you have answered every question that applies to you. Then place the Questionnaire in the stamped envelope provided and return it to the research team by post. Thank you for your participation.