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Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11)

Final Report from the Primary Phase: Pre-school, School and Family Influences on Children's Development During Key Stage 2 (Age 7-11)

Kathy Sylva[+], Edward Melhuish[#], Pam Sammons[$], Iram Siraj-Blatchford and Brenda Taggart**

[+]University of Oxford,
*[#]Birkbeck, University of London, [$]University of Nottingham and *Institute of Education, University of London*

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THE EPPE 3-11 RESEARCH TEAM

Principal Investigators

Professor Kathy Sylva
Department of Education, University of Oxford
00 44 (0)1865 274 008 / email kathy.sylva@education.ox.ac.uk

Professor Edward Melhuish
Institute for the Study of Children, Families and Social Issues
Birkbeck University of London
00 44 (0)207 079 0834 / email e.melhuish@bbk.ac.uk

Professor Pam Sammons
School of Education, University of Nottingham
00 44 (0)115 951 4434 / email pam.sammons@nottinghham.ac.uk

Professor Iram Siraj-Blatchford
Institute of Education, University of London
00 44 (0)207 612 6218 / email i.siraj-blatchford@ioe.ac.uk

***Brenda Taggart**
Institute of Education, University of London
00 44 (0)207 612 6219 / email b.taggart@ioe.ac.uk

Research Officers

Dr Sofka Barreau
Institute of Education, University of London
00 44 (0)207 612 6608 / email s.barreau@ioe.ac.uk

Dr Yvonne Anders (née Grabbe)
Institute of Education, University of London
00 44 (0)207 612 6608 / email y.grabbe@ioe.ac.uk

Dr Stephen Hunt
Institute of Education, University of London
00 44 (0)207 612 6608 / email s.hunt@ioe.ac.uk

Dr Helena Jelicic
Institute of Education, University of London
00 44 (0)207 612 6608 / email h.jelicic@ioe.ac.uk

Rebecca Smees
Institute of Education, University of London
00 44 (0)207 612 6608 / email r.smees@ioe.ac.uk

Wesley Welcomme
Institute of Education, University of London
00 44 (0)207 612 6684 / email w.welcomme@ioe.ac.uk

Olga Cara
Institute of Education, University of London
00 44 (0)207 612 6608 / email o.cara@ioe.ac.uk

*Also Research Co-ordinator

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Executive Summary

EPPE 3-11 is a large study of the developmental trajectories of approximately 2800 children in England from age 3 to 11 years. This report focuses on the primary school phase, particularly Key Stage 2 (ages 7-11). Many children have prospered, leaving Key Stage 2 (at age 11) with confidence and armed with the skills they need to tackle learning in secondary school. However, some children moved onto secondary school with poor skills in key areas or with low self-image and aspiration. The EPPE 3-11 project set out to explain some of the reasons behind these different developmental trajectories.

Learner trajectories and measuring factors that might shape them
We established a developmental profile for each child including cognitive and language assessments (standardised assessments), social and emotional assessments (carried out by key pre-school and school staff) and self-reports completed by the children themselves. These longitudinal assessments undertaken at age 3, 5, 6, 7, 10 and 11 are the core of the study. We used parental interviews and questionnaires to find out about the child's history from birth and family demographic characteristics when the child was 3, 6 and 11. Parents were also asked about daily routines and learning activities with their children at home and in the community. The 141 pre-school settings and a subset of the primary schools children attended (125 school in Year 5) were studied through interviews, questionnaires and observations.

The project also used data on Key Stage 1 (KS1) and Key Stage 2 (KS2) National assessment scores for every child in England, grouped by the schools they attended, to calculate academic effectiveness measures for primary schools. We located each primary school an EPPE 3-11 pupil attended on a scale of 'academic effectiveness' (standardised for England), after controlling for their prior attainment and the demographic characteristics of each school's intake. More detailed information, including systematic observations and Ofsted judgements, was obtained for a subset of 125 focal schools attended by EPPE 3-11 pupils.

EPPE 3-11 has compiled a record for each child that contains the following information:

INDIVIDUAL LEVEL DATA						
Assessment	Age 3	5	6	7	10	11
Cognitive assessments	√	√	√ NFER tests	√ National Assessment	√ NFER tests	√ National Assessment
Social/behavioural profiles	√	√	√	√	√	√
Home Learning Environment (HLE)	√ Early years HLE		√ KS1 HLE			√ KS2 HLE
Pupils' self-report				√	√	
Community characteristics/ neighbourhood					√	√
PRE-SCHOOL/PRIMARY SCHOOL LEVEL DATA						
Institution characteristics – quality and effectiveness	√					
Academic effectiveness	√				√ Across KS2	
ADDITIONAL INFORMATION IN SUB-SAMPLE OF 125 SCHOOLS:						
Teacher report: classroom/school processes, quality of teaching					√	
Ofsted judgements of school					√ Across KS2	

Looking for consistent patterns and relationships
Using complex statistical modelling we identified patterns of development for pupils who differ by gender, home background, social group and community. Such analyses can identify the kinds of pupils and the combinations of social and educational experiences that predict more successful or poorer development. In addition, we established the net influences of pre-school, for example, controlling for other important influences such as child and family factors. We also studied primary school influences.

Case studies of a small sample of pupils from low socio-economic (SES) group and their families who were doing better than expected enriched the quantitative picture enormously. They illustrated how families from disadvantaged circumstances can support their children to raise their achievement. The case studies illuminated practices that parents, family and community members used to enhance pupils' social and educational capital through gains in skill and aspiration.

Overarching influences on children's development
The pioneering work of Bronfenbrenner (1986; 1994; 1998) has identified immediate and more distant factors that shape children's development. The child is located at the centre of a series of concentric circles, surrounded and influenced first by the family, then the community (including schools), and finally the national and cultural framework within which all families and schools are embedded. Six overarching domains of potential influence on children were identified and their effects on development were measured:

i. individual characteristics associated with the child, e.g., gender or birth weight
ii. family characteristics, e.g., parental education, home language
iii. home learning environment (HLE), i.e. learning opportunities in the home
iv. the neighbourhood/community characteristics
v. pre-school attendance and experiences
vi. primary school experiences.

Establishing the separate effects of each of these influences is difficult enough but we attempted to discover how these factors interact to shape children's development. This was made possible by the large scale and longitudinal nature of the study, and the rich and varied data collected on children, families, pre-schools and schools.

Structure of the report
We begin with a brief background to the study, and then Section 2 considers the design features of the study, including the assessments used to create each child's developmental trajectory between age 3 and 11 years. Section 3 moves on to explore individual, family and home learning environment (HLE) influences on pupils' developmental outcomes at age 11. In Section 4 the educational influences of the primary school are added to the picture, showing how the academic effectiveness of each primary school is related to pupils' outcomes. The influence of the primary school is also considered in relation to interactions with earlier pre-school effectiveness and quality.

Section 5 'drills down' into the pupils' experiences of the classrooms and schools in which they learn. Here we present findings on a sub-sample of 1160 EPPE 3-11 pupils in 125 schools in Year 5 classrooms (age 10). Using observations and questionnaires we investigate educational practices that shape learning and development inside the classroom and the school, and show relationships with pupils' development at age 10 and progress from Year 1 (age 6) to Year 5 (age 10).

Section 6 focuses on the pupils' self-reports and on the way they perceive their school and teachers. The self-perceptions (e.g. how happy they are at school or how good they think they are at maths) are combined into key dimensions such as 'Enjoyment of school', 'Academic self-image' and 'Behavioural self-image', which are then linked to child and family characteristics and to developmental trajectories.

In Section 7 there is discussion of resilient and vulnerable pathways, drawing on quantitative and case study methods. This section identifies positive (or 'protective') influences that can ameliorate risk factors in development, especially the role of family support for learning and pre-school education. Section 8 discusses 'other' influences on children's outcomes such as neighbourhood, mobility, out of school hours learning, transitions to secondary school, and term of birth. Section 9 pulls together the longitudinal findings, ending with some recommendations.

Phases of the research

The research has proceeded in three phases: the pre-school period and continuing to the end of Key Stage 1 (age 7), Key Stage 2 (age 11), and (to be reported later) Key Stage 3 (age 14). The first phase was summarised in a final report (Sylva et al., 2004) and there have been numerous technical papers and research briefs covering different aspects of the pre-school, Key Stage 1 and Key Stage 2 phases (see www.ioe.ac.uk/projects/eppe). This report is a summary of the second phase (7-11 years). The third phase of the research is currently underway (Key Stage 3, age 11-14) and a report will be available in 2011.

Major findings

1 The lasting effects of pre-school, including the contribution of quality

The benefits of pre-school education have largely persisted through to the end of Key Stage 2. Attendance at pre-school remains beneficial for both academic and social/behavioural outcomes, as well as pupils' self-perceptions. Importantly the quality of the pre-school (measured on the Early Childhood Environment Rating Scales, ECERS-R see Harms, Clifford & Cryer, 1998; ECERS-E see Sylva et al., 2006) predicted pupils' developmental outcomes net of all other influences. For all social outcomes, the benefits of pre-school were greater for boys, for pupils with special educational needs (SEN), and for pupils from disadvantaged backgrounds. However, for some of the outcomes, notably English, Mathematics and 'Hyperactivity', only pre-schools of medium or high quality had lasting effects. Finally, the higher the value added academic effectiveness of the pre-school attended, the better the longer term outcomes for children. Attending any pre-school has lasting benefits for 'Pro-social' behaviour and academic outcomes, but the effects are largely carried by medium to high quality pre-schools. Children who did not attend pre-school and those who attended low quality pre-school showed a range of poorer outcomes at age 11.

2 The contribution of the family and the home learning environment (HLE)

The overall effects of child and family characteristics were less powerful at age 11 than at age 7; nonetheless mother's highest qualification level and the Early years home learning environment (HLE) still had strong effects upon academic outcomes. Gender was a strong predictor for 'Pro-social' behaviour and 'Hyperactivity', with girls being more pro-social and boys more hyperactive. There were weaker effects for gender for academic outcomes; in Mathematics boys have higher attainment at age 11 and girls have better outcomes in English. These findings are not new but what is surprising is the continuing strong influence of the Early years HLE. Moreover, significant characteristics such as family income, FSM and family SES are *less* powerful predictors than parents' qualification levels or the Early years HLE indicating that social capital remains important. Home support for learning during the pre-school period continues to show effects on several outcomes (attainment in English and Mathematics, 'Self-regulation', 'Pro-social' behaviour and 'Hyperactivity') at the end of primary school. In addition, the small group of children with English as an additional Language (EAL) and still in need of support at age 11 showed poorer outcomes.

3 The contribution of primary schools to children's development

The academic effectiveness of the primary school was measured between Key Stage 1 and 2 independently of the longitudinal sample, by analysing national assessments for all pupils (600,000+) in all state primary schools (15,000+) in England across three successive cohorts (2002-2004, see Melhuish et al., 2006a). EPPE 3-11 pupils who attended an academically more effective primary school had significantly better outcomes, net of child and family background. The effects were moderate to strong on both English and Mathematics scores, particularly so for Mathematics. Not only was the effectiveness of the primary school linked to pupils' absolute attainment at age 11, it also predicted the amount of progress the EPPE 3-11 pupils made between the ages of 7 and 11. For social/behavioural outcomes, however, the academic effectiveness of the school did not show a significant effect across all pupils. However, certain groups such as those with special educational needs (SEN), or whose mothers had low educational qualifications, had better social/behavioural outcomes if they attended schools that were more academically effective. There was no evidence of any adverse outcome for social behaviour or self-perceptions where pupils attended an academically more effective primary school. Thus, achieving high academic standards has no adverse impact on enjoyment or academic and behavioural self-image or social outcomes. Indeed for more vulnerable groups it seems to be beneficial.

4 Classroom and school processes

Classroom observations revealed considerable variation in the quality of pupils' educational experiences during Year 5 (Summer 2004, Summer 2005) although observations indicated less time off-task and more engagement with lessons than in other earlier studies (Galton, Simon & Croll, 1980; Galton et al., 1999). Interestingly, observed quality was significantly higher in that half of classes where teachers used the Plenary session (an indication of closer adherence to the Literacy and Numeracy strategies). Overall *Teaching quality* was a significant predictor of better progress over Key Stage 2 from age 6-10 in both Reading and Mathematics. The *Quality of Pedagogy* and *Classroom Control* were particularly important for progress in Mathematics with higher *Quality of Pedagogy* also related to reduced 'Hyperactivity' and better 'Pro-social'

behaviour and 'Self-regulation'. High levels of classroom *Disorganisation* predicted poorer progress in both Reading and Mathematics and increased 'Hyperactivity'.

The relationships between teachers' views of their school and pupils' outcomes were complex. For instance: teachers' reports on more consistent homework practices and better school communication with parents and parental support for pupils' learning, were related to better progress in Mathematics and some social outcomes. Where teachers reported higher levels of Anti-academic ethos in their school, children made less academic and social/behavioural progress. Finally medium levels of Pupils' agency and voice (as apposed to high or low levels) also predicted improved Mathematics and social/behavioural outcomes. In schools where teachers reported active *School communication with parents,* pupils showed better progress in 'Self-regulation'. In addition, where teachers reported strong *Parental support for their child's learning*, pupils made better progress in Reading and 'Pro-social' behaviour.

The Ofsted inspection measure of overall 'School effectiveness' was a moderately strong positive predictor of progress in Mathematics and 'Self-regulation' whilst the judgment on the 'Quality of school leadership' showed a positive relationship with Mathematics progress. Ofsted's judgement on a school's 'Improvement since last inspection' was a significant predictor of Mathematics progress, as well as development in 'Self-regulation', 'Pro-social' and 'Anti-social' behaviour. This indicates that pupils who attended a higher quality school (as judged by inspectors) made more progress and had better development, taking into account their background and prior attainment, confirming the importance of primary school influences in shaping pupils' outcomes during Key Stage 2.

5 How pre-school and primary school interact to affect pupils' learning and development

EPPE 3-11 is the first study to investigate the combined effects of pre-school and primary school on pupil outcomes. The combination of attending a higher quality pre-school and then moving on to an academically effective primary school had clear benefits for pupils' cognitive outcomes to age 11, especially for Mathematics. High quality pre-school appears to provide some 'protection' against attending an ineffective primary school; pupils who attended high quality pre-schools fared better in low effective primary schools than pupils who had not attended pre-school or those who had attended lower quality pre-schools. The reverse was also true, pupils who were fortunate enough to attend a primary school of high academic effectiveness showed better outcomes in Key Stage 2 (compared to children in low effective schools) even if they had not attended a pre-school or if their pre-school was of low quality.

6 Influences are different for English, Mathematics and social/behavioural development

By Year 6 the influences on English attainment were somewhat different from those for Mathematics. For English, child, family, and home, background mattered relatively more than for Mathematics. For English the effects of mothers' highest qualification and the Early years home learning environment (HLE) were more than twice as large as those of pre-school or primary school. For Mathematics, mothers' highest qualification was the strongest predictor, with pre-school and primary school effectiveness being relatively more influential than for English. Pre-school and primary school influences were stronger for Mathematics. Educational influences are more evident for pupil progress across Key Stage 2, and are on a par with the positive impact of the Early years HLE and mothers having A-levels versus no qualifications.

Patterns of influence differ for social/behavioural development. In Year 6, background characteristics were found to be better predictors of 'Self-regulation' than for other social/behavioural outcomes. In addition, gender effects were particularly strong for 'Pro-social' behaviour and 'Hyperactivity', having 3-4 times as large an effect as pre-school quality and effectiveness. Mother's highest qualification was also an important predictor and had the strongest effects for 'Self-regulation' and 'Hyperactivity' outcomes. Thus the patterns of influence vary for different outcomes, as well as for different groups of pupils. Only a large scale and longitudinal study could reveal such subtle differences, and the interacting effects of pre-school and primary education.

7 Pupils' self-perceptions: what influences them and their effects on future development?

Influential factors for pupils' self-perceptions differ for each self-perception measure. Gender was the strongest precursor of 'Behavioural self-image', whereas for 'Academic self-image' the strongest precursors were father's highest qualification and the Early years home learning environment (HLE). 'Enjoyment of school' was higher for pupils who were eligible for free school meals (FSM) and for those who had previously attended a high quality pre-school.

Self-perceptions (in Year 5) were differentially associated with pupils' outcomes. Pupils' 'Academic self-image' had the strongest relationship with Reading, Mathematics and 'Self-regulation', whereas pupils' 'Behavioural self-image' had the strongest relationship with 'Hyperactivity', 'Pro-social 'and 'Anti-social' behaviour in Year 5. There appeared to be strong *reciprocal* relationships between 'Academic self-concept' and academic achievement and between 'Behavioural self-image' and social/behavioural outcomes, which might be expected because the pupil doing well may gain confidence and motivation that enhances later outcomes.

Pupils' perceptions of primary school were related to cognitive and social/behavioural outcomes. Pupils' positive view about their social environment was related to better outcomes for all cognitive and social/behavioural outcomes in Year 5. Pupils' perceptions of 'Teachers' support for pupils' learning' were positively related to 'Self-regulation' and 'Pro-social' behaviour, whereas perceptions of 'Headteacher qualities' were related to 'Pro-social' behaviour and 'Hyperactivity', and to Reading attainment in Year 5. It appears that pupils' experiences of feeling safe and supported in schools are related to overall development.

8 How pre-schools, schools and families can support the development of pupils from disadvantaged and ethnic minority backgrounds achieve 'against the odds'

Disadvantaged children and boys in particular benefit significantly from good quality pre-school experiences. If disadvantaged children attended centres that included children from mixed social backgrounds they made more progress than if they attended centres serving predominantly disadvantaged children. Children identified as 'at risk' of learning or behavioural difficulties are helped by pre-school, with integrated settings and nursery schools being particularly beneficial in providing a better start to primary school. Irrespective of the level of disadvantage, 'home' children (those with little or no pre-school experience) show poorer cognitive and social/behavioural outcomes at age 5 and at age 7, and poorer academic outcomes and 'Pro-social' behaviour at age 11 compared to those who attended pre-school. They are also more likely to be identified by teachers as having some form of SEN during KS1.

The Early years home learning environment (HLE) and staff support for parents in providing a quality HLE have been found to promote intellectual and social development in all children. While the social class and levels of education of parents were related to child outcomes, the Early years HLE was also found to be more important than family SES and income effects. Moreover HLE is only moderately associated with social class or mothers' qualification levels. What parents *do* is therefore vitally important and can counteract other disadvantaging influences, particularly during pre-school. For this reason pre-school and school settings that do not include provision for parent support and education are missing an important element in raising achievement and enhancing social/behavioural development over the longer term.

The case study findings on pupils (selected for low socio economic status [SES] and varied ethnic status) who 'succeeded against the odds' showed that what they had in common was higher scores on the Early years home learning environment (HLE). Interviews with parents and pupils to explore what might account for pupils' success revealed: a) a range of family members provided support for pupils' learning, b) pupils themselves were active in maintaining these practices and c) education was valued highly by the family as a means of improving life chances.

Parents and the pupils with a higher Early years HLE from a disadvantaged context thought that the reason some pupils did better in school was because they were more attentive and made more of an effort. These parents had high expectations for their children and saw education as important for achieving economic independence and employment opportunities in the future. They hoped their children would attend higher education and have a professional career.

The evidence supports the focus on initiatives that provide family and/or child mentoring (e.g. Learning Mentorship) as these may have a role in developing social capital. Community focused supplementary schools and classes can also provide important educational resources. Schools and pre-schools need to do more to encourage the involvement of parents and the wider family, particularly in the education of disadvantaged children.

Some implications of EPPE 3-11

EPPE 3-11 has highlighted the importance of large scale, longitudinal studies with a mixed methods approach (Sammons et al., 2005; Siraj-Blatchford et al., 2006) studying how different phases of education are related to children's development. There are implications of the findings for policy and practice for improving pre-schools and primary schools. These include enhancing the quality of pre-school, especially through more qualified staff; supporting parents as educators as well as carers; additional support for disadvantaged pupils and the school they attend; balancing academic and socio-emotional emphasis within the curriculum in pre-school; and treating health, education and care as inseparable (as pre-school settings that did this e.g. the integrated settings, had better outcomes for children and provided a better start to primary school).

The EPPE 3-11 project has also contributed to the research literature. It has highlighted the importance of large scale, mixed methods longitudinal studies and shown how different phases of education interact with one another and with key background family demographics. The results demonstrate the importance of investment in early years education and support for families. It also confirms the impact of primary school. The longitudinal research design demonstrates that pre-school on its own is not a 'magic bullet'. It does not remove but can help ameliorate the adverse impact of disadvantage.

Also the project has provided a unique insight into the enduring impact of early experiences, especially the Early years home learning environment (HLE) and the quality of pre-school. EPPE 3-11 has drawn particular attention to the importance of classroom practices. The overall quality of teaching is especially important for progress in Reading and Mathematics, while specific features predict behavioural outcomes. The project has also revealed that disadvantage is complex and that multiple disadvantages interact and are key sources of inequality. If a child experiences no pre-school or poor quality pre-school and a less academically effective primary school, their prospects of good outcomes are significantly reduced. In this way educational influences may reinforce existing inequity. By contrast, good provision and experiences can help to counteract the risk of poor outcomes. This is of particular concern for disadvantaged children. Thus, educational influences have the capacity to mitigate or further exacerbate inequalities. Longitudinal and mixed-method data can demonstrate how important it is to ensure that disadvantaged groups have access to high quality educational experiences from pre-school onwards.

Although the primary school phase of the EPPE 3-11 study comes to an end in 2008 the research continues. The Effective Pre-school, Primary and Secondary Education Project (EPPSE 3-14) follows the same students to the end of Key Stage 3 (age 14) and will report findings in 2011 on the way interactions between home, pre-school, primary and secondary schooling shape the development and destinations of young people.

Section 1: Introduction and background to the study

Summary of Key Messages

The initial phase of the EPPE study ran from 1996 – 2003 ; its findings indicated that in Key Stage 1:

- There is an enduring impact of attending pre-school on children's cognitive and social/behavioural development
- The quality of the pre-school setting and duration of attendance are important for children's development.
- Specific pedagogical and structural practices differentiated effective pre-school settings.
- The quality of the Early years home learning environment promoted intellectual and social development in all children.

The Effective Pre-school and Primary Education project (EPPE 3-11) is Europe's largest longitudinal investigation into the effects of pre-school and primary education on pupils' developmental outcomes. More than 2800 children were assessed at the start of pre-school (around the age of 3) and were then followed up when they entered school along with a further 300+ children with no pre-school experience. All children were then followed for a further six years until the end of Key Stage 2 (age 11 years). The study used an 'educational effectiveness' design to establish the contribution of child, family, home learning environment (HLE), and school characteristics related to children's progress.

Children were recruited from the major types of Foundation Stage settings existing in England at the start of the study (1997): integrated centres (fully combining care, education and often health); maintained nursery schools, nursery classes, playgroups, private day nurseries, and local authority day nurseries. In addition a group of 'home' children with no pre-school centre experience were studied for comparison purposes. Parent interviews provided extensive information on the family and on home activities and the child's health and care history before the age of three. The first phase of the EPPE study, of children aged 3-7 years, demonstrated the contribution to children's development of attendance at different types of early childhood provision. The study investigated the effects of duration and quality of pre-school, and the contribution to children's outcomes of differing pedagogical strategies and levels of staff qualification.

The study also demonstrated the important contribution of family characteristics to children's development, including demographic influences such as social class and daily experience such as family activities that enhance young children's learning. By examining the effects of education after taking into account child and family characteristics, the positive influence of early childhood education has been demonstrated, especially for children from disadvantaged backgrounds and those at risk of developing special educational needs (SEN). In developing the study further, to the end of primary education, the EPPE research was informed by the policy and research contexts in the UK and internationally (see Appendix 1)

Earlier findings from the EPPE research programme: ages 3 - 7

The original EPPE study (1996-2003) followed children from entry to pre-school (around aged 3) till they finished the first phase of primary schooling (aged 7, in Year 2 at the end of Key Stage 1). The project produced 12 Technical Papers (and a number of Research Briefs) on the findings over the pre-school and early primary period. This phase of the project is summarised in Sylva et al., 2004. For more information visit the EPPE website at www.ioe.ac.uk/projects/eppe

Section 1: Introduction and background to the study

The findings over the first phase of the study are summarised below:

The impact of pre-school at school entry (age 5)

1. Effects of pre-school

Pre-school experience, compared to none, enhances children's cognitive and social/behavioural development.

2. Type of provision

Some settings are more effective than others in promoting positive child outcomes. 'More' and 'less' effective centres can be found in all types of provision. Overall however, children made better progress (cognitive and social/behavioural) in fully integrated centres and nursery schools, but poorer progress in Local Authority day nurseries.

3. Duration and age of entry

The duration of attendance is important with every month of pre-school experience after age 2 years linked to better intellectual development and improved independence, concentration and sociability. Full-time attendance led to no better gains for children than part-time. Children who had longer hours (greater than 2,000) in group care under the age of two years had higher levels of 'Pro-social' behaviour but a slightly increased 'risk' of 'Anti-social' behaviour at 5 years old.

4. Quality of provision

The observed higher quality of pre-school centres is related to better intellectual/cognitive and social/behavioural development in all children.

5. The main effects of pre-school are present at school entry; these strong effects can be seen in the difference between school entry profiles of the 'home' children and the pre-school group. The influence of pre-school is also demonstrated in the 'dose effect' by which the more pre-school experience a child has, the more progress they make in the period 3-5 years. Also better quality provision was associated with better child outcomes, and settings that had more qualified staff, especially with a good proportion of trained teachers, showed higher quality and their children made more progress and better social/behavioural gains compared to those attending centres of low quality.

6. Effective pre-school practices in settings

Case studies revealed that where settings viewed educational and social development as complementary and equally important, children made better all round progress. Effective pedagogy includes some structured interactions between adults and small groups of children, traditionally associated with the term 'teaching'. Also notable in more effective settings was the provision of planned learning environments and 'sustained shared thinking' to extend children's learning.

7. Vulnerable children

Irrespective of level of disadvantage, 'home' children (those with little or no pre-school experience) show poorer cognitive and social/behavioural outcomes at entry to school (and at age 7) than those who attended pre-school and they are more likely to be identified by teachers as having some form of SEN. Disadvantaged children and boys in particular can benefit significantly from good quality pre-school experiences. Where disadvantaged children attended centres that included children from mixed social backgrounds they showed further benefit than if they attended centres containing predominantly disadvantaged children. Children 'at risk' of learning or behavioural difficulties are helped by pre-school, with integrated settings and nursery schools being particularly beneficial.

8. The importance of the Early years home learning environment (HLE) and support for parents

The quality of the Early years home learning environment (where parents are actively engaged in learning activities with children) promoted intellectual and social development in all children. While parent's social class and levels of education were related to child outcomes the quality of the Early years home learning environment (HLE) was more important and only moderately associated with social class or mothers' qualification levels. What parents do is more important than who they are. For this reason pre-school and school settings that do not include parent support and education are missing an important element in raising achievement and enhancing social/behavioural development.

The impact of pre-school at the end of Key Stage 1 (age 7)

The beneficial effects of pre-school remained evident throughout Key Stage 1 (first 3 years of primary school), although effects for some outcomes were not as strong as they had been at school entry, probably because of the increasingly powerful influence of the primary school on children's development. By the end of Year 2 most children had been in their primary school for three years while the typical child had only been in pre-school for 18 months.

Figures 1a and 1b show the effects of pre-school attendance on children's National assessments in Reading and Mathematics at age 7, broken down by the social class of their parents. Reading and Mathematics scores are higher for the children in the higher social groupings. However, at each social class level it is clear that the pre-school children have higher scores. What is especially worrying is that the scores of disadvantaged children who did not attend pre-school fall below Level 2, the watershed for skills needed to progress on Key Stage 2 school work (and the national expected level for children of this age).

Figure 1a: Reading at Age 7 by SES and pre-school experience

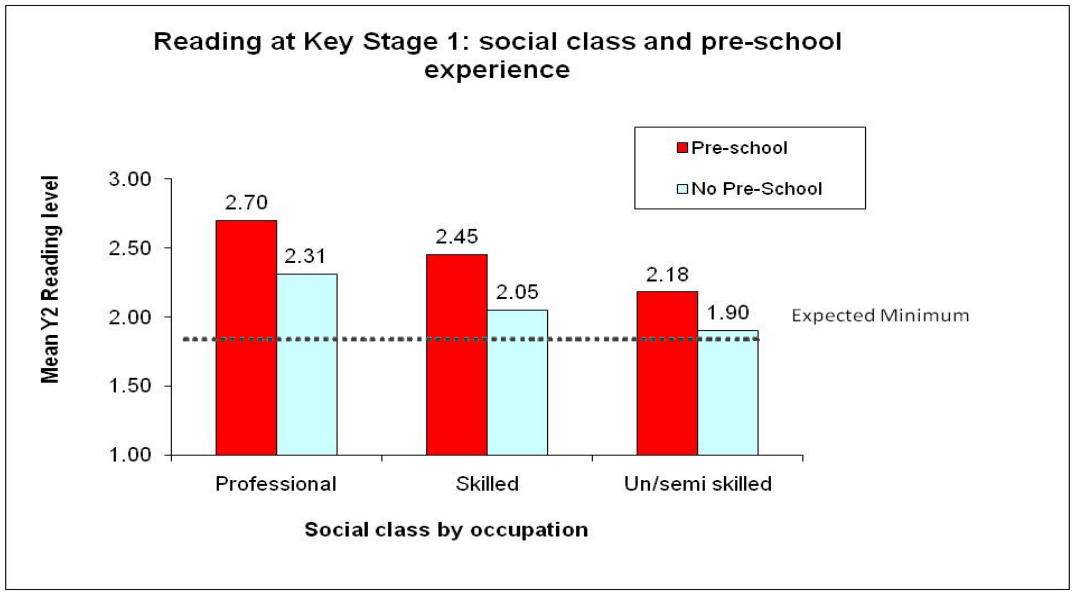
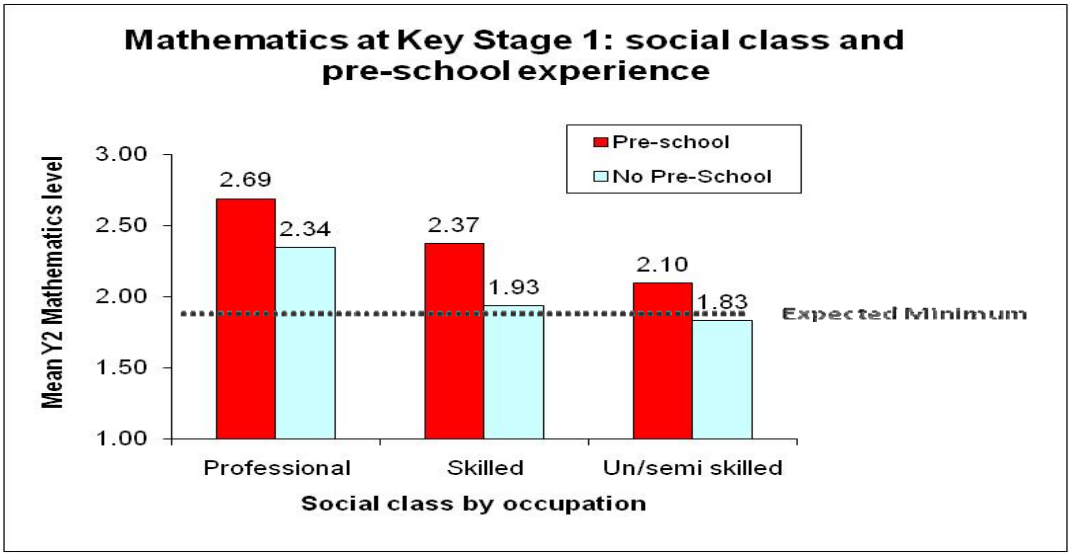


Figure 1b: Mathematics at Age 7 by SES and pre-school experience



Duration of pre-school
The number of months a child attended pre-school continued to have an effect on their progress through Key Stage 1 (KS1). This effect was stronger for academic or cognitive outcomes than for social/behavioural development.

Quality and effectiveness of pre-school
While pre-school quality was significantly related to children's Reading and Mathematics at age 6, at age 7 the relationship between quality and academic attainment was weaker, and the effect of quality on all forms of social/behavioural development, including 'Anti-social' behaviour, was no longer significant. However, the impact of a pre-school centre's effectiveness was still significant at the end of Key Stage 1 (KS1) on social/behavioural outcomes.

Vulnerable children
Many children continued to be 'at risk' of special educational needs (SEN) at the end of Key Stage 1 (2.3% of the EPPE sample had full SEN statements), with more of the 'home' children falling into this group even after taking into account background factors. Multiple disadvantage continued to be associated with poorer outcomes.

Effective pre-school settings
The specific pre-school a child attended shaped their development at school entry. These unique pre-school centre effects continued to influence children's cognitive and social/behavioural development throughout Key Stage 1 (KS1). Of course, this does not mean that primary school has no impact on children's lives – only that the individual pre-schools they attended continued to have an influence. Indeed, the KS1 findings indicate important variations in primary school effects and these are a focus of later sections of this report.

What differentiates the most effective pre-schools?: Evidence from case studies
The evidence presented has demonstrated the continuing effects associated with attending higher quality or more effective pre-schools. Here we summarise evidence from case studies concerning what differentiates the most effective from the moderately effective pre-schools. Analysis of the quantitative data from every EPPE child revealed that in some pre-school centres children made progress that was as expected, better than expected, or worse than expected, given their individual and home characteristics.

In choosing settings for case studies we compiled a profile of each setting based on how well it promoted children's cognitive and social development. The case study settings were chosen from a range identified as 'good' to 'excellent'. The data from 12 effective pre-schools reveal a unique 'story' for each centre. For full details on the methodology and findings, see EPPE Technical Paper 10 (Siraj-Blatchford et al., 2003), which provides comprehensive descriptions of the case study settings. The associated, Department for Education and Skills (DfES) funded, Researching Effective Pedagogy in the Early Years (REPEY) study (Siraj-Blatchford et al., 2002) allowed two reception classes to be added the 12 EPPE cases, and this part of the report also draws on these data too (14 cases in total). The aim of the intensive case studies was to tease out specific pedagogical and other practices associated with 'excellent' outcomes compared to those centres with 'good' or more 'average' outcomes.

'Effectiveness' used in this study is based on child outcomes, which is regarded as, a necessary but insufficient component of quality as high quality provision requires good quality child care and pedagogical practices.

In the case studies, trained researchers, who were already familiar with the centres, spent two weeks in each centre collecting qualitative data. Data from multiple sources was triangulated with manager and parent interviews, and, extensive naturalistic observations of staff (over 400 hours). In addition systematic focal child observations of children (254 target child observations) were conducted, while they were engaged in various curricular activities (Sylva et al., 2007a).

Findings

Settings were compared in terms of their key quality characteristics e.g. the pedagogy employed, the curriculum on offer, the ethos and the management and organisational strategies. The term pedagogy refers to the instructional techniques and strategies that enable learning to take place. It refers to the interactive process between teacher/practitioner and learner. It includes how aspects of the learning environment (e.g. materials provided, organisational techniques, actions of the family and community etc.) are harnessed to promote learning in children.

Effective pedagogy in the early years was found to involve both the kind of interaction traditionally associated with the term 'teaching' and also the provision of instructive learning play environments and routines. The 'excellent' settings provided both teacher-initiated group work and freely chosen, yet potentially instructive play activities. Children's cognitive outcomes appear to be directly related to the quantity and quality of the teacher/adult planned and initiated focused group work for supporting children's learning. The research findings support the general approach taken in *Curriculum guidance for the foundation stage* (QCA/DfEE, 2000). The settings that viewed cognitive and social development as complementary seemed to achieve the best outcomes. Trained teachers were most effective in their interactions with children, using the most 'sustained shared thinking' interactions.

Our 'effective' case study centres had many shared characteristics but also differences. All case study settings generally presented a warm, caring, safe, secure and supportive approach to their children. All the settings engaged children in a range of different groupings, individual and group play, group focused table top activities, interest areas and snacks and story times. All case study settings had a welcoming appearance. The displays on the whole reflected the children's work. Children were generally treated with respect. The centres were warm and inviting places. Staff appeared calm and engaged well with the children. All these centres had good resources. However, the outdoor play environments varied greatly.

All 'effective' settings had strong leadership, characterised by a strong, shared philosophy, and long serving staff. Managers took a strong lead in curriculum and planning particularly in the 'excellent' centres, which had a stronger educational focus, placed higher value on the importance of adult-child interaction, and supported their staff to develop better ways of engaging children. They also encouraged staff development (although training was variable across sectors and local authorities). Where there were trained teachers we found a stronger educational emphasis, with the teachers playing a lead role in curriculum planning and offering positive pedagogical role modelling to less well-qualified staff. There was considerable variation in staff salaries (2003 figures) ranging from £3,000-£7,000 per annum (playgroups) to £15,000-£32,000 (maintained sector).

Using qualitative case study data to elucidate quantitative findings

The case study analysis has gone a long way in providing explanations for the patterns and associations between particular practices (as measured by the ECERS-R and E, see Sylva et al., 1999a; 1999b) and developmental outcomes (see Sammons et al., 2002a; 2003; Sylva et al., 2006). We pay special attention to each of the following:

- Adult-Child Interactions.
- Differentiation and formative assessment.
- Discipline and adult support in talking through conflicts.
- Parental partnership with settings and the home education environment.
- Knowledge of the curriculum and child development

Adult-child interactions

'Excellent' settings encouraged relatively more 'sustained shared thinking' to provide cognitive challenges and extend children's thinking (see Siraj-Blatchford et al., 2003). Periods of 'sustained shared thinking' may be a necessary pre-requisite for excellent early years practice, especially where this is also encouraged in the home through parent support. The staff in 'excellent' settings extended child-initiated interactions, which also extended the child's thinking. Adult 'modelling' was often combined with more sustained periods of shared thinking, and it appeared that open-ended questioning was associated with better cognitive achievement (representing 5% of the questioning used in 'excellent' settings).

In 'excellent' settings two thirds of activities were child-initiated, but half of these were extended by the adult, and one third adult-initiated. Staff in 'excellent' settings regularly extended child-initiated activities without dominating them. 'Sustained shared thinking' was most likely to occur when children were interacting 1:1 with an adult or with a single peer partner. Freely chosen play activities often provided the best opportunities for adults to extend children's thinking. Adults need therefore, to create opportunities to extend child-initiated play as well as teacher-initiated group work, as both have been found to be important vehicles for promoting learning.

The most qualified staff (almost all trained teachers in our study) provided children with more experience of academic activities (especially language and Mathematics) and provided children with higher cognitive challenges. They also provided the most direct teaching (instruction through demonstration, explanation, questioning, modelling etc.) and used more 'sustained shared thinking'. Furthermore, we found that less well qualified staff functioned as significantly better pedagogues when working alongside qualified teachers.

Differentiation and formative assessment

There was a positive association between curriculum differentiation, formative assessment, and the process of selecting activities to provide the cognitive challenges. Adults 'modelling' (or demonstrating) positive attitudes, behaviours etc., was a valuable pedagogic strategy. The best settings kept good records and engaged with parents about their child's progress on a weekly or monthly basis. However, we found little evidence of detailed formative feedback to children *during* their engagement with tasks.

Discipline and adult support in talking through conflicts

The 'excellent' settings adopted discipline/behaviour policies that involve staff in supporting children in rationalising and talking through their conflicts.

Parental partnership

Where settings shared *educational* aims with parents, and pedagogic efforts were made by parents at home to support children, sound learning took place. The 'excellent' settings shared child-related information between parents and staff, and parents were often involved in decision making about their child's learning.

Knowledge of the curriculum and child development

Practitioners' knowledge and understanding of the curriculum are vital. A good grasp of the appropriate 'pedagogical content knowledge' is just as important in the early years as at any stage of education. Moreover we found, crucially, that the most 'effective' educators also demonstrated knowledge of which content was most relevant to the needs of individual children, requiring a deep understanding of child development.

Section 2: How EPPE 3-11 studied children's development

Summary of Key Messages

The same 3,000 children were studied to the end of Key Stage 2 (age 11) for both cognitive and social/behavioural development (at age 10 and 11).

- All primary schools attended by EPPE children were rated for 'academic effectiveness' using national assessment data.
- Children's self perceptions were studied alongside cognitive and social-behavioural outcomes.
- Classroom observations were conducted in a sub-set of classrooms.
- Analytical strategy takes account of child, family, the Early years home learning environment (HLE), pre-school and primary school factors.

This section has three main components. The EPPE 3-11 sample is described with its 2,500 cognitive and social/behavioural child development trajectories and how the project studied the children's views and perceptions. Then a description is provided about how the project investigated what influences children's developmental trajectories, such as home, pre-school, primary school processes and neighbourhoods. Finally, this section shows how the EPPE 3-11 analyses deal with interactions between different key child experiences (e.g., home, pre-school and primary school), as well as dealing with questions of characteristics of effective classrooms, resilience and out-of-school learning. These three sections comprise the methodology.

Design of the study

EPPE 3-11 is a mixed method longitudinal study combining quantitative and qualitative methods. It is interdisciplinary in using constructs and methods drawn from a range of disciplines including education and psychology.

Aims of the research for Key Stage 2 (KS2)

The EPPE 3-11 aims were developed from the findings of the earlier pre-school and Key Stage 1 (KS1) EPPE study. They were:

a) To investigate the continuing effects of pre-school to the end of Key Stage 2
b) To describe the characteristics of 'effective' primary classrooms and schools
c) To identify factors that contribute to resilient and vulnerable pathways in the EPPE children
d) To describe the contribution of 'out-of-school learning' (homes, communities, internet) to children's development.

The Sample

i) The child sample

Over 2,800 children were recruited around the age of 3+ at their pre-school settings together with over 300 'home' children without pre-school experience recruited at the start of school (see Sammons et al., 1999). During the primary school phase of the study there were over 2,600 children still in the study.

ii) The primary school sample

All primary schools that contain EPPE 3-11 children (800+ schools approximately 100 local authorities and 2,600 children)

During primary school, data were collected from various sources: EPPE pupils filled out questionnaires (response rate was 80% of the original sample of 3172 children), their parents were sent questionnaires (response rate was 70%) and teachers of EPPE pupils completed a questionnaire about the EPPE pupil (response rate was 85%). Using all data on the longitudinal sample of EPPE 3-11 children, and their pre-schools and schools, the contribution of background, pre-school and school factors has been estimated.

Sub-sample of primary schools with EPPE 3-11 children for classroom observations in Year 5 (125 schools, 1,160 children)
Only a subset of schools attended by EPPE 3-11 children were recruited for classroom observations and teachers filled out questionnaires providing information on classroom and school processes (100% response rate). This was supplemented by questionnaires completed by the classmates (peers) of the EPPE children (6,000 children).

All primary schools in England (16,000 schools, 600,000 children)
In order to establish the academic effectiveness of each of the schools an EPPE 3-11 child attended, we estimated their 'value added' to children's academic attainment using the government's database of National assessment results at KS1 and KS2. Using data from all state primary schools, and all their pupils, value added multilevel modelling was employed to estimate the effectiveness of each school in England for English, Mathematics and Science as well as average attainment. Within this database it was possible to create an 'academic effectiveness' score for each school that EPPE 3-11 children attended, taking account of background factors and prior attainment.

Child trajectories
Many child trajectories were created for each child's progress over time; some were academic trajectories (e.g., Mathematics) while others related to social/behavioural development (e.g. 'Pro-social' behaviour).

Cognitive outcomes

Taking account of developmental change, the study uses different cognitive assessments:

- Start of pre-school: British Ability Scales (BAS, Elliot, Smith & McCulloch, 1996) assessments
- Start of primary school: British Ability Scales (BAS) assessments, plus Pre-reading.
- Year 1: NFER-Nelson Primary Reading Level 1 and Mathematics 6 tests
- Year 2: Key Stage 1 National Assessments: Reading and Mathematics
- Year 5*:* NFER-Nelson Primary Reading Level 2 and Mathematics 10 tests
- Year 6: Key Stage 2 National Assessments: Mathematics and English – a combined measure of Writing, Spelling and Reading (via comprehension).

Note that the measure of Pre-reading used when children entered reception class as well as measures of Reading and English attainment can all be regarded as measures of Literacy. Similarly the measure of Early number concepts (from BAS) used when children entered reception class and measures of Mathematics attainment can be regarded as measures of Numeracy.

NFER-Nelson tests at ages 6 and 10
To ensure comparability over time, an internal standardisation and normalisation procedure was applied, taking account of age effects within the school year group. The scores for the EPPE 3-11 sample were internally standardised to a mean of 100 and a standard deviation of 15. Therefore all children scoring better than 100 at a certain time point are scoring above the average attainment level expected for their chronological age (belong to the upper half of the sample of that assessment, controlling for age effects). Due to the use of internally standardised attainment scores, the scores can only be used to investigate the progress or improvement of certain groups of children *relative* to the total EPPE 3-11 sample, but cannot be used to show *absolute* progress over time. For details of the standardisation and normalisation procedure see Sammons et al., (2007a, Appendix 2).

National Assessments at ages 7 and 11
Test levels were collected at the end of Year 2 and Year 6. However, National assessment test levels are ordinal categories: they place pupils' into a few ranked attainment groups: Year 2: 6 groups from working towards level 1, level 1, through 2c, 2b, 2a to level 3; Year 6: 6 groups from working towards level 1, level 1 through to level 6.

In addition to test levels, data were also collected on children's individual test scores within levels. This allowed the creation of more finely differentiated outcome measures (referred to as decimalised levels) for the multilevel analysis. For children with a valid level for the National assessment test taken, their decimalised score was calculated as follows:
Decimalised score = level of test achieved + {(raw score – lowest valid raw score for corresponding level) / highest valid raw score possible for the level}

For further details of the decimalisation procedure see Sammons et al., (2004a), Appendix 3. To ensure comparability over time, an internal standardisation and normalisation procedure was applied that takes account of age effects within the school year group. The scores are internally standardised to a mean of 100 and a standard deviation of 15, as for other cognitive assessments. For information on term of birth effects see Section 8.

Social/behavioural outcomes
Beginning at age 6 we used an extended version of the Strengths and Difficulties Questionnaire (Goodman, 1997) to measure different features of children's social/behavioural development in Years 1, 2, 5 and 6. The social/behavioural child profile was completed by a teacher who knew the EPPE 3-11 child well. Principal component analysis and confirmatory factor analysis were used to identify the main underlying dimensions of social behaviour in Year 6 and to see if the social behavioural factors were similar to Year 5 results (see Sammons et al., 2007b). The Year 5 findings were replicated at Year 6 in defining the main four aspects of social behaviour: 'Self-regulation', 'Pro-social' behaviour, 'Hyperactivity' and 'Anti-social' behaviour. Specific questionnaire items associated with each of the four social/behavioural dimensions are presented in Box 1.

Box 1: Items associated with each social/behavioural dimension in Year 6 (age 11)

'Self-regulation' (α=0.87)
1. Likes to work things out for self; seeks help rarely
2. Does not need much help with tasks
3. Chooses activities on their own
4. Persists in the face of difficult tasks
5. Can move on to a new activity after finishing a task
6. Open and direct about what she/he wants
7. Confident with others
8. Shows leadership in group work
9. Can take responsibility for a task

'Hyperactivity' (α=0.87)
1. Restless, overactive, cannot stay still for long
2. Constantly fidgeting or squirming
3. Easily distracted, concentration wanders
4. Thinks things out before acting
5. Sees tasks through to the end, good attention span
6. Quickly loses interest in what she/he is doing
7. Gets over excited
8. Easily frustrated
9. Impulsive, acts without thinking
10. Can behave appropriately during less structured sessions
11. Fails to pay attention
12. Makes careless mistakes

'Pro-social' behaviour (α=0.87)
1. Considerate of other people's feelings
2. Shares readily with other children (treats, toys, etc.)
3. Helpful if someone is hurt, upset or feeling ill
4. Kind to younger children
5. Often volunteers to help others (teachers, other children)
6. Offers to help others having difficulties with a task
7. Sympathetic to others if they are upset
8. Apologises spontaneously

'Anti-social' behaviour (α=0.75)
1. Often fights with other children or bullies
2. Often lies or cheats
3. Steals from home, school or elsewhere
4. Vandalises property or destroys things
5. Shows inappropriate sexual behaviour toward others
6. Has been in trouble with the law

α= Cronbach's alpha (An alpha score of 0.65 or above supports good consistency for research purposes; for clinical purposes an alpha of 0.80 is required).

Scores on each social/behavioural dimension were calculated as a mean of all items corresponding to each dimension. Higher scores indicate better behaviour for 'Self-regulation' and 'Pro-social' behaviour; lower scores indicate better behaviour (lower incidence from teacher ratings) for 'Hyperactivity' and 'Anti-social' behaviour. Note that scores on all social/behavioural measures are skewed towards the more desirable end of the scale. This is especially important for the more negative aspects of social behaviour where raised scores indicating potential maladaptive behaviour (using the cut-off point suggested by Goodman) are only evident for a very small minority of children (only 3.9% for 'Anti-social' behaviour and 7.4% for 'Hyperactivity'). Similarly, almost ten per cent (9.8%) of children show extremely low levels of 'Pro-social' behaviour and just under twelve per cent (11.5%) of children show very low levels of 'Self-regulation' in Year 6. Very few (only 1.9%) children had abnormal scores on both 'Hyperactivity' and 'Anti-social' behaviour, and even fewer (only 1.2%) had abnormal scores on all four aspects of social behaviour. Most children are rated positively for these features of social behaviour, and the results are in line with other research on social behaviour and with the distribution of scores for social/behavioural measures for the EPPE 3-11 sample at younger ages.

Self-perceptions and children's views
Information about children's self-perceptions and experiences of school was collected through a self-report questionnaire in Year 2 and Year 5. The items were derived from a study of existing measures (e.g., Grosin and McNamara, 2001; Teddlie and Stringfield, 1993) and adapted for use with this age group. Although measures of children's self-perceptions were collected in both Year 2 (age 7) and Year 5 (age 10) of primary school, pupils' views of their learning environment were collected in Year 5 (age 10) only.

Self-reported experiences of school at the end of Year 2
Statistical analyses were used to explore the variation in children's responses to the questionnaire items and to see whether robust measures of their attitudes and self-perceptions could be identified. The results revealed a number of underlying dimensions (factors) (for further descriptive details see Sammons et al., 2008a, Appendix 2). Four main factors were found through the combined principal components analysis followed by confirmatory factor analysis (see Box 2).

Box 2: Items associated with each pupils' self-perception dimension in Year 2 (age 7)

'Enjoyment of school' (α=0.69)	**'Behaviour self-image'** (α=0.62)
1. I like school	1. I try to do my best at school
2. I like answering questions in class	2. I am kind to other children
3. I like Reading	3. I behave well in class
4. I like doing number work	
5. I like Science	
6. School is interesting	
'Academic self-image' (α=0.57)	**'Alienation'** (α=0.52)
1. I am clever	1. I get tired at school
2. My teacher thinks I am clever	2. I get fed up at school
3. I do my work properly	3. I get angry at school

α= Cronbach's alpha

Pupils were generally very positive about their experiences, leading to a high degree of skew in the distributions of the factors. This is not unusual for attitude scales.

Attitudes towards school at the end of Year 5 (not studied at Year 6)
The statistical analysis of the Year 5 questionnaire items again identified a number of underlying dimensions (factors) (for details see Sammons et al., 2008a, Appendix 4). Four factors (see Box 3) were revealed by the combined principal components analysis and the confirmatory factor analysis and were broadly similar to those found in Year 2.

Box 3: Items associated with each pupils' self-perception dimension in Year 5 (age 10)

'Enjoyment of school' (α=0.76) 1. Lessons are interesting 2. I like school going to school 3. I get fed up at school 4. I get tired at school 5. I like English 6. I like Mathematics 7. I like Science	**'Anxiety and Isolation'** (α=0.74) 1. I feel lonely 2. I get upset 3. I feel worried 4. Other children bully me
'Academic self-image' (α=0.74) 1. I am clever 2. I know how to cope with my school work 3. I am good at school work 4. My teacher thinks I'm clever	**'Behaviour self-image'** (α=0.62) 1. I try to do my best at school 2. I behave in class 3. I talk to my friends when I should be doing my work 4. I hit other children

α= Cronbach's alpha

The distributions of the dimensions 'Anxiety and Isolation', 'Academic self-image' and 'Behaviour self-image' show a high degree of skew often found in attitude rating scales. Note that a high score on all the Year 5 factors relates to more positive self-perceptions, as the scales were recoded into normalised scores with a mean of 100 and a standard deviation of 15 from the original scales.

Information about the 'influences' on children's developmental trajectories

Individual children and their families: Data were collected about child and family characteristics that may influence children's attainment, development and progress. Parental interviews were administered when the children entered the study in the pre-school period and information was collected on demographic characteristics such as education, employment and number of children in the household. At the same time, information was collected on the child's early care history, birth weight and developmental problems. This information was updated through parental questionnaires towards the end of Key Stage 1 (KS1) and again towards the end of primary school.

The Home Learning Environment (HLE): The pre-school parent interview collected information on the Early years HLE: (reading with children, number/letter activities, etc.), and other activities such as bedtime, TV viewing etc. In addition, information on the KS1 HLE was collected through a questionnaire towards the end of KS1 (ages 6/7). We also collected information on 'other learning' activities at the end of KS2, including computer access and use at home, homework and out of school learning opportunities. The Early years HLE is used extensively in KS2 analyses because it is a stronger predictor of outcomes at age 11 than the KS1 HLE (for more details see Section 3).

The neighbourhood: Parental perceptions of their neighbourhood were studied via the parental questionnaires in KS1. Postcode information was also used to derive a measure of area deprivation from administrative databases.

The Primary Schools: In analyses measures of child, family, HLE and pre-school from the earlier EPPE work up to the end of KS1 (age 7 years) is included (see Sammons et al., 2002a; 2003). However differences between the schools attended by EPPE 3-11 children in KS2 are also taken into account. To this end EPPE 3-11 set about establishing measures of primary school academic effectiveness, and also classroom and school processes as described below.

The academic effectiveness of the primary school
To establish the academic effectiveness of each primary school, separate measures of primary school effectiveness in English, Mathematics and Science were derived from independent value added analyses of pupil progress for three successive national cohorts (2002-2004) using National assessment data matched between Key Stage 1 and 2 for all pupils (see Melhuish et al., 2006a; 2006b) for every primary school in England. Multilevel models are used to investigate children's progress during Key Stage 2 by controlling for a child's prior attainment, as well as for a number of background influences. These allow measurement of the contribution of the primary school attended. Primary schools where children make significantly greater progress than predicted (on the basis of prior attainment and intake characteristics) can be viewed as *more academically effective,* and schools where children make less progress than predicted can be viewed as *less effective*. The phrase 'academic effectiveness' here therefore refers solely to these value added measures of progress.

The analyses focus on **progress**, rather than absolute attainment, in the three subject areas of English, Mathematics and Science, and in average key stage scores. The value added models controlled for pupil background characteristics such as gender, ethnic group, English as an additional language, free school meal (FSM) eligibility and special educational needs (SEN) as well as prior attainment and school intake characteristics. Further development of the value added models measured the differential effects for boys and girls in different ethnic groups, as well as considering area effects. The child's postcode was used to relate the child's residence to the Index of Multiple Deprivation (IMD – for further details see The English Indices of Deprivation 2004: Summary [revised], 2007) and to variables derived from the 2001 Census. In these analyses Key Stage 1 (KS1) results were linked to Key Stage 2 (KS2) results at the pupil level supplemented with additional pupil and school level data (including FSM, EAL, ethnicity etc), and area characteristics to provide additional contextual controls. From these analyses, it was possible to identify trends in effectiveness in terms of academic outcomes over the three successive years.

In analysing progress, the value added models include measures of a child's ability at the start of Key Stage 2, i.e. Key Stage 1 attainment, as well as predictor variables that might explain progress. The consequences of this strategy are as follows:

- The inclusion of Key Stage 1 attainment in the value added models will absorb the effects of several child, parent, family, home and area factors, if their effects do not persist additively over the Key Stage 2 period. Hence the relative importance of these factors in measuring progress may appear substantially less than would be the case if Key Stage 1 scores are excluded in the models, i.e. attainment only is considered.
- Some children who start from a very low point may make a lot of progress across KS2 but nonetheless their overall attainment by age 11 may still be below average.

These analyses were used to produce measures of the academic effectiveness of all primary schools in England (see Appendix 5 for key findings related to all primary schools in England).

Observations of classrooms and school processes
Trained researchers conducted detailed classroom observations in 125 EPPE 3-11 focal schools in Summer 2004 and Summer 2005. Classroom observations were conducted using schedules developed in the USA. The instruments used were the Instructional Environment Observation Scale (IEO, Stipek, 1999) and the Classroom Observation System for Fifth Grade (COS-5, Pianta, NICHD, 2001), which covered a wide range of pedagogical practices and pupil behaviours. Further details are provided in section 6 of this report. These observations helped to establish the variation in classroom practices across a range of indicators (Sammons et al., 2006a; 2006b; 2006c). In addition teacher questionnaires provided further data on school processes and climate, as did questionnaires administered to all the peers in Year 5 of each EPPE child.

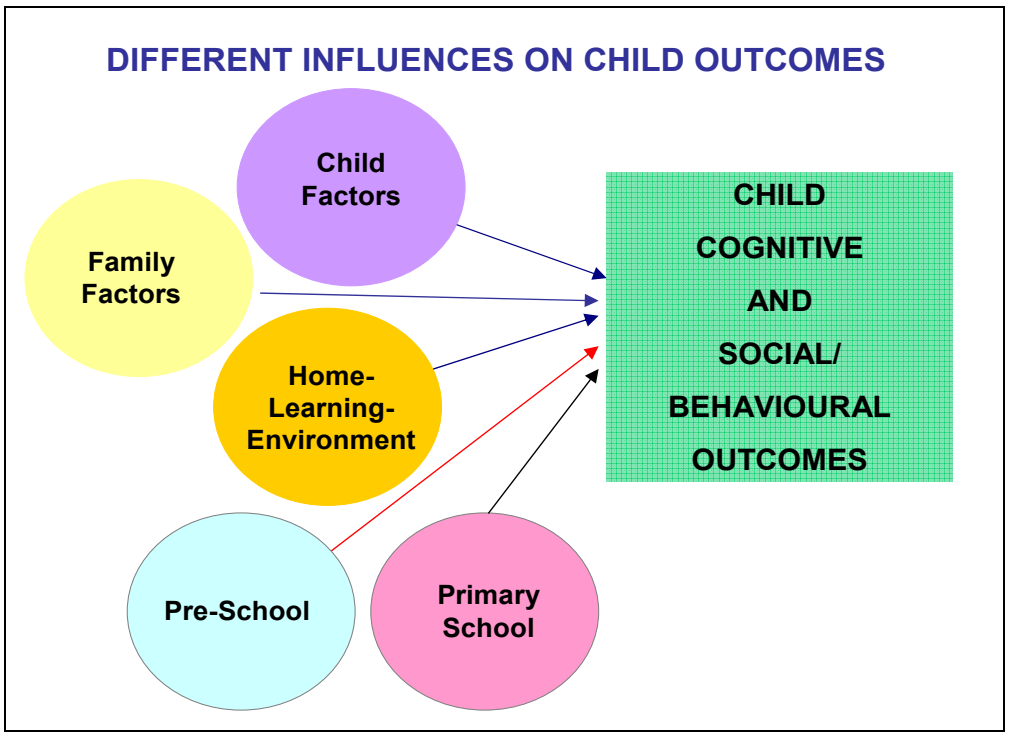
Ofsted inspection judgements
Several measures from Ofsted inspection data were used as predictors of children's progress in school. The Ofsted data were also used to explore the relationships between the EPPE 3-11 classroom data and the views of inspectors in the following areas: judgements on effectiveness, improvement since last inspection, leadership, quality of teaching and learning and inspectors' ratings of a number of pupil outcomes as well as attendance, attitudes and behaviour in these schools.

Case Studies
As part of another study (the Equalities Review, EPPE 3-11 Team, 2007) case studies of resilient children from vulnerable families were carried out. These centred on interviews with parents and young people towards the beginning of secondary education (Siraj-Blatchford et al., 2007a) and also included information from the individual developmental trajectories and information collected earlier in the study from parents.

Data collection
Full details of data collection procedures, instruments and response rates are contained in the technical reports associated with each phase of the study (see www.ioe.ac.uk/projects/eppe or http://www.dcsf.gov.uk/research/programmeofresearch/index.cfm?type=5).

Analytical strategy
The analyses employ a range of statistical techniques from descriptive and correlation analysis to multilevel (hierarchical) regression methods to examine the way child, family and home characteristics influence children's cognitive attainment and progress up to the end of KS2. In these analyses we also establish the effects associated with both pre-school and school characteristics. However this can only be adequately achieved if we first take account of the influence of a range of background factors that also affect children's development as shown in Figure 2. In the statistical analyses, multilevel modelling is used as it capitalizes on the hierarchical structure of the data (i.e. pupils clustered within schools, Goldstein, 1995), and therefore produces more accurate estimates of the net effects of different factors.

Figure 2: Influences on children's development



The research questions

The research design draws on the range of data collection methods to answer the specific research questions, summarised below: The analyses are based, in the main, on establishing the 'value added' contribution to children's development of pre-schools, primary schools, families and communities.

a) *Do the effects of pre-school continue through to Key Stage 2 and how does pre-school interact with primary school in shaping children's development?*

EPPE 3-11 explored whether these early benefits remain apparent for both cognitive and social/behavioural development at the end of primary school. This part of the research is particularly concerned with establishing whether the influence of attending a more effective pre-school, or one of high quality, is maintained or reduced for those who attend less effective primary schools. Likewise, did those who had no pre-school experience, or only limited or poor quality pre-school experience 'catch up' if they attended a more effective primary, indicating to what extent later 'good' school experience can compensate for early lack of or poor pre-school experience. Similarly, did those children who attend both a more effective pre-school and a more effective primary obtain a greater benefit? This is of particular policy relevance for disadvantaged pupils.

The analyses documented the enduring impact of pre-school on children's outcomes towards the end of primary education, after controlling for child and family characteristics along with the home learning environment (HLE). This is one of the few studies in the international literature to attempt such educational effectiveness analyses (see Sammons et al., 2008b; 2008c).

b) *What are the characteristics of 'effective' primary classrooms and schools?*

Before exploring the practices and processes in the EPPE children's schools, the researchers first had to establish how (relatively) effective, in terms of academic attainment, were the schools that contained EPPE 3-11 pupils. Using data on effectiveness of the full sample of schools, a selection of 125 schools attended by four or more EPPE 3-11 pupils (across a range of 'effectiveness' scores) were chosen for classroom observations in Year 5.

Classroom observations were conducted using two observation instruments to explore variation in classroom processes, including teachers' and pupils' classroom behaviour and experiences. The Instructional Environment Observation Scale (IEO, Stipek, 1999) and the Classroom Observation System for Fifth Grade (COS-5, Pianta, NICHD, 2001) were used. The COS-5 was employed in Year 5 classes in 125 schools and the IEO in a sub-set of 93 of the same classes and schools. In addition, information on children's perceptions of classroom pedagogy and school ethos was collected through a questionnaire (All about me in School) for all (n=1160) EPPE 3-11 children attending the sub-sample of schools and all of their peers (n= 2,720). Teachers working with these classes also completed a questionnaire on their school and classroom practices.

c) *Which factors contribute to resilient and vulnerable pathways in the EPPE sample?*

The analyses for this part of the study were carried out as part of a separate grant from the Equalities Review. Using statistical analyses of the full EPPE 3-11 dataset we identified children who had 'succeeded beyond expectations' and also children who underachieved in relation to expectations. We explored factors associated with these resilient and vulnerable trajectories using qualitative as well as quantitative data.

d) *What is the contribution of 'out-of-school learning' to children's development?*

This research question continues the theme on the contribution of the home learning environment (HLE) to children's learning and development. Now the children were older the research explored, through questionnaires to pupils and parents, information on out-of-school learning opportunities, e.g., learning in the home, participation in community activities, the use of information technology.

Section 3: Child, family and home background effects at the end of primary school

Summary of Key Messages

- Significant child characteristics for attainment in English gender, birth weight, ethnicity and continued need of EAL support and for Maths: birth weight, early health problems and ethnicity.
- A range of family characteristics are significant for a range of different outcomes, however mother's education, SES, FSM status remain important for all outcomes. Father's education becomes significant by end of primary school.
- The Early years home learning environment (HLE) remains important at age 11 for all outcomes.

The EPPE 3-11 project has considered how a wide range of factors may influence children's development. For example when looking at a child's attainment in English analyses consider whether child, family, neighbourhood, pre-school and school influence English attainment. When progress is considered the child's prior attainment is added into the statistical model. The large sample size and the statistical methods allow the separate influence of each of the predictors to be estimated, so that when an effect for pre-school is shown it is after allowing for all the relevant background factors.

This section reports on the influence of background factors upon children's development, in particular the child, family and home learning environment (HLE) influences.

Child characteristics

EPPE 3-11 has measures related to the child on a range of characteristics that are tested for significant associations with child outcomes. These are:

Age	Gender	Ethnicity
English as an additional language (EAL)	Birth weight	Birth order
Perinatal health difficulties	Early developmental problems	
Early behaviour problems	Early health problems	

In addition when considering progress over a particular period the child's attainment at the start of that period is included. Not all of these factors were found to show significant effects and only those that do show significant effects upon children's outcomes are discussed here.

Children's attainment and progress in English (and Reading) and Mathematics at the end of primary school in Year 5 and Year 6 (ages 10 and 11) has been analysed. The results are similar for both age 10 and 11 years. For English (and Reading), gender, birth weight, ethnicity, the need of EAL support and early developmental problems are all found to have statistically significant effects that are distinct from the effects of all other characteristics considered. For Mathematics the following child characteristics are found to have a significant net effect: birth weight, early health problems, gender and ethnicity.

Parental, family and home characteristics

A range of measures of the parents, family, and home characteristics have been derived from the parental interview at the start of the study and parental questionnaires during Key Stage 1 (KS1) and Key Stage 2 (KS2). These measures, shown below, have been tested for their effects upon children's development.

Parental characteristics
Socio-economic status (SES) taken from the highest occupational status of either parent
Family earned income (from KS1 parental questionnaire)
Poverty (child eligible for Free School Meals or not – FSM)
Marital status
Mother's level of employment — Father's level of employment
Mother's education — Father's education
Mother's age — Father's age

Family characteristics
Lone parent — Number of siblings — Life events

Home characteristics
The home learning environment (Early years HLE) in the pre-school period
The KS1 home learning environment (HLE)
For a list of all HLE items see Appendix 3.

Background effects at the end of primary school

Child, family and Early years HLE characteristics remain significant predictors of children's cognitive and social/behavioural development at age 11 (although their influence is weaker than when children were age 7). This may reflect the growing importance of primary school and peer influences.

Child characteristics
At age 11, girls attainment is significantly higher than that of boys in English (ES=0.29) but boys attainment is somewhat better in Mathematics (ES=-0.19). This is in contrast to findings on gender differences at earlier time points (age 6 for example) where girls showed higher attainment than boys in both subjects. There are marked gender differences on all measures of social/behavioural development. Boys were rated by teachers as displaying more Hyperactive and 'Anti-social' behaviour than girls, whereas girls were rated more highly on 'Self-regulation' and 'Pro-social' behaviour than boys. Differences between the genders are especially large for 'Pro-social' behaviour and 'Hyperactivity' (where the effect size is 0.71 for both measures).

At age 11 children with very low birth weight had significantly lower attainment in English (ES=-0.47) and Mathematics (ES=-0.48) than children with normal birth weight[1]. This is in line with findings at earlier time points.

Also, children whose parents reported early developmental problems at the beginning of the study showed lower attainment in English at age 11 than children for whom no early developmental problems were reported (one developmental problem: ES=-0.24). Similar effects were found with Mathematics at age 11 (one developmental problem: ES=-0.15). Children who had one early behavioural problem had significantly lower levels of 'Self-regulation' (ES=-0.25) and 'Pro-social' behaviour (ES=-0.24) and significantly higher levels of 'Hyperactivity' (ES=0.31) and 'Anti-social' behaviour (ES=0.24) at age 11. In contrast, having early developmental problems was found to be a significant predictor only for later 'Self-regulation' (ES=-0.47), with children who had one or more early developmental problems showing lower 'Self-regulation' at age 11.

[1] Babies born weighing 2500 grams or less are defined as below normal birth weight: foetal infant classification is below 1000 grams, very low birth weight is classified as 1001-1500 grams and low birth weight is classified as 1501-2500 grams (Scott & Carran, 1989).

Children who still needed support for English as an additional language (EAL) showed lower attainment in English (ES=-0.59) and Mathematics (ES=-0.64) at age 11 than others. Possibly the net effect of EAL support is slightly stronger for Mathematics than English because EAL support is often targeted at reading rather than mathematics in primary schools. Need of EAL support was an important predictor of 'Self-regulation' (ES=-0.65) and 'Hyperactivity' (ES=0.46), with children still in need of EAL support at age 11 being rated by their teachers as having lower 'Self-regulation' and higher levels of 'Hyperactivity'.

Parental and Family characteristics

When considering children's development at the end of primary school several parental and family characteristics show significant effects and these are discussed here.

Mother's education, as measured by highest level of qualification, continued to show a consistent pattern of strong and positive effects. The categories degree and higher degree showed the strongest positive influence (compared with the group that had no qualifications). In terms of effect sizes, at age 11 the association was stronger than at earlier time points, especially for English (ES=0.76 for mother having a degree versus no qualification for English, ES=0.71 for Mathematics). See Figures 3.1 and 3.2 for details on effect sizes for other qualification levels compared to no qualification at age 11. Mother's education was also a strong predictor for all four social/behavioural outcomes at age 11. Higher mother's qualification levels are associated with increased 'Self-regulation' (ES=0.55) and 'Pro-social' behaviour (ES=0.36) as well as lower levels of 'Hyperactivity' (ES=-0.45) and 'Anti-social' behaviour (ES=-0.27). These findings are in line with the results of analyses for previous years, but slightly stronger.

Father's education also had a statistically significant effect on English and Mathematics attainment, but mother's education showed a stronger link. Father's education was not a strong predictor of social/behavioural development at age 11, but was a significant predictor for 'Self-regulation' (ES=0.29) and 'Hyperactivity' (ES=-0.30). Children whose father has a degree or higher degree have higher levels of 'Self-regulation' and lower levels of 'Hyperactivity' than children whose father had no qualifications.

Figure 3.1: The net effect of mother's qualification on English attainment at age 11

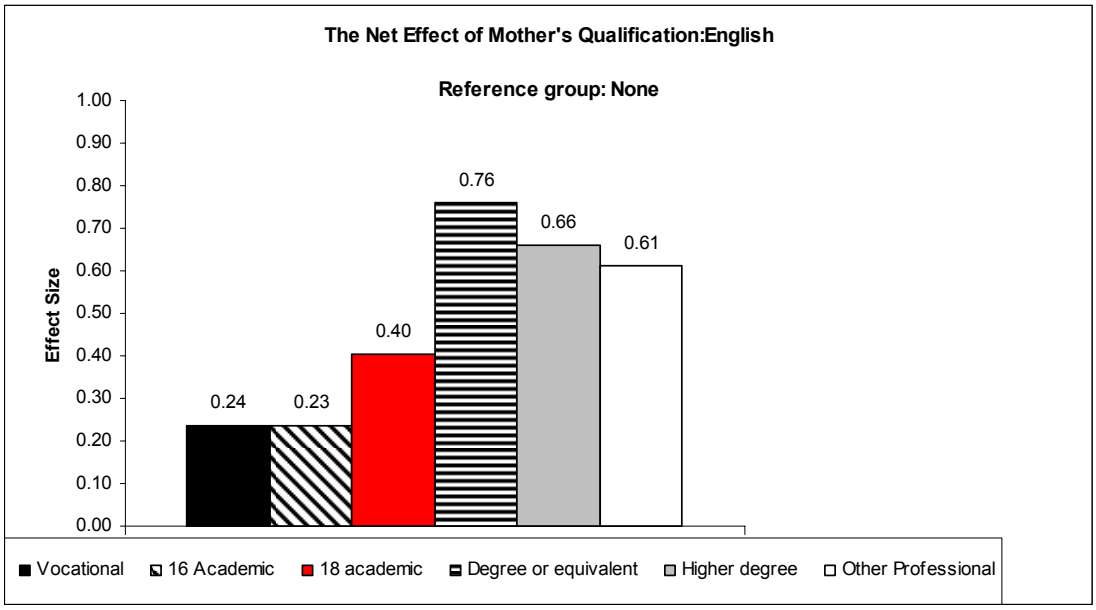
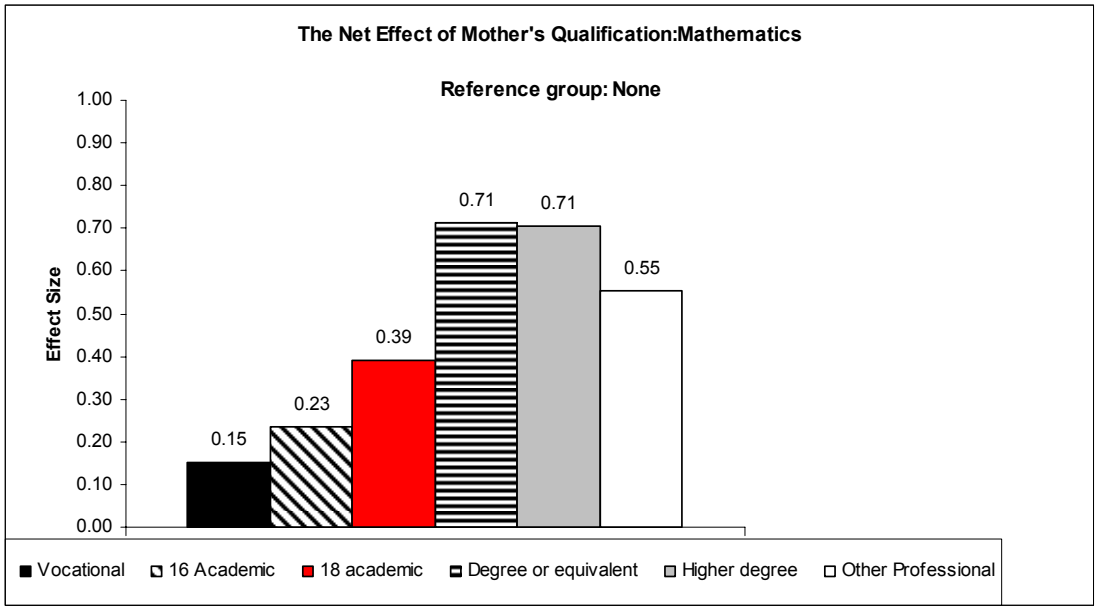


Figure 3.2: The net effect of mother's qualification on Mathematics attainment at age 11



In terms of socio-economic status (SES; measured by parents' highest social class of occupation), compared with 'professional non-manual', all other SES categories were associated with lower attainment for both English and Mathematics at age 11. This was statistically significant for Mathematics attainment for children whose parents belong to the groups 'skilled non manual', 'skilled manual', 'semi-skilled', 'unskilled', and 'unemployed'. For English attainment the category 'skilled manual' and 'semi-skilled' were associated with significant lower attainment. Relative to the comparison group professional non-manual, all other SES groups show poorer outcomes at age 11 when controlling for other influences. Results in terms of effect sizes are illustrated in Figures 3.3 and 3.4. Effect sizes were in the range -0.03 to -0.34 for English, and -0.15 to -0.36 for Mathematics. For social/behavioural outcomes at age 11, SES was a significant predictor for 'Anti-social' behaviour only. Children from families in the highest SES group have lower teacher rated 'Anti-social' behaviour than children from families in the skilled non-manual (ES=0.23), unskilled manual (ES=0.28) and unemployed (ES=0.20) groups.

Figure 3.3: The net effect of family SES on English attainment at age 11

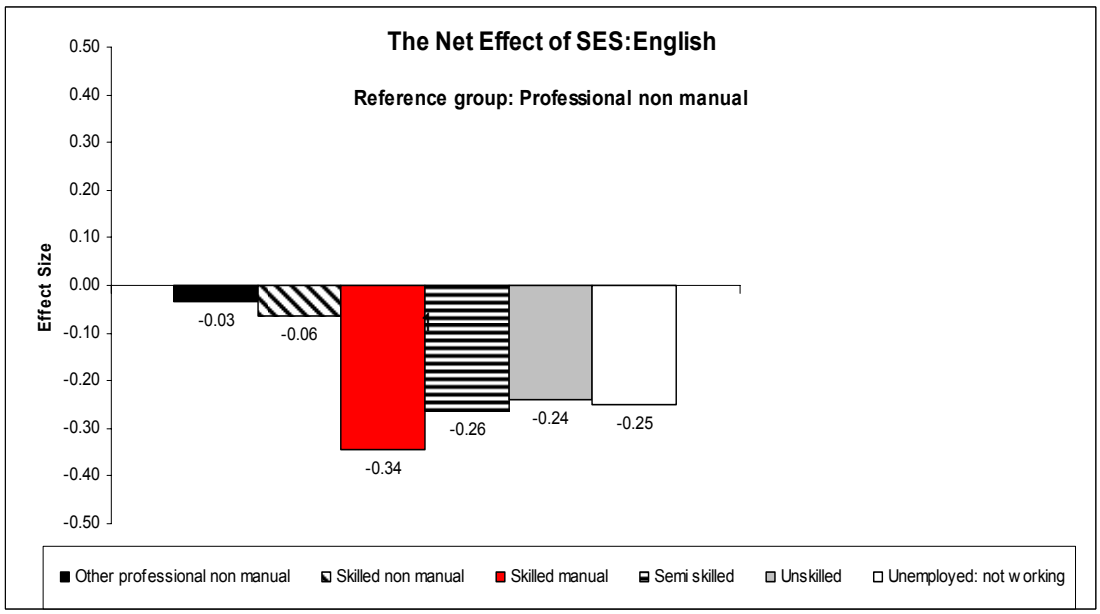
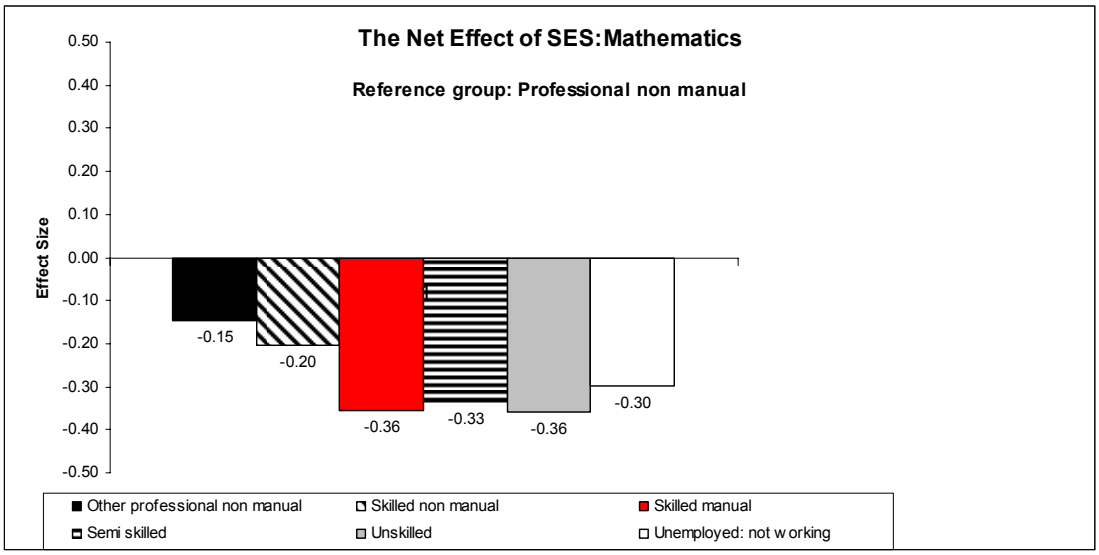


Figure 3.4: The net effect of family SES on Mathematics attainment at age 11



Taken together the results show that children whose parents belong to the highest SES group - professional non-manual - continue to have significantly higher attainment, net of the influence of income and qualifications (parental education), though qualifications are relatively more important than either income or SES in affecting children's cognitive outcomes.

The free school meals (FSM) proxy measure of poverty showed a negative relationship with attainment at age 11. The differences were moderate to weak (ES=-0.23 for English, ES=-0.15 for Mathematics). FSM was a significant predictor for 'Self-regulation' (ES=-0.23), 'Hyperactivity' (ES=0.21) and 'Anti-social' behaviour (ES=0.27) at age 11. Children eligible for FSM had poorer teacher behaviour ratings compared to other children, with lower levels of 'Self-regulation' and higher levels of 'Hyperactivity' and 'Anti-social' behaviour.

In terms of family income, children in families with high income in Key Stage 1 (analysed in 2003, see Appendix B of Sylva et al., 2004) (£37,500 - £67,499 per annum) have better scores in English at age 11 than children whose parents have no earned income (ES=0.23). For Mathematics effect sizes in the range of 0.15 to 0.25 are found for different income groups between £17,500 per annum and more than £67,000 per annum. Family earned income, was also a significant predictor of 'Self-regulation', 'Pro-social' behaviour and 'Hyperactivity' at age 11, even after controlling for all background characteristics. The net effects show that children who come from families with medium and high earned income have higher levels of 'Self-regulation' (ES=0.33 to 0.38) and 'Pro-social' behaviour (ES=0.22 to 0.23) at age 11 than children from families with low income or no earned income. In addition, children from families with a low-medium income level have lower levels of 'Hyperactivity' (ES=0.24) at age 11 than children from families with low income or no earned income.

As a group, children from larger families (3 or more siblings) showed lower attainment in Reading at age 10 (ES=0.21) but not in Mathematics. This may reflect reduced opportunities for parental time with a child in larger families during the early years (see below for discussion of the Early years home learning environment). However, the effects of family size were no longer significant at age 11.

Mother's marital status (measured at age 6-7) was a significant predictor of 'Pro-social' behaviour at age 11. The findings suggest that children of separated or divorced mothers have lower levels of teacher rated 'Pro-social' behaviour (ES=-0.18) than children of married mothers. In addition, we looked at the predictive influence of association of change in marital status (i.e., change in marital status from when children were in the pre-school period to when children were in KS1) with children's social/behavioural outcomes at age 11.

Changes in marital status were coded into four categories: (1) couple at both times, (2) single at both times, (3) change from couple to single and (4) change from single to couple. Interestingly, after controlling for other background characteristics there were significant differences in 'Hyperactivity' and 'Anti-social' behaviour among children coming from different marital status change groups. The findings suggest that children's whose mothers made a change from being single to either getting married or living with a partner have higher levels of 'Hyperactivity' (ES=0.24) and 'Anti-social' behaviour (ES=0.25) than children whose mothers were married or living with the partner at both times. This finding is in line with other research on families where it was found that parent's transition into new marriage is linked with children's increased negative behaviour (Dunn et al., 1998; Dunn, 2002).

The Early years Home Learning Environment (Early years HLE) in the pre-school period
Parenting practices such as reading to children, using complex language, responsiveness, and warmth in interactions are all associated with better developmental outcomes (e.g. Bradley, 2002). This partly explains links between SES and developmental outcomes, in that higher SES parents use more developmentally enhancing activities (Hess, Holloway, Price & Dickson, 1982). Stimulating activities may help children with specific skills enhancing development (e.g. linking letters to sounds), but also, and perhaps most importantly, by developing the child's ability and motivation concerned with learning generally. Additionally, it is possible that a feedback loop is operating whereby parents are influenced by the child's level of attainment, which would lead to children with higher ability possibly receiving more parental stimulation, although analyses in the pre-school showed that even taking account of general cognitive ability those with a higher Early years home learning environment (HLE) had better outcomes. What aspects of the home environment produce effects upon children's competence at the start of school in Literacy and Numeracy? To address this question, an interview-based measure of the Early years HLE was developed and tested for its association with academic achievement at the start of school. Groups with unexpected levels of attainment (not achieving as expected on the basis of demographic characteristics) were examined using multilevel modelling to investigate sources of unexpected performance linked to the home environment (for more details see Melhuish et al., 2008a).

EPPE also measured the HLE at age 7 (see Appendix 3 for KS1 HLE items and Appendix 7 for further information). The Early years HLE explained more variance in KS2 outcomes and so has been used in the analyses that follows. There are two possible reasons for this: i) early learning at home is more powerful, or ii) the interview conducted when the child was 3-4 years old yields more accurate data than the postal questionnaires used at KS1.

Children's characteristics and family background were included in a multilevel model, to predict children's age-adjusted achievement at age 5 using child, family, and pre-school characteristics (family and background characteristics) as predictors. From these models, three categories of performance (unexpected over-achievers, expected, and unexpected under-achievers) for Literacy and Numeracy were constructed based on child residual scores deviating by at least ±1 standard deviation. Sixteen per cent of children were achieving higher than predicted from their background in both Literacy and Numeracy, and similar proportions (16% Literacy, 15% Numeracy) were achieving less well than would be predicted.

Each of the 14 home activity items that had been derived from the parental interview was regressed in separate equations on the individual categorical variables of over- or under-achievement. The seven social/routine activities (play with friends at home, and elsewhere, visiting relatives/friends, shopping, TV, eating meals with family, regular bedtime) were not significant for under- or over-achievement in Literacy and Numeracy at age 5. Conversely, the seven activities providing clear learning opportunities (frequency read to, going to the library, playing with numbers, painting and drawing, being taught letters, being taught numbers, songs/poems/rhymes) each had significant positive effects on unexpected achievements. Since the items are conceptually and statistically linked this supports the creation of a combined measure, the Early years home learning environment (HLE).

The frequency of each of the seven activities was coded on a 0-7 scale (0=not occurring, 7= very frequent), and the seven scores were added to produce an index with a possible range of 0-49, which was normally distributed with a mean of 23.42 (SD = 7.71).

To support the conclusions that the Early years HLE added to the prediction of achievement over that provided by family and background characteristics for children, new multilevel models for Literacy and Numeracy were created including the Early years HLE index in addition to the significant family and child background factors. By adding the Early years HLE to the demographic model, the explained variance at the child level showed a twenty-one per cent increase for age 5 Literacy and an eighteen per cent increase for age 5 Numeracy, thus supporting the conclusion that the Early years HLE is an important predictor of development

The results clearly support the importance of the Early years HLE and the influence of the Early years HLE was over and above that of standard proxy measures of parental education and SES. The results also demonstrate that this interview method is useful for identifying variability in parenting. While other family factors such as parents' education and SES are also important, the extent of the Early years HLE exerts a greater and independent influence on educational attainment. The comparison of over, average, and under-achieving groups indicates that at age 5 the Early years HLE is effective in differentiating both over and under-achieving groups from children achieving as expected, i.e. across the ability range.

The Early years HLE is important for school readiness yet it is only moderately associated with SES and parents' educational levels (correlations = 0.28 - 0.33) indicating that low SES homes sometimes score highly and, conversely, high SES homes at times sometimes score poorly on the Early years HLE measure.

The effects of the Early years HLE and parenting upon children's development may partly be due to the teaching and learning of specific skills, e.g. letter-sound relationships and improved language and vocabulary. However, the multiplicity of learning opportunities included in the Early years HLE suggests that the effects may also be related to more generalised and motivational aspects of child development, e.g. learning to learn. Also children may internalise aspects of parental values and expectations (implicit in the activities of the Early years HLE) as they form a self-concept of themselves as a learner. Such a perspective is congruent with Vygotsky's theory (1978) that children learn higher psychological processes through their social environment and specifically with adult guidance operating within a child's 'zone of proximal development' (stimulation within the child's comprehension) and reinforces the idea that children acquire cognitive skills such as literacy through interaction with others who aid and encourage skill development.

It is possible that the strong relationship between the Early years HLE and cognitive scores is mediated by some intervening unmeasured factor. Those parents, who answer the questions in a way leading to a high score, may have other characteristics that lead their children to have higher cognitive scores. However, even if this were so, the Early years HLE would still be an efficient proxy measure of such unmeasured factors. Moreover, the fact that some activities such as teaching songs and nursery rhymes in pre-school related most strongly to language development, while teaching letters and numbers and reading to the child was a better predictor of pre-reading skills at age 5, suggests that these specific activities do have a measurable impact on learning.

Whatever the mechanisms, the influences of parenting upon child development are pervasive. Similar results are reported by Bradley et al. (2002). Also research involving 0-3 year-olds from the evaluation of the Early Head Start (EHS) program, which provided combinations of home-visits and centre childcare intervention for disadvantaged families, found that the intervention increased both the quantity and quality of parents' interaction with children, as well as children's social and cognitive development (Love et al., 2005).

A review of early interventions concluded that, to gain the most impact, interventions should include both parent and child together with a focus on enhancing interactions (Barnes & Freude-Lagevardi, 2003). Such work indicates that parenting behaviours are learnable, and changes in parenting are associated with improved child development. Similar conclusions derive from a study (Hannon, Nutbrown & Morgan, 2005), where children showed better literacy progress when parents received a programme on ways to improve child literacy during the pre-school period.

What predicts the level of the pre-school home learning environment (HLE)?
The Early years home learning environment (HLE) is strongly associated with better cognitive and social development, including 'Self-regulation'. The effects associated with the Early years HLE upon children's development are stronger than for other traditional measures of disadvantage such as parental SES, education or income. The Early years HLE varies between boys and girls similarly across all samples, with girls having higher overall Early years HLE scores than boys. Parents' education level has similar effects upon Early years HLE scores for all ethnic groups, with higher parents' education level (particularly mother's) being associated with higher Early years HLE. For the White UK low SES group the effect of father's education disappears, possibly because of limited variation in father's education for this sub-group and perhaps prevalence of absent fathers.

The Early years HLE varies between ethnic groups, however, as Table 3 (below) indicates the sample sizes for some ethnic groups can be quite small, only around 33 Bangladeshi pupils for example. Where the home language is not English, Early years HLE scores are markedly lower, but we need to be cautious as sample sizes are small for several minority ethnic groups. In the case studies discussed later we show how some parents from different minority ethnic groups do value and promote the home learning environment. Also, the Early years HLE shows similar predictive relationships with both cognitive and social/behavioural outcomes in all minority ethnic groups. This indicates that the Early years HLE measure is useful for understanding factors affecting children's development across all the minority ethnic groups studied. We also find that for all ethnic groups the Early years HLE is associated with differences in child and family characteristics and when these are taken into account only the Black African and Pakistani groups still have significantly lower Early years HLE than the White UK group. When the low SES sample is considered separately, and allowing for background factors, these ethnic differences are largely reduced and often insignificant. Also when examining the impact of Early years HLE upon children's under- or over-achievement in Literacy and Numeracy (relative to expectations) the effects of the Early years HLE are strong across most ethnic groups with some ethnic groups showing Early years HLE effects stronger than the White UK group. This clearly indicates that the Early years HLE is important for these ethnic groups in determining how children reach different levels of attainment.

Where a child has more than 3 siblings (as a measure of large family size) this also depresses the Early years HLE score, as does the presence of early developmental problems for the child, and these influences upon the Early years HLE are stronger for boys than for girls. Where children attended a pre-school, the composition of the pre-school was associated with differences in the Early years HLE for all groups. Where more of the other mothers using the pre-school had a degree then the Early years HLE was higher. This suggests that opportunities for mixing with other parents who are better educated may have some benefits for parenting, i.e. the possibility of a peer-group learning effect amongst mothers or parents. This pre-school influence appears somewhat stronger for girls than boys.

Also where children lived in more deprived areas (measured by the IMD, see The English Indices of Deprivation 2004: Summary [revised], 2007) their Early years was depressed, and this effect was stronger for boys than girls.

Table 1: Effect sizes for SES, parents' education, and Early years HLE on 5, 7 and 10 year olds outcomes

High versus low group	5 year olds		7 year olds		10 year olds	
	Pre-reading	Numeracy	Reading	Mathematics	Reading	Mathematics
SES	0.29	0.43	0.37	0.39	0.26	0.32
Mothers' Education	0.35	0.23	0.33	0.33	0.46	0.37
Fathers' Education	ns	ns	0.19	0.16	0.25	0.23
Earned income	0.31	0.28	0.15	0.15	0.24	0.23
Early years HLE	0.73	0.65	0.60	0.50	0.49	0.45

ns = non significant

N.B. Table 1 (above) does not include cognitive outcomes because the English score in Year 6 (KS2, age 11) National assessments is a composite measure that includes other skills, in addition to Reading (such a spelling, comprehension etc.).

The variation in the Early years home learning environment (HLE) for different groups
The factors that influence the Early years HLE can be examined through statistical analysis (in this case multilevel models) and those showing significant effects upon the Early years HLE, together with effect sizes are shown in Table 2. The effect sizes are shown separately for analyses with the total sample, low SES only, White UK low SES, boys and girls.

Table 2: Effect Sizes of Factors associated with effects upon the Early years HLE

	Total Sample	Low SES	White UK Low SES	Boys	Girls
Gender	+0.38***	+0.35***	+0.38***	-	-
Home language not English (i.e. EAL)	-0.60***	-0.61***	-	-0.53***	-0.76***
3+ siblings	-0.30***	-0.34***	-0.46*	-0.41***	-0.18
Developmental Problems	-0.23**	-0.34***	-0.42*	-0.31***	-0.10
Mother's Education	+0.46***	+0.45***	+0.40*	+0.49***	+0.58***
Father's Education	+0.23***	-	-	+0.30***	+0.20
Pre-school- % mothers degree	+0.25**	+0.20*	+0.25	+0.18	+0.38***
Area deprivation	-0.25***	-0.30**	-0.13	-0.34**	-0.20*

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

The Early years HLE tends to vary by socio-economic status (SES) and by ethnic group as can be seen from raw average scores shown in Table 3.

Table 3: Mean Early years HLE by SES and Ethnic Groups

	Prof SES	Mid SES	Low SES	Total (rank)	N
White UK Heritage	26.8	23.3	20.3	**24.1 (1)**	2205
White European Heritage	27.0	20.5	15.1	**22.7 (3)**	116
Black Caribbean Heritage	25.1	21.0	19.3	**21.4 (4)**	105
Black African Heritage	18.0	21.5	19.3	**20.4 (5)**	63
Indian Heritage	23.7	18.5	17.1	**20.1 (6)**	61
Pakistani Heritage	19.1	14.8	14.2	**15.2 (9)**	146
Bangladeshi Heritage	23.8	15.5	19.6	**17.5 (8)**	33
Any Other Ethnic Minority Heritage	22.1	19.5	17.2	**19.7 (7)**	180
Mixed	26.8	21.2	21.2	**23.4 (2)**	83

Within ethnic groups there is usually a pattern of the professional groups having higher Early years HLE than the middle SES groups who are higher than the low SES group. The ethnic groups vary with the White UK group showing the highest Early years HLE and the Pakistani group showing the lowest Early years HLE.

Early years home learning environment (HLE) and Educational Achievement at the end of primary school

The Early years home learning environment (HLE) was found to remain as a powerful predictor of better cognitive attainment at age 11 after 6 years in primary school. The effect size (ES) for Mathematics between the highest and the lowest scoring groups on the Early years HLE index was ES=0.42 'net' of other child and family factors, while for English the ES=0.69 (see Figures 3.5 and 3.6). At earlier time points the impact of learning experiences at home on attainment in Mathematics were found to be slightly stronger, and still the results illustrate the continued importance of these experiences. A high Early years HLE rather than a low one has a similar positive effect on later outcomes at Year 6 to having a mother with a degree versus one with no qualification. It should be noted that there are only modest correlations (correlations = 0.28 – 0.33) between Early years HLE and parents' qualification level. In terms of the statistical model the Early years HLE and parents' qualification level work as two independent predictors indicating that some parents can provide a high scoring Early years HLE irrespective of their own qualification levels and support the development of their children in this way.

Figure 3.5: The net effect of Early years HLE on English attainment at age 11

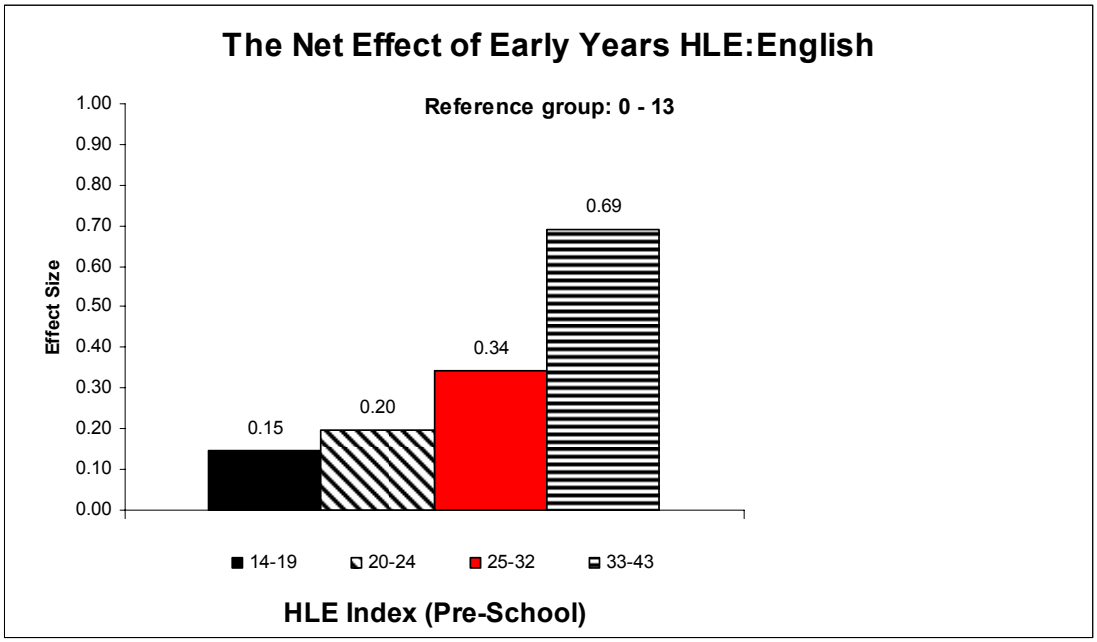
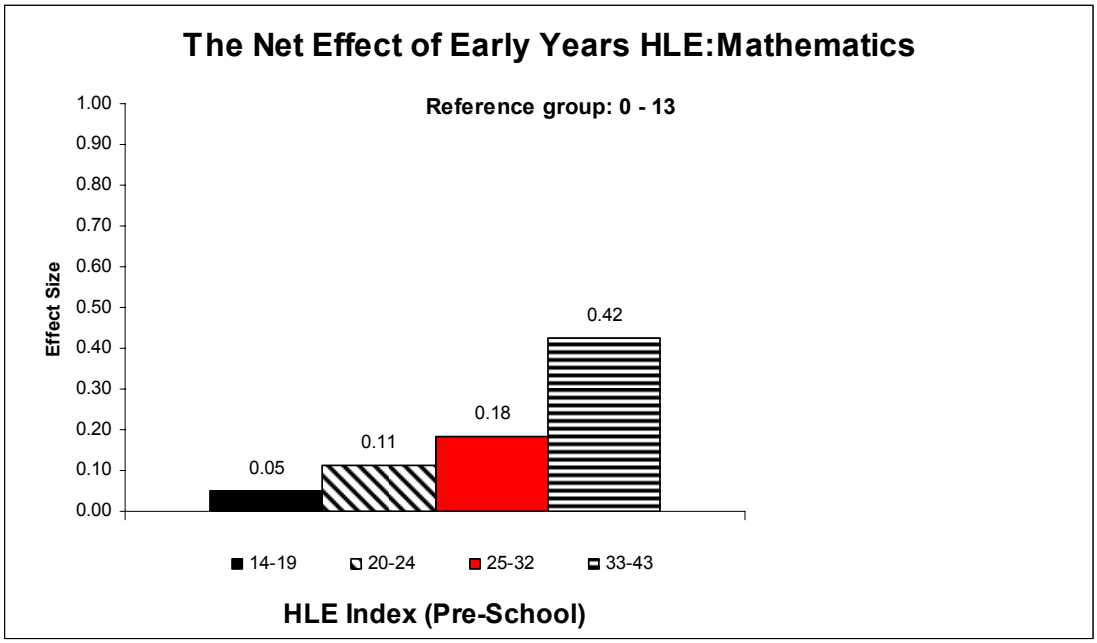


Figure 3.6: The net effect of Early years HLE on Mathematics attainment at age 11



Effects of Early years home learning environment (HLE) on social/behavioural outcomes at the end of primary school

In addition to the strong effects upon cognitive outcomes associated with the Early years home learning environment (HLE), there were consistent effects for social/behavioural outcomes. These can be illustrated by considering social/behavioural outcomes at age 11.

Table 4: Differences in social/behavioural development at age 11 by HLE groups

Early years Home Learning Environment (HLE)		0-13 (very low)	14-19	20-24	25-32	33-45 (very high)
'Self-regulation'	Mean	2.15	2.28	2.31	2.40	2.55
	S.d.	0.50	0.47	0.47	0.47	0.41
	Net Effects (ES)	**0**	**0.14**	**0.10**	**0.22**	**0.42**
'Pro-social' behaviour	Mean	2.31	2.44	2.47	2.52	2.61
	S.d.	0.50	0.45	0.48	0.47	0.43
	Net Effects (ES)	**0**	**0.15**	**0.11**	**0.17**	**0.22**
'Hyperactivity'	Mean	1.75	1.65	1.61	1.54	1.46
	S.d.	0.48	0.44	0.42	0.42	0.38
	Net Effects (ES)	**0**	**-0.11**	**-0.11**	**-0.20**	**-0.23**
'Anti-social' behaviour	Mean	1.17	1.14	1.11	1.09	1.06
	S.d.	0.32	0.28	0.25	0.22	0.17
	Net Effects (ES)	ns	ns	ns	ns	ns
Total N		248	564	610	823	302

*'0-13' (very low) as comparison category ns = non significant

After controlling for child and family characteristics, Early years HLE had a significant net effect on children's 'Self-regulation', 'Pro-social' behaviour and 'Hyperactivity' at age 11 (see Table 4). For all three outcomes, children with a score of 25+ on the Early years HLE had significantly more positive ratings of their behaviour than children with a score below 14 on the Early years HLE. The findings suggest that children with higher Early years HLE have higher levels of 'Self-regulation' (ES=0.42) and 'Pro-social' behaviour (ES=0.22) and lower levels of 'Hyperactivity' (ES=-0.23). These findings show that a child's Early years HLE has a continuing effect on their later social/behavioural development and that this is moderately strong for 'Self-regulation'.

Does neighbourhood affect educational achievement and social development?
We used three measures when considering the influence of neighbourhood. Two measures reflected the parents' perceptions of their neighbourhood in terms of social cohesion and safety, and the third was the Index of Multiple Deprivation (IMD, see The English Indices of Deprivation 2004: Summary [revised], 2007). For a fuller discussion of measures and results for neighbourhood analyses see Section 8.

Firstly we considered children's outcomes at age 6 and 11 years. These outcomes were analysed firstly in terms of the standard child and family demographic characteristics, then the neighbourhood measures were added to the analysis to see if they showed an additional effect, and finally the Early years HLE measure was added to see if neighbourhood effects were altered when the Early years HLE was included.

There were not any significant effects associated with any of the neighbourhood measures for Reading and the social/behavioural outcomes once the Early years HLE was added to the analysis. For Mathematics, the IMD score had a small significant additional effect (ES=0.13) on Mathematics at 6 years of age, whereby children in areas of higher deprivation scored lower even after taking account of all child, family, and Early years HLE effects. At age 11 years all effects of neighbourhood disappeared once the Early years HLE was added to the analysis.

This pattern of results whereby initial neighbourhood effects disappear once the Early years HLE is added suggests that inter-family differences may mediate neighbourhood effects. Family characteristics and neighbourhood characteristics can co-vary, and when examined together family characteristics tend to dominate the neighbourhood measure but without one being just an alternate expression of the other.

Section 4: Pre-school and Primary School Influences on children's attainment and progress in Key Stage 2 - Cognitive and social/behavioural outcomes

Summary of Key Messages

- Attending a pre-school confers significant benefits to children's development at age 11.
- Higher quality pre-school provides significant benefits to children across a range of outcomes.
- High quality is particularly important for boys, SEN children and those from multiply disadvantaged backgrounds and can act as a protective factor for children who attend a less academically effective primary school.
- A higher quality pre-school coupled with a high Early years HLE provides additional benefits across a range of outcomes.
- The academic effectiveness of the primary school is also important
- A high Early years HLE coupled with attending a high quality pre-school and a high academically effective primary school can give a significant boost to children's outcomes at age 11.

Continuing Pre-school effects

Continuing effects of pre-school were considered in terms of whether just attending pre-school had benefits over no pre-school, and also whether there were any significant effects associated with variations in pre-school experience in terms of different levels of pre-school quality or pre-school effectiveness.

Pre-School Attendance

Figures 4.1 and 4.2 show the effects of pre-school attendance on pupils' Reading and Mathematics attainment at age 11 by the socio-economic status (SES) of their parents; these correspond to figures 1a and 1b which also show the same relationship but at age 7. Similar to results at age 7, it is again clear that high SES is associated with higher attainment; and at each social class level pre-school attendance is associated with higher attainment. The scores of disadvantaged children who did not attend pre-school fall below the expected minimum level of attainment for this age group. Note that these graphs represent only mean scores and not the results of multi-level analyses controlling for background factors which are presented in the rest of this section.

Figure 4.1: Reading at age 11 by SES and pre-school experience

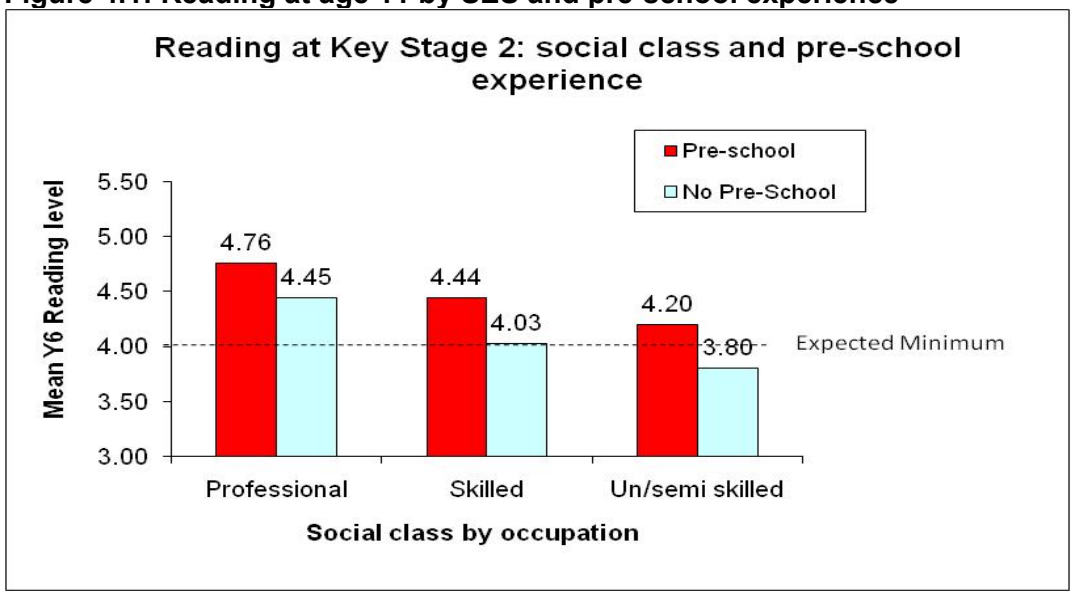
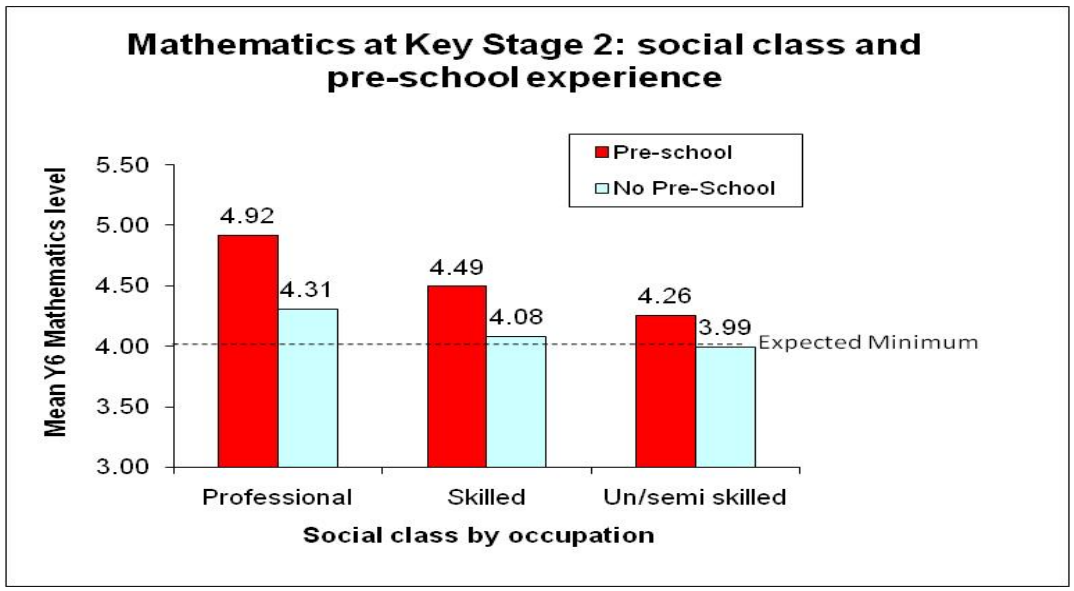


Figure 4.2: Mathematics at age 11 by SES and pre-school experience



In Year 6, controlling for background factors, there are significant net effects on attainment in English and Mathematics for the most basic indicator: attendance at pre-school compared to no pre-school (ES=0.22 and ES=0.26, respectively) which is consistent with earlier findings for Year 2 although with a reduced sample size these differences were not apparent in Year 5. Also attending a pre-school compared with not attending (the 'home' group) showed a positive effect on children's 'Pro-social' behaviour (ES=0.19) at the end of Year 6, but there were no statistically significant differences for other aspects of social behaviour.

Pre-school Quality

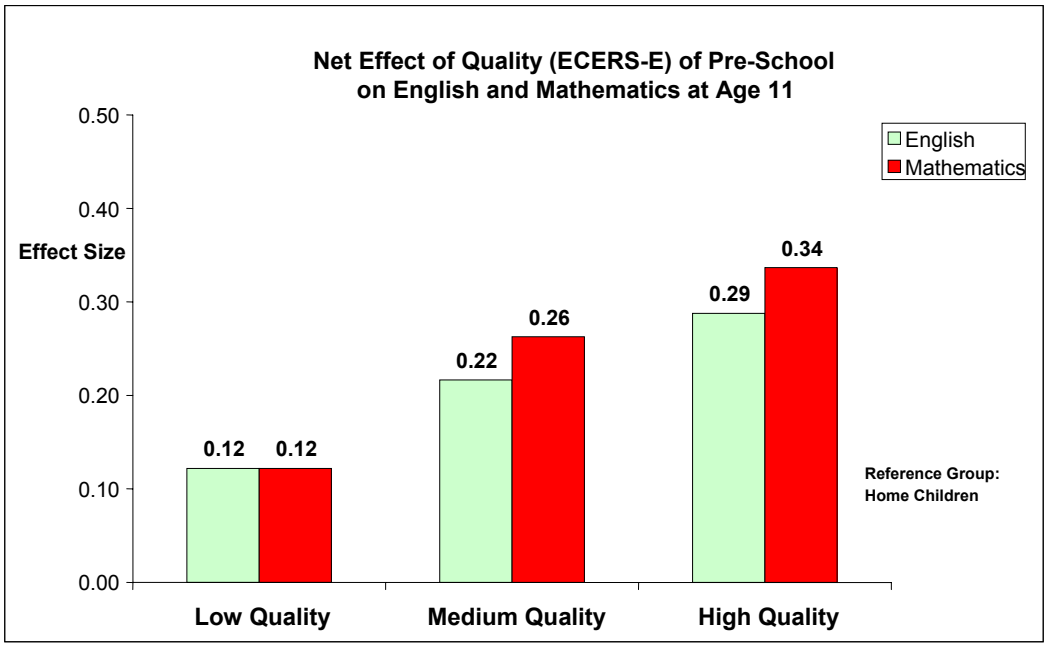
We can divide the sample into groups of children with
1. no pre-school experience (i.e. the 'home' group, 10% of sample),
2. low quality pre-school (15%),
3. medium quality pre-school (52%) and
4. high quality pre-school (23%), based on pre-school ECERS-E scores (for description of pre-school quality measures see Sylva et al., 1999a).

After adjusting for background factors the effects associated with each of these groups can be seen in Figure 4.3, where the no pre-school ('home' children) group is used as the comparison or baseline group (effect size =0).

Cognitive outcomes

There is clearly a gradient (see Figure 4.3) whereby the attainment of each of the pre-school groups increases compared to the no pre-school group as pre-school quality increases. The low quality group scores more highly on English and Mathematics than the no pre-school group (ES=0.12) however the differences do not reach statistical significance. For both the medium and high quality groups their advantage over the no pre-school group does reach statistical significance. In addition, the high quality group scores better than the low quality group for English (ES=0.17) and Mathematics (ES=0.21). The advantage of the medium quality group over the low quality group reaches statistical significance for Mathematics (ES=0.14) but not English. The effect of high quality versus none is most noticeable for Mathematics (ES=0.34) and for English (ES=0.29).

Figure 4.3: The impact of Pre-school quality (ECERS-E) on English & Mathematics in Year 6



There is clearly a gradient whereby the attainment of each of the pre-school groups increases compared to the no pre-school group as pre-school quality increases. The low quality group scores more highly on English and Mathematics than the no pre-school group (ES=0.12) however the differences do not reach statistical significance. For both the medium and high quality groups their advantage over the no pre-school group does reach statistical significance. In addition, the high quality group scores better than the low quality group for English (ES=0.17) and Mathematics (ES=0.21). The advantage of the medium quality group over the low quality group reaches statistical significance for Mathematics (ES=0.14) but not English. The effect of high quality versus none is most noticeable for Mathematics (ES=0.34) and for English (ES=0.29).

Section 4: Pre-school and Primary School Influences on children's attainment and progress in Key Stage 2 - Cognitive and social/behavioural outcomes

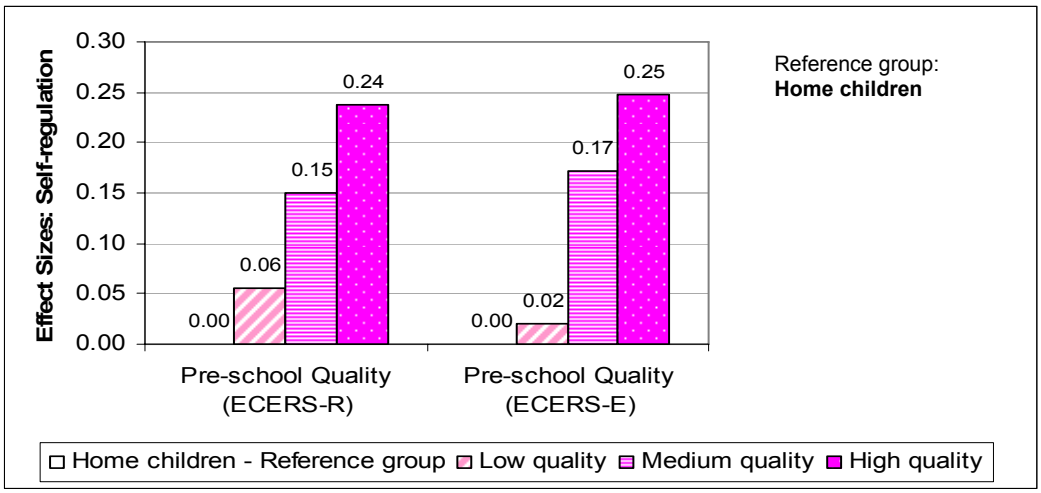
The high quality of pre-school is especially beneficial for the most disadvantaged pupils, where disadvantage is measured in terms of multiple disadvantage index (see Appendix 4). In the case of Mathematics (but not English) high multiple disadvantaged pupils who attended high quality pre-schools had significantly greater attainment than high multiple disadvantaged pupils who did not attend pre-school (ES=0.21). Similarly, high quality of pre-school is especially beneficial for the pupils of low qualified parents. Those who attended high quality pre-schools had significantly greater attainment in Mathematics than children of low qualified parents who did not attend pre-school (ES=0.28).

We can conclude pre-school quality is a significant predictor of later Key Stage 2 performance in both English and Mathematics. Also medium or high quality pre-school is associated with significantly enhanced attainment compared to no pre-school or low quality pre-school, and the effects are comparable in size to the difference between boys and girls.

Social/behavioural outcomes

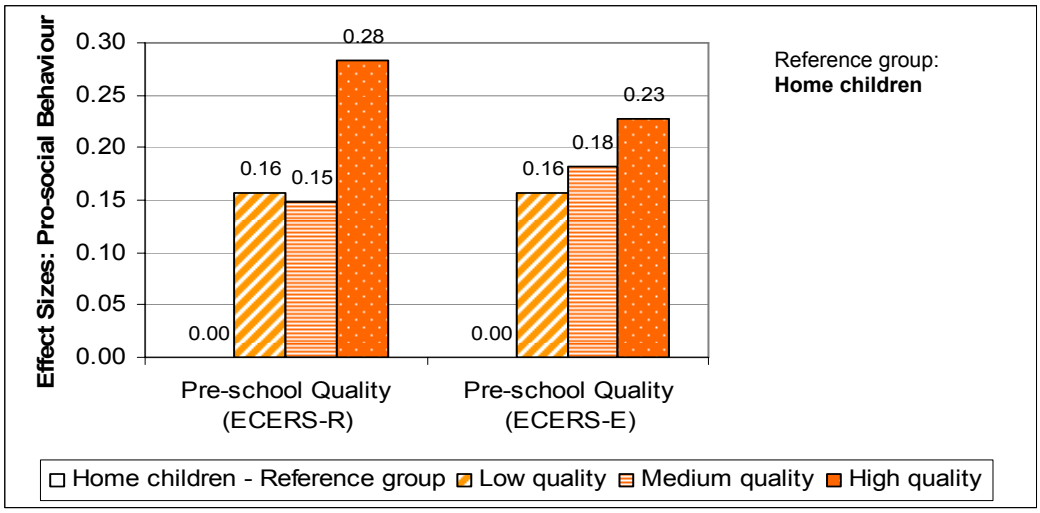
The two measures of pre-school quality[2] (ECERS-R and ECERS-E; see Sylva et al., 1999a) both had a statistically significant impact on all four social/behavioural outcomes at age 11, with ECERS-R having a slightly stronger impact on later 'Pro-social' and 'Anti-social' behaviour than ECERS-E (see Figures 4.4, 4.5, 4.6 and 4.7). Children who had attended medium and high quality pre-schools showed higher levels of 'Self-regulation' in Year 6 than others (ES=0.24 for ECERS-R and ES=0.25 for ECERS-E). 'Home' children were rated by teachers as displaying less 'Pro-social' behaviour relative to children who had attended pre-school, although the difference is most marked for those who attended high quality (ES=0.28 for ECERS-R and ES=0.23 for ECERS-E). All these effects are 'net' of background influences reported earlier.

Figure 4.4: The impact of Pre-school quality (ECERS-R & ECERS-E) on 'Self-regulation' in Year 6



[2] Pre-School quality measure ECERS-R: The American Early Childhood Environment Rating Scale (Harms et al., 1998) is based on child centred pedagogy and also assesses resources for indoor and outdoor play.
Pre-School quality measure ECERS-E: The English Early Childhood Environment Rating Scale (Sylva et al., 2003) intended as a supplement to ECERS-R and developed to reflect the Desirable Learning Outcomes (latterly the Early Learning Goals) and the Curriculum Guidance for the Foundation Stage.

Figure 4.5: The impact of Pre-school quality (ECERS-R & ECERS-E) on 'Pro-social' behaviour in Year 6



In terms of negative social/behavioural outcomes, for the 'Home' (no pre-school) group and the high quality pre-school group children were rated by teachers as displaying significantly less 'Hyperactivity' in Year 6 than children who had attended low quality (ES=0.22 for both ECERS-R and ECERS-E) and medium quality pre-school (ES=0.17 for ECERS-R and ES=0.14 for ECERS-E). This finding is in line with the findings for Year 5 (see Sammons et al., 2007b). The impact of pre-school quality on 'Anti-social' behaviour had a similar effect as for 'Self-regulation' and 'Pro-social' behaviour and indicates that children who attended high quality pre-schools had lower 'Anti-social' behaviour in Year 6 than 'Home' children (ES=-0.23 for ECERS-R and ES=-0.22 for ECERS-E).

Overall these findings suggest that attending a high or medium quality pre-school has a lasting effect in promoting or sustaining better social/behavioural outcomes, in terms of increased 'Self-regulation', higher 'Pro-social' behaviour and lower 'Anti-social' behaviour levels at age 11. However results indicate that the no pre-school group and the high quality pre-school group both show less 'Hyperactivity' than the low and medium quality pre-school groups.

Figure 4.6: The impact of Pre-school quality (ECERS-R & ECERS-E) on 'Hyperactivity' in Year 6

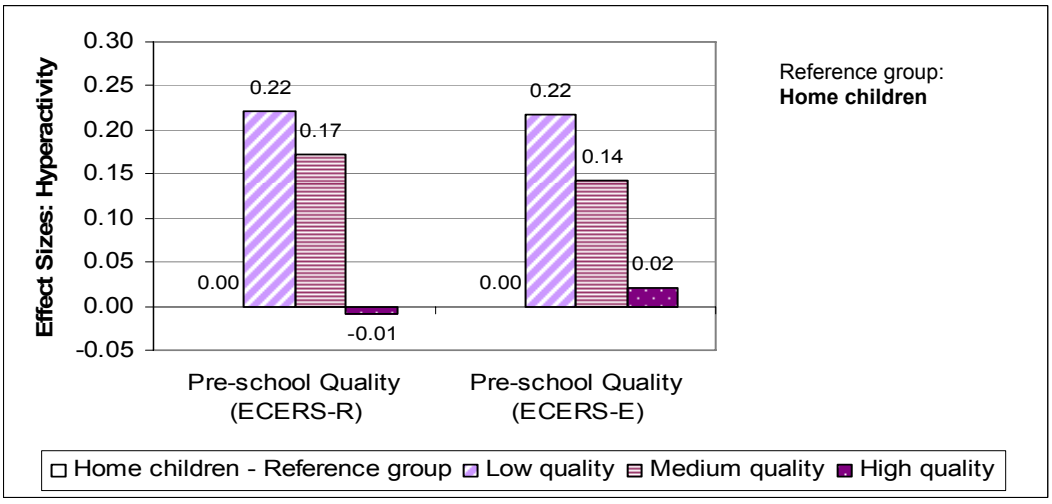
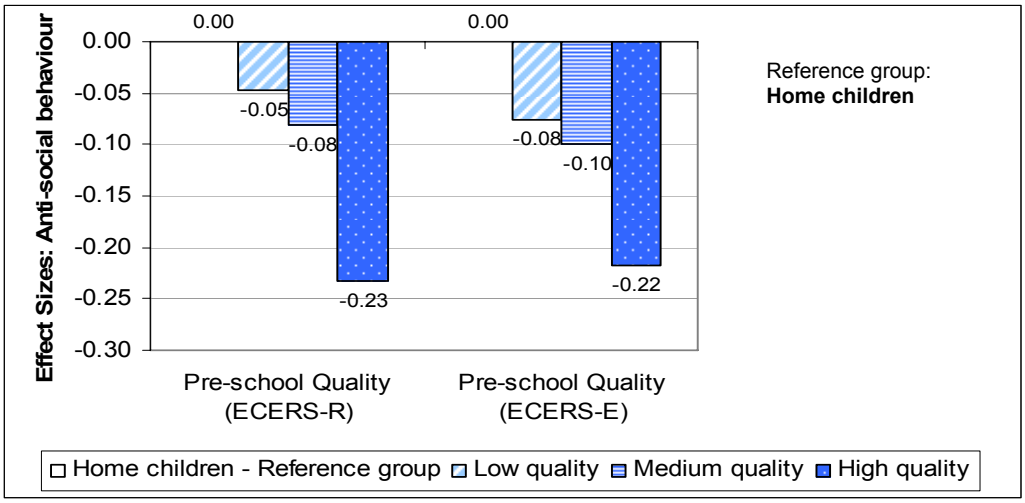


Figure 4.7: The impact of Pre-school quality (ECERS-R & ECERS-E) on 'Anti-social' behaviour in Year 6



Differential effects of quality for subgroups

Analyses explored whether there is a differential effect of pre-school quality for certain groups of children. Differential effects of pre-school quality were tested for gender, FSM in Year 6, early behavioural problems (as reported by parents at the start of the study), and low versus high levels of mother's qualifications. Analyses also explored the potential differential impact of pre-school quality for children who were identified for special educational needs (SEN) versus children who were never identified for SEN during primary school. The analyses were conducted by testing interaction effects between each of these variables and the pre-school quality measured by ECERS-E.

Controlling for significant background characteristics, differential effects were evident only for gender (boys vs. girls) and SEN (children identified as SEN vs. never identified as SEN). The effect for gender is in line with findings reported by other research (Niles, et al., 2008). Our findings indicate that boys benefit more from attending a higher quality pre-school than girls in terms of increased levels of teacher rated 'Self-regulation' (ES=0.32 for boys versus ES=0.18 for girls) and especially 'Pro-social' behaviour (ES=0.45 for boys versus ES=0.02 for girls), and lower levels of 'Hyperactivity' (ES=-0.28 for boys versus ES=-0.10 for girls) and 'Anti-social' behaviour (ES=-0.34 for boys versus ES=-0.11 for girls) in Year 6. Overall girls have much better scores on all four social/behavioural outcomes than boys; however, boys who previously attended a higher quality pre-school showed greater benefit relative to girls. In other words, girls tend to have similar levels of social/behavioural outcomes in Year 6 regardless of earlier pre-school quality, the exception being for 'Self-regulation' where girls who had previously attended high quality pre-school tended to have higher 'Self-regulation' in Year 6 than girls who had attended low quality pre-school or no pre-school. In particular, boys gain more than girls in terms of improved 'Self-regulation' if they had experienced higher quality pre-school.

Children identified as having a SEN during primary school gained more from attending a higher quality pre-school centre in terms of increased 'Self-regulation' (ES=0.36 for SEN group versus ES=0.04 for non-SEN group) and 'Pro-social' behaviour (ES=0.23 for SEN group versus ES=0.17 for non-SEN group), and lower 'Hyperactivity' (ES=-0.32 for SEN group versus ES=-0.08 for non-SEN group) and 'Anti-social' behaviour (ES=-0.39 for SEN group versus ES=-0.03 for non-SEN group) in Year 6.

Overall, children who were never identified as having a SEN have better scores on all four social/behavioural outcomes than children who were identified as having a SEN during primary school as might be expected. However, children identified as having a SEN show significantly better outcomes if they attended a higher quality pre-school than other children (i.e., children never identified as having a SEN tend to have similar levels of social/behavioural outcomes in Year 6 regardless of pre-school quality). This suggests that medium and especially high quality pre-school can serve as a protective factor for children identified as having a SEN and benefit their all-round social/behavioural development.

Analyses also tested if there was a differential effect of attending pre-school for children with low versus high multiple disadvantage. The Multiple disadvantage index[3] is a summary measure (see Appendix 4) based on various child, family, and Early years HLE predictors, such as low birth weight or living in a family with low socio-economic status (SES), which are associated with an increased risk for lower attainment and poor social/behavioural outcomes. The findings suggest that children from a high multiple disadvantage background benefit more from attending a high quality pre-school than children from low multiple disadvantage backgrounds. Overall children with low multiple disadvantage have better scores on 'Hyperactivity' and 'Anti-social' behaviour outcomes than children with high multiple disadvantage; however, children with high multiple disadvantage showed better outcomes at the end of Key Stage 2 if they previously attended a high quality pre-school than children with low risk do (for Hyperactivity, ES=-0.29 for high multiple disadvantage group versus ES=-0.13 for low disadvantage group; for Anti-social behaviour, ES=-0.34 for high multiple disadvantage group versus ES=-0.06 for low disadvantage group). These findings are also in line with other recent studies in the U.S., which suggest that children who come from a high family risk level benefit more from pre-school than children coming from low family risk level (Niles, et al., 2008), although such studies did not explore the interaction with quality of pre-school centre.

Pre-school Centre Effectiveness

As described earlier we were able to produce measures of pre-school centre effectiveness (value added residuals which measure relative value added gains over the pre-school period compared to those predicted by the multilevel model). For details see Sammons et al., (2002a; 2003).

Cognitive outcomes

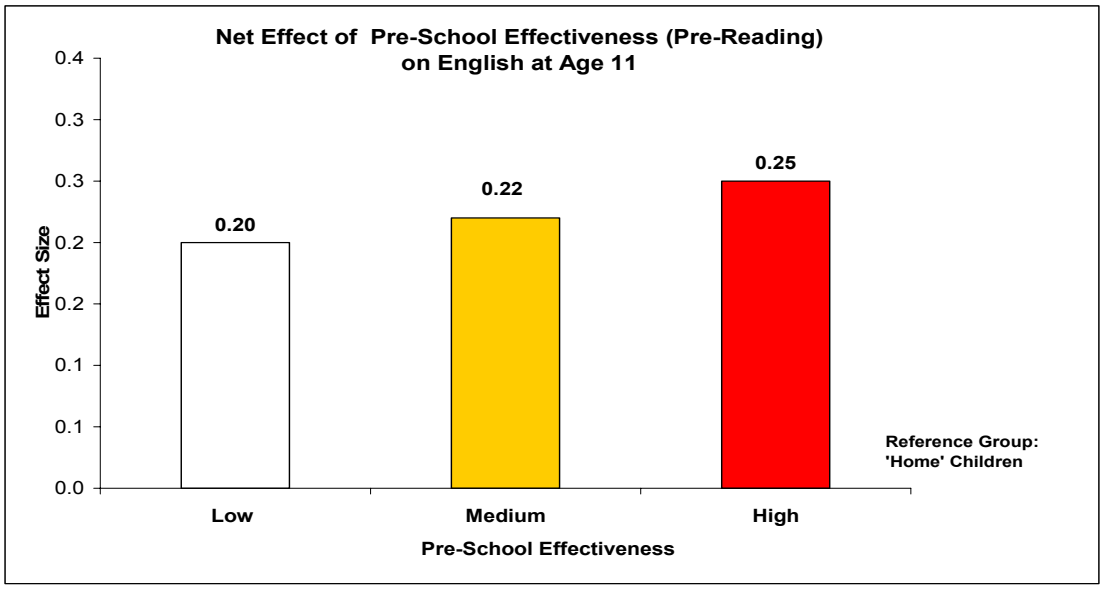
We tested whether pre-school centre effectiveness (in terms of promoting children's progress in Pre-reading) predicted better English attainment later in Key Stage 2, and also whether pre-school centre effectiveness (in terms of promoting children's progress in Early number concepts) predicted better Mathematics attainment in Key Stage 2 National Assessments.

Controlling for child, family and HLE influences, pre-school effectiveness showed a positive net impact on children's attainment in both English and Mathematics at Year 6 (see Figures 4.8 and 4.9). These analyses revealed that children who had attended a more effective pre-school setting also showed significantly better attainment than children who had attended no or only a low effective pre-school setting.

In terms of English attainment, compared to 'no pre-school', children who went to low, medium, or high effective pre-schools have significantly higher attainment at age11.

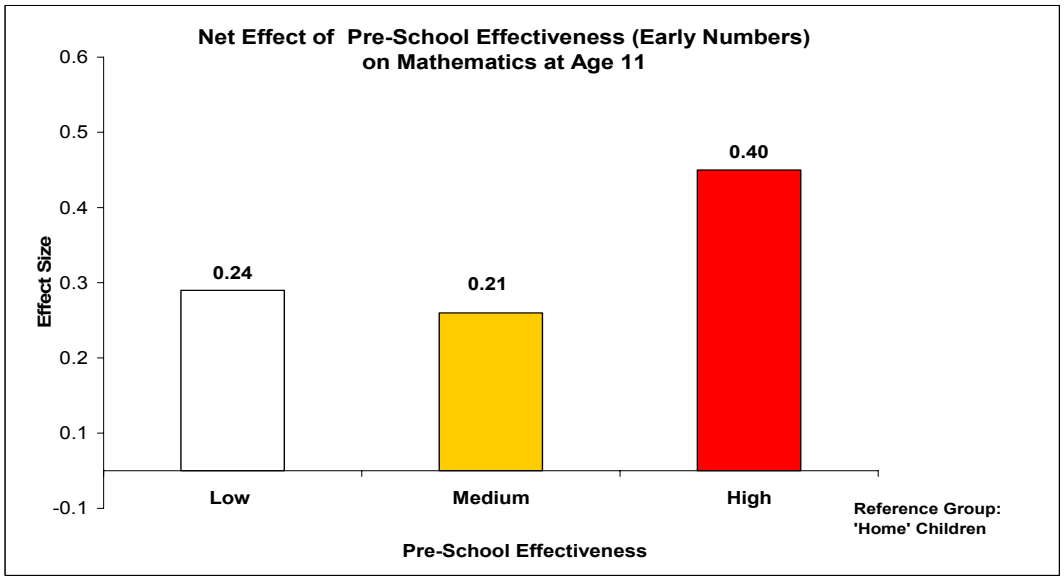
[3] Note that the Multiple disadvantage index is a measure developed as part of the Early Years Transition and Special Educational Needs (EYTSEN) Project and reflects a level of children's disadvantaged background (also it is a child-level measure). This measure is different from the Index of Multiple Deprivation (IMD) used earlier in the report for testing neighbourhood influences. IMD is a nationwide index combining weighted measures of levels of crime, barriers to housing, living environment, education and skills training, health deprivation and disability, employment and income for a specific neighbourhood (for further details of the IMD see The English Indices of Deprivation 2004: Summary [revised], 2007).

Figure 4.8: The impact of pre-school effectiveness (Pre-reading) on attainment in English at Year 6



For Mathematics attainment the picture is similar, compared to 'no pre-school', children who went to low, medium, or high effective pre-schools have significantly higher attainment. In addition those who attended high effective pre-schools did significantly better than those who had attended low or medium effective pre-schools. The effect of attending a high effective pre-school is moderately strong and on a par with mother having an A level qualification versus no qualification.

Figure 4.9: The impact of pre-school effectiveness (Early numbers concepts) on attainment in Mathematics at Year 6



Section 4: Pre-school and Primary School Influences on children's attainment and progress in Key Stage 2 - Cognitive and social/behavioural outcomes

Similar to the effects of high quality pre-school, high academically effective pre-school is especially beneficial for the most disadvantaged pupils. In the case of Mathematics (but not English) high multiple disadvantaged pupils who attended high academically effective pre-schools had significantly greater attainment than high multiple disadvantaged pupils who did not attend pre-school (ES=0.25). Similarly, high academically effective pre-school is especially beneficial for the pupils of low qualified parents. Those who attended high academically effective pre-schools had significantly greater attainment in Mathematics than children of low qualified parents who did not attend pre-school (ES=0.32).

Social/behavioural outcomes

During the pre-school phase of the EPPE 3-11 research, analyses provided measures of pre-school effectiveness, in terms of Literacy (Pre-reading), Numeracy (Early number concepts) and separately for 4 measures of social/behavioural development ('Independence and Concentration', 'Peer-sociability', 'Co-operation and Conformity', and reducing 'Anti-social' behaviour). All pre-school effectiveness measures were tested as potential predictors for later social/behaviour outcomes.

Children who had attended a more effective pre-school setting still showed significantly better social/behavioural development six years later. More specifically, pre-school academic effectiveness had a significant positive impact on children's later 'Self-regulation' and 'Pro-social' behaviour (see Figures 4.10 and 4.11). The findings reveal that children who attended a more effective pre-school show higher levels of 'Self-regulation' (ES=0.29) and 'Pro-social' behaviour (ES=0.27) in Year 6.

Figure 4.10: The impact of Pre-school Effectiveness (Early number concepts) on 'Self-regulation' in Year 6

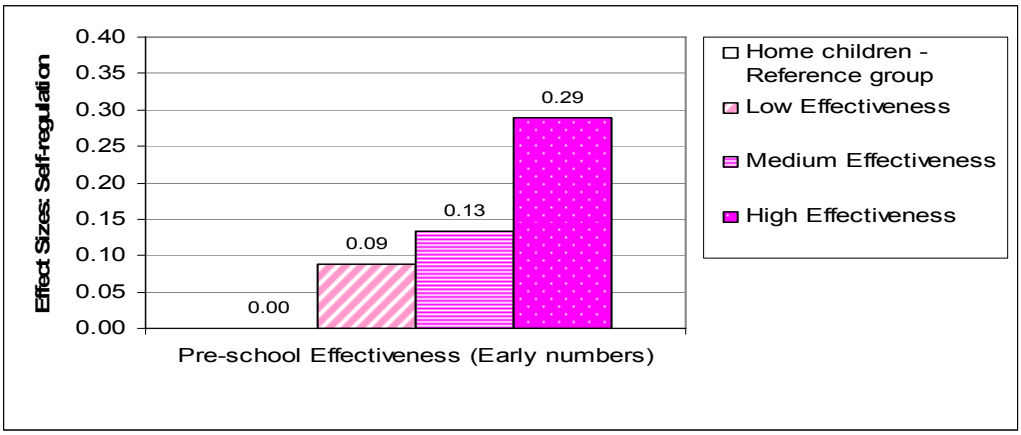
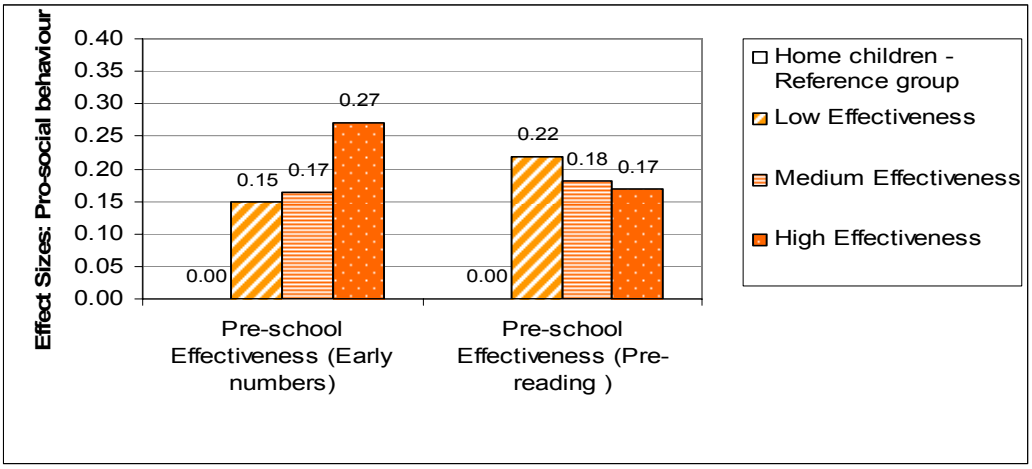


Figure 4.11: The impact of Pre-school Effectiveness (Early number concepts & Pre-reading) on 'Pro-social' behaviour in Year 6



All four indicators of pre-school effectiveness related to social/behavioural development were statistically significant predictors for better 'Self-regulation' and 'Pro-social' behaviour at age 11 (see Figures 4.12 and 4.13) Overall, children who have attended a medium or high effectiveness pre-school show better 'Self-regulation' and more 'Pro-social' behaviour than the 'Home' group. Also, children who have attended medium and high effective pre-schools were rated by their teachers as showing better 'Self-regulation' (ES=0.12 to ES=0.24) and more 'Pro-social' behaviour (ES=0.17 to ES=0.38) than children from low effectiveness pre-schools. The difference for 'Pro-social' behaviour between the high effective and low group is largest (ES=0.38).

Figure 4.12: The impact of Pre-school Effectiveness (Social behaviour) on 'Self-regulation' in Year 6

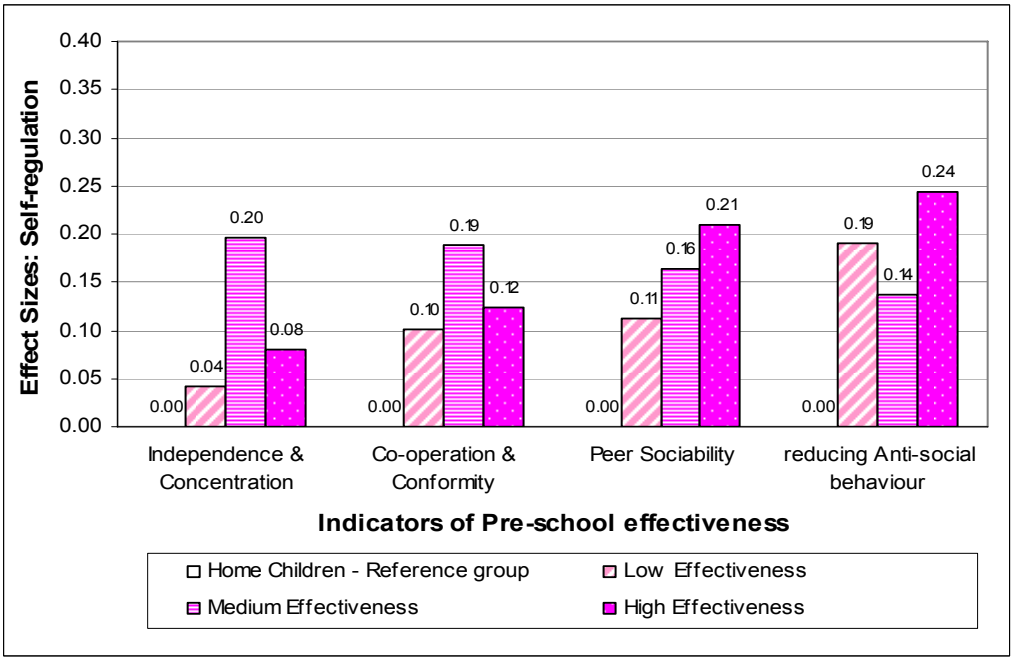
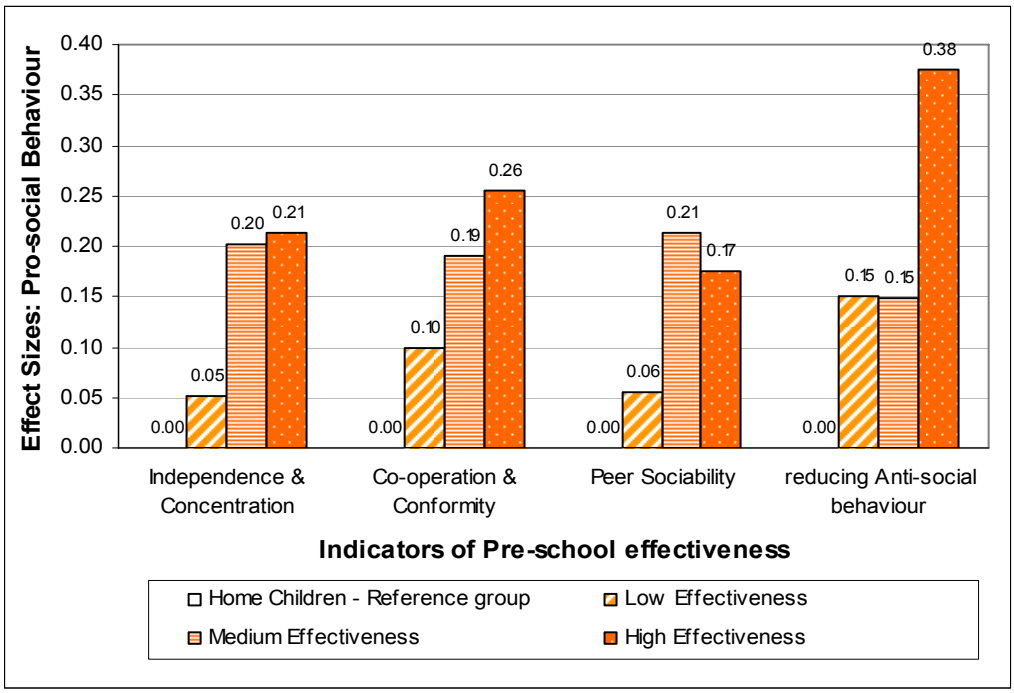


Figure 4.13: The impact of Pre-school Effectiveness (Social behaviour) on 'Pro-social' behaviour in Year 6



Pre-school effectiveness was a statistically significant predictor for lower 'Hyperactivity' and 'Anti-social' behaviour at age 11 (Figure 4.14 and Figure 4.15). Children who had attended a low effectiveness pre-school in terms of 'Independence and concentration' and 'Peer Sociability' were found to have higher levels of 'Hyperactivity' in Year 6 than others, especially the 'home' group. Similarly, children who attended a high effectiveness pre-school in terms of reducing 'Anti-social' behaviour were found to have lower levels of 'Anti-social' behaviour in Year 6 than others. Nonetheless 'home' children showed good outcomes for 'Hyperactivity' in Year 6 in contrast to the other three social/behavioural outcomes, and significantly better outcomes than those who attended low effective pre-school settings (see Figure 4.14).

Figure 4.14: The impact of Pre-school Effectiveness ('Independence & Concentration' and 'Peer Sociability') on 'Hyperactivity' in Year 6

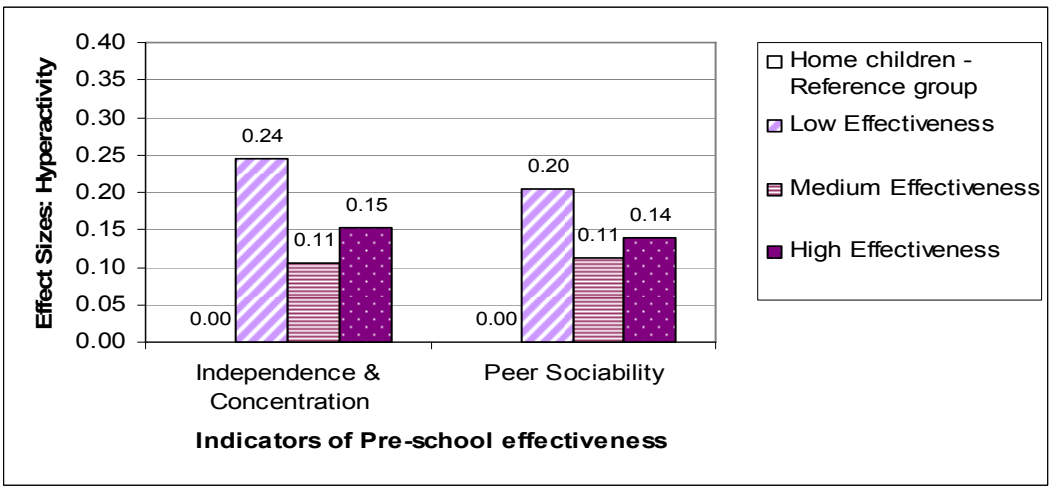
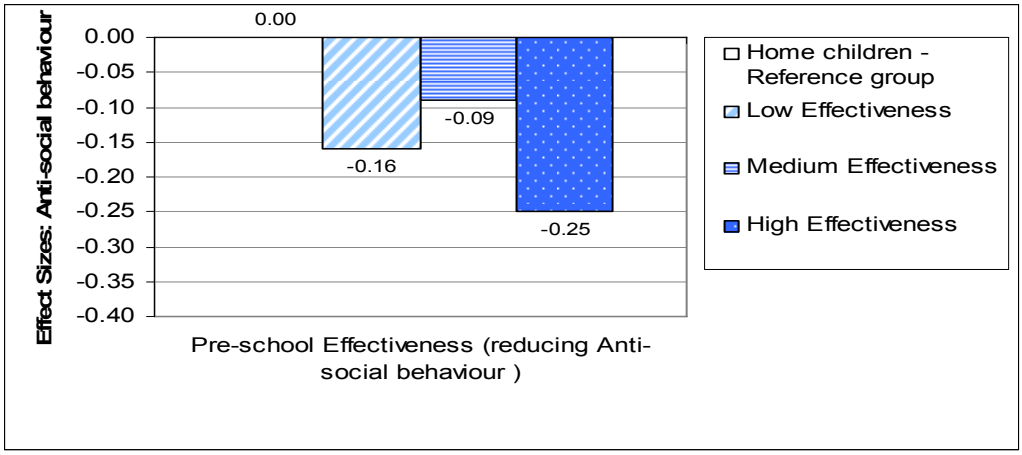


Figure 4.15: The impact of Pre-school Effectiveness ('Anti-social' behaviour) on 'Anti-social' behaviour in Year 6



The combined effect of the home learning environment (HLE) and pre-school
Given that the analyses described above have already demonstrated modest effects for the quality and effectiveness of pre-school experience and strong effects for the Early years HLE on child outcomes, their joint effects were investigated[4]. For this analysis the Early years HLE index was regrouped into three categories representing low, medium and high Early years HLE.

Cognitive outcomes

Early years home learning environment (*HLE) and Pre-school Attendance*
Figure 4.16 shows the combined effect of Early years HLE and pre-school attendance (yes/no); the reference group for these analyses is 'no pre-school and low Early years HLE'.

Figure 4.16 shows for English, the positive effect of a good Early years HLE for the 'home' children. Children who did not go to pre-school and who had a medium or high score on the Early years HLE index show a benefit, ES=0.29 and ES=0.37 respectively, compared to the 'home' children (no pre-school) with low Early years HLE.

However, when comparing these two groups of 'home' children (no pre-school) to the equivalent pre-school children (those with medium and high Early years HLE scores) the benefits of attending pre-school are apparent; the pre-school children with medium and high Early years scores have effects sizes of 0.33 and 0.57 respectively. Furthermore, children with low Early years HLE tend to benefit especially from pre-school attendance (ES=0.27) compared to 'home' children. Children with high Early years HLE and pre-school experience also show the largest positive effects, ES=0.57. Interestingly the difference in ES between the low Early years HLE group who did or did not go to pre-school (ES=0.27) is slightly larger than the difference in ES between the high Early years HLE group who did or did not attend pre-school (ES difference 0.20).

[4] The effect of cross-classification (assigning individuals to groups based on a combination of measures, such as high/medium/low HLE and high/low/medium pre-school quality) can often result in a reduction of the sample (individuals are lost if they have data missing for just one measure) and reduced numbers in the low or high groups. Pre-school quality for example is initially grouped as low/medium/high quality, the medium group consisting of 52% of the sample with 15% in the low and 23% in the high group, the remainder being 'home' children. When this measure is crossed with an additional measure, such as Early years HLE, the numbers in the low/high groups tend to be reduced further.

Figure 4.16: The combined impact of Early years HLE and pre-school on English attainment at Year 6

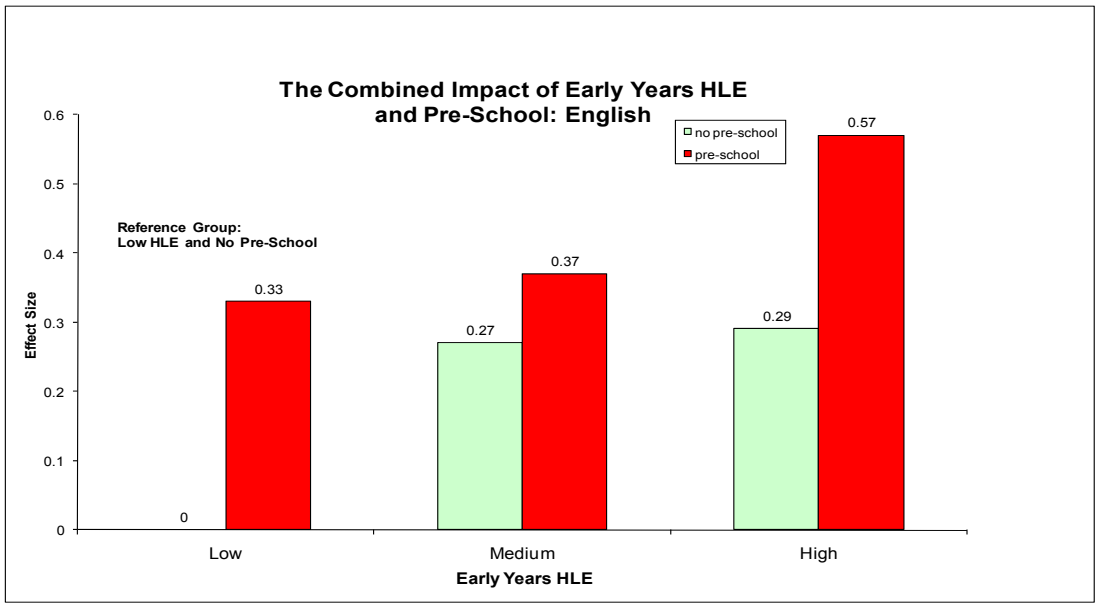
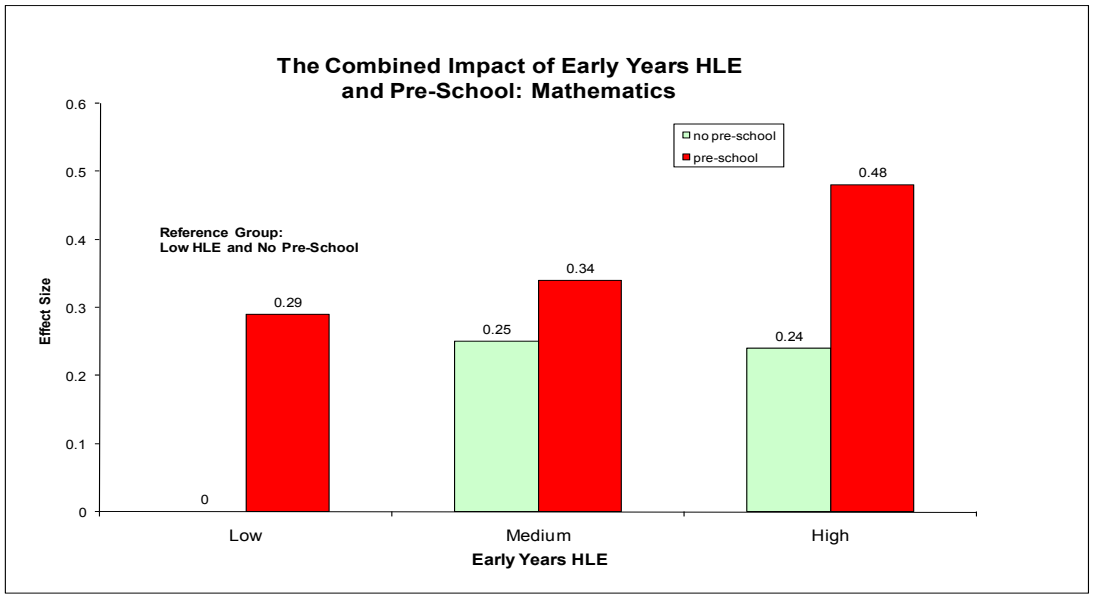


Figure 4.17: The combined impact of Early years HLE and pre-school on Mathematics attainment at Year 6



For Mathematics, the group of children with low Early years HLE receive a distinct advantage from attending a pre-school compared to 'home' children (ES=0.29). For children who had medium Early years HLE scores, pre-school attendance makes some difference (ES=0.25 versus 0.34). The group of children with high Early years HLE not only get a boost through Early years HLE, but also an additional advantage from the pre-school centre experience (ES=0.24: the difference between the two groups' effect sizes, and the difference between the effect of pre-school and no pre-school). Again the advantage of attending pre-school for those children who had a low Early years HLE (ES=0.29) is slightly stronger than that for high HLE children (ES=0.24). Taken together the results support the view that both children who had a low Early years HLE and those who had high Early years HLE show a significant benefit from pre-school attendance, though the impact for children who had medium Early years HLE scores is weaker. The impact is likely to be particularly important for children who had lower Early years HLE given the boost others gain from a more favourable Early years HLE and is larger than the effect of FSM.

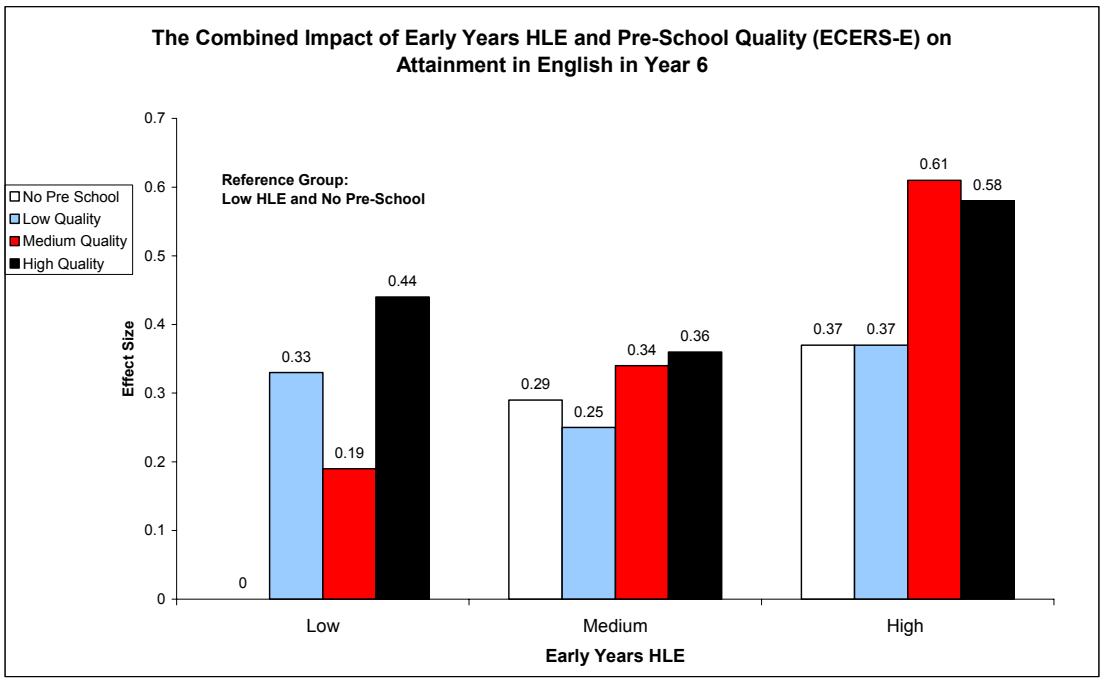
Early Years home learning environment (HLE) and the Quality of the Pre-school
Further analyses were conducted investigating not just pre-school attendance but also the quality of the pre-school centre attended and any joint effects with the Early years HLE. This gives further insight into the way Early years HLE and pre-school may interact and influence children's cognitive attainments in the longer term (see Figure 4.18). The reference group in these analyses is again the 'low Early years HLE and no pre-school' group. Results are reported in terms of effect sizes.

Figure 4.18 shows the results for English and illustrates that children who had a low Early years HLE gained an advantage from attending any pre-school, but particularly high quality pre-schools (ES=0.44). Children who had medium Early years HLE scores received an additional benefit from attending higher quality pre-school, though the extra boost (in ES) for the 'high quality' is not as great as was found for children who had a low Early years HLE.

Children who had a high Early years HLE and went to a medium or high quality pre-school have the strongest positive benefit in English attainment at the end of Year 6 (ES=0.61 and 0.58 respectively).

Again the 'home' children and those attending low quality provision also benefit from high Early years HLE, with a comparable net effect size (ES=0.37 for both respectively). However their boost is not as great as that for low Early years HLE children who went to high quality pre-school. Children who went to low quality pre-school who had high Early years HLE (ES=0.37) are still doing better than those children who went to low quality pre-school and had low (ES=0.33) or medium (ES=0.25) Early years HLE. These findings underline the importance of the quality of the pre-school centre for promoting English attainment and also the importance of Early years HLE.

Figure 4.18: The combined impact of Early years HLE and quality of pre-school on attainment in English at Year 6



For the most disadvantaged (in terms of Early years HLE) any pre-school makes a positive difference but especially high quality. Here the net effect is slightly stronger than that found for a mother having an A-level qualification compared to having no qualification.

Figure 4.19: The combined impact of early years HLE and quality of pre-school on attainment in Mathematics at Year 6

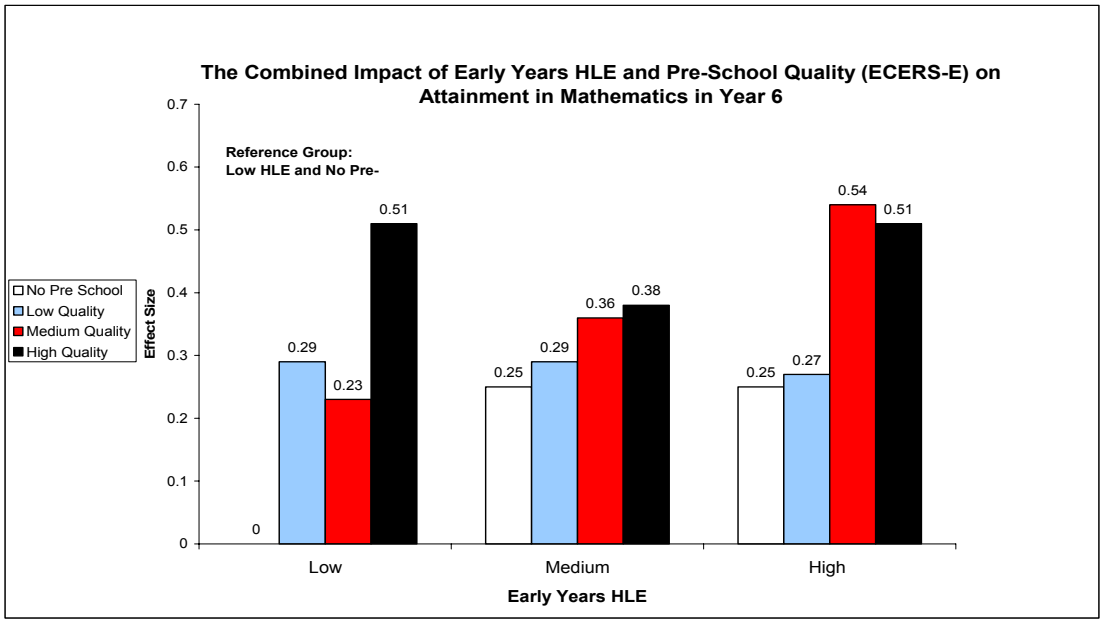


Figure 4.19 shows that for Mathematics the pattern of results is similar to that found for English, and indicates significant positive effects. Children who had low Early years HLE are doing best at the end of Year 6 if they previously attended a high quality pre-school and the effect is moderately strong (ES=0.51) compared to the 'low Early years HLE and no pre-school' combination. Children with medium Early years HLE show smaller, but important effects of pre-school, with the effect sizes increasing gently in a linear fashion as the quality of the pre-school improves compared to 'low Early years HLE and no pre-school' (ES=0.29 for low, ES=0.36 for medium and ES=0.38, for high quality pre-school).

For children who did not go to pre-school, those who had a medium Early years HLE show better Mathematics results at Year 6 than children who had experienced a low Early years HLE (ES=0.25). In contrast, children who had a high Early years HLE show greater benefit from medium and high quality pre-school for later Mathematics results (ES=0.54 for medium quality, ES=0.51 for high quality compared to ES=0.25 for 'high Early years HLE and no pre-school') when compared to the 'low Early years HLE and no pre-school'. The impact of high quality pre-school versus none is strongest for children who had a low Early years HLE (0.51) compared with children who had a high Early years HLE where the ES difference is 0.26 (0.51 – 0.25).

The interactions suggest that the benefits of the pre-school experience are mediated by the quality of Early years HLE experienced by children and that high quality pre-school has a particular strong benefit for children who had a low Early years HLE.

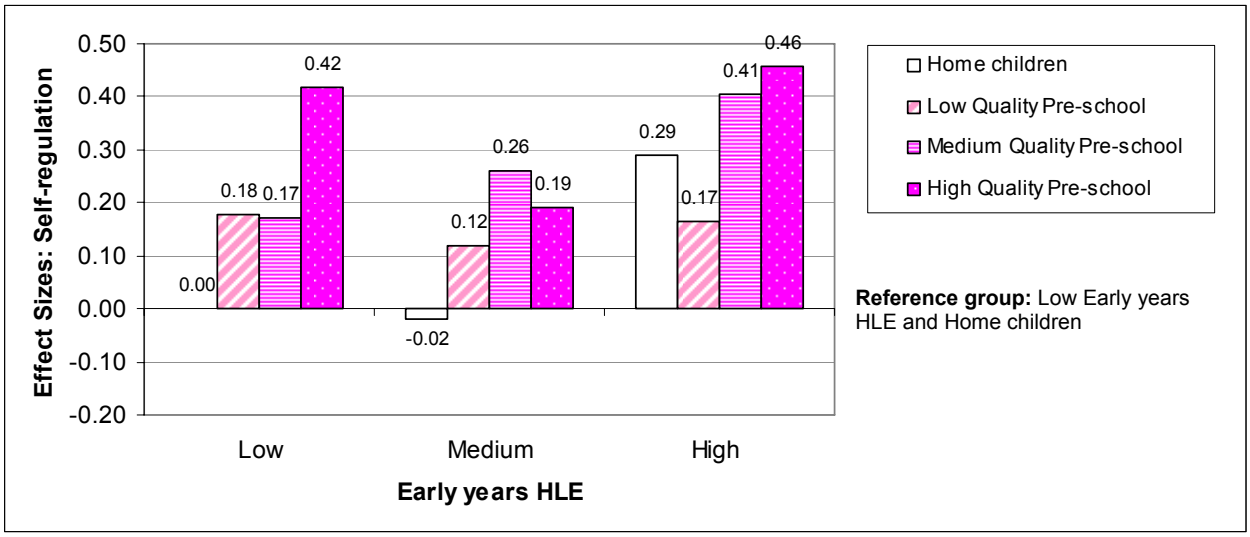
Social/behavioural outcomes

'Self-regulation' was the only social/behavioural outcomes that had significant interactions between Early years HLE and pre-school quality.

Self-regulation

As can be seen in Figure 4.20, 'Home' children with high Early years HLE scores (ES=0.29) have a higher 'Self-regulation' level in Year 6 relative to 'Home' children with low (reference group) and medium (ES=-0.02) Early years HLE scores. On the other end, children with low Early years HLE who previously attended a high quality pre-school have significantly better 'Self-regulation' in Year 6 (ES=0.42) relative to children with low Early years HLE but no pre-school experience (i.e., 'Home' children). 'Self-regulation' benefits from the combined effect of medium or high pre-school quality and high Early years HLE (ES=0.41 for medium and ES=0.46 for high quality).

Figure 4.20: The combined impact of Early years HLE and Pre-school quality (ECERS-E) on 'Self-regulation'

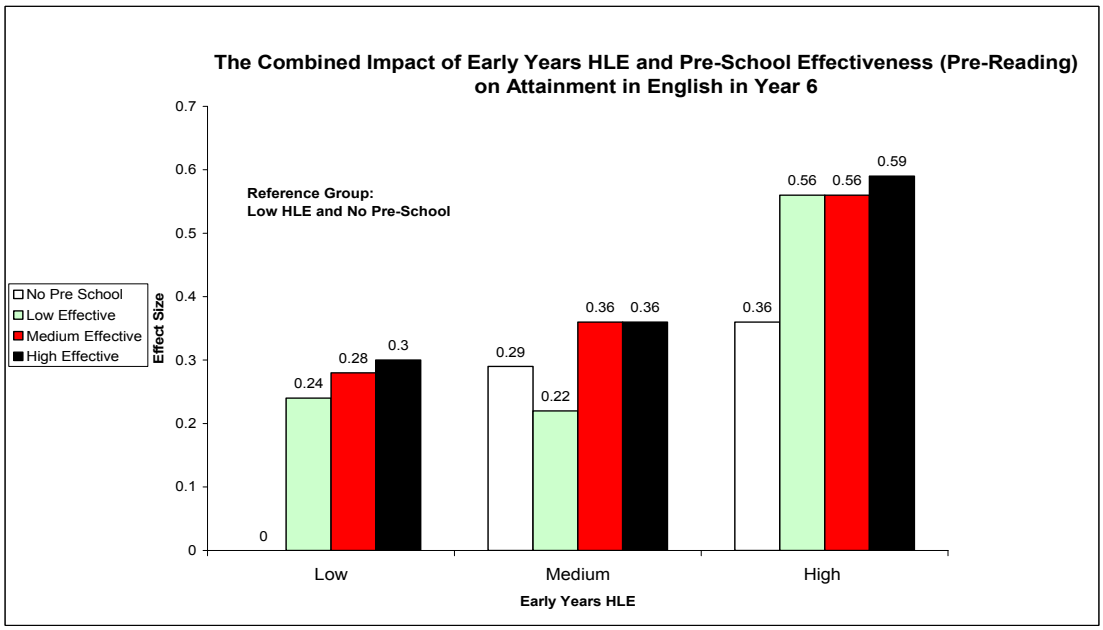


There is a strong combined impact of Early years HLE and pre-school quality on later 'Self-regulation'. Controlling for other background characteristics, a combination of high Early years HLE and attendance at a medium or high quality pre-school is a strong predictor of higher 'Self-regulation' levels at the end of Key Stage 2. In addition, high Early years HLE seems to act as a protective factor for children who do not attend pre-school helping them achieve higher levels of 'Self-regulation' in primary school (ES=0.29). Similarly, attending high quality pre-school seems to protect against the disadvantage of a low Early years HLE and promotes children's later 'Self-regulation' and this boost (ES=0.42) is stronger than the influence of FSM or SES.

Early years home learning environment (HLE) and Pre-school Effectiveness

We also investigated the issue of differential pre-school effects on Early years HLE and pre-school centre effectiveness for cognitive outcomes.

Figure 4.21: The combined impact of Early years HLE and pre-school effectiveness* (in terms of Pre-reading) on attainment in English at Year 6**



*Pre-school effectiveness is a measure of the extent to which children in a setting make progress 'above', 'below' or 'as expected' based on their measured outcomes (controlling for pre-test). This value added measure differs from quality as measured in the ECERS-E and ECERS-R observational rating scales.

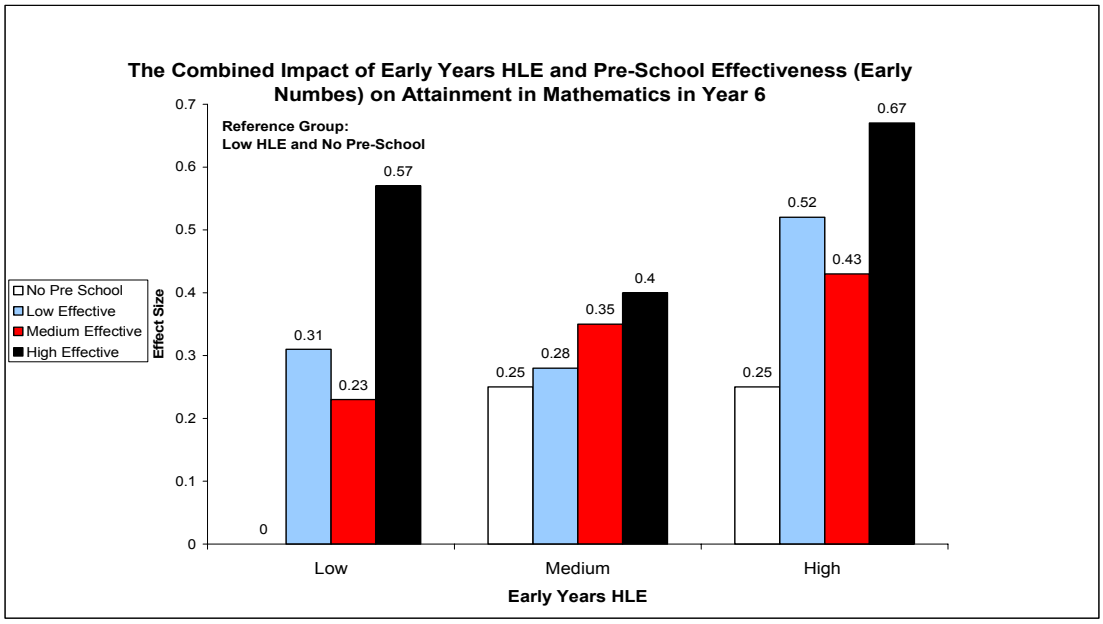
**Pre-reading consists of phonological awareness (rhyme and alliteration) and letter recognition.

Results for English show a clear trend: compared to low Early years HLE and no pre-school all other combinations show a sustained benefit on later attainment in Year 6; the effect sizes tend to increase in terms of both Early years HLE score and pre-school effectiveness.

Figure 4.22 shows the results for Mathematics, which are similar to those for English, although the differences tend to be more pronounced. Overall, the beneficial effects tend to increase in terms of both Early years HLE score and pre-school effectiveness.

Children who had a low Early years HLE obtain most advantage from attending pre-schools that were highly effective in promoting young children's numeracy (ES=0.57), as opposed to medium effective (ES=0.23) or low effective pre-schools (ES=0.31). For children who had a medium Early years HLE, attainment also shows a steady if modest increase along with the effectiveness of the pre-school. The children who show the greatest attainment boost are those children who had a high Early years HLE compared to those who had a lower Early years HLE but who attend pre-schools of equivalent effectiveness. Consistent with this, the children that do best had both a high Early years HLE and attended a highly effective pre-school (ES=0.67). These children not only benefit from the high level of their Early years HLE but get an additional boost from attending a more effective pre-school.

Figure 4.22: The combined impact of Early years HLE and effectiveness of pre-school (in terms of Numeracy) on attainment in Mathematics at Year 6



For English and Mathematics these findings are in accord with those for pre-school quality.[5] Nonetheless, the boost from a highly effective pre-school is most marked for those children who had a low Early years HLE (ES=0.57) compared with the difference between no pre-school and highly effective pre-school for those children who had a high Early years HLE (0.67 – 0.25 = 0.42).

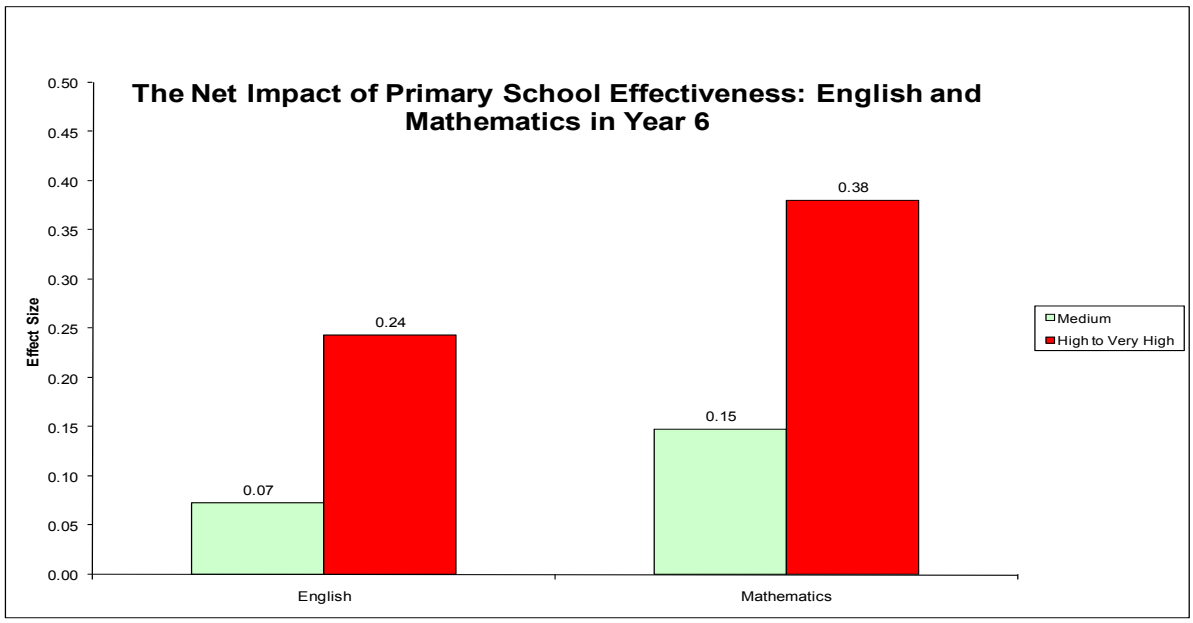
[5] It should be noted that pre-school quality is a factor found to help predict pre-school effectiveness, although it does not account for all the variation in effectiveness amongst the 141 centres in the sample (Sammons et al., 2002a).

Primary school academic effectiveness

The academic effectiveness[6] of the primary school EPPE 3-11 children went on to attend had a significant influence on their later attainment in English and Mathematics in Year 6, taking account of the influence of background influences. For English, attending a high academically effective primary school was associated with a significant boost to attainment (ES=0.24). Moreover, results show that previously attending a high quality pre-school still offered some compensation/protection for those who went on to attend an academically less effective primary school. Also for Mathematics the quality and effectiveness of the pre-school still predicted later attainment controlling for other factors. However, the academic effectiveness of the primary school was a more important predictor of Mathematics (ES=0.38) in Year 6, which appears to be more sensitive to the academic effectiveness of the primary school than English in Year 6. This is in line with earlier school effectiveness research indicating that school effects tend to be stronger for Mathematics and Science.

Attending a highly academically effective primary school is a predictor of better educational attainment particularly for disadvantaged pupils. In English the effectiveness of the primary school is relatively more important for the more disadvantaged than the less disadvantaged, where disadvantage is measured in terms of multiple disadvantage index (see Appendix 4). The more disadvantaged children, children who score two or above on the multiple disadvantage index, show higher attainment when they go to a highly effective primary school (ES=0.25) compared to those attending a low effective primary school. The more disadvantaged children also show higher attainment in Mathematics when they attend a highly effective primary school (ES=0.43), or even a medium effective primary school (ES=0.24) compared to a low effective primary school.

Figure 4.23: The impact of primary school effectiveness on English and Mathematics at Year 6



[6] The analyses of the National Pupil Database have been undertaken independent of the EPPE 3-11 research for three full cohorts of pupils (2002–2004) and were used to establish academically less or more effective schools (Melhuish et al., 2006a; 2006b).

The effectiveness of the primary school attended is also a predictor of better Mathematics outcomes for children with low qualified parents. Children with low qualified parents have significantly better scores in Mathematics if they attend a medium (ES=0.35) or high (ES=0.44) academically effective primary school. In addition, attending a highly academically effective primary school is a predictor of increased 'Self-regulation' and reduced 'Anti-social' behaviour for children identified as having a SEN in primary school (ES=0.32 for 'Self-regulation' and ES=0.37 for 'Anti-social' behaviour outcome) and those with mothers who had a low qualification level (ES=0.33 for 'Anti-social' behaviour outcome only).

The combined impact of pre-school experience and primary school effectiveness

Given that pre-school experience and primary school effectiveness have long lasting effects on later cognitive attainments, their joint effects were investigated. We sought to establish whether going to a high quality or more effective pre-school had a protective influence if a child went on to a less effective primary school, and whether 'home' children, or those who went to a less effective or low quality pre-school, did better later if they went to a more effective primary school. We combined the two measures pre-school quality (according to the ECERS-E score of the pre-school) and primary school academic effectiveness and incorporated them in the same model to explore any joint effects of pre-school and primary school. Results for English and Mathematics are shown in Figures 4.24 and 4.25. Due to smaller numbers, medium and highly effective primary schools were grouped together, and the reference group is no pre-school ('home' children) and low effective primary school.

Figure 4.24: The combined impact of pre-school quality and primary school effectiveness on attainment in English at Year 6

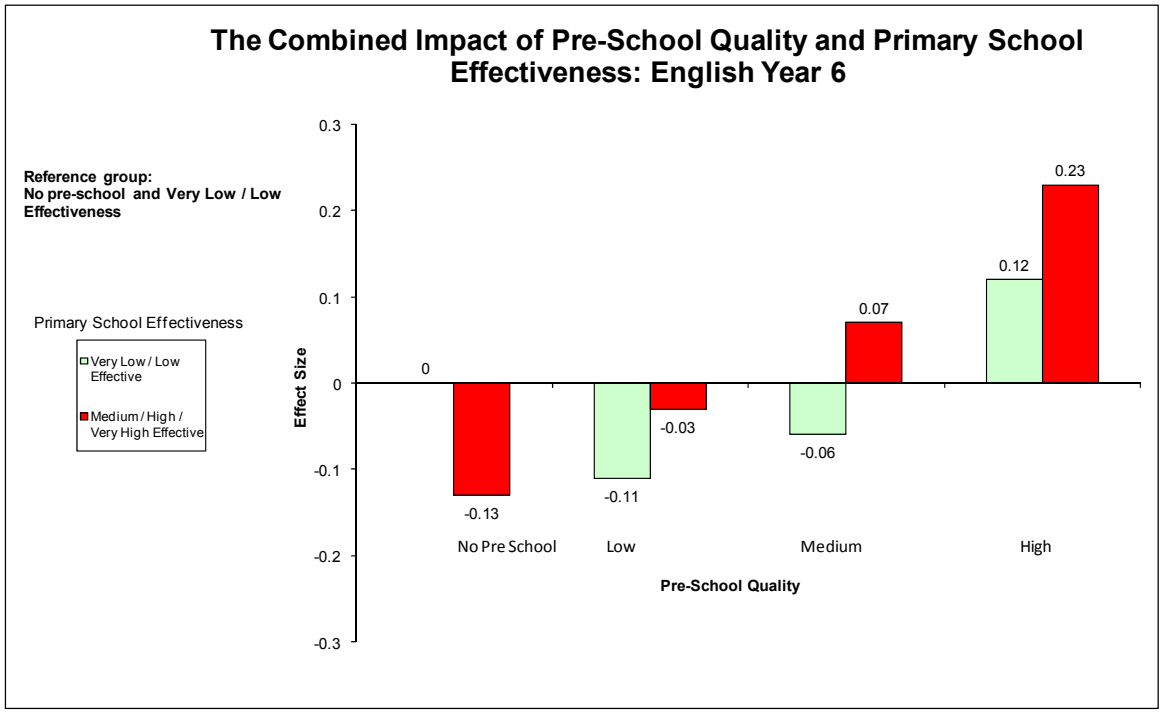
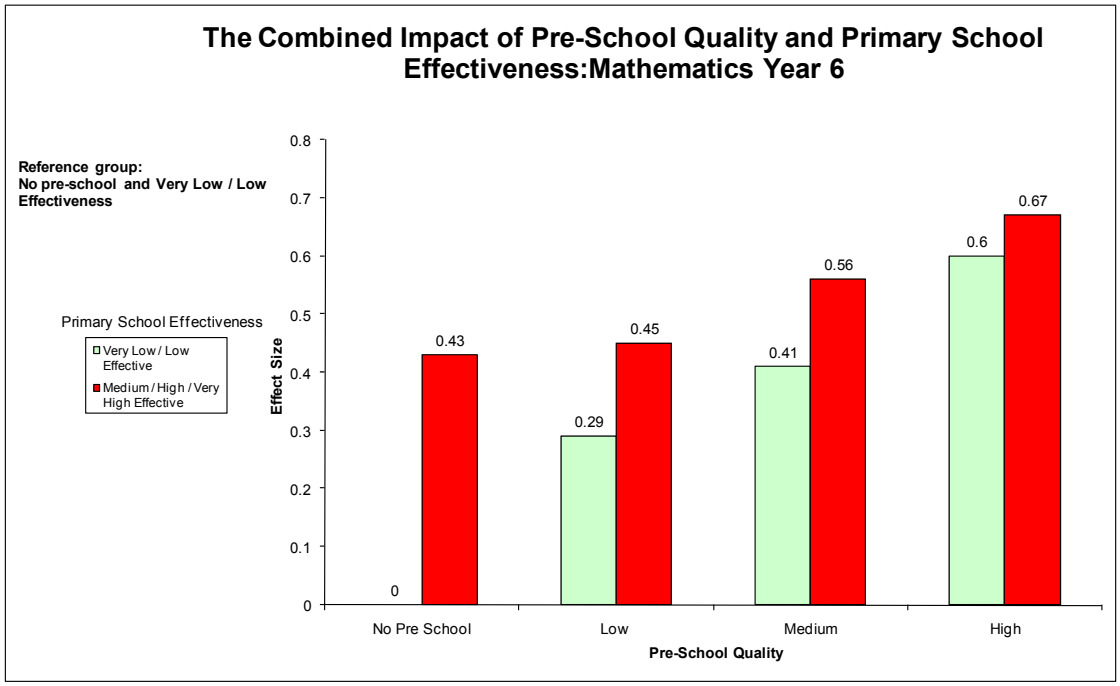


Figure 4.24, illustrates that for English children who did not attend any pre-school have low attainment, even if they go to a medium/high academic effective primary school later on (ES=-0.13). Furthermore, children who attended a low quality pre-school show no benefit from a medium or highly effective primary school although this was not so for attainment in Mathematics (see Figure 4.25). For children who attended a medium quality pre-school it is only those that attended a medium/high effective primary school that show enhanced attainment, and even this is small (ES=0.07). Of those who attended high quality pre-schools both groups benefit, but those at medium/highly effective primary schools benefit most (ES=0.23).

The contrast between the low quality/high effectiveness group (ES=0.12) and medium quality and high effectiveness group (ES=0.07) indicates that the quality of the pre-school can compensate for the possible adverse influence of attending a lower effectiveness primary school.

Figure 4.25 shows a much clearer pattern of results; the better the quality of pre-school the higher the attainment in Mathematics, and the more academically effective the primary school the higher the Mathematics attainment in Year 6. Children who did not attend pre-school gain a particularly strong benefit from attending a more academically effective primary school (ES=0.43). Children who went to a low or medium quality pre-school centre and low effective primary school later on are still doing better than those children who did not have any pre-school experience and went to a low effective primary school (ES=0.29). Children who went to high quality pre-school are doing particularly well, even if they then moved onto a low effective primary school later on (again indicative of an apparent compensatory effect). For children who went to a high quality pre-school centre and a medium/high effective primary school, we find an additive effect. These children show the greatest boost in attainment at the end of Year 6 controlling for the influence of all other background factors (ES=0.67), so for those who went to a high quality pre-school the effectiveness of the primary school had less impact than it did for those who did not go to pre-school or attended a low quality pre-school.

Figure 4.25: The combined impact of pre-school quality and primary school effectiveness on attainment in Mathematics at Year 6



The combined impact of pre-school effectiveness and primary school effectiveness

In addition to the analyses of the individual impact of pre-school and primary school academic effectiveness, these two measures were taken together and incorporated in the same model so that the combined effects could be studied. We sought to establish whether going to a more effective pre-school had a protective influence if a child went on to a less effective primary school, and whether 'home' children or those who went to a less effective pre-school centre did better later if they went to a more effective primary school. Results for English and Mathematics are presented in Figures 4.26 and 4.27. The reference group for these analyses are children with no pre-school experience ('home' children) who attended a low academically effective primary school.

Figure 4.26: The combined impact of pre-school and primary school effectiveness on attainment in English at Year 6

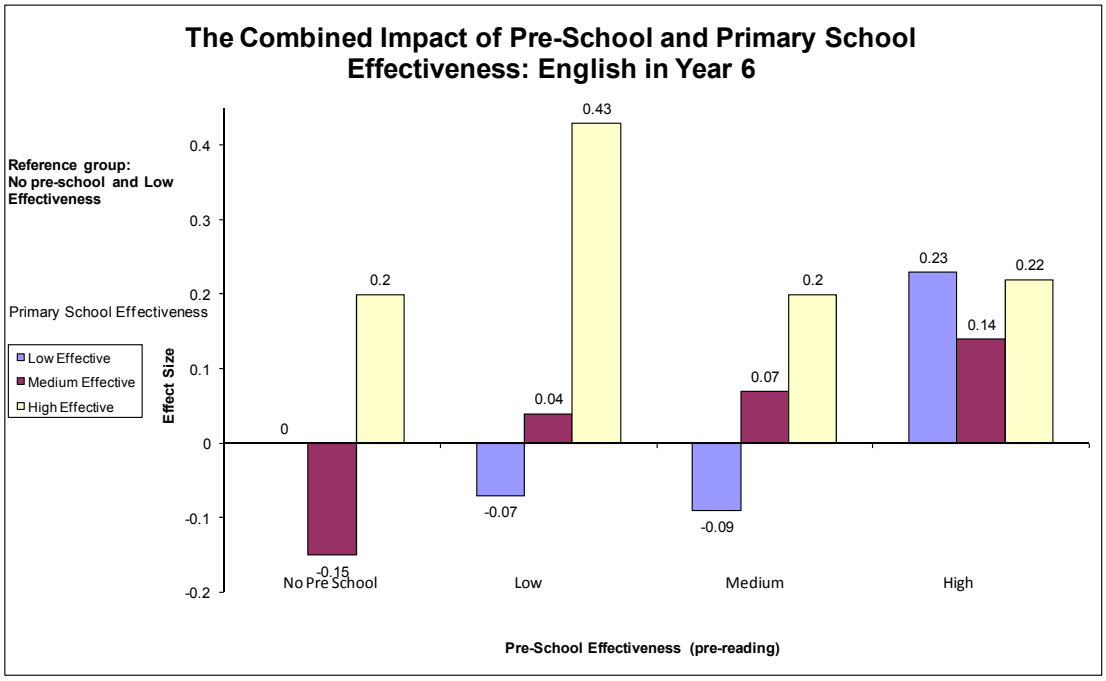
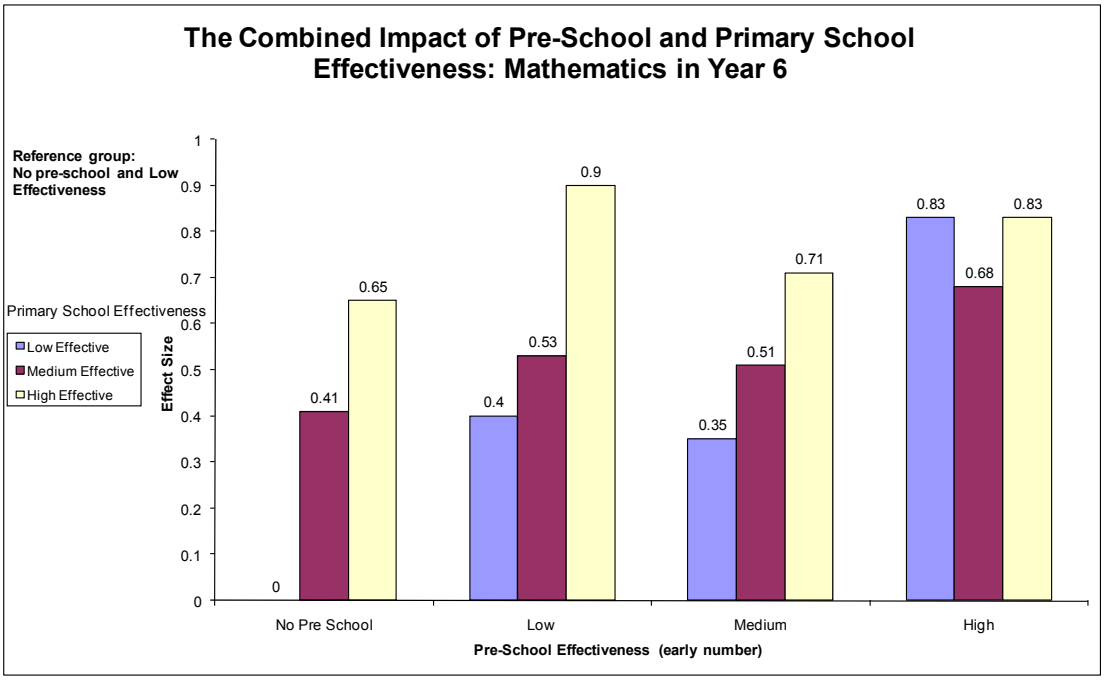


Figure 4.27: The combined impact of pre-school and primary school effectiveness on attainment in Mathematics at Year 6



Figures 4.26 and 4.27 shows for both English and Mathematics that in the case of those children who attended high effective pre-schools, children have comparable levels of attainment regardless of the academic effectiveness of the primary school they attend. This, however, does not hold for children who attended lower effective pre-schools: in such cases there is a clear gradation of attainment by primary school academic effectiveness.

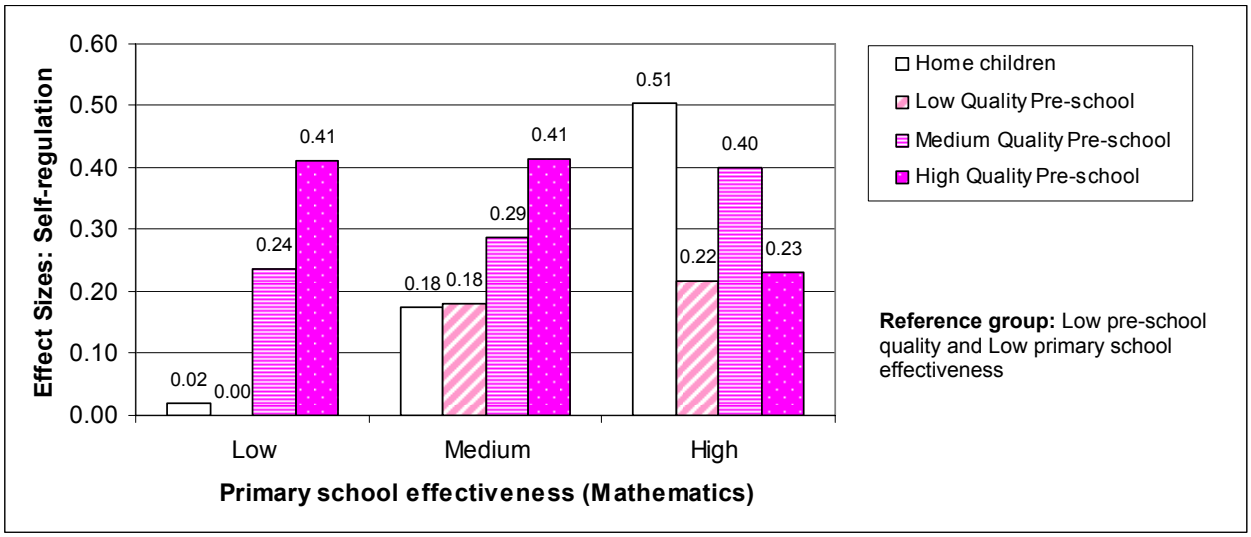
The pattern of results for Mathematics is particularly striking for those who went to no pre-school where those who attended a high academically effective primary school show a significant boost (ES=0.65), which is almost twice as strong as the effect of SES. The difference for those who went to low effective pre-school related to primary school academic effectiveness is also large (ES difference 0.9 – 0.4 = 0.5). Therefore the effectiveness of the primary school attended is particularly important for children who attend a less effective pre-school.

Self-Regulation

Primary school academic effectiveness was not a statistically significant predictor of social/behavioural dimensions on its own. We sought to establish whether primary school academic effectiveness might be significant in combination with pre-school quality as was found in analyses of children's academic outcomes.

For these analyses, we combined measures of pre-school quality and indicators of primary school effectiveness to explore whether going to a higher quality pre-school had a protective function if a child went to a less academically effective primary school later on. We sought to establish whether children who did not go to pre-school or went to only a low quality pre-school appeared to have benefited more from the academic effectiveness of the primary school in terms of their social/behavioural development. We combined the various primary school academic effectiveness indicators with the ECERS-E measure of pre-school quality, which is also a measure of *academic* quality (see Sylva et al., 2006), and tested these measures in the full contextualised models controlling for all relevant background factors.

Figure 4.28: The combined impact of Pre-school quality (ECERS-E) and Primary school effectiveness (Mathematics) on 'Self-regulation'



At age 11 the only significant interaction was between pre-school quality and primary school academic effectiveness (in terms of Mathematics) related to children's 'Self-regulation' (see Figure 4.28). Children who attend low or even medium academically effective primary school but who previously attended a high quality pre-school show significantly better 'Self-regulation' at the end of Key Stage 2. Similarly, attending a high academically effective primary school will benefit those children who either did not attend any pre-school or those who attended only a low quality pre-school in terms of boosting higher levels of 'Self-regulation' at age 11. As expected, children who either did not attend pre-school or went to low quality pre-school and afterwards to a low academically effective primary school had the lowest 'Self-regulation' levels at the end of Key Stage 2. However, it should be noted that the strength of the effect size (ES=0.51) seen for the 'home' children who attended a high academically effective primary school is partly due to the small group size (n=12), although the comparison controls for family background.

These findings suggest that pre-school and primary school effects interact and may be additive and, therefore, the 'masking' of pre-school effects may be bi-directional. Thus, primary school academic influences may not only mask earlier pre-school effects but may also be masked by the positive or negative effects of the pre-schools that children had attended, such that high quality pre-schools may attenuate negative effects of primary schools and low quality pre-schools may reduce positive effects. It appears that 'Self-regulation' is the only social/behavioural outcome for which we find evidence of a clear and significant pattern of influences related to academic effectiveness of the primary school. This is likely to reflect stronger links at child level between 'Self-regulation' and academic attainment.

Summarising Pre-school and Primary School Influences

The contextualised multilevel models tested the net impact of different aspects of pre-school and primary school experience while controlling for all other background measures simultaneously and thus provide rigorous and conservative estimates of statistical significance of any continuing pre-school effects on later attainment in Year 6 as well as of primary school influence.

The contextualised analyses show that good pre-school experience (in terms of high quality and high effectiveness) can still make a difference to children's longer term cognitive attainments even after 6 years full-time in primary school education. Compared to earlier time points the strength of effects have decreased to some extent as might be expected, due to the length and variation in primary school experience and also probably reflecting the growing influence of the peer group.

The results also illustrated that the academic effectiveness of the primary school also matters for attainment in English and Mathematics at the end of Year 6. A highly academic effective primary school seems to be especially important for those children who did not go to pre-school (the lowest attainment occurs for the no pre-school group with a low academically effective primary school). However, attending low quality pre-school offers relatively few lasting benefits for attainment (in contrast to findings at younger ages). On the other hand attending high quality or more effective pre-school seems to act as a moderate to strong protective factor for children who go on to attend a less academically effective primary school.

Attending a highly academic effective primary school is also important for the 'home' (no pre-school) group for predicting better 'Self-regulation'. Attending high quality pre-school appears to act as a protective factor for children who then attend a less academically effective primary school for 'Self-regulation'.

Pupils' progress across Key Stage 2 (KS2)

The quality and effectiveness of the pre-school also predicted pupils' progress from Key Stage 1 to Key Stage 2 (Pre-school quality for English ES=0.05–0.23; Mathematics ES=0.05–0.20; Pre-school effectiveness for English ES=0.10–0.28; Mathematics ES=0.13–0.22) suggesting that pre-school not only provides an initial boost to attainment levels, but also helps promote later progress (possibly by fostering children's capacity to learn and their motivation, may be via increasing their 'Self-regulation'). Similarly children attending more academically effective primary schools make significantly more progress during KS2 and the impact on progress is larger than that of most background factors (English ES=0.37; Mathematics ES=0.52).

Section 4: Pre-school and Primary School Influences on children's attainment and progress in Key Stage 2 - Cognitive and social/behavioural outcomes

The boost to children's progress over KS2 given by attending an academically more effective primary school is stronger than that of the pre-school, as might be expected given the length of time children spend in primary school (6 years). This again confirms the importance of the primary school as an influential factor for children's educational progress as well as their attainment levels, net of background factors and prior attainment. Again as with attainment, the school effects are stronger for progress in Mathematics than English (in line with findings in other educational effectiveness studies, see Teddlie & Reynolds, 2000).

Summary and implications of pre-school and primary school effects at end of primary school

The findings for National assessment outcomes at the end of primary school (Year 6) are broadly in line with those identified at age 10 (Sammons et al, 2007a; 2007c), where standardised assessments (NFER tests) were adopted to measure children's attainment. In both years teachers' assessments of social behaviour were collected. The consistency in findings for the academic as well as those for the social/behavioural outcomes provides greater confidence in the robustness of the results (since Year 5 was not a National assessment year and therefore there was less likelihood of any possible bias that might be introduced through the impact of high stakes assessment on teachers' behaviour/test preparation on children's Year 6 outcomes). The findings at the end of primary school are summarised in Table 5 below.

The EPPE 3-11 study demonstrates the extent to which individual child, family and home learning environment (HLE) background factors continue to predict children's academic outcomes (attainment/progress) and social/behavioural development in Key Stage 2. Longitudinal studies are able to monitor this over time, which is relevant to the debate on equity in education, and to policies that seek to raise standards, reduce the equity gap and promote inclusion.

Low quality pre-school has little enduring extra benefit over the 'home' (no pre-school) group and was associated with some poorer social outcomes, although not for 'Pro-social' behaviour. Conversely, medium and particularly high quality pre-school still benefits children's cognitive and social/behavioural outcomes at age 11 and progress over KS2. 'Home' children do less well on most outcomes compared to those who attended medium or higher quality pre-school. They also show a continued disadvantage in terms of 'Pro-social' behaviour but better outcomes for 'Hyperactivity'.

High scores on the Early years HLE seem to be a protective factor for children who did not attend pre-school, promoting better 'Self-regulation' in Key Stage 2. Similarly, previous experience of attending high quality pre-school ameliorates the negative impact of a low Early years HLE fostering relatively better 'Self-regulation' at age 11.

Attending an academically more effective primary school boosts children's academic outcomes in English and particularly in Mathematics; there are also benefits for 'Self-regulation' while there is no evidence of negative influence on social/behavioural outcomes. This has important implications for the Every Child Matters agenda by showing that promoting better academic outcomes does not compete with better social/behavioural development. Primary school academic effectiveness is a particularly significant influence for those children who did not have the advantage of attending a pre-school, many of whom came from families with low levels of education. This findings is very relevant to policy aims to encourage social inclusion as well as raising standards.

The results indicate that the combination of different influences at home and in education (of a high Early years HLE along with a higher quality, more effective pre-school and a more academically effective primary school) can give a significant boost to children's outcomes at age 11 years.

These findings add to the debate about reducing the achievement gap for disadvantaged groups. Concerted action to improve the Early years HLE, and both pre-school and primary school experiences (reducing variation in quality and effectiveness) will be needed to make a difference to outcomes for the most disadvantaged children. In addition, the present findings suggest that there will still be a need for specially targeted interventions for children who are identified as well behind their peers in cognitive and social/behavioural profiles at the start of primary school, particularly if these children have not had the benefit of a good pre-school experience or a good Early years HLE. This may go some way to narrowing the achievement gap during KS1 and KS2 since early intervention has a better chance of improving such pupils' learning trajectories (Sammons et al., 2004b; Hurry & Sylva, 2007; Sylva et al., 2008).

Table 5: Summary of background factors and pre- and primary school influences on cognitive attainment and social behaviour at Year 6

(Only the largest significant effect sizes are reported)

		English	Mathematics	'Self-regulation'	'Pro-social' behaviour	'Hyperactivity'	'Anti-social' behaviour
Child Factors & (Largest significant effect size group)	Compared to						
Gender (Girls)	Boys	0.29	-0.19	0.30	0.71	-0.71	-0.38
Ethnicity (Indian)	White UK heritage		0.45				-0.27
Ethnicity (Bangladeshi)	White UK heritage			0.37		-0.55	-0.27
Ethnicity (Other ethnic minority)	White UK heritage				-0.28		
Early Developmental problems (1-2 Problems)	None	-0.24	-0.15				
Early Developmental problems (2 + Problems)	None			-0.47			
Early Behavioural problems (1 Problem)	None			-0.25	-0.24	0.31	0.24
Need of EAL support (Need EAL support)	None	-0.59	-0.64	-0.65		0.46	
Birth weight (Very low <=1500g)	Normal	-0.47	-0.48				
Family factors							
Free school meals (FSM) (FSM)	Non-FSM	-0.23	-0.15	-0.23		0.21	0.27
Family earned income (£17,500 - £29,999)	None earned				0.25	-0.24	
Family earned income (£37,500 - £67,499)	None earned	0.23	0.22	0.38			
Mother's qualification level (Degree)	None	0.76	0.71		0.36		-0.27
Mother's qualification level (Higher Degree)	None			0.55			
Mother's qualification level (Other professional)	None					-0.53	
Father's Qualification level (Degree)	None			0.29		-0.30	
Father's Qualification level (Higher Degree)	None	0.39	0.34				
Family SES (Unskilled)	Professional non-manual		-0.36				0.28
Family SES (Skilled manual)	Professional non-manual	-0.34					
Marital Status (Separated/ divorced)	Married				-0.18		
Change in Marital Status (Single -Couple)	Couple-Couple					0.24	0.25
Home Learning Environment (HLE)							
Early years HLE (Highest)	Low	0.69	0.42	0.42	0.22	-0.23	
Key Stage 1 HLE (Moderate- High)	High	0.18	0.17				

Table 5 (cont): Summary of background factors and pre- and primary school influences on cognitive attainment and social behaviour at Year 6

(Only the largest significant effect sizes are reported)

		English	Mathematics	'Self-regulation'	'Pro-social' behaviour	'Hyperactivity'	'Anti-social' behaviour
Pre-school & (Largest significant effect size group)	Compared to						
Attending (Pre-school)	'home' - not attending	0.22	0.26		0.19		
Pre-school quality							
ECERS-E (Low)	'home' - not attending					0.22	
ECERS-E (High)	'home' - not attending	0.29	0.34	0.25	0.23		-0.22
ECERS-R (Low)	'home' - not attending					0.22	
ECERS-R (High)	'home' - not attending			0.24	0.28		-0.23
Pre-school effectiveness							
Early number concepts (High)	'home' - not attending		0.40	0.29	0.27		
Pre-reading (Low)	'home' - not attending				0.22		
Pre-reading (High)	'home' - not attending	0.25					
'Co-operation and Conformity' (Medium)	'home' - not attending			0.19			
'Co-operation and Conformity' (High)	'home' - not attending				0.26		
'Independence & Concentration' (Low)	'home' - not attending					0.24	
'Independence & Concentration' (Medium)	'home' - not attending			0.20			
'Independence & Concentration' (High)	'home' - not attending				0.21		
'Peer Sociability' (Low)	'home' - not attending					0.20	
'Peer Sociability' (Medium)	'home' - not attending				0.21		
'Peer Sociability' (High)	'home' - not attending			0.21			
'Anti-social' behaviour (High)	'home' - not attending			0.24	0.38		-0.25
Primary School Effectiveness							
English (High)	Low	0.24					
Mathematics (High)	Low		0.38				

Section 5: Understanding the influences of primary school practices

Summary of Key Messages

- Observations and questionnaires were undertaken for a sub-sample of 125 schools, in Year 5 classrooms.
- There was significant variation in teachers' practices and children's educational experiences in Year 5 and 'quality' was uneven.
- Higher order thinking skills were infrequently observed in 30% of Year 5 classrooms.
- Use of the plenary was associated with better outcomes, but regular use was patchy.
- The quality of teaching was poorer in schools with higher levels of disadvantaged pupils.
- Higher scores on overall teaching quality and quality of pedagogy were associated with better outcomes for children.
- Consistent homework policies, high school standards, good communications with parents and an 'academic' ethos were all related to better outcomes for children.
- Ofsted judgements of school effectiveness, improvement since last inspection and school leadership all predicted better outcomes for children.

Exploring classroom processes in Year 5

A number of school and teacher effectiveness studies have drawn attention to the importance of classroom experience in accounting for variations in pupil outcomes (see Scheerens and Bosker 1997; Teddlie and Reynolds 2000; McCaffrey et al., 2004; Muijs & Reynolds, 2005). Models of educational effectiveness have drawn particular attention to the importance of the classroom and variations in teacher behaviour and practice in accounting for differences in students' progress and development (Galton et al., 1999; Creemers & Kyriakides, 2007). In order to investigate the role of classroom experiences in shaping children's academic and social/behavioural outcomes, more detailed investigations were conducted focussing on Year 5 classes. This year was selected because the classrooms were thought to be more 'typical' of Key Stage 2 because of the absence of national assessments in this year.

Classroom observations
Classroom observations were carried out in 125 classrooms (over two years: Summer 2004, Summer 2005) selected for their (relatively) high number of EPPE 3-11 children and located in schools with a wide range of value added academic effectiveness results. The Classroom Observation System for Fifth Grade (COS-5, Pianta) was administered in the full sample of 125 focal schools and the Instructional Environment Observation Scale (IEO, Stipek) in a sub-sample of 93 of them. Observations were conducted in a range of lessons by trained researchers with a particular emphasis on lessons in the core subjects. For details of the instruments see Appendix 8.

Box 4 (below) shows the five dimensions identified from the COS-5 observations: 'Quality of pedagogy', 'Disorganisation', 'Child positivity', 'Positive engagement' and 'Attention and control'). These account for seventy-six per cent of the variance in observed practice using the COS codes.

Box 4: Underlying Dimensions for the COS-5 (Pianta)

Quality of pedagogy
1. Classroom codes - Richness of instructional method
2. Classroom codes - Detachment/Teacher
3. Classroom codes - Positive classroom climate
4. Classroom codes - Productive use of instructional time
5. Classroom codes - Evaluative Feedback
6. Classroom codes - Teacher Sensitivity

Disorganisation
1. Child codes - Disruptive
2. Classroom codes - Chaos
3. Classroom codes - Negative classroom climate

Child positivity
1. Child codes -Self-Reliance
2. Child codes - Sociable/co-operative with peers
3. Child codes - Child-Teacher Relationship

Positive engagement
1. Child codes - Positive Affect
2. Child codes - Activity level

Attention and control
1. Child codes - Attention
2. Classroom codes – Over-Control

Data from the Literacy and Numeracy scales of the IEO instrument were analysed separately for 93 classrooms. Analysis of both Literacy[7] and Numeracy yielded similar factors – 'Pedagogy', 'Subject development' and 'Learning linkages' - explaining seventy-three per cent of the variance in the individual Literacy items, and seventy-six per cent of the variance in the Numeracy items. The Literacy and Numeracy items that form particular factors are reported in Box 5.

Box 5: Underlying dimensions for the IEO (Stipek)

Literacy	Numeracy
1. Pedagogy 1. Classroom climate 2. Classroom routines 3. Social support for student learning 4. Student engagement 5. Instructional conversations	**1. Subject development** 1. Use of Maths analysis 2. Depth of knowledge and student understanding 3. Basic skill development in the context of problem solving 4. Maths discourse and communication 5. Locus of Maths authority
2. Subject development 1. Higher Order Thinking (HOT) in writing 2. Purposeful development of writing skills	**2. Pedagogy** 1. Classroom climate 2. Classroom routines 3. Social support for student learning 4. Student engagement
3. Learning linkages 1. Cross-Disciplinary connections 2. Linkage to life beyond the classroom	**3. Learning linkages** 1. Cross-Disciplinary connections 2. Linkage to life beyond the classroom

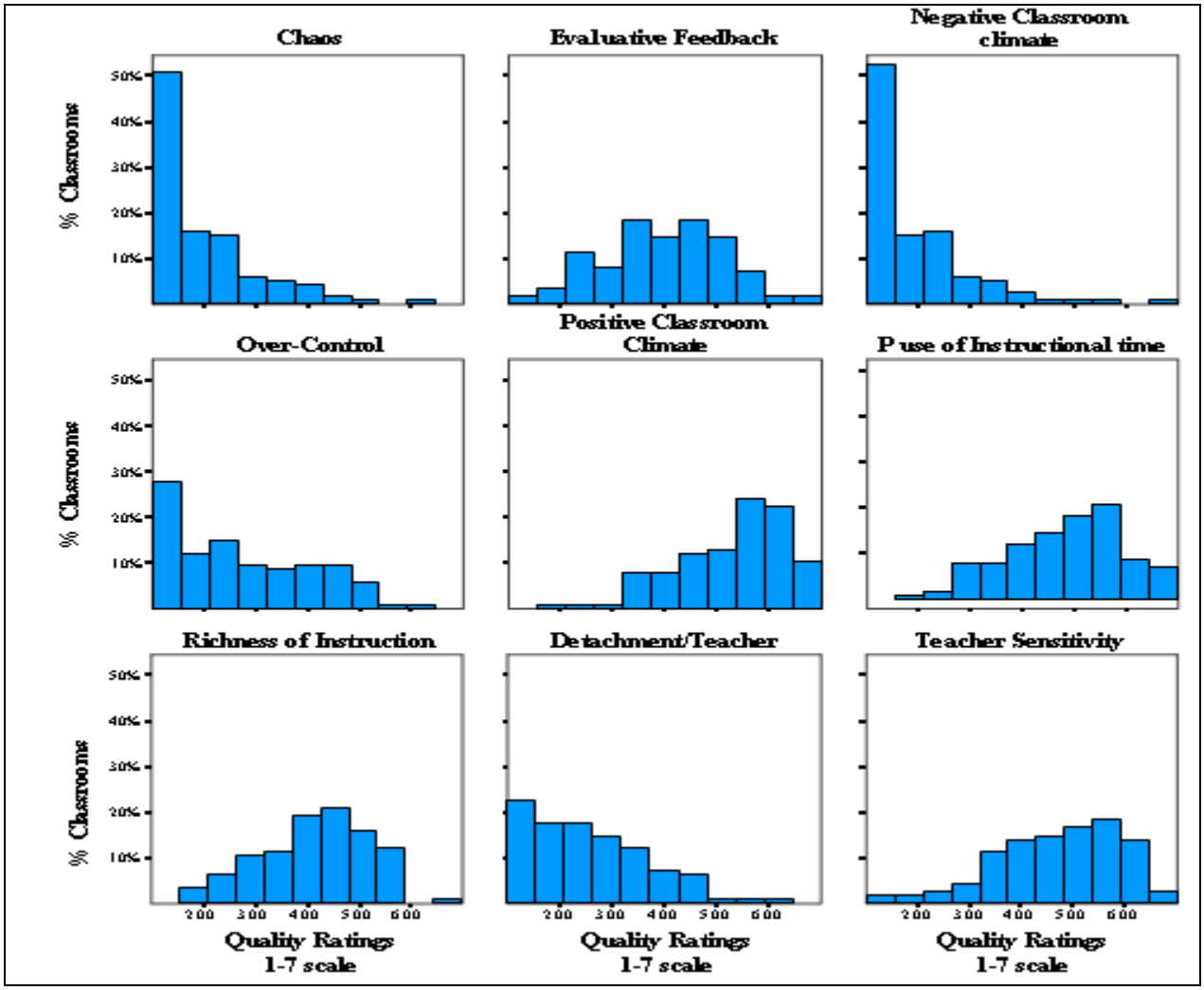
[7] The analysis of the Literacy scale included only nine of the 11 items. The two remaining items - 'Reading as meaning making' and 'Basic skills development in the context of Reading' - were not included as these two activities were mutually exclusive and would rarely co-occur within the same observation cycle, consequently the number of observations for these items were too small to include.

The latent structures underlying the Literacy and Numeracy data were conceptually similar. Three factors were extracted for each set of data, each consisting of 'Subject development', 'Pedagogy' and 'Learning linkages' dimensions. The items loading on the 'Learning linkages' were the same for both Literacy and Numeracy; the items loading on *Pedagogy* were again the same with the exception of 'Instructional conversation' which was an additional item to load on Literacy; the *Subject Development* factors were subject specific.

Pedagogical practices and classroom organisation

The observations revealed variation in teachers' practices (and pupils' behaviours), as illustrated below (for full details see Sammons et al., 2006a; 2006b; 2006c).

Figure 5.1: Distributions of Classroom practice and processes



N.B. Reading this figure: each dimension is coded on a 7 point scale of quality (1 = low and 7 = high) and the figures show the percentage of classrooms at each quality score. P = productive use of instructional time.

Figure 5.1 nicely illustrates the variation between the 125 classes in nine areas of behaviour identified from the COS-5 instrument. Only 'Chaos' and 'Negative classroom climate' are strongly skewed, showing that the majority of classrooms experienced very little 'Chaos' or Negative classroom climate'. However, classroom observations showed considerable variation in the quality of learning experiences. The extent of the variation shows that pupils in different Year 5 classes can have quite different educational experiences.

Despite evidence of rising standards across primary schools associated with the National Strategies, it appears that quality remains uneven. This was particularly evident in important domains such as: 'Richness of instructional methods', 'Using basic skills in the context of problem solving' and the 'Development of higher order thinking skills'. Characteristics of classrooms that were rated more highly in these areas were: 'thought provoking' reciprocal discussions, children using hypothesis to experiment with a range of ways of tackling a problem and teachers modelling problem solving. In around a fifth of classes relatively little use of evaluative feedback was seen, while approximately seventeen per cent of classes had very low ratings (3 or below) for 'Richness of instruction'. Pupils in such classes therefore had poorer learning environments than those in typical classes.

Teaching analytic skills – There was little or none of this pedagogical practice observed in around thirty per cent of Year 5 classes in the sample. 'Analysis' in this context includes 'higher order' critical thinking skills of analysis, inference, application, interpretation, problem solving, and planning.

Student engagement - Generally, levels of student engagement were found to be relatively high, although in a small minority of classes this was not the case. Teacher detachment was usually low and encouragingly little 'off-task' pupil behaviour was observed. The levels of 'off-task' behaviour observed were lower than those reported in findings from classroom studies in the 1980s.

Organisation of teaching – Overall the time spent in different groupings (e.g. whole class, individual etc.) was in accord with the National Strategies (Literacy/Numeracy) recommendations for daily lessons, with the exception of the use of the plenary session (see below). More time in whole class (56%) than individual work (36%) was observed, and group work was found to be less common (9%). These findings differ from other primary school studies where individual work tended to be more common than whole class work, but differences in definitions used in different observation instruments make direct comparisons difficult (e.g. Galton et al., 1999). The majority of teachers appear to use more 'interactive whole class teaching' as recommended in the National Strategies.

'Group work' - Observations of pupils in large and small groups were very rare (except in Science where 11% of observations were in groups). Teachers varied in the extent to which they encouraged pupil co-operation in both the type of tasks they assigned and the level of co-operation they encouraged. The SPRinG study (Blatchford, 2004) indicates that there can be benefits from collaborative group work at KS2 as pupils engage in more (and more sustained) interactions with other pupils. Our research indicates that such group work was uncommon.

The Plenary - Most schools broadly followed the format of the National Strategies (Literacy and Numeracy) except for the use of plenary. Around a third of classes that were observed used a plenary for both Literacy and Numeracy. In half the classes a plenary was observed in one but not the other subject. In approximately a quarter no plenary was observed in either lesson. The quality of teaching was found to be significantly higher in classes where plenaries were used for both Literacy and Numeracy, and the lowest quality was found in classes where plenaries were absent. The absence of the plenary in around half of Literacy and Numeracy lessons observed (51% Literacy, 49% Numeracy) is of particular concern as this part of the lesson is intended to give opportunities for student feedback and consolidation of learning. Black and Wiliam (1998) argue that 'informative' feedback is 'an essential component of classroom work' (1998, p.9) that can lead to raised standards of achievement. By missing this part of the lesson some teachers may be reducing the opportunity to provide consolidation. In particular the use of more demanding higher order communication and 'dialogic teaching' (Wells, 1999; Mercer and Littleton, 2007), is typically more common in plenary and other whole class activities.

While the research was not designed to investigate the implementation of the National Strategies, findings on the positive link between the use of the plenary and quality indicate that teachers who adhere more closely to the suggested three part lesson show significantly better practice overall.

Disadvantaged groups
The observational data showed that the quality of teaching tends to be poorer in schools with higher levels of social disadvantage (measured by the percentage of pupils eligible for FSM) and this has implications for the social inclusion and raising standards agendas. In schools with a higher percentage of pupils eligible for FSM, Year 5 classes scored significantly lower on particular aspects of teaching 'quality'. In Mathematics, there were fewer opportunities for pupils to practice basic skills in the context of problem solving (which encourages higher order thinking). There was also less 'social support for learning' and fewer opportunities for children to demonstrate their subject knowledge.

In literacy, pupils in schools serving more disadvantaged intakes spent more time in 'off-task' talk (student engagement) and their classrooms were less likely to be well organised, with transitions between activities being poorly managed. In addition, the classroom climate (extent to which pupils are respected and have autonomy) and social support for learning (high expectations) were significantly and negatively associated with the level of social disadvantage (measured by percentage of pupils eligible for FSM).

Although the classroom observations on disruptive behaviour, discipline episodes and class 'chaos' suggest that pupil behaviour was generally good in the large majority of classes, behaviour tended to be worse in schools where there were relatively more children eligible for free school meals (% FSM). The results also indicated that poor organisation of work by some Year 5 teachers was associated with level of social disadvantage (e.g. on the item 'chaos').

These results warrant further investigation, given concerns about the gap in attainment related to pupil background, a gap that increases as children progress through school. Our findings may reflect the influence of lower teacher expectations or the recruitment of less experienced or poorly performing teachers in schools serving more disadvantaged communities. They may also link to difficulties relating to pupil behaviour, attitudes and attendance that teachers face in schools serving poorer families. In fact it may be all of these, 'expectations' do not have to be 'self-fulfilling' to constitute a problem, as Good and Brophy (1997) have argued: "*Expectations tend to be self-sustaining. They affect both* perception*, by causing teachers to be alert for what they expect and less likely to notice what they do not expect, and* interpretation*, by causing teachers to interpret (and perhaps distort) what they see so that it is consistent with their expectations. Some expectations persist even though they do not coincide with the facts*" (Good & Brophy, 1997, p441).

Predicting children's progress using observational measures and teacher perception factors

Further analyses were conducted to establish whether the variation in classroom practice predicted EPPE 3-11 pupils' progress and development from Year 1 to Year 5 in the 125 focal schools. These analyses were based on 1160 pupils (around 45% of the total sample now in the study).

Our analyses show that both teachers' classroom practice and overall school level factors make a significant difference to children's academic and social/behavioural progress during primary school after controlling for child, family and home learning environment (HLE) characteristics. We looked at particular classroom factors; including one we termed 'overall teaching quality'. The observation instruments identified significant variations in observed quality. The analyses indicate that teachers could be divided into groups based on observations of their ***overall*** 'Quality of teaching'.

The COS-5 dimensions were divided into four levels of observed teaching quality: below one standard deviation (sd) of the mean (Low), within one sd below the mean (Low-Medium), within one sd above the mean (Medium-High) and above one sd of the mean (High). Due to fewer cases for the IEO sub-sample, the IEO dimensions were divided into just three groups – the bottom 20% (Low), middle 60% (Medium) and top 20% (High). These groupings were used to construct a global measure of teaching/classroom quality based on the combined individual dimensions[8]. A global indicator of *Teaching quality* was created for the overall COS-5 instrument and for Literacy and Numeracy scales of the IEO.

The global indicators of *Teaching quality* were created in three stages. First, the individual dimensions were recoded such that scores below 1 sd of the mean received a value of (-1), scores within 1 sd of the mean received a value of (0), and scores above 1 sd of the mean received a value of (1). The recoded variables were then summed and the resulting distributions can be seen in Table 6. Finally, as the extreme Low and the extreme High categories consisted of very few numbers, the bottom two and the top two categories were collapsed for all three global indicators to produce 5 categories representing varying levels of observed practice for the COS-5 global indicator of *Teaching quality* and 3 categories for each of the IEO global indicators of quality.

Table 6: Distributions of the combined dimensions for each observation instrument

Number of pupils by each summed category of teacher behaviour (quality)	-3.00	-2.00	-1.00	0.00	1.00	2.00	3.00	Total
COS-5	28	156	269	295	311	84	17	1160
IEO: Literacy	0	41	167	333	193	23	0	757
IEO: Numeracy	0	3	272	281	231	21	0	808

	Low	Low-medium	Medium	Medium-High	High
COS-5 Overall Indicator of *Teaching quality* (Total n= 1160)	n= 184	n=269	n=295	n=311	n=101
	15.9%	23.2%	25.4%	26.8%	8.7%
IEO Overall Indicator of *Teaching quality* (Total n= 757)	n= 208	N/A	n=333	N/A	n=216
	27.5%	N/A	44.0%	N/A	28.5%

What matters in the classroom?

The two observation instruments identified significant variations in observed quality indicating that children's educational experiences in Year 5 classes differed significantly with some having the benefit of higher quality experiences.

A number of important underlying dimensions of classroom processes have been identified such as 'Quality of Pedagogy', 'Disorganisation', 'Child positivity', pupils' 'Positive engagement' and the extent of 'Attention and control', as well as specific features of practice related to Literacy and Numeracy teaching and learning. These underlying dimensions were tested in multilevel models of children's progress and development to establish whether variations in children's classroom experiences are associated with developmental outcomes. In addition, the global measures of overall *Teaching quality*, described above, were tested in the models.

[8] The individual (grouped) dimensions within each scale were summed up. The summation process produced 21 categories, which were then reduced to five broader groups with roughly equal numbers.

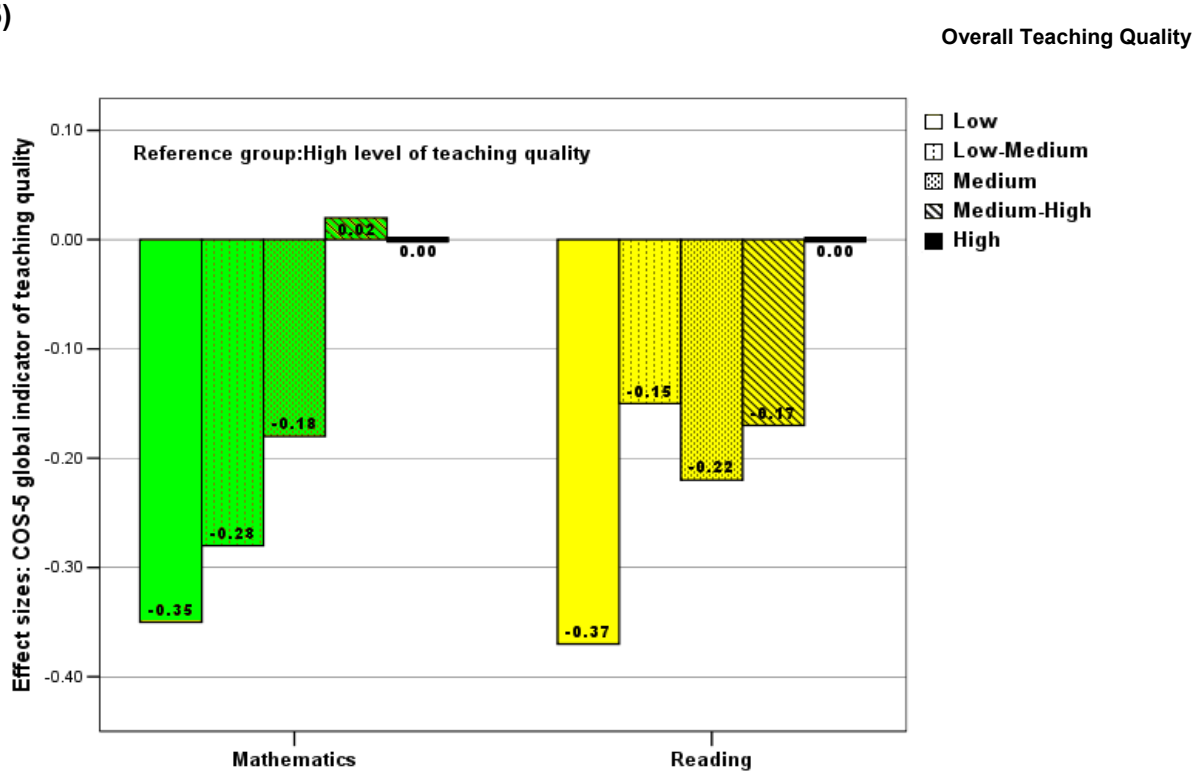
The goal was to investigate experiences in Year 5 classes that were related to outcomes in Year 5. Multilevel models tested the predictive power of different measures of classroom processes and overall Teaching quality for children's progress/development across Years 1 to 5. The models of children's progress control for prior attainment (or prior social behaviour) measured in Year 1 as well as a wide range of child, family and home learning environment (HLE) influences as described for the full sample in Section 3 of this report. The progress/developmental gains are measured over four years in primary school. The outcomes studied include Reading and Mathematics (measured by NFER standardised tests), and four social/behavioural, measures derived from teachers' ratings of individual children (covering the four dimensions of 'Hyperactivity', 'Self-regulation', 'Anti-social' behaviour and 'Pro-social' behaviour)[9].

It was hypothesised that higher quality classroom experiences would predict better child progress between Year 1 and Year 5. School effectiveness research has drawn attention to the importance of the classroom level in accounting for variations in student outcomes but such research has tested limited measures of classroom processes and usually only examined cognitive outcomes (Teddlie & Reynolds, 2000). The EPPE 3-11 project has studied a detailed set of classroom measures obtained from observations in Year 5 in relation to pupils' outcomes and thus can explore the relative strength of classroom experiences on a wide range of outcomes.

Overall Teaching Quality

The results indicated that the overall measure of *Teaching quality* was a significant and moderate to strong predictor of both Reading (ES=0.35) and Mathematics progress (ES=0.37) for pupils in the 125 schools (see Figure 5.2). These differences refer to the contrast between the High and Low groups on the overall measure of *Teaching quality*. Three important conclusions can be drawn from these results.

Figure 5.2: The effect of Overall *Teaching quality* on Pupils' Cognitive progress (Year 1 to Year 5)



[9] For further details of the social/behavioural measures see Sammons et al., 2007b).

First, it is possible to classify teachers in Year 5 classes into groups according to their overall Teaching quality across a range of different dimensions of classroom behaviour and practice.

Second, overall Teaching quality is a significant predictor of cognitive progress for pupils across the period Year 1 to Year 5. Pupils in schools where Year 5 overall Teaching quality was observed to be High do significantly better in both Reading and Mathematics than those attending schools where Year 5 quality was observed to be Low.

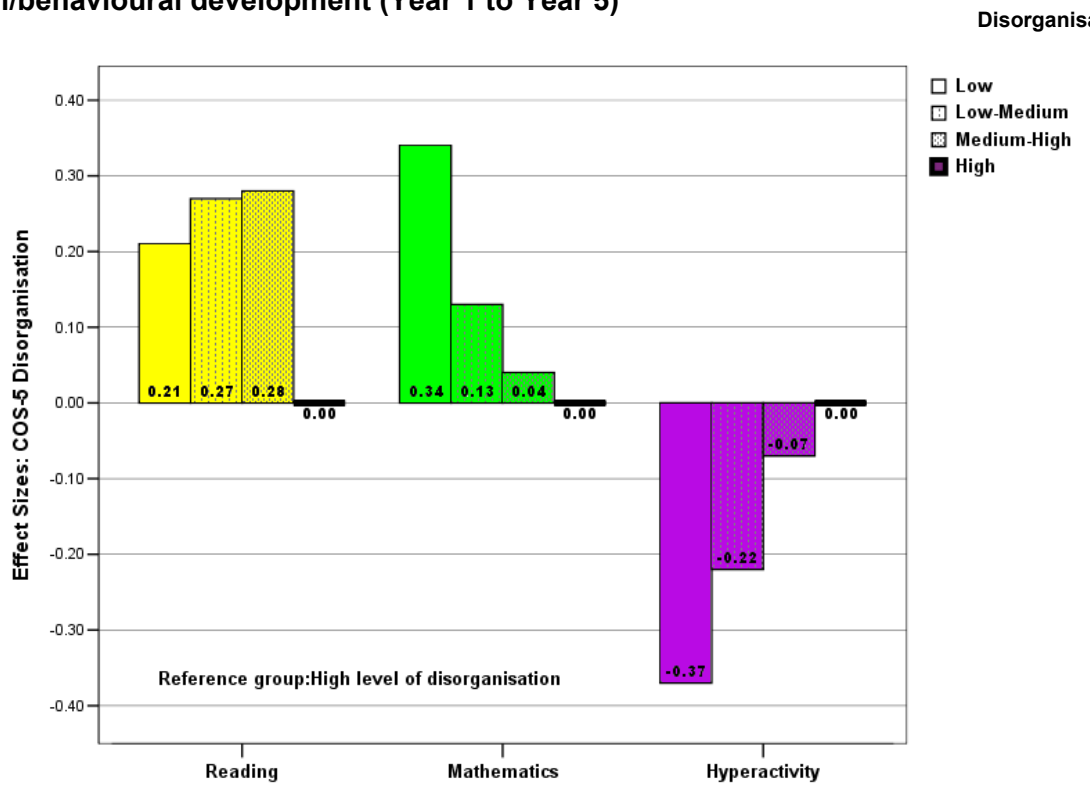
Third, the overall quality of teaching, as measured by the instruments, was consistently related to children's academic progress but not to children's social/behavioural development.

Nonetheless, more specific aspects of classroom processes were found to predict both better social/behavioural development and better cognitive progress. For example, the effect of overall *Teaching quality* is similar to the net influence of mothers' highest qualification level (comparing the influence of having academic qualifications at age 18 years versus no qualifications), and larger than the net influence of either gender or eligibility for FSM.

Aspects of Teaching

High levels of observed classroom 'Disorganisation' in Year 5 (related to teachers' organisation and the behavioural climate of the classroom) were associated with poorer progress in Reading, Mathematics and 'Hyperactivity'.

Figure 5.3: The net effects of 'Disorganisation' on Pupils' Cognitive progress and social/behavioural development (Year 1 to Year 5)[10]



[10] The 'Hyperactivity' graph (see Figure 5.3) shows that children in classes that scored highly on the 'Disorganisation' factor had poorer developmental progress for the developmental measure 'Hyperactivity' (increased over Years 1 to 5); while those in classes with low scores for the factor 'Disorganisation' had the best outcomes.

The factor 'Disorganisation' is related to the behavioural climate of the classroom and this finding supports earlier studies indicating that a calm and orderly climate facilitates learning and teaching (Teddlie & Reynolds, 2000). We have already described significant, though modest, associations between social disadvantage in the primary school intake and the level of 'Disorganisation' in Year 5 classes (Sammons et al., 2008d). It may be harder for teachers to maintain good order in schools serving higher proportions of disadvantaged children. It may also be the case that poorer classroom practice is a contributory factor in explaining the poorer outcomes of children from disadvantaged families. It is likely that both explanations play a part. Our analyses have tested and controlled for a wide range of background measures, including parents' qualifications, occupations and income. Over and above such influences, features of classroom experience such as 'Disorganisation' may play an important role in shaping children's educational futures.

Other research (Ross & Hutchings, 2003; Darling-Hammond, 2002; Wirt et al., 2002; 2003) has suggested that schools in disadvantaged communities can find it harder to recruit and retain experienced and better qualified teachers. This suggests that a stronger emphasis on promoting overall quality of teaching and a more orderly classroom climate may promote better educational outcomes for pupils in schools with above average proportions of disadvantaged children.

While the overall *Teaching quality* was equally predictive of both Reading and Mathematics progress, specific features of 'Quality of Pedagogy' in Year 5 showed stronger relationships with children's Mathematics progress. Reviews of school and teacher effectiveness research have suggested that schools vary more in the effects on Mathematics than on Reading (Scheerens and Bosker, 1997; Muijs and Reynolds, 2005). These results suggest that the overall *Teaching quality* measure seems to be equally important for both outcomes but specific features of classroom processes, such as 'Quality of pedagogy', are better predictors of children's progress in Mathematics compared to English. *Teaching quality* was also found to be important for children's progress in terms of reducing 'Hyperactivity', and promoting positive progress in 'Pro-social' behaviour and 'Self-regulation'. More detailed guidance on the features of pedagogy associated with this higher quality factor may prove helpful in promoting improvement in practice. Items in the 'Quality of Pedagogy' factor included richness of instructional method, a positive climate, productive use of instructional time, the use of evaluative feedback, teacher sensitivity and lack of teacher detachment. Overall, this factor describes a classroom where teachers provide a rich learning environment, where pupils are challenged in their learning and provided with specific evaluative feedback on how to improve their work, as well as a positive emotional climate.

The quality of 'Attention and control' observed in the classroom was also linked with better progress in Mathematics and better development in 'Self-regulation', while the measure of observed 'Child Positivity', (which involved the nature of Child-Teacher relationships, children's co-operative skills and their self-reliance) was related more to the emotional features of classroom processes and was a predictor of better progress in Reading.

What matters outside the classroom?

In addition to classroom observations, we explored teachers' perceptions of different aspects of school/classroom processes and organisation using a questionnaire in the 125 schools (see Appendix 6). Underlying dimensions were identified and tested in the multilevel progress models to predict child outcomes in Year 5. These dimensions were:

1. Parental support for their child's learning
2. School communication with parents
3. Pupils' behaviour
4. Anti-academic ethos
5. Pupils' agency and voice.

Box 6: Items corresponding to each dimension of teachers' perceptions

Parental support of their child's learning (α = 0.78)
1. For the pupils in this class the home environment adversely affects their learning
2. There is a high level of parental support for their child's learning at school
3. Parents give a lot of support to the work of the school

School communication with parents (α = 0.72)
1. The school is good at communicating its expectations of pupils to parents
2. Parents are regularly informed about their child's progress and achievements
3. If a pupil seriously infringes school rules parents will be informed immediately

Pupils' agency and voice (α = 0.68)
1. Pupils organise activities for themselves
2. Pupils' views are listened too and taken seriously

Use of homework and school standards(α = 0.63)
1. Teachers set homework every week in their class
2. Most teachers mark and return homework promptly
3. Overall standards set at this school are high enough

Pupils' behaviour (α = 0.89)
1 Teachers and pupils get on well at this school
2 Pupils show respect to teachers and all other staff
3 Most pupils at this school are interested in learning
4 Most pupils at this school want to do well in their school work
5 There are very few pupils at this school whose behaviour in class prevents other pupils from learning
6 Most pupils behave well in class
7 There is not much bullying or name-calling of other pupils

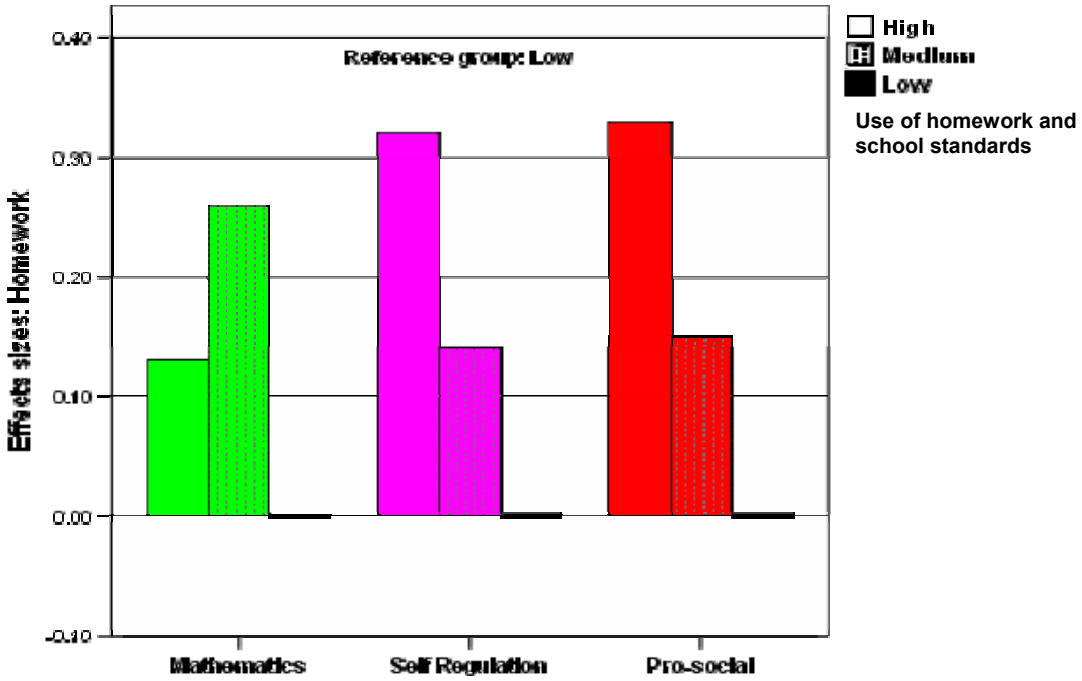
Anti-academic ethos (α = 0.73)
1. Many pupils don't do as well as they could because they are afraid that other pupils won't like them
2. Most pupils who get good marks or work hard are teased by other pupils
3. Pupils in this school only work hard if carefully supervised

α= Cronbach's alpha

Use of homework and school standards

Teachers' reports on the *Use of homework and school standards* indicated a positive relationship with Mathematics progress with the strongest effects for the Medium and not the High group (see Fig. 5.4). Higher scores on this factor were also associated with better developmental gains for 'Self-regulation' and 'Pro-social' behaviour, with effects strongest for the High versus the Low group. The items that define this measure included: teachers set homework every week for their class, most teachers mark and return homework promptly, and whether the overall standards set for pupils at the school were perceived to be high enough.

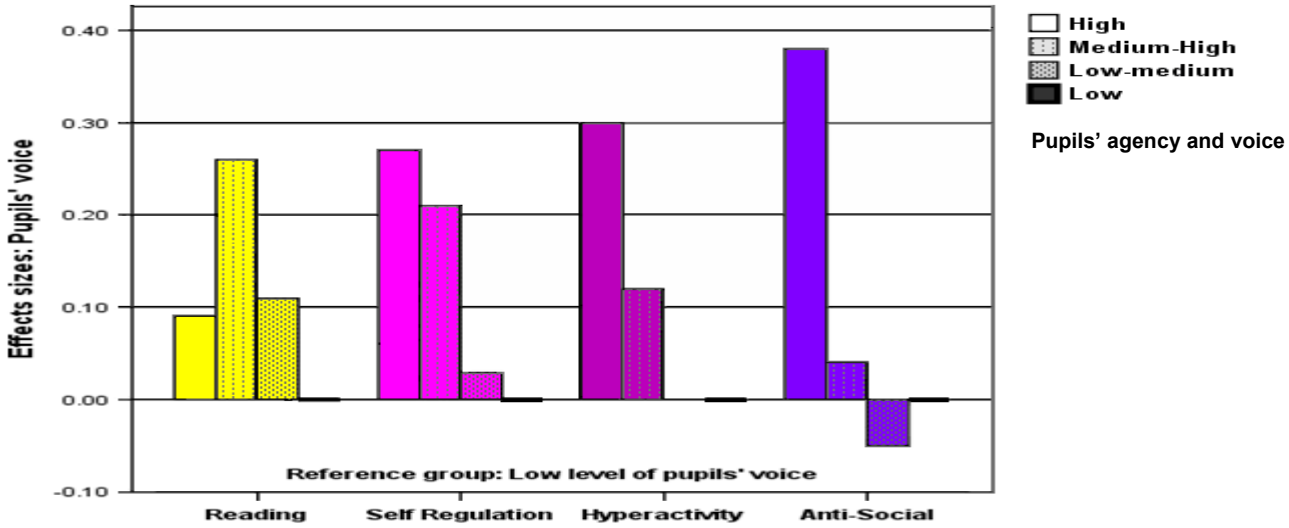
Figure 5.4: The effect of *Use of homework and school standards* on Pupils' Cognitive and Social/behavioural progress (Year 1 to Year 5)



Pupils' agency and voice

Progress in Reading was positively linked with the factor *Pupils' agency and voice*. Differences were largest between the Low and the Medium-High groups suggesting that moderate levels of *Pupils' agency and voice* are more strongly related to progress in Reading than either Low or High levels (see Figure 5.5). 'Self-regulation' was also positively linked with the factor *Pupils' agency and voice*. Children in schools where teachers indicated High or Medium-High levels of Pupils' agency and voice showed significantly increased levels of 'Self-regulation'

Figure 5.5: The effect of *Pupils' agency and voice* on Pupils' Cognitive and Social/behavioural progress (Year 1 to Year 5)

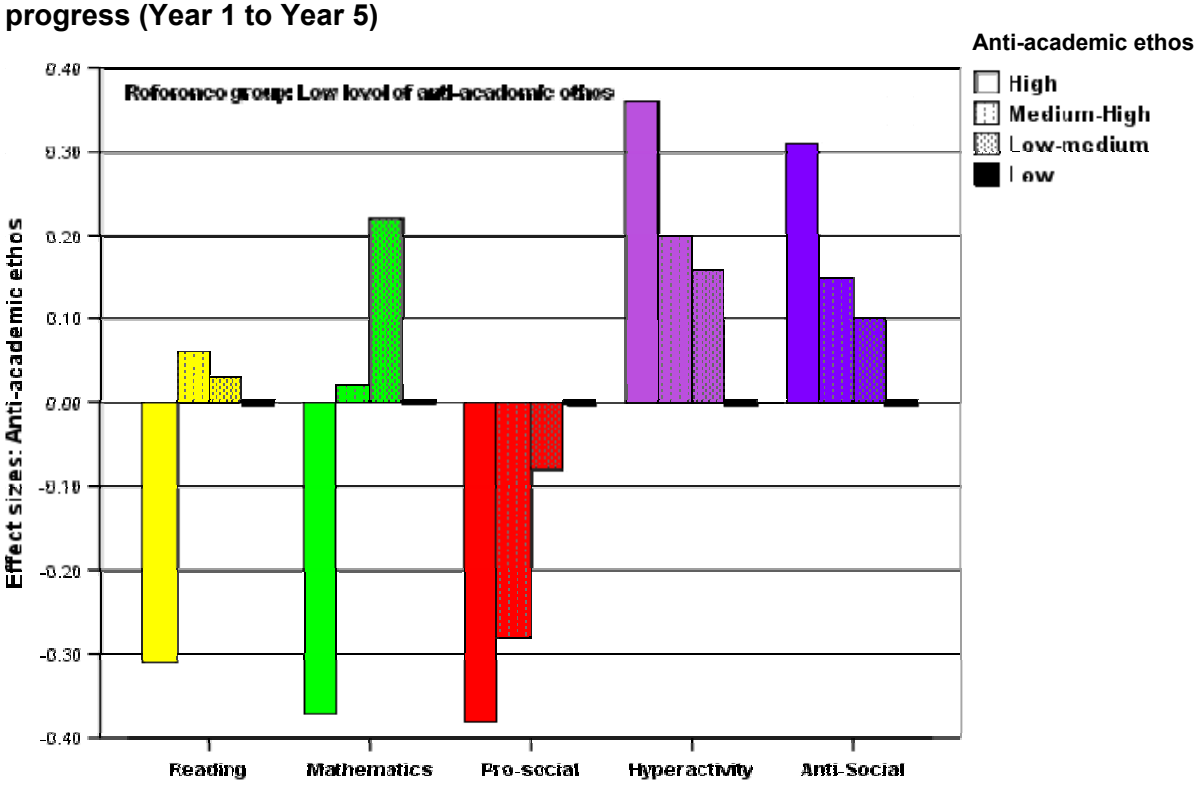


It was hypothesised that children would show positive social behaviour in schools where pupils had greater opportunities to organise activities for themselves and their views are listened to and accommodated, however the findings appear to suggest otherwise. Contrary to expectations, pupils' 'Hyperactivity' and 'Anti-social' behaviour was significantly higher in schools where teachers indicated high levels of *Pupils' agency and voice*. These schools may be responding to poor pupil behaviour by giving more emphasis to pupils' voice so *Pupils' agency and voice* may be an attempt at a constructive response by schools seeking to counter negative behaviour. Alternatively, some moderate amount of involvement and autonomy may be optimum, and beyond a certain point, children at this age may not respond well to high levels of autonomy because such strategies may adversely affect the disciplinary climate. Further study of *Pupils' agency and voice* (as reported by teachers) may be needed to explore these associations and their impact.

Anti-academic ethos

Pupils in schools with high levels of *Anti-academic ethos* showed significantly poorer progress in Reading and Mathematics; differences were mainly between the High and Low groups. The relationships between *Anti-academic ethos* and social/behavioural dimensions were graduated, showing a steady decrease in 'Pro-social' behaviour and a steady increase in 'Hyperactive' and 'Anti-social' behaviour as a function of increasing *Anti-academic ethos* in the school (see Figure 5.6).

Figure 5.6: The effect of *Anti-academic ethos* on Pupils' Cognitive and Social/behavioural progress (Year 1 to Year 5)

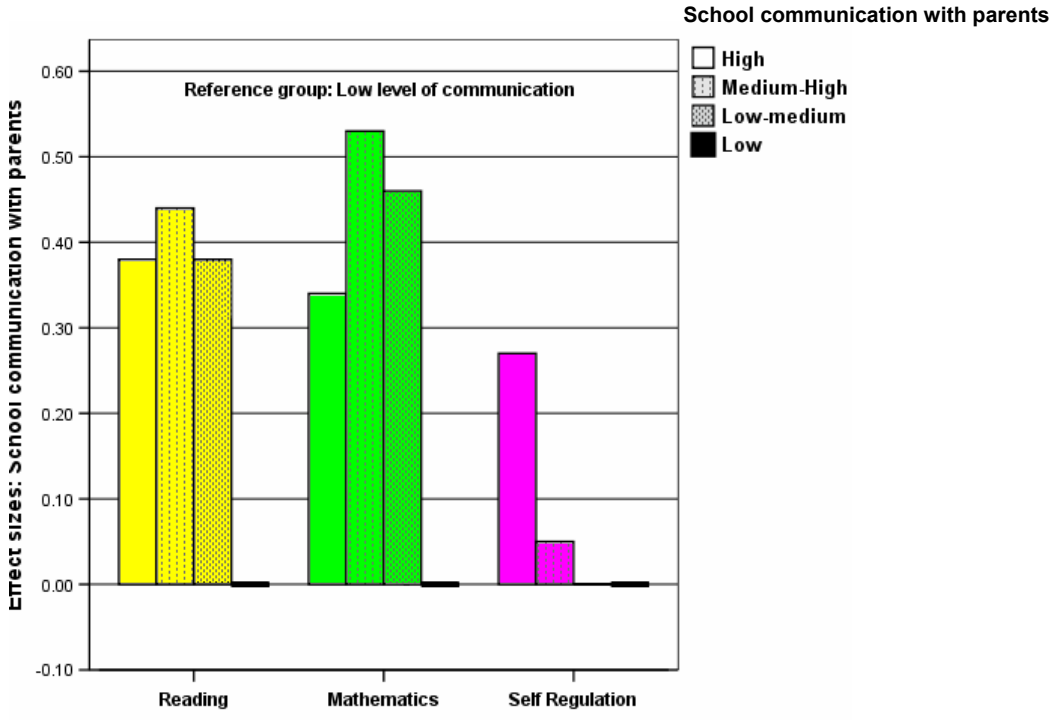


Parental communication and support

Two factors on the teacher questionnaire (*School communication with parents* and *Parental support of their child's learning*) were significant predictors of better outcomes for pupils in Year 5. Of the two factors, teachers' perceptions of *School communication with parents* was the stronger predictor of Reading (ES=0.38) and Mathematics (ES=0.34) with pupils making better progress in schools where teachers reported good communication (such as parents being regularly informed about their child's progress/achievements and the school being good at communicating its expectations of pupils to parents). This factor also predicted better developmental progress for 'Self-regulation' (ES=0.27), the social/behavioural outcome most strongly linked to cognitive outcomes.

Teachers' judgements of overall *Parental support of their child's learning* also showed a significant positive relationship with pupils' progress in Reading (ES=0.28) but not in Mathematics; this factor was also found to be a strong and positive predictor of 'Pro-social' behaviour (ES=0.38). Overall, these findings indicate that, after taking account of other influences, pupils make better progress in schools where teachers reported good communication with parents in aspects such as communicating expectations of pupils to parents, or regularly informing parents about their child's progress and achievements.

Figure 5.7: The effect of *School communication with parents* on Pupils' Cognitive and Social/behavioural progress (Year 1 to Year 5)



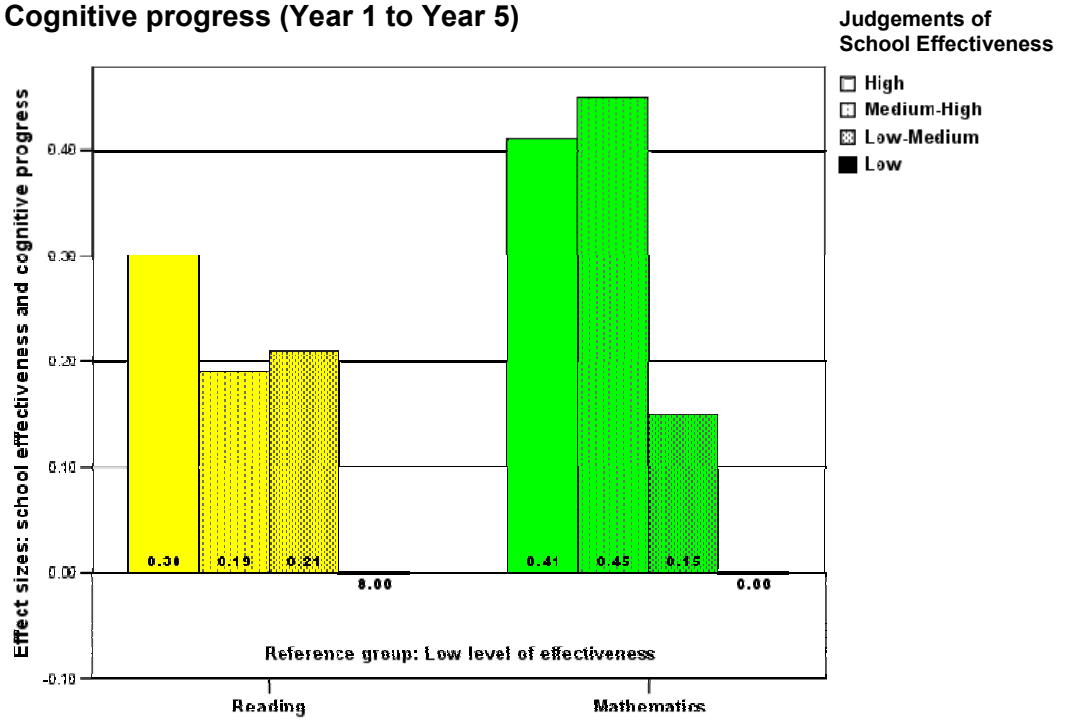
The relationship between classroom observations and measures of effectiveness

In addition to investigating the impact of classroom processes based on observational data, further analyses were conducted to explore the predictive power of more global indicators of school quality based on independent professional judgements of Ofsted inspectors (using inspection data from Ofsted reports). Earlier analyses (Sammons et al., 2006a) at the school level had already demonstrated significant associations between observational data and inspection reports on the 125 focal schools. A number of the classroom process factors, derived from the observations, were found to be positively related to Ofsted judgements of school effectiveness, improvement and leadership. This supported the conclusion that the observed measure of overall Teaching quality was found to be higher in schools previously identified as showing better quality by Ofsted inspectors (judgements on 'School effectiveness', 'Improvement since their last inspection' and 'Leadership'). Ofsted measures were tested in the multilevel models of children's Year 5 outcomes.

'School effectiveness'

The overall Ofsted judgement of 'School effectiveness' was a strong predictor of better outcomes for the sub-sample of EPPE 3-11 children, after controlling for other factors (prior attainment/social behaviour and background factors). Attending a more effective school (as judged by inspectors) made a significant difference to all outcomes (Reading, Mathematics and all four social/behavioural outcomes), more strongly for Mathematics (ES=0.41, see Figure 5.8), 'Self-regulation' (ES=0.39) and 'Pro-social behaviour' (ES=0.37).

Figure 5.8: Ofsted judgements of 'School effectiveness' and net influence on Pupils' Cognitive progress (Year 1 to Year 5)



'Improvement since last inspection'

The Ofsted judgement of overall school 'Improvement since the last inspection' showed similar results. The effects were particularly strong for pupils' progress in Mathematics (ES=0.35, see Figure 5.9) and three aspects of social behaviour (see Figure 5.10): 'Self-regulation' (ES=0.49), 'Pro-social' behaviour (ES=0.43) and 'Anti-social' behaviour (ES=0.31).

Figure 5.9: Ofsted judgements of 'Improvement since last inspection' and net influence on Pupils' Cognitive progress (Year 1 to Year 5)

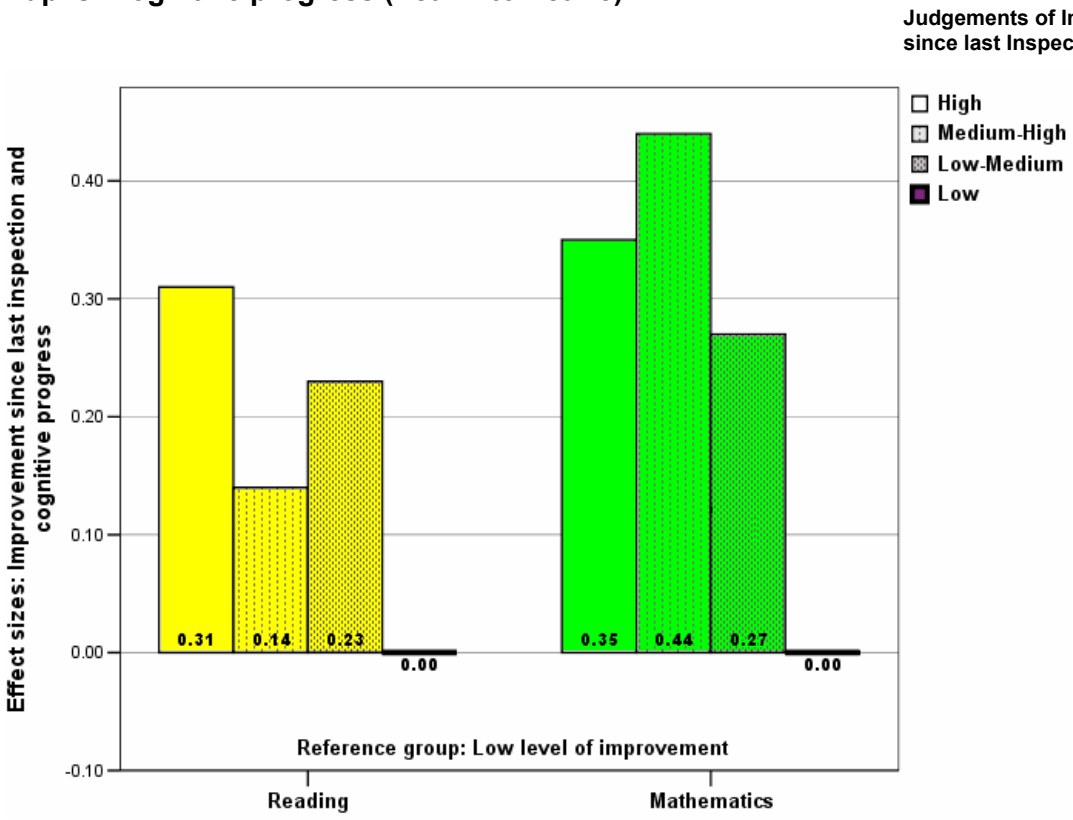
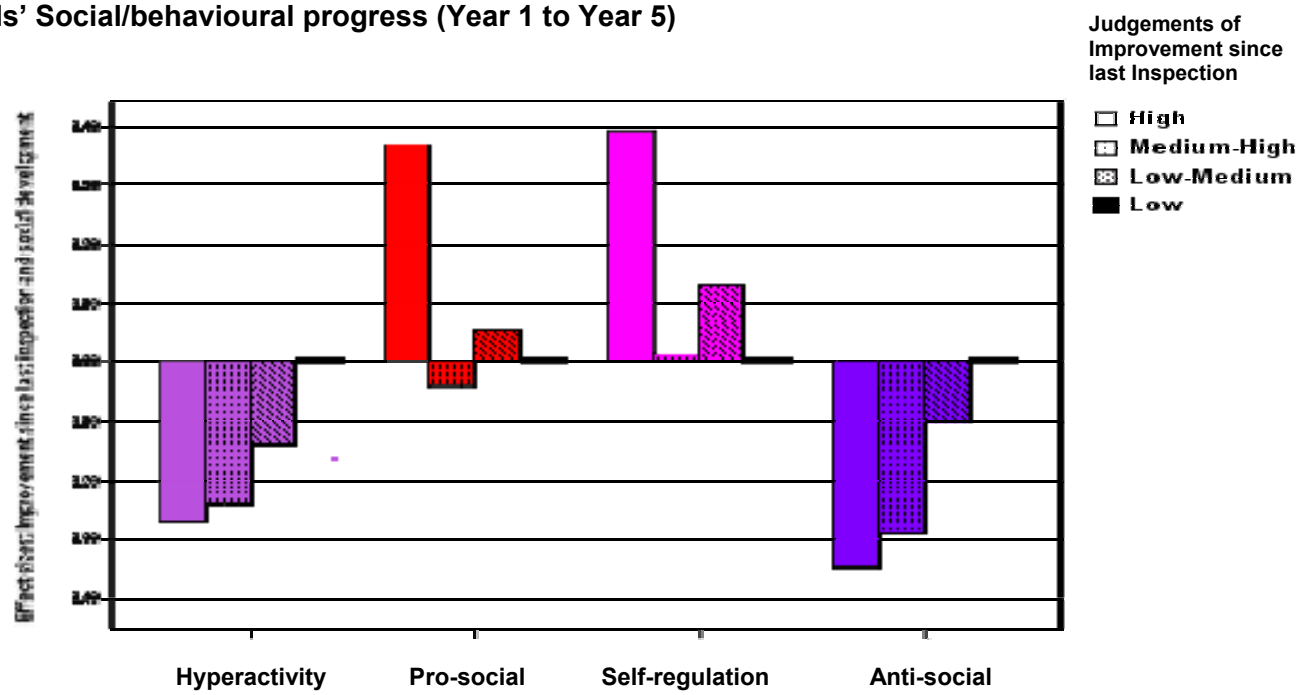


Figure 5.10: Ofsted judgements of 'Improvement since last inspection' and net influence on Pupils' Social/behavioural progress (Year 1 to Year 5)



'Leadership'
Ofsted judgements of school 'Leadership' also showed modest positive relationships with progress in Mathematics (ES=0.32), 'Hyperactivity' (ES=-0.22) and 'Anti-social' behaviour (ES=-0.23).

The overall judgments by Ofsted inspectors (leadership, improvement since last inspection etc.) are of policy interest as they show that going to a 'better' school (as identified by Ofsted) does make a significant difference to pupils' cognitive and social/behavioural progress across the board. Pupils in the EPPE 3-11 sample who attended more effective and improved schools showed longer term benefits in terms of a wide range of outcomes, even when child background and family influences were controlled. The results can also be seen to provide some independent support for the validity of the Ofsted judgements, by confirming their predictive validity for a range of pupil outcomes.

Measures of social disadvantage (Free School Meals - FSM)
There is evidence that the overall characteristics of pupil intake (measured by the percentage of pupils eligible for FSM) also influence children's cognitive progress and social/behavioural outcomes (for Mathematics, 'Hyperactivity', 'Self-regulation' and 'Anti-social' behaviour). Comparisons were made between children in schools that were above the average in terms of the level of social disadvantage and children in schools below the average in terms of social disadvantage. Higher levels of social disadvantage in the school (measured by % of pupils eligible for FSM) were a predictor of poorer outcomes, controlling for all other significant child, family and home learning environment (HLE) characteristics including the individual child's family income and eligibility for FSM. However, the effects are somewhat weaker (ES range 0.23-0.29) than those found for the Ofsted measures of school effectiveness and improvement (ES range 0.27-0.49). Elsewhere our study has shown that only one of the classroom observation measures was associated with level of disadvantage of pupil intake (Sammons et al., 2006a); 'Classroom Disorganisation' was negatively associated with social disadvantage of pupils (% of pupils eligible for FSM, Correlation r=0.36). These findings support other research (Reynolds et al., 2006) on the importance of school composition and indicate that the challenges in raising attainment are greater for schools in areas of higher disadvantage (Sammons, forthcoming - 2008).

Conclusions

Reviews of school and teacher effectiveness research have consistently revealed the importance of a range of school and classroom features that promote better educational outcomes for students; see Teddlie and Reynolds (2000), Scheerens and Bosker (1997), Sammons (2007c). These include a positive school culture, good leadership, creating a positive learning environment, high expectations and good quality teaching.

The EPPE 3-11 study is the first to combine a wide range of data that explore the relationship between detailed measures of child, family and home learning environment (HLE) influences and pupils' progress (in both cognitive and social/behavioural outcomes) and link this detailed information to what teachers do in the classroom and measures from inspection judgements (Ofsted). This has enabled the exploration of the predictive power of different measures in accounting for variation in children's progress in English primary schools across a range of outcomes.

The analyses of classroom observations show it is possible to group teachers in Year 5 classes in terms of differences in overall *Teaching quality* across a range of observed dimensions of teaching practice. Overall *Teaching qu*ality is a significant predictor of better cognitive progress for children between Years 1 and 5, and this is particularly evident in the High and Low quality groups. In other words, children in schools where Year 5 overall *Teaching quality* was observed to be High do significantly better in both Reading and Mathematics progress than those in classes where overall quality was observed to be Low. However, overall *Teaching qua*lity was not associated with social/behavioural progress in any consistent way. It appears that the overall quality of teaching as measured by the observations has a greater influence on pupils' academic progress, than on other social/behavioural outcomes.

With regard to other measures, pupils who attended more effective and improved schools, as measured by Ofsted judgements during regular school inspections, also showed longer term benefits for both social/behavioural and academic outcomes. The measure of Ofsted judgement of school leadership also showed a significant though weaker positive influence. This supports the conclusions of school effectiveness research that school matters. Even when the powerful influences of child, family and home are controlled, the results show that going to a 'better' primary school provides additional benefits for pupils' academic progress and social/behavioural outcomes.

In addition, teachers' perceptions of a number of features of their schools (such as *School communication with parents*, *parental support*, consistent emphasis on homework, *Pupils' agency and voice*, and *Anti-academic ethos*) are also significant predictors of pupils' academic progress and social/behavioural development from Year 1 to Year 5.

The quality of classroom teaching and the overall quality of the primary school were both predictors of better outcomes, while contextual influences and communication with parents are also significant. We conclude that initiatives that give a stronger emphasis to promoting the overall quality of teaching and creating a more orderly classroom climate are likely to improve educational outcomes for all pupils and may be particularly important for schools with higher proportions of disadvantaged pupils (because these schools are more likely to have higher levels of classroom disorder).

A major review by Scheerens and Bosker (1997) concluded that school effects are larger for minority ethnic and disadvantaged groups (in this report the sample size does not allow detailed analysis of school effects for specific sub-groups). Therefore improving the quality of teaching and overall effectiveness of the school is likely to be necessary to promote better educational outcomes in the long term, particularly for disadvantaged pupils. This conclusion is also

supported by recent Ofsted findings of schools in disadvantaged areas (Ofsted, 2007[11]; Ofsted 2008) and studies of school found in special measures that improved. The EPPE 3-11 findings support the view that quality of classroom practices and overall quality of schools and their leadership make an important difference to children's academic and social/behavioural progress. The results suggest the need to reduce the variation in the quality found between classroom practices and school's processes in order to raise achievement/development and promote greater equity.

Key findings on the influences of primary school practices

Pedagogy

- Levels of student engagement were relatively high and classroom climates were generally positive. Teacher detachment and levels of pupils' 'off-task' behaviour were generally low.
- There was considerable variation in the quality of the educational experiences of children in different classes, indicating that some children attend poorer quality settings, which has implications for the promotion of greater equality of educational opportunities.
- Most teachers broadly followed the format of the National Strategies (Literacy and Numeracy) except for the use of the plenary, which was not observed in nearly half of the classes observed.
- The quality of teaching and pupil response was found to be consistently higher in classes where a plenary was used for both Literacy and Numeracy lessons and lowest in classes where no plenary was used in either subject.

The impact of School Context

- The incidence of poor pupil behaviour and classroom disorganisation was observed to be greater in schools with higher levels of social disadvantage, measured by the percentage of pupils eligible for free school meals (FSM). The quality of pedagogy was also found to be poorer in schools with higher levels of social disadvantage.

Associations between classroom practice and Ofsted measures of 'effectiveness'

- Observed practice was found to be better in schools that had been rated more positively by Ofsted Inspectors in earlier inspections (particularly in schools rated more highly on overall leadership and school effectiveness). This suggests that the practice of Year 5 teachers in more effective schools is related to the overall quality of the school and its leadership.
- Significant positive associations were also found between Ofsted judgements of 'School effectiveness' and 'Improvement since the last inspection' and teachers' use of a plenary in Literacy and Numeracy lessons.
- Several aspects of observed practice were also found to be weakly related to better value added outcomes in English and Mathematics.

Classroom factors, (particularly overall Teaching quality and Child positivity, which combines teacher-child and peer relationships and children's own self-reliance) and *Parental support* have an important influence on children's progress in Reading between Year 1 and Year 5. School level factors were relatively less important for Reading. Progress in Mathematics, however, is relatively equally influenced by factors at classroom level (overall *Teaching qu*ality and 'Quality of Pedagogy') and school level (Quality of school leadership, *School communication with parents*, *Use of homework and school standards*). This finding is in accord with analyses from the full sample that indicate stronger school effects for children's progress in Mathematics (Sammons et al., 2007a).

School-level characteristics (e.g. *Anti-academic ethos*, *Use of homework and school stand*ards, and the extent of recent school 'Improvement since last inspection') are stronger predictors of student outcomes than classroom level factors, although these do matter. The exception is the classroom measure of 'Quality of Pedagogy', which was beneficial both for reducing 'Hyperactivity', and promoting 'Pro-social' behaviour and 'Self-regulation' (e.g. concentration, self-reliance).

[11] See Ofsted Annual Report 2006/2007 (para. 282-284, p. 69 -70).

Section 6: Exploring Pupils' Self-perceptions and Views of primary school

Summary of Key Messages

- Background factors such as gender, birth weight, FSM status, Early years HLE, SEN status showed strong associations with pupil's self-perceptions across a range of outcomes.
- Early educational experiences (pre-school and Early years HLE) were also associated with Pupil's self-perceptions across a range of outcomes.
- The majority of children view their primary school experiences positively.
- There were significant child, family and pre-school factors which led to more positive dispositions to school.
- Pupils' self-perceptions, particularly 'Academic self-image' and 'Behavioural self-image' were associated with academic and social/behavioural outcomes.
- Pupils identified as having SEN have less favourable self-perceptions.
- Children with moderate (as opposed to high or low) levels of 'Enjoyment of school' had better progress in Reading and Mathematics from Year 1 to Year 5.

In Year 5 (age 10), we sought pupils' views on school and classroom life. We produced measures of pupils' self-perceptions in terms of several key characteristics 'Enjoyment of school', 'Anxiety and Isolation' and 'Self-image' (academic and behavioural), as well as their views of different features of primary school: 'Teachers' support for pupils' learning', 'Headteacher qualities' and 'Positive social environment'. Full details are reported in 3 Technical Papers (Sammons et al., 2008a, 2008e, 2008f).

Pupils' Self-perceptions: Box 7 shows the items from the questionnaire associated with each self-perception factor as derived by confirmatory factor analysis.

Box 7: Items associated with each dimension of pupils' Self-perceptions in Year 5 (age 10)

'Enjoyment of school' (α=0.76) 1. Lessons are interesting 2. I like going to school 3. I get fed up at school 4. I get tired at school 5. I like English 6. I like Mathematics 7. I like Science	**'Anxiety and Isolation'** (α=0.74) 1. I feel lonely 2. I get upset 3. I feel worried 4. Other children bully me
'Academic self-image' (α=0.74) 1. I am clever 2. I know how to cope with my school work 3. I am good at school work 4. My teacher thinks I'm clever	**'Behaviour self-image'** (α=0.62) 1. I try to do my best at school 2. I behave in class 3. I talk to my friends when I should be doing my work 4. I hit other children

α= Cronbach's alpha

Pupils' views of school: Box 8 shows the items from the questionnaire associated with each factor related to pupils' views of their primary school.

Box 8: Items associated with each dimension of pupils' Views of primary school in Year 5 (age 10)

'Teachers' support for pupils' learning' (α=0.68)
1. I am told by my teacher I can do well
2. If I do well get praised
3. If I don't understand my work someone will explain it to me
4. I am told how I am getting on with my work by my teacher
5. I am helped to do my best

'Headteacher qualities' (α=0.68)
1. The head is interested in the children
2. The head makes sure children behave well
3. The head is really interested in how much we learn at school

'**Positive Social Environment'** (α=0.69)
1. The children in this school are really friendly
2. There is not much bullying or name calling at this school
3. I feel safe at lesson times
4. I feel safe at break and lunch times

α= Cronbach's alpha

Subsequent analyses are described in two parts:
A. The contribution of child, family, home learning environment (HLE), pre-school and school characteristics to pupils' self-perceptions and views of primary school measured at Year 5 and
B. The relationships between pupils' self-perceptions and their views of primary school and both cognitive progress (Reading and Mathematics) and social/behavioural development ('Self-regulation', 'Hyperactivity', 'Pro-social' behaviour and 'Anti-social' behaviour) from Year 1 to Year 5

A. Factors contributing to Pupils' Self-perceptions and Views of primary school

Pupils' Self-perceptions

Several background characteristics had modest relationships with pupils' self-perception factors, with gender being the strongest background factor. In addition, pre-school and primary school influences on pupils' self-perceptions were small but statistically significant. Nonetheless, there was significant variation between schools in the self-perceptions of their pupils, especially for 'Enjoyment of school' and 'Academic self-image' suggesting that in some schools pupils enjoy school more and feel more positive about their 'Academic self-image'.

Child and family characteristics

Gender

Gender had the strongest predictive association with pupils' self-perceptions in Year 5. Girls reported greater 'Enjoyment of school' in Year 5 (ES=0.19) and, in particular, they tend to have a better 'Behavioural self-image' than boys (ES=0.53), but they also tend to feel more 'Anxious and isolated' than boys (ES=0.15). However, boys and girls do not differ significantly for the factor 'Academic self-image' at this age.

Birth weight

Pupils who had a low birth weight reported higher levels of 'Anxiety and Isolation' (ES=0.29) and a similar trend was found for those with a record of early developmental problems during pre-school years (ES=0.19).

Free school meals (FSM) as in indicator of poverty

Pupils eligible for FSM showed significantly higher levels of 'Enjoyment of school' (ES=0.26). However, they had somewhat poorer 'Behavioural self-image' in Year 5 (ES=-0.11). This suggests that the influence of social disadvantage varies for different self-perception factors.

Parents' qualifications

Fathers' qualifications were also related to pupils' self-perceptions. Pupils whose fathers have higher qualifications (18 academic, degree or higher degree) had higher 'Academic self-image' than pupils whose fathers have no qualifications (ES from 0.19 to 0.27). By contrast, pupils whose fathers have professional or vocational qualifications have higher scores in terms of 'Anxiety and Isolation' (ES=0.60 for professional and ES=0.23 for vocational) than pupils whose fathers have no qualifications. Mothers' qualifications were not significantly associated with pupils' self perceptions.

The Early years HLE

The Early years Home Learning Environment (HLE) (measured at age 3 to 4) continued to show a significant positive impact on pupils' 'Academic self-image' in Year 5. Those who had experience of a better Early years HLE also had higher levels of 'Academic self-image' in Year 5 (ES from 0.18 to 0.24).

SEN status

Pupils who had been identified as having a special educational need (SEN) during primary school had somewhat less favourable self-perceptions (ES from -0.16 to -0.33). This suggests that pupils identified as having SEN are more vulnerable in terms of their self-perceptions and may need more support for their socio-emotional development in addition to getting support for their cognitive development in primary school.

Pre-school influences

Quality and academic effectiveness

Earlier educational experiences were significant predictors in shaping EPPE 3-11 pupils' later cognitive and social/behavioural outcomes during Key Stage 2 as has been shown in Sections 4 and 5 of this report (also see Sammons et al., 2007a; 2007b). Pre-school quality has a small but significant effect on pupils' later self-perceptions in Year 5: pupils who had attended high quality pre-schools reported higher levels of 'Behavioural self-image' (ES=0.13) and 'Enjoyment of school' (ES=0.18) than pupils who had attended low quality pre-school. In addition, pupils who had attended highly effective pre-schools in terms of their effectiveness in reducing 'Anti-social behaviour' reported higher levels of 'Academic self-image' in Year 5 than pupils who had not attended a pre-school (the 'home' group).

Primary School influences

Academic effectiveness of the primary school

Primary school academic effectiveness[12] did not have a significant impact on pupils' self-perceptions, except for 'Behavioural self-image'. Pupils who attended academically high effective primary school have more positive 'Behavioural self-image' (ES=0.13). This is in line with findings on teachers' ratings of pupils.

In summary, even though there were no strong effects of the influence of background factors on pupils' self-perceptions, the results support the conclusion that a better Early years home learning environment (HLE) had a protective influence on later outcomes via its relationship to higher 'Academic self-image'. Pupils of fathers with higher (academic) qualifications also have higher 'Academic self-image' but may show more 'Anxiety and isolation'. A number of indicators of disadvantage are related to more negative self-perceptions and this is in line with findings for both cognitive and social/behavioural outcomes. These results confirm that disadvantaged pupils are at a higher risk of poor all round development although they seem to enjoy school more.

[12] The analyses of the national pupil database was undertaken independent of the EPPE 3-11 research for three full cohorts of pupils (2002 – 2004) and sought to establish academically less or more effective schools (Melhuish et al., 2006a; 2006b).

Pupils' Views of primary school
Overall, the majority of children view their primary school positively, with only a small minority giving very negative responses. This is in line with other studies. However, there were significant associations between factors and key background and other child and family characteristics.

Child and family characteristics
Child, family and home learning environment (HLE) background characteristics were only weak predictors of pupils' views of primary school. Only a few background factors showed a significant relationship with pupils' views of primary school. Girls were more positive about their headteachers (ES=0.13) and more positive about their social environment (ES=0.15) than boys. This is also in line with research on school and classroom climate elsewhere (Quek et al., 2002; Yates, 2001).

Pupils entitled to FSM had more positive views of the extent of Teachers providing support for pupils' learning (ES=0.14). Pupils with higher family salaries view the social environment in the school more positively (ES=0.34). In addition, children who had the lowest Early years home learning environment (HLE) had less positive views of the social environment than pupils who had the highest Early years HLE (ES=-0.22).

Pre-school influences
Previously attending any pre-school compared to not attending ('home' children) was predictive of more positive views of the social environment in primary school (ES=0.18). In addition, quality of pre-school was also significant: pupils who had attended a high (ES=0.18) or medium quality pre-school (ES=0.20) showed more positive views of the '*Social environment'* in their primary schools than pupils who had not attended pre-school and pupils who attended low quality pre-school.

Primary school influences
Primary school academic effectiveness was not associated with pupils' views of primary school in contrast to findings of benefits for academic outcomes reported in Section 4.

Most pupils reported positive views about their headteacher in primary school. The headtacher was viewed as a person who is very much interested in children and makes sure everyone behaves in school. Pupils who had reported higher 'Enjoyment of school' were also likely to have favourable views of their teachers, headteachers and the social environment in school. Pupils with positive self-perceptions, particularly higher 'Enjoyment of school', also had positive views of their primary school.

These results also indicate that a certain amount of variation (13%) in pupils' views of their primary school can be attributed to differences between schools, particularly for the dimensions 'Headteacher Qualities' and 'Positive Social Environment'. This suggests there are significant differences between primary schools' in terms of the behaviour of headteachers and in terms of the social environment and how pupils view them.

B. Relationships of Pupils' Self-perceptions and Views of primary school to their developmental outcomes

Pupils' Self-perceptions and outcomes
The three factors 'Enjoyment of school', 'Academic self-image' and 'Behavioural self-image' were tested as predictors of pupils' outcomes at age 10 and progress from age 6 to age 10 (cognitive and social/behavioural), controlling for child, family and home learning environment (HLE) characteristics extending the models and analyses described in Section 4. Pupils' self-perceptions (particularly 'Academic self-image' and 'Behavioural self-image') were stronger predictors of their social/behavioural and cognitive outcomes at age 10 than pupils' views of their primary school. Findings were similar for both attainment and progress up to Year 5.

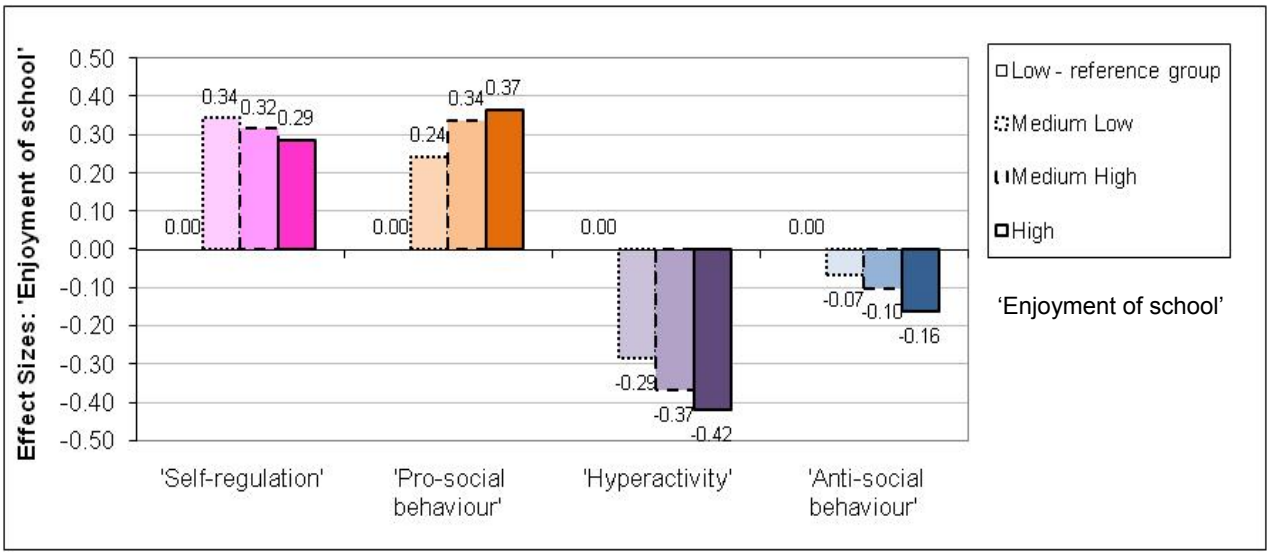
'Academic self-image' and 'Behavioural self-image'
All self-perception factors were related to pupils' outcomes, suggesting that having a higher 'Academic self-image' and/or 'Behavioural self-image' is associated with higher cognitive attainment and better social/behavioural outcomes, as well as progress on these outcomes from Year 1 to Year 5 (ES=0.16 to 0.51 for cognitive progress and ES=0.18 to 1.05 for social/behavioural development).

Pupils' 'Academic self-image' was the strongest predictor of cognitive progress (ES=0.38 for Reading and ES=0.51 for Mathematics) and progress in 'Self-regulation' (ES=0.56), whereas pupils' 'Behavioural self-image' was the strongest predictor of 'Hyperactivity' (ES=-1.05), 'Pro-social' behaviour (ES=0.68) and 'Anti-social' behaviour (ES=-0.48). These findings are in line with research on pupils' self-concept (Marsh, 2006) and suggest that a pupil's views of their own academic abilities are more likely to be related to their attainment and progress in Reading and Mathematics, as well as teacher's ratings of the pupil in terms of 'Self-regulation'.

Similarly, a pupil's own views of their behaviour are likely to be related to teacher's ratings of 'Pro-social' behaviour, 'Hyperactivity' and 'Anti-social' behaviour (for similar findings see Haynes, 1990). However, it is not possible to conclude that there is a causal effect of pupils' self-perceptions on their cognitive and social/behavioural outcomes. The findings only show that the relationship between 'Academic self-image' and cognitive outcomes is strong and statistically significant, taking account of other influences, which was expected since previous studies have consistently shown a strong *reciprocal* relationship between academic self-concept and academic achievement (Marsh, 1994; 2006; Marsh and Yeung, 1997). Similarly, there is likely to be a reciprocal relationship between 'Behavioural self-image' and social/behavioural outcomes (Sammons et al., 2008e).

'Enjoyment of school'
The factor 'Enjoyment of school' was positively related to social/behavioural development, indicating that pupils who enjoyed going to school and were interested in classes had higher progress in 'Pro-social' behaviour (ES=0.37) and 'Self-regulation' (ES=0.29), and also larger reduction in 'Hyperactivity' (ES=-0.42) and 'Anti-social' behaviour (ES=-0.16) as shown in Fig. 6.1.

Figure 6.1: The effect of 'Enjoyment of school' on children's Social/behavioural development from Year 1 to Year 5



However, the relationship between 'Enjoyment of school' and cognitive progress was not linear. Medium levels of 'Enjoyment of school' were linked with higher progress in Reading (ES=0.30) and Mathematics (ES=0.25) than either high or low levels of 'Enjoyment of school'. This indicates that pupils who enjoyed going to and being in school the most did not necessarily have the highest cognitive progress, but this relationship varies for different levels of 'Academic self-image'. The results show that low levels of 'Academic self-image' were related to the lowest progress in Reading and Mathematics regardless of the level of 'Enjoyment of school'. However, for higher levels of 'Academic self-image', the 'Enjoyment of school' did matter: medium levels of 'Enjoyment of school' were related to the highest progress in Reading (ES=0.51) and Mathematics (ES=0.64) from Year 1 to Year 5.

Pupils' Views of primary school and outcomes

Pupils' views of 'Positive Social Environment'

The measure of children's views of 'Positive Social Environment' was related to all pupil outcomes in Year 5, as well as progress in these outcomes from Year 1 to Year 5 (ES=0.20 for Reading, ES=0.17 for Mathematics, ES=0.21 for 'Self-regulation', ES=0.30 for 'Pro-social' behaviour, ES=-0.41 for 'Hyperactivity' and ES=-0.21 for 'Anti-social' behaviour) as shown in Figures 6.2 and 6.3. This suggests that when a pupil feels safe and peers are viewed as friendly, both educational and social/behavioural outcomes benefit.

Figure 6.2: The effect of 'Positive Social Environment' on children's Reading and Mathematics progress from Year 1 to Year 5

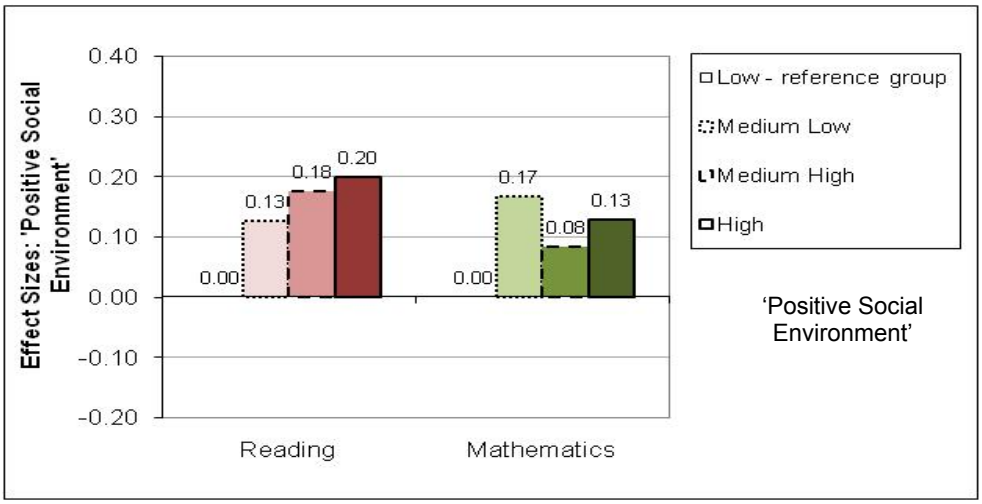
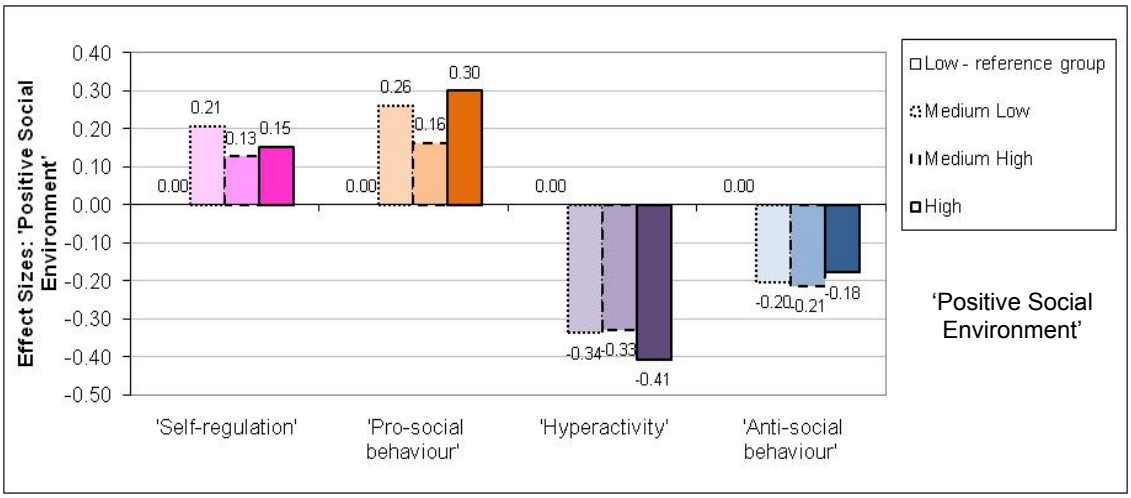
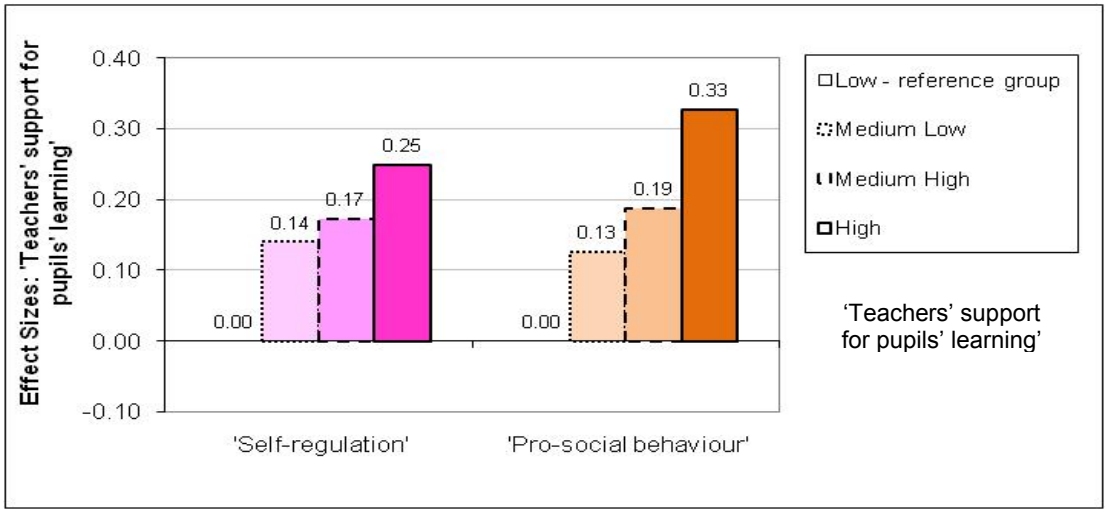


Figure 6.3: The effect of 'Positive Social Environment' on children's Social/behavioural development from Year 1 to Year 5



Pupils' views of 'Teachers' support for pupils' learning'
Pupils' perceptions of 'Teachers' support for pupils' learning' were positively related to progress in 'Self-regulation' (ES=0.25) and 'Pro-social' behaviour (ES=0.33). Attending a school where the pupils perceive they get support for learning from their teachers predicts better pupil development in terms of 'Self-regulation' and 'Pro-social' behaviour from Year 1 to Year 5 (see Figure 6.4).

Figure 6.4: The effect of 'Teachers' support for pupils' learning' on pupils' Social/behavioural development from Year 1 to Year 5



Pupils' views of 'Headteacher qualities'
The factor 'Headteacher qualities' was a weakly significant predictor of progress in 'Pro-social' behaviour and reduction in 'Hyperactivity'. Where a pupil perceives that the Headteacher is interested in pupils and is making sure that pupils behave, pupils have slightly higher progress in 'Pro-social' behaviour (ES=0.16) and larger reduction in 'Hyperactivity' (ES=-0.16) from Year 1 to Year 5.

These analyses of pupils' views of their primary school broadly support the conclusion that the quality of pupils' experiences in terms of feeling safe and supported in schools provides measurable benefits in terms of pupils' all round development.

Conclusions and Implications

This part of the EPPE 3-11 research identified significant variations in pupils' self-perceptions at age 10 in terms of 'Academic self-image' and 'Behavioural self-image', as well as in their 'Enjoyment of school'. These self-concept measures are strongly linked with pupils' academic and social/behavioural outcomes and progress/development in these outcomes (measured by standardised tests and teacher's ratings). It is likely that pupils' views of themselves and their attainment have a reciprocal relationship. Those who have higher Reading and Mathematics scores and better progress will be likely to develop a more favourable 'Academic self-image' and vice versa. A similar pattern is evident for the connection between pupils' self-perception of their behaviour and measures of their behaviour in school rated by teachers. It is likely that feedback processes (observations, teachers' comments, comparisons of self and peers) mediate these relationships. In addition, supporting children in improving their attainment (by formative feedback, high quality teaching and appropriate learning experiences) is also likely to improve their 'Academic self-image' and 'Behavioural self-image'.

In addition, the results reveal that there are differences in pupils' experiences of school that help to account for variations in their educational outcomes and progress. Those who perceive their schools more favourably in terms of 'Teachers' support for pupils' learning' have better progress.

'Headteacher qualities' appears to play an important role too, in terms of the pupils' perceptions of their Headteacher's interest in pupils and their impact on behavioural climate. Results suggest that encouraging greater pupil participation in school and enhancing these features of school culture may foster improved pupils' educational outcomes and greater 'Enjoyment of school'. However, high levels of 'Enjoyment of school' on their own do not predict better attainment or behaviour.

These research results have implications for the Excellence and Enjoyment agenda since they indicate that the affective, behavioural and academic domains are complementary and remain important for all round good child development. Improving the school culture in terms of experience of a 'Positive Social Environment' is also likely to promote better cognitive and developmental progress and overall outcomes. School policies and classroom practices that take steps to explore pupils' views and perceptions are more likely to encourage and promote the development of positive self-perceptions in pupils, and will be better placed to target support for more vulnerable groups.

Section 7: Understanding Pupils' learning trajectories

Summary of Key Messages

- Children's achievements and development are influenced by social disadvantage but also by parenting.
- The EPPE analyses have shown that pre-school and primary school factors are also important when background factors are taken into account.
- Having allowed for background factors many children achieve as expected, but some performed better than expected and some worse that expected.
- Over and under performance relative to that expected from background characteristics is influenced by 'Self-regulation' and Early years home learning environment (HLE).
- Case studies show that low SES families where children perform better than expected show several characteristics supporting children's learning, such as high Early year HLE, support for learning from family members and high parental expectations.
- EPPE 3-11 data suggests that efforts should be made to improve young children's Early years home learning environment (HLE) (i.e. birth-4 years).
- Findings suggest that primary schools and pre-schools should target greater *educational* support for those children who need it and that a focus on 'education' need not be incompatible with a focus on social and behavioural development.

We have approached the issue of differences in pupils' learning trajectories through an examination of the achievement gaps that are increasingly apparent as children progress through the educational system. Using the EPPE 3-11 longitudinal data we start off by specifying what influences achievement differences between different groups of pupils in academic outcomes, and then move on to examine unexpected performance. By unexpected performance we refer to a situation where pupils do better or worse than might be expected on the basis of their family and demographic background. This approach can help in understanding not only underperformance but also where pupils attain 'against the odds'. We look closely at the influence of families, especially the ways they foster pupils' academic and social/behavioural development. We then show that disadvantaged families can support the development of better achievement in their children, leading to greater academic success and to more positive 'Self-regulation'. We provide qualitative case studies of low SES pupils who have 'achieved above expectation', charting the positive influences that families living in poverty have brought to bear on their children. The study highlights the important role of the wider family, grandparents, siblings and the community in promoting skills and aspirations. At the end of this section we explore the policy recommendations with practical suggestions for 'closing the gap'. These findings have important implications for the study of equity in education and were conducted to contribute to The Cabinet Office Equalities Review (2007) (see EPPE 3-11 Team, 2007).

Achievement gaps and what influences them

This section begins with a description of achievement 'gaps' for young children from a range of ethnic and social backgrounds. We describe the contribution of child factors, family influences and pre-school and primary education to pupil's achievement.

Over many decades, research studies have documented the relationship between socio-economic status (SES) and children's development (e.g. Davie, Butler & Goldstein, 1972). In terms of which aspects of SES relate most strongly with academic achievement, there is long standing evidence (Mercy & Steelman, 1982) that parental education is the best predictor, with maternal education being most potent in the early years. However, such relationships account for only a limited amount of difference in academic achievement.

From a meta-analysis of studies, White (1982) concluded that possibly as little as five per cent of the variance in academic achievement was linked to SES. While such estimates are open to dispute, clearly other factors are necessary to explain variation in academic achievement, and EPPE evidence can illuminate these factors.

The extent and persistence of academic under-achievement associated with low SES and some minority ethnic status led to policy initiatives in the USA such as the Elementary and Secondary Education Act (1965) and the recent No Child Left Behind Act (2001), and the UK government's concern with 'closing the gap' between the disadvantaged and the rest of the population. Similar thinking also applied to policies in other countries aiming to change schooling to improve outcomes for disadvantaged pupils. However, several studies indicate that school under-achievement amongst disadvantaged pupils is presaged by cognitive differences below school age, as shown in the Early Childhood Longitudinal Study (ECLS-K) (Denton, West & Walston, 2003). Indeed the relationship between SES and cognitive development is present from infancy (McCall, 1981). Such evidence suggests that the causes of poor academic achievement largely lie in experiences and development during the pre-school years. For example, Heckman and Wax (2004) recently proclaimed, "*Like it or not, the most important mental and behavioural patterns, once established, are difficult to change once children enter school*" (p.A14).

Parenting matters and varies with SES. Parcel and Menaghan (1990) found that mothers with more intellectually stimulating jobs provided more support and stimulating materials for their children, which was in turn linked to children's verbal skills. The argument linking low SES to lack of cognitive stimulation and lower cognitive development has a long history and has regularly been supported by evidence (e.g. Bradley et al., 2001; Brooks-Gunn et al., 1997).

As shown in section 3 of this report, parenting practices and learning opportunities provided in the home are associated with better developmental outcomes. This partly explains links between SES and developmental outcomes, in that higher SES parents use more developmentally enhancing activities. However, the results for the Early years HLE indicate that it is the frequent occurrence of learning activity in the home that is particularly important. While there is an association with SES, it has only been found to be moderate in EPPE 3-11 analyses (correlation=0.30).

As well as home background and parenting effects, the EPPE 3-11 study demonstrates significant pre-school (and later school) effects (see Sections 3 and 4 of this report). The pre-school effects were most marked at entry to primary school where pre-school (particularly high quality and longer duration) gave children a better start to school (Sylva et al., 2004). However, benefits also remained evident during Key stage 1 and at the end of Key Stage 2 (section 4), although the pre-school influence was not as strong as at the start of school. In addition there are benefits of pre-school in reducing the 'risk' of SEN (Sammons et al., 2004b).

Using age 10 data new evidence emerged on the attainment gap in Reading and Mathematics for different groups of children. In addition, analyses identified important differences in social behaviour in relation to 'Self-regulation' and 'Hyperactivity'. Differential patterns of development between ages 6 and 10 years revealed the groups of pupils for whom the gap has widened or reduced during Key Stage 2 and the factors associated with better or poorer progress. The findings draw special attention to the importance of the Early years HLE on longer term educational outcomes, both academic and social/behavioural.

The importance of educational experiences in shaping outcomes at the end of primary school is highlighted in previous sections. In particular it is the quality and effectiveness of the pre-school attended that predicts better outcomes. Pre-school influences are somewhat stronger for Mathematics and 'Self-regulation' than for Reading. Also the academic effectiveness of the primary school attended has a significant impact at the end of primary school.

For 'home' children (no pre-school provision) in particular, the effectiveness of the primary school attended can help to reduce the attainment gap (for those attending a high academically effective primary school there is a particular boost for Mathematics). Additionally, previous experience of attending a higher quality or more effective pre-school acts as a protective factor for pupils attending a less academically effective primary school.

Key findings on the effectiveness of pre-school, primary school and the Early years home learning environment (HLE)

When EPPE 3-11 investigated pupils' attainment at age 10 years, the attainment gap remains significant and had widened for some groups (in relation to measures of socio-economic disadvantage for example) although in some cases the attainment gap had changed (boys and those of Indian ethnic background were now doing better in Mathematics in contrast to findings at younger ages). The strongest net effects on outcomes at age 10 are for measures of Early years home learning environment (HLE) and parents' qualification levels, followed by low birth weight, need for English as an additional language (EAL) support, early health or developmental problems and family soico-economic status (SES). Much of the difference in attainment between ethnic groups is related to differences in influential demographic factors such as these, although there are still some (relatively) low and high attaining groups. Multiple disadvantage remains an important predictor of educational outcomes. 'Good' pre-school still matters. There is evidence of continuing pre-school effects for attainment in Reading and especially in Mathematics as well as better social/behavioural outcomes (increased 'Self-regulation' and reduced 'Hyperactivity'). It is differences in the quality and effectiveness of pre-school that most contribute to better outcomes in the longer term, rather than just attending or not attending a pre-school setting.

Although 'home' children (who did not attend pre-school) have begun to catch up from a much lower starting point, an attainment gap remains. Primary school academic effectiveness (measured by value added in National assessments[13]) is a significant influence. Those who attended more academically effective primary schools show better cognitive attainment and better social behaviour at age 10, than children in less academically effective primary schools. Earlier we discussed the evidence concerning the *combined* effects of pre-school and primary school in shaping educational outcomes. It is important to raise the quality and effectiveness of both as no one factor is the key to raising achievement – it is the combination of experiences over time that matters. The child who has a better Early years HLE, and goes to a high quality effective pre-school setting and who then goes on to attend a more effective primary school has a combination of 'protective' experiences that reduces the risk of low attainment and also benefits social/behavioural development.

There is no evidence to support the contention that pre-schools or primary schools that foster better academic outcomes are less successful at fostering social/behavioural development. Rather, the evidence indicates that the two are associated (Siraj-Blatchford et al., 2003). High quality and more effective pre-schools support better outcomes in both cognitive and social/behavioural domains. Likewise, a higher quality Early years HLE benefits both cognitive and social/behavioural development throughout pre-school and primary school. Moreover, children with a high Early years HLE may gain extra benefits in Reading outcomes from high quality pre-school (presumably because the home and pre-school influences support and reinforce one another).

The implication is that policy development should seek to promote strategies to support improvements in Early years HLE especially for vulnerable groups (e.g. disadvantage SEN) and also work to improve the quality and effectiveness of pre-school provision.

[13] The analyses of the national pupil database was undertaken independent of the EPPE 3-11 research for three full cohorts of pupils (2002 – 2004) and sought to establish academically less or more effective schools (Melhuish et al., 2006a; 2006b).

Pre-schools are well placed to identify children who may need extra support if they do not experience a stimulating Early years HLE and could work with parents to improve the Early years HLE. Ways to improve the provision in poorer quality pre-schools in disadvantaged communities need to be given a priority, since poor quality provision does not offer long term benefits in improved child outcomes.

In addition the primary school attended also plays an important role. Improving the academic effectiveness of primary schools is particularly important for disadvantaged groups of pupils (by family SES and qualification levels, income etc.), since we find that school effects matter more for these groups. The finding that both social behaviour and Reading and Mathematics attainment is boosted by academically effective primary schools has important messages for the achievement of the Every Child Matters agenda; it shows that the promotion of better academic outcomes does not conflict with promoting better social/behavioural development. The finding that primary school effectiveness is a more significant influence for disadvantaged pupils (especially those who didn't go to pre-school) is of particular importance.

In order to help reduce the achievement gap for multiply disadvantaged groups, actions to improve the Early years HLE, and pre-school and primary school experiences, will be needed since improvements to any one in isolation would be insufficient to boost outcomes on its own. In addition, it is likely that specially targeted interventions for pupils identified as particularly behind their peers in cognitive or social/behavioural development at the start of primary school will also be necessary to prevent a widening of the gap during primary school.

Performance above or below expectation and what predicts it

Ethnicity

It has frequently been noted that there are ethnic group differences in educational attainment, but to what extent are these differences to be expected on demographic grounds? Here we find that most of the differences in attainment between ethnic groups results from their demographic and background characteristics with relatively little variation being due to specific ethnic group factors.

However, there remain some ethnic group differences in terms of attainment in relation to expected performance. At the start of school (age 5) White UK, Pakistani and Mixed ethnicity groups are all achieving as predicted by their demographic characteristics (little or no difference between predicted and measured scores). These results are largely replicated at age 10 in Reading and Mathematics scores for these groups.

At age 5 years both the Black Caribbean and the Black African ethnic groups, on average, attain higher Literacy (Pre-reading) scores than expected, but do worse than expected for Numeracy (Early number concepts). By age 10 years both Black groups are doing worse for Reading but the Black Caribbean group shows slightly better than predicted attainment for Mathematics.

At age 5 years, the Indian, Bangladeshi and 'Other' ethnic groups achieve better than predicted scores for Literacy and Numeracy and therefore appear to be more resilient than other ethnic groups. At age 10 years the Indian group continues to attain better than expected for Reading and Mathematics. However, the Bangladeshi group are now attaining lower scores than expected for both subjects. The 'Other' ethnicity group at 10 years are attaining slightly worse than expected for Reading and slightly better for Mathematics. The marked decline from age 5 to age 10 for the Bangladeshi group, suggests that primary schooling may not be benefiting this group as much as other ethnic groups.

'Self-regulation'
When we look at what factors may lead to better or worse than expected performance we find that the strongest effect is their level of 'Self-regulation' ('Independence and Concentration') at the start of school. The factors associated with better 'Self-regulation' are being female, higher parental education and income, better Early years HLE, quality of pre-school, and time in pre-school, are all associated with better 'Self-regulation'. Conversely lower birth weight, eligibility for free school meals (FSM), developmental and behavioural problems are associated with poorer 'Self-regulation'.

Early year Home Learning Environment (HLE)
The Early years home learning environment (HLE) also had a strong, independent effect on better than expected attainment at ages 5 and 10, with higher Early years HLE being associated with better than expected attainment, the effects being strongest at age 5 and also stronger for Literacy than Numeracy. The effects of the Early years HLE on attainment are apparent across all ethnic groups.

Gender
Girls outperform boys in Reading at age 5 and 10 although the effect is stronger at age 5. By age 10 boys show an advantage for Mathematics. The relative better performance for girls differs amongst ethnic groups with the advantage of being female being greater in the Black Caribbean, Black African, Indian, Bangladeshi and 'Other' ethnic groups than for the White UK group at age 5. By age 10 the situation looks very different with the advantage of being female being reduced. For Black Caribbean and Black African ethnic groups the situation is reversed with boys now showing better attainment than girls.

How do low SES families support pupil's learning in the home?
From the foregoing discussion it is clear that the home learning environment is an important determinant of children's educational and social development. We used qualitative case studies (Siraj-Blatchford et al., 2007a) to investigate the experience of low SES families who were achieving against the odds from five ethnic groups: White UK, Pakistani, Black Caribbean, Black African and Bangladeshi. The broad objective was to establish how (and why) some poorer families in each of these communities were able to provide better support for their children's learning at home. Department for Education and Skills (DfES, 2006) evidence showed that Pakistani, Bangladeshi, Black African and Black Caribbean children are more likely to experience deprivation than White UK children:

> *For example, 70% of Bangladeshi pupils and almost 60% of Pakistani and Black African pupils live in the 20% most deprived postcode areas (as defined by the Index of Multiple Deprivations) compared to less than 20% of White British pupils (DfES, 2006, p.5).*

Various parental activities are related to differences in attainment (Sylva et al., 2004; Melhuish et al., 2008a; 2008b). Analysis of child/parent/home data identified a range of indicators of disadvantage (defined as risk of low attainment). In terms of child characteristics, for example, children tended to be disadvantaged where they lived in large families with 3 or more siblings or were born prematurely, or with a low birth weight (below 2500 grams).

Although the parents' SES and education were also strongly related to child outcomes, (Sammons et al., 2002a; 2003) as stated above, the Early years home learning environment (HLE) was found to be more important (Melhuish et al., 2008a). From age 3 years onwards, strong associations were found between poor cognitive attainment and a less stimulating Early years HLE. By comparison there was only a moderate, positive association between the Early years HLE and parents' SES and qualifications (r=0.3). For example, the children of parents who reported that they regularly taught/played with the 'abc' had pre-reading scores 4.5 points higher than children whose parents did not teach/play with the alphabet. This could be compared to the impact of social class where it was found that the difference between the lowest classifications (IV and V) and highest (I) was only 2.4 points (Sammons et al., 2002a). Evidence on the importance of the Early years HLE has been covered in section 3.

- The provision of a positive Early years home learning environment (HLE) is still associated with children achieving more in terms of both cognitive and social/behavioural development at ages 10 and 11.
- Families from some ethnic and socio-economic groups tended to have lower scores on the Early years HLE. This may reflect material and the less tangible aspects of poverty (e.g. related to social capital) experienced by many disadvantaged ethnic and socio-economic groups.

However, research concerned with parent partnership and participation with schools remains a controversial area and different understandings of parental partnership and participation exist (Croll, 2004). But as Jones and Allebone (1998) have argued, initiatives continue to be developed that appear to offer parents the opportunity to participate in the culture of the school while offering no real opportunity to recognise the contribution of their own knowledge and social background to the children's education. Yet:

> *…More recently projects **have** developed in which there is a more equal notion of partnership developed between the school and the community and in which the richness of the home environment **is** recognised* (E.g. Bouchard et al., 1998; Civil, 1996; Macbeath, 1996)

We recognise the role played by extended family members in providing for the Early years home learning environment (HLE) and we refer to the participation of 'families' rather than to parents alone. We also recognise that children themselves affect the construction of the home learning environment (Runyan, et al., 1998, Harpham et al., 2002). The case studies were also concerned with providing the children's own perspectives.

Various studies on family involvement in the early years of schooling for Reading and Literacy development (see Hewison, 1988; Spreadbury, 1995), suggest that children's educational development can be enhanced with long-term positive effects. However, other researchers suggest that some forms and patterns of parental involvement can constrain and even contribute towards the reproduction of social inequalities (Brown, 2000). In working with parents then, this suggests that pre-school and primary staff require careful preparation and planning. Epstein (1996) provides a particularly useful typology of the six main types of family-school-community involvement that is summarised below:

Type 1: Basic Obligations of Parents (for example, building a positive home environment that fosters children's learning and development and assisting schools to understand families).

Type 2: Basic Obligations of Schools (for example communicating with parents about programme expectations, evaluations, and children's progress).

Type 3: Parent Involvement at School (for example volunteering in classrooms to support the school and children).

Type 4: Parent Involvement in Learning and Developmental Activities at Home (for example providing material and ideas to parents about how to interact with children at home to help them with academic learning activities such as reading).

Type 5: Parent Involvement in Governance and Advocacy (for example including parents in decision making, advisory councils, and parent-teacher organizations).

Type 6: Collaborating with Community (for example working together with community businesses, social service agencies, and other members of the community (McBride et al., 2003).

Recent governments have been concerned to foster parental choice and participation in their children's education and as Epstein and Dauber (1991) and Siraj-Blatchford and Clarke (2000) have shown, most educational settings are good at promoting Types 2 and 3 but they have failed to make adequate provision and progress to achieve Types 1, 4, 5 and 6. Arguably, these latter *types* (and type 4 in particular) are more likely to lead to successful family involvement towards genuine participation and towards a better education for children. Research by Dauber and Epstein (1993), also suggests that families become more involved in supporting their children's education in the home when they perceive their contribution is actively encouraged by the school.

The qualitative case-study research questions

The case studies addressed these questions:

1. What is it that parents do to support the HLE and how do they support their children?
2. How do parents and children see the quality of their HLE affecting the pre-school experience, and how does this vary according to individual characteristics?
3. What are the key characteristics and motivations of families with low socio-economic backgrounds who manage to have higher scoring HLE?
4. What family aspirations and expectations exist and how do these support, maintain or constrain achievement?
5. What level of information or understanding of the early years and primary education system do these parents have, what do they understand of the benefits?
6. What do the children and their parents think are the reasons for their children's success?
7. What external influences (e.g. pre-school staff, work colleagues media etc.) have supported or encouraged the development of the HLE?
8. What social capital do these families possess?

To answer these questions analysis was conducted (aided by NVIVO) that identified key issues in the data such as 'learning dispositions'.

The focus of the case studies was on low SES families from five ethnic groups: White UK, Pakistani, Black Caribbean, Black African and Bangladeshi. Interviews were carried out with 21 individual children and their parent/s with a moderate or relatively high scoring Early years HLE and attainment and relatively low SES from the range of diverse backgrounds; 7 of these are boys. We also identified a further 3 children, from different ethnic groups with a 'typical' low scoring Early years HLE and attainment making the total sample 24. The case studies explored how and why some low SES families provide a more stimulating Early years HLE, which has been shown to reduce the adverse impact of poverty or minority status.

As both Sammons (1995) and Siraj-Blatchford (1995) observed, while prior research has provided us with quite a lot of information about the factors associated with underachievement, we know rather less about the factors associated with high achievement. To some extent these case studies may be seen to contribute to that end, and provide answers to other questions posed:

Family constructions of the parental role
We investigated what parents did practically to create a high scoring HLE and how parents and children saw the HLE affecting their pre-school experience, and how this varied according to individual characteristics.

Our findings suggest that the minority ethnic and social groups that we studied have a good deal more in common than they have different, in how they supported their children in the home. We also found that a very wide range of family members provide support for children's learning. All of the families from each of the more stimulating Early years HLE, low SES groups studied, provided their children with a good deal of structure; they read to their children in their early years and went on to listen to them read at an early age. Numerous other educational stimulus and activities were also provided, and the children themselves were active in maintaining these practices. We found that our respondents possessed a fairly broad understanding of education and a strong desire to benefit from the services available.

For parents with English as an additional language (EAL) the opportunities offered by a pre-school in supporting their children in learning English were clearly significant. It was also clear that the positive HLEs were provided as an alternative to other culturally appropriate educational provisions, community language or religious instructions. In some cases they clearly complement these provisions strongly (e.g. in African-Caribbean Supplementary Schools).

We asked the parents what they felt the barriers were to providing a positive HLE but the only reason that they could give us were related to the time available and their personal circumstances, such as health. Other family pressures made it very difficult for some families to provide support and even in the most diligent of households, the home learning environments of individual children sometimes changed when home circumstances changed (e.g. with the birth of an additional child). For most parents any dip in the child's attainment was met with a new strategy, but for a few the problems that they were facing proved too difficult to overcome. In such cases there was a need for further support to be provided through family services.

The family's sense of efficacy in supporting their children's learning
Various reasons were given for parents supporting the education of their children at home but all of the parents had a very clear idea of the major benefits. For the families who had a high scoring Early years HLE both the parents and the children believed that some children did better in school because they were more attentive in the classroom and making more of an effort. For those families where there was a lower scoring HLE, or where the children's progress was disappointing (for various reasons) despite positive beginnings, the reason for children's success was attributed more to innate ability. When we asked what they considered the benefits of schooling and pre-schooling to be, most of the parents and the children demonstrated highly instrumental attitudes towards schooling. These may be seen to be closely in tune with the *Every Child Matters* agenda. The most frequent references were made to achieving economic independence, and to employment opportunities.

Parents' expectations for their children were extremely high with all of the more stimulating HLE parents suggesting their children should attend higher education and go on to professional careers. Many parents also referred to their own educational ambitions. To a large extent the children's aspirations mirrored these and were similarly instrumental (or performance) based - although the children were more likely to suggest an alternative interest as well (e.g. becoming a sportsman/sportswoman, pop star, actor etc.).

Family members become involved in the education of their children when they believed that their own (and the child's) efforts will be rewarded. If they consider the child's educational success to be dependent less upon effort and more upon the child's (or their own) innate ability, then they are less likely to become involved.

We explicitly asked the parents why they thought some children did better at school than others, and most told us that they thought that it *was* the result of being more attentive in the classroom and making more of an effort. The children's responses were very similar, with the most capable children in the sample who had benefited from higher HLEs showing 'masterful learning' orientations (Dweck, 1986). The responses of children with lower HLEs and attainment suggested 'learned helplessness'.

The active encouragement of parent participation by schools
We found little evidence of any support being provided to parents apart from the application of Reading schemes. For many parents, the anticipation of, and preparation for, secondary transfer was especially daunting. The case studies suggest that, as Crozier and Davies (2005) found, schools do more to encourage the involvement of the wider family in children's education. Possibly early childhood settings and schools *expect* parents to intervene in their children's education, to be proactive and demanding. Research has shown that middle class parents intervene in their children's education because they don't trust the educational establishments. Much of the same attitude was evident in some of our parent responses.

While the EPPE 3-11 study has shown that some pre-schools (particularly Integrated Centres and Nursery Schools) provide sustained support for parents in developing an effective Early years HLE, little evidence of this was found in these case studies. Whilst some parents spent some time 'helping out' in the pre-schools, this was not sustained into primary school. The parents also reported on the feedback that they received, which was usually either in response to specific (e.g. behavioural) problems or provided on an annual or termly basis providing a summary of their child's progress. None of the parents provided examples of positive feedback that might help them to provide additional support at home during the pre-school years.

Some minority ethnic and working class parents put their trust entirely in the professionals, believing the experts know best, and that they are acting in the best interests of their children. Unfortunately, some parents may even lower their own expectations of their children's capabilities according to a pre-school, or school report on their child's progress.

Social capital and the development of reciprocal partnerships
We explored the social capital possessed by the higher than average scoring HLE families. The case studies provide support for Reynolds (2006a; 2006b) who has documented the ways in which Caribbean young people in the UK construct their ethnic identity, and the ways they apply transnational family and kinship networks and relationships as social and material resources. Extended family support and role modelling was evident in all the communities studied. Given the difficulty of providing such resources externally this evidence lends support to initiatives involving some element of mentoring. A substantial role might be played in this through the new 'Common Assessment Framework' (CAF) and through 'mainstreaming' Learning Mentorship initiatives. Many of our respondents could be seen to be acting as *cultural brokers* who saw no particular problem in reconciling their cultural, religious and academic aspirations.

Our evidence lends support to initiatives involving some element of family and/or child mentoring. Schools and pre-schools require further support in the development of family participation and reciprocal partnership. Community focused supplementary schools and classes seem to provide important resources, and efforts should be made to involve them fully in any future home learning environment (HLE) support initiative.

Given the evidence discussed in this section, if we are to reduce underachievement, it would seem that there are two practical responses that should be considered:

a) efforts should be made to improve young children's Early years home learning environment (HLE) (i.e. birth-4 years).
b) primary schools and pre-schools should target greater *educational* support for those children who need it.

Section 7: Understanding Pupils' learning trajectories

The Government's aims for 'Every Child Matters' are for every child, whatever their background or their circumstances, to have the support that they need to:

- *Be healthy*
- *Stay safe*
- *Enjoy and achieve*
- *Make a positive contribution*
- *Achieve economic well-being*

These also appear to be the aspirations that our working class parent respondents have for their own children. But the biggest question still remains: How are these ends to be achieved? Notions of 'cultural deficit' have been voiced in the past and it is therefore essential in our discussions of the home learning environment (HLE) that we shouldn't be seen to be blaming those *experiencing* educational underachievement for their own problems. In most academic circles theories of cultural deficit have been rejected, and it is recognised that schools should do more to recognise the strengths that minority ethnic and working class children bring with them into school.

Section 8: Other influences on children's development

Summary of Key Messages

- Neighbourhood influences are not significant during primary school when taking into account family characteristics, particularly Early years HLE, and much less important than school influences.
- Mobility during pre-school and primary schooling is related to social factors but its impact on children's development is weak and mixed. Only in KS2 was mobility related to lower levels of progress, and only for Mathematics, after allowing for all other possible contributing factors.
- Out of school hours learning (OSHL) is related to disadvantage, especially to lower levels of education in the parents. Children benefit from OSHL.
- Most transitions from primary to secondary school are positive. To ensure that children's transitions are successful, social adjustment, institutional adjustment and curriculum interest and continuity all need to be taken into account when planning transition strategies.
- 'Autumn born' children were more likely to achieve the highest scores (Level 5) on National assessments at age 11, whilst children who were 'summer born' tended to perform more poorly, when compared to the older (autumn born) children and were more likely to be identified as having a special educational need (SEN).

In understanding children's development there are a range of influences beyond the child, family, pre-school and school that can potentially be important. In this section we consider the possible influences of the neighbourhood, out-of-school learning, and pre-school and primary school mobility upon children's development. We consider the transition from primary school to secondary school and how this might be optimised. In addition we looked at terms of birth to illuminate the debate on summer born children.

The neighbourhood influences on children's development

Several research projects have indicated that the nature of the neighbourhood in which a child lives may affect development over and above the influences of the child's family. For example in a population representative longitudinal study in the USA it has been found that living in more affluent neighbourhoods is associated with better child IQ scores over and above effects of family socio-economic status (SES) and parent education (Chase-Lansdale, Gordon, Brooks-Gunn, & Klebanov, 1997). Some have claimed that such neighbourhood influences may explain five to ten per cent of the variation in academic attainment (Leventhal & Brooks-Gunn, 2000). Such neighbourhood influences would include the perceived value of education in that neighbourhood, schools' and children's access to resources from the neighbourhood, e.g. libraries, parks and recreational facilities, and also community-based efforts to support child development.

Much research concerning the influence of 'neighbourhood' effects has focussed on adolescents (e. g. Leventhal & Brooks-Gunn, 2000; Sampson, Raudenbush and Earls, 1997). While adolescents may well experience greater exposure to neighbourhood features such as peer groups, 'role models' and general milieu, the neighbourhood as a source of influence may also be important for younger children. In the USA, the Committee on Integrating the Science of Early Childhood Development (2004) suggested that the interaction between pre-school children and their relatives, neighbours, religious communities, child care and health systems may well lead to neighbourhood influences beginning long before adolescence. Thus there is reason to consider neighbourhood influences on young children's development and behaviour.

Some existing evidence indicates some small effects for young children's development associated with the neighbourhood. In the USA, Chase-Lansdale, Gordon, Brooks-Gunn, Klebanov (1997) found around two per cent of the variation in behaviour problems and academic achievement for 5 and 6 year olds was linked to neighbourhood effects (deprivation and ethnic diversity). Similarly in the UK McCulloch and Joshi (2001) found 4-5 year olds achieved lower cognitive scores if they came from poorer rather than more affluent neighbourhoods independently of other socio-economic measures. Also in the analysis of data for over 500,000 children per year for three successive years (2002-2004) in all state primary schools in England, Melhuish et al., (2006a; 2006b) found that children's progress from Key Stage 1 (age 7) to Key Stage 2 (age 11) was also influenced to a small extent by the level of deprivation of their neighbourhood. However, it is possible that such 'neighbourhood' effects may reflect unmeasured differences in families resulting from the non-random distribution of families across neighbourhoods.

All research discussed so far deals with the issue of neighbourhood effects by seeing whether there is a separate influence associated with neighbourhood deprivation after standard child and family demographic factors, such as child gender, ethnicity and age, and parental socio-economic status (SES) and education, have been taken into account. Such research does not include data on families as rich as that in the Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11) research. Thus it is possible with the EPPE 3-11 data to investigate neighbourhood influences including more control of child and family factors than has previously been achieved. In particular the EPPE research has developed a measure of the learning opportunities provided within the home, the Early years home learning environment (HLE) index and this measure has proved to be a powerful predictor of educational achievement (e.g. Melhuish et al., 2008a) and social/behavioural development (e.g. Sammons et al., 2008c).

Measures of the neighbourhood

Other EPPE 3-11 reports concerning the basic influences on children's cognitive performance (e.g. Sammons et al., 2007a) show the influence of child, family and home learning environment characteristics on attainment and progress. In addition to these factors three measures of the neighbourhood are considered: two measures reflecting the parents' perceptions of their neighbourhood in terms of social cohesion and safety, and the Index of Multiple Deprivation (IMD).

The neighbourhood perception measures were derived from a parent survey completed when the EPPE 3-11 child was approximately six years old. The responses to questions related to the neighbourhood were entered into a principal components analysis (varimax rotation) and two clear factors emerged. These neighbourhood factors are described below in terms of the items that loaded most heavily upon the factor.

For one neighbourhood dimension, there were four questions concerned with neighbourhood safety that loaded on the same neighbourhood factor, and were related to the perceived frequency of: violence or crime involving people; violence or crime involving property; general nuisance; and sense of safety when walking alone after dark. These items showed good inter-item consistency (Cronbach's alpha = 0.75) and appeared to provide a coherent neighbourhood dimension.

For the second neighbourhood dimension, three questions loaded on the same neighbourhood factor, and were concerned with social cohesion and involved the perceived frequency of neighbours: doing favours for each other; sharing information on schools or children's activities; visiting each other's houses. These items also showed good inter-item consistency (Cronbach's alpha = 0.84) and again appeared to provide a coherent neighbourhood dimension.

In addition to the above measures of perceived safety and social cohesion, the IMD score was used as a neighbourhood measure. The IMD is a nationwide index combining weighted measures or levels of: crime; barriers to housing; living environment; education and skills training; health deprivation and disability; employment and income (for further details of the IMD see The English Indices of Deprivation 2004: Summary [revised], 2007). Greater IMD scores indicate greater levels of area deprivation. The 2004 IMD scores were assigned to each child on the basis of their postcode.

The three neighbourhood measures showed only small associations with each other indicating that they were relatively separate dimensions of the neighbourhood (safety - social cohesion *rho* = .09; IMD - safety *rho* = -.32; IMD - social cohesion *rho* = -.15;).

The neighbourhood measures were moderately associated with family demographic measures. Greater neighbourhood safety and social cohesion and lower deprivation (IMD score) were associated with greater family social advantage (defined as a combination of parental educational, occupational and income status). Similarly there was a moderate association between the neighbourhood measures and the Early years home learning environment (HLE) measure with families in more advantaged neighbourhood tending to score higher on the Early years HLE index.

Does neighbourhood have a separate effect upon educational achievement?
Firstly we considered children's ability in Reading and Mathematics as measured by standardised assessments at age 6 years. These outcomes were analysed firstly in terms of the standard child and family demographic variables, then the neighbourhood variables were added to the analysis to see if they showed an additional effect, and finally the Early years HLE measure was added to see if neighbourhood effects were altered when the Early years HLE was included.

With Reading there were no significant effects associated with any of the neighbourhood variables. With Mathematics, the IMD score was associated with a significant effect that persisted even when the Early years HLE measure was added into the analysis. The IMD score had a small significant additional effect (ES=0.13) on Mathematics scores at 6 years of age, whereby children in areas of higher deprivation scored lower even after taking account of all child, family, and Early years HLE effects.

This strategy for investigating the possible effects of neighbourhood variables was repeated when children were aged 11 years. At this age the children's performance in English and Mathematics in the Key Stage 2 National Assessments were used as the measures of educational achievement. When only child and family demographics are included in the analysis, the addition of the IMD score was associated with a significant additional effect. However when the Early years HLE measure was also added the effect for IMD became insignificant. This pattern of results was reflected for both English and Mathematics whether considering either attainment or progress from age 7 (Key Stage 1). It is possible that inter-family differences may mediate neighbourhood effects. Family characteristics and neighbourhood characteristics can co-vary, and when examined together family characteristics tend to supersede or displace the neighbourhood measure but without one being reducible to the other. This may well be happening. When we include the Early years HLE variable in analyses the effects for neighbourhood become insignificant, yet without the Early years HLE in the analysis there is still a significant neighbourhood (IMD) effect. Such an interpretation suggests that the process by which the neighbourhood influences pupil outcomes is mediated through effects upon within family processes that give rise to different family environments, reflected in changes in the HLE, which in turn affect child development and educational achievement. For example decisions concerning activities with children may be influenced by the wider peer group, i.e. peer group learning may be operating amongst parents.

Does neighbourhood have a separate effect upon social/behavioural development?
Controlling for child, family and Early years HLE characteristics, none of the neighbourhood measures had statistically significant effects on any of the four social/behavioural measures at Year 6. Considering that in these models we controlled for specific family level characteristics, it is likely that these specific family level predictors suppressed any neighbourhood effects. Similar findings were evident for the sample of children from all schools in England where census-derived data had a stronger effect on pupils' educational outcomes and therefore suppressed any IMD effects (see also Melhuish et al., 2006a; 2006b).

Mobility and children's development

Mobility is defined here as a change of pre-school or primary school that does not result from school closure, amalgamation, or transfer across phases of schooling. Prior research has only dealt with mobility during school age, and has indicated that mobility, specifically moving school, is associated with lower levels of academic attainment. Machin, Telhaj and Wilson (2006) found that children aged 5 to 16 who change schools are more likely to have a low previous academic attainment record than children who do not change. However, Machin et al., (2006) also found that, "*pupils who move school and home simultaneously are typically more socially disadvantaged than otherwise*" (p. Executive Summary). Furthermore, Strand and Demie (2006) have found that although 7 to 11 year old pupil mobility is associated with poorer attainment, when other background factors (e.g. disadvantage) are taken into account this association is reduced, and it completely disappears when looking at progress, i.e. controlling for prior attainment. These findings suggest that it is social disadvantage rather than mobility that accounts for the lower academic attainment that has been associated with mobility as it co-varies with disadvantage rather than exerting an independent influence on academic attainment. However with secondary school pupils, this perspective should be qualified by the findings of Strand and Demie (2007) who found that mobility did have a significant negative association with academic performance by age 16 (GCSEs and other measures).

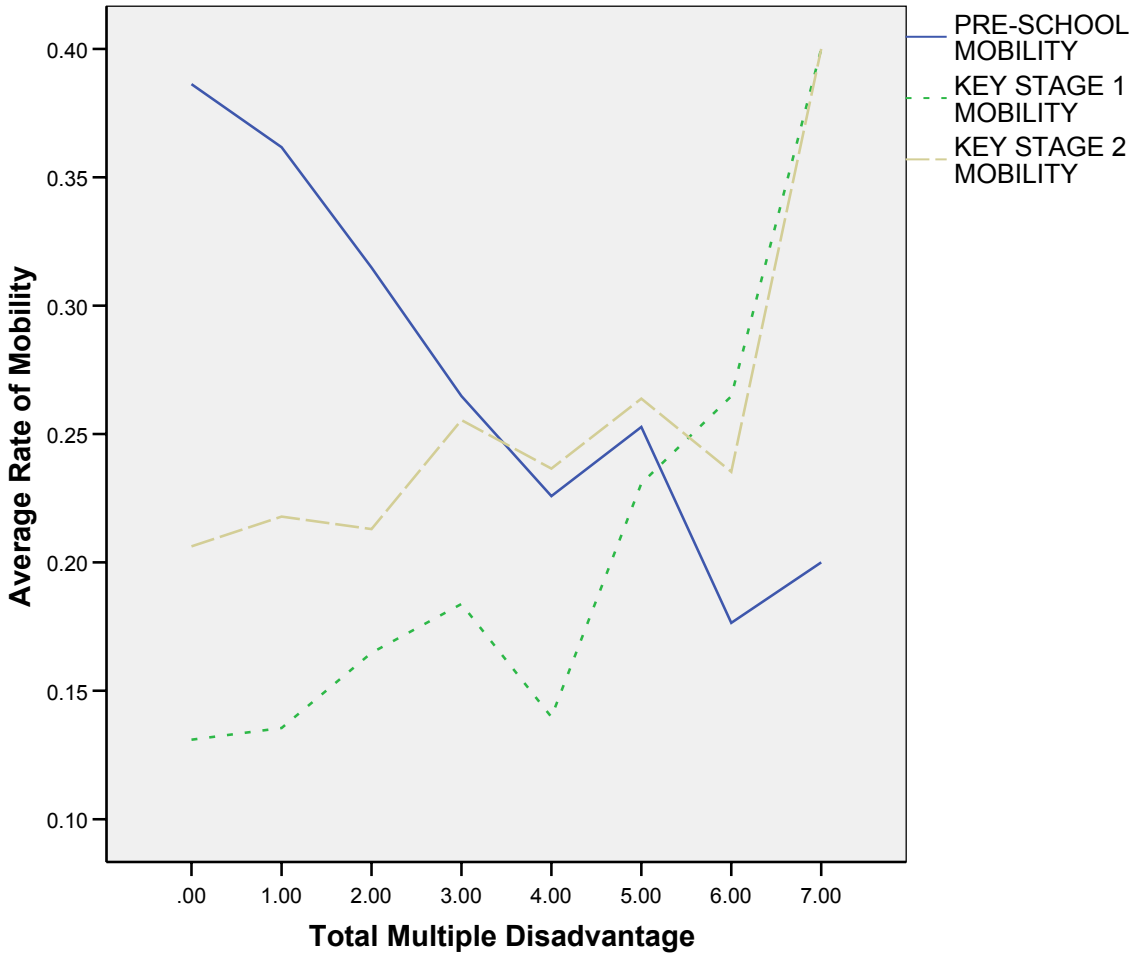
EPPE 3-11 analyses have shown that in terms of the characteristics of mobile children, a clear difference was evident in level of social advantage, between families whose children moved between pre-school centres and those who moved in primary school, i.e. pre-school mobility and primary school mobility. More advantaged families, defined in terms of mother's highest qualification, were more likely to move during pre-school; and those eligible for free school meals (FSM) less likely to move during pre-school. In terms of pre-school centres the majority (81%) of the children who moved pre-schools attended playgroups, private day nurseries and Local Authority day nurseries initially. Additionally, children who attended pre-school for a longer length of time (two years or more) were more likely to move pre-schools. Most mobile children (60%+) moved to nursery classes either for their first (or second) change of pre-school. It is likely that parents chose to move from fee paying to free provision at age 3 plus.

Mobility during Key Stage 1 (KS1 - 5-7 years old) of primary school had the reverse characteristic: those more socially disadvantaged, in terms of FSM and those with absent fathers, were more likely to move during KS1. Mobility during Key Stage 2 (KS2 - 8-11 years old) was also typified by social disadvantage but not to the same degree as during KS1.

Children who were mobile during pre-school were more likely to come from socially advantaged families and to attend a more academically effective primary school. By contrast, children who were mobile in KS1 were more likely to come from socially disadvantaged families and have been attending a primary school with a significantly lower academic effectiveness before moving school. These differences in family characteristics of mobile children in pre-school versus those mobile in primary school are illustrated in Figure 8.1 below.

The pattern evident in Figure 8.1 shows the more advantaged children, who had the lower scores on the Multiple Disadvantage Index, had higher rates of pre-school mobility and lower rates in KS1. There was little discernable difference by advantage in terms of KS2 mobility, except in the cases of those with the highest levels of disadvantage, who also had the highest rates of mobility.

Figure 8.1: Average Rate of Mobility by Multiple Disadvantage



Does mobility affect academic achievement?

The results of EPPE 3-11 multilevel analyses, controlling for background characteristics and prior attainment, indicate that mobility itself, moving pre-school centre is not a significant predictor of poorer academic progress. That is, for this sample, mobility does not empirically produce diminished or increased academic progress during the pre-school years. The results were similar considering mobility in Key Stage 1. However, by the end of KS2 there was evidence of an association between lower levels of progress in Mathematics in KS2 and mobility in the KS2 period. Mathematics may cause special difficulties for children as they struggle with an unfamiliar curriculum or pedagogy (Mantizicopoulos and Knutson, 2000), which would point to the need for greater flexibility and personalisation on the part of teachers in this subject.

The findings of the present research, in terms of mobility itself, are broadly consistent with previous research (Strand and Demie, 2006). Mobility, that is at least one change of setting, either during pre-school or KS1 has little independent impact on cognitive outcomes, when both background and prior attainment are taken into account and when the estimate is made against a simple non-mobility group for the same period.

Does mobility affect social/behavioural development?
There is evidence, however, that later mobility is associated with diminished social/behavioural outcomes, specifically 'Self-regulation' and 'Pro-social' behaviour at KS1 (age 7 years), and all social/behavioural outcomes ('Self-regulation', 'Pro-social' behaviour, 'Hyperactivity' and 'Anti-social' behaviour') at KS2 (age 10-11 years). While these diminished outcomes are associated with primary school mobility, it is not clear whether this is a causal relationship or whether mobility reflects unmeasured family characteristics that might mediate the association between mobility and social/behavioural outcomes. Possible unmeasured family characteristics that might be influential include parental personality such as being go-getting or achievement oriented or sub-cultural factors related to child achievement. Also movement might be job related, or due to family breakdown, or increase in family size. However, it is also possible that poor social/behavioural development might dispose parents to move their child to another school.

Out of school hours learning (OSHL) in Key Stage 2

Two questionnaires administered when EPPE 3-11 pupils were in Year 5 (age 10) asked about a range of activities pupils undertook during Key Stage 2, including 'out of school hours' learning activities. Out of school hours learning (OSHL) can be seen as any educational or learning experience conducted out of school hours. It includes learning at outside groups or classes such as ethos led groups and religious themed groups, sports classes, private music tuition and extra tuition in an academic subject. Some took place on school premises and may be part of the extended school offer but others were not. The focus in this part of the study was on the benefit of OSHL and not its provider.

The findings on levels of participation in out of school hours learning activities (OSHL) and the impact of these on pupils' academic attainment and social/behavioural development are reported below. For the impact of 'other' characteristics on pupil outcomes see Sammons et al., 2008a; 2008e). For full details on the impact of out of school learning in Key Stage 2 is to be found in forthcoming publications – see the EPPSE website www.ioe.ac.uk/projects/eppe for further details.

Level of participation in out of school hours learning activities
Just over three quarters of the EPPE 3-11 children took part in some kind of out of school hours education/learning activity (OSHL). The number of activities engaged in ranged from none to six with forty-eight per cent engaged in just a single activity, thirty-four per cent in two activities and eighteen per cent in three or more[14]. The most popular out of school hours activities were:
Sports tuition (54%),
Extra tuition in a school subject (20%)
Arts or ethos led group[15] (17%)
Private music tuition (14%)
Religious school (8%) and
Cultural school (2%).

Child and family characteristics and out of school hours learning activities (OSHL)
Participation in any activity was related to the mother's qualification level, the Key Stage 1 (KS1) home learning environment (HLE) and father's socio-economic status (SES).

[14] Data on eight types of activity in total were collected, including any 'other activities' category (this consisted of different types of hobby club). The highest number of activities recorded was six. The highest group '4+ activities can be split into 4 activities (n=54, 2.5%), 5 activities (n=13, 0.6%), 6 activities (n=5, 0.2%).
[15] Examples of ethos led groups: Woodcraft Folk, Brownies and Scouts.

Girls were more likely to engage in a higher number of activities. Girls were also over represented in: arts activities (72% of total), extra tuition in a school subject (66% of total) and religious groups (59% of total)[16]. The only activity where more boys participated than girls was in sport (57% of the total were boys).

Just over one fifth of the overall OSHL group was from a minority ethnic group, representing seventy-five per cent of the extra cultural studies participants (being mostly Indian, Bangladeshi and Mixed race). Children from Black African, 'Other ethnic groups', Indian, Pakistani and Bangladeshi groups were over represented in religious groups (58% of those participating, compared to 41% of the White UK group). Children from Black Caribbean, Black African, 'Other ethnic groups', Pakistani and Bangladeshi groups were over represented in Extra tuition in a school subject group (32% of those participating were from a non-white UK ethnic group compared to 22% in the full sample returning data). Bangladeshi children were also less likely to have private music lessons. Children with English as an additional language (EAL) were more likely to participate in cultural/religious groups and slightly more likely to have private music tuition.

The level of parental qualifications, especially for the mother, was found to be predictive of OSHL participation[17] with the children of mothers with higher qualifications (degree or higher degree), taking part in more sport, private music lessons, Arts activities, and Ethos led groups. Just over half of children whose mothers had no qualifications took part in an OSHL (54%) compared to ninety-three per cent of children with mothers who had a degree and ninety-five per cent of children with mothers who had a higher degree. Mothers' and fathers' qualification level was also found to be predictive of engagement in more than one activity.

Mothers' working status was tested as a net effect alongside Mothers' qualification and found to significant for sport and extra tuition. For sport, children with mother's working part time and full time were more likely to engage in Sport OSHL than children whose mother did not work (part time ES=0.28, full time ES=0.18). Children with mothers who were self employed were more likely to have extra tuition in a school subject than children whose mothers did not work (ES=0.29).

Once other pupil background characteristics were controlled for, family SES was a strong predictor of participation in Private music tuition, with children from higher SES families participating more. Children with no or very few disadvantages (measured by the index of multiple deprivation) during their early years were also much more likely to participate in OSHL, and far more likely to take part in more than one type of activity.

Higher scores on the HLE were predictive of higher participation in all OSHL except for religious groups. Few other pupil background factors were found to be predictive of participation in an OSHL[18].

The impact of TV and gaming and out of school hours learning (OSHL)
Children who watched more TV were less likely to engage in OSHL. For example, eight per cent of children who participated in OSHL watched less than 3 hours TV each weekday (compared to sixty-four per cent of children not participating). Children watching larger amounts of TV and engaged in gaming activities were also less likely to be involved in sporting activities. Having a TV in the child's bedroom was also predictive of lower levels of OSHL (without controlling for background factors).

[16] Gender was not a significant predictor of participation in tuition and religious groups once other pupil background factors were taken into account.
[17] Mother's qualification was found to be predictive of all out of school activities except cultural studies, extra tuition in a school subject and Dance.
[18] Children with developmental problems in the early years were less likely to participate in Ethos type groups; children of low birth weight were more likely to take Private music tuition and children from larger families were less likely to take Extra tuition in a school subject.

There is a strong relationship between the level of TV and gaming activities and parental qualification and social class. When background factors are controlled for the impact of TV and gaming activities is weakened, but still significant in some areas: children watching larger amounts of TV a day being less likely to take up sports activities (for 3-4 hours of watching TV a day ES=-0.21, 5+ hours of watching TV a day ES=-0.38).

Special Educational Needs (SEN)
Controlling for background factors, children with SEN were less likely to be involved in OSHL activities and those with a full statement of SEN demonstrated particularly low levels of OSHL engagement (ES=-0.36). Children on the School Action stage of the SEN register were also less likely to engage in higher numbers of OSHL (ES=-0.17), a sports activity (ES=-0.11) or Private music tuition (ES=-0.12).

Neighbourhood
Again, controlling for background factors, in neighbourhoods that were reported by EPPE parents as being more 'positive environments' and more 'neighbourly' there were higher levels of participation in Private music tuition and OSLH participation.

Out of school hours learning and progress in cognitive outcomes and social behaviour
EPPE 3-11 pupils who engage in OSHL activities had significantly higher attainment compared to those pupils were not involved in OSHL (not controlling for background factors), being particularly marked for participation in Private music tuition, Ethos led groups and pupils engaging in more than one activity. Controlling for background factors, participation in any OSHL activity is also a predictor of progress in Mathematics (ES=0.17) and English (ES=0.20) from Year 2 to Year 6, although it appears that engagement in more than one activity conveys somewhat greater benefits.

Taking part in a sports activity is predictive of greater progress in both Mathematics (ES=0.16) and English (ES=0.17), controlling for background factors. Additionally, taking part in an Arts OSHL is also predictive of greater progress in English (ES=0.26). The impact of OSHL participation is larger for English than Mathematics.

Pupils engaging in OSHL also showed significantly better social/behavioural outcomes compared to those who were not engaged in OSHL. Controlling for prior social/behavioural development and pupils' family background, engagement in any OSHL activity is a predictor of improvement in 'Self-regulation' (ES=0.13) and 'Pro-social' behaviour (ES=0.17). Engagement in more than one activity conveys greater benefits for 'Self-regulation' (1 activity ES=0.13, ns; 2 activities ES=0.17; 3 activities ES=0.25) and 'Pro-social' behaviour (1 activity ES=0.17; 2 activities ES=0.15; 3 activities ES=0.25). Taking part in a sports activity is also predictive of greater progress in 'Self-regulation' (ES=0.13) as is Private music tuition (ES=0.13). Taking part in Extra tuition in a school subject is also predictive of greater progress in 'Pro-social' behaviours (ES=0.19).

The benefits of OSHL could be particularly important for lower attaining pupils as the positive effects of structured after school activities for education, later income, lower levels of depression and self-regulation have been reported elsewhere (MacBeath et al, 2001; Margo et al., 2006; Carroll & Purdie, 2007), however previous research (MacBeath et al., 2001) points to the need for such provision to be voluntary (MacBeath et al., 2001).

Implications
The EPPE 3-11 findings reveal both social and economic divides in children's access to 'Out of school hours learning', mirroring earlier research in this area (Lareau, 2003; Wikeley et al., 2007). Mother's qualifications are a strong predictor of attainment and social/behavioural outcomes at different time points (Sammons et al., 2008a; 2008e), and also predicts children's engagement in learning experiences outside school hours. Father's qualifications are also important as they predict engagement in practical areas such as sports, Ethos led groups and Private music tuition as well as having Extra tuition in a school subject, even after the mother's influence has been taken into account; again this resonates with earlier research (Goldman, 2005). These findings suggest that it is not sufficient just to improve access to OSHL, there needs to be a greater emphasis on demonstrating to parents, especially those who have not had full access to education themselves, that these activities are worthwhile. Engaging parents of all backgrounds in providing a rich home learning environment for their children could encourage parents to see education as not restricted to school hours.

Transition between primary and secondary school

The EPPE 3-11 study undertook a sub-study of more than 500 children and families that sheds light on current transition practices from primary to secondary school and highlights what helps and hinders a successful transition. It takes into account the influence of child and family background characteristics such as socio-economic status (SES) and gender. It suggests how the transition experience could be improved to enhance smooth continuity between primary and secondary school. For full details of this study see Evangelou et al., (2008a; 2008b).

The study used a mixed methods approach to investigate issues related to transition for four distinct groups: Local Authorities (LAs), pupils, parents and schools. Officers in six LAs were asked about the way transition was dealt with in their Authority. Pupils at the end of their first term at secondary school completed a questionnaire on their thoughts and experiences of transition, and the study also sought parents' opinions to illustrate the whole family's experience.

Finally, there were twelve case studies selected from the respondents of the questionnaire because of their positive experiences of transition. These involved interviews with the children and their primary and secondary teachers. This provided further details of the systems in place that support the transition processes between school phases.

The sample was drawn from 1190 children and their parents in the project, who were making the transition to secondary school at the end of the 2005-06 academic year. Responses were received from 550 children (a 46% response rate) and 569 parents from across England. The sample was selected from 6 LAs in five regions (a Shire County, an Inner London borough, a Metropolitan authority in the Midlands, an East Anglian authority, and two authorities in the North East), being representative of urban, rural and inner-city areas (Sammons et al., 1999; Sylva et al., 1999c). Children were recruited to the case studies using stratified selection to get a balanced mix by region, gender, socio-economic status (SES) and ethnicity.

Most pupils (84%) had felt prepared for moving to secondary school, and after spending a term at their new school nearly three quarters of the children said they felt happy. However, there were a minority of children who did not feel prepared.

Transition procedures
Local Authorities responsibilities: admissions procedure, administrating information to schools and parents.

Local Authority reported successes: good information booklets about the secondary schools, open days, talks by the secondary teachers, meetings with children and staff. Transfers were better when:

a) Transferees (either a whole classes or families) could see examples of work, and sample lessons in secondary school
b) Year 7 teachers made 'familiarisation' visits to primary schools where they shared information on skills and understanding needed in Year 7 as well as the 'style of lessons' pupils might experience
c) The first day in secondary school allowed them opportunities to experience the space and facilities without other pupils around
d) Choice Advisors, a new Government initiative in some areas, provide impartial advice and support to parents
e) Curriculum continuity was achieved with the use of 'bridging materials' where the same workbooks were used in both Years 6 and 7.

Local Authorities' reported challenges: secondary schools lack of 'trust' in data sent to them by primary schools leading to re-testing of children in Year 7. LAs differed enormously on opportunities and systems to evaluate training and issuing guidance on good transitions practice. For a full list of procedures used to support transitions see Evangelou et al., (2008a).

Key Features of a Successful Transition

- Most parents getting their first choice of school, there were few appeals and parents received information on time;
- Children had greatly expanded their friendships and boosted their self-esteem and confidence;
- Children showed more interest in school in comparison to primary school;
- Children found it easy getting used to new routines;
- Year 6 work prepared pupils for work in Year 7.

Secondary school helped by:

- Orientating pupils quickly in the geography of new buildings;
- Relaxing rules in the early weeks and offering support with homework;
- Making helpful visits to primary schools (see procedures above);
- Offering induction/taster days and extensive information booklets;
- Offering assistance with lessons and homework;
- Offering help with study skills e.g. how to use reference sources, how to revise, how to make notes and how to write an essay.

Other things promoting a positive transition for children included:

- Their own attitude to looking forward to going to secondary school and showing an interest in secondary school work;
- The friendliness of older children at secondary school;
- Moving with many primary school friends;
- Having older siblings at the same secondary school.

What hinders a successful transition?
For Local Authorities:

- Parents' lack of understanding of the admissions process;
- Parents trying to 'subvert' the system (e.g. pretending to live in an area to get a better chance of preferred school place) caused problems;
- Where neighbouring authorities had different procedures;
- Where information on the National Pupil Database was incorrect.

For children

- Bullying (30% of parents reported their children having been bullied at secondary school);
- Worrying about their ability to do the work;
- Having new teachers for subjects;
- Making friends.

Transitions for vulnerable children

Overall, children with special educational needs (SEN) or those from other vulnerable groups did not experience less successful transitions than other children. However, children with SEN (approximately 20% off the sample) were more likely to be bullied. On the positive side, children with SEN and other health problems were experiencing greater curriculum continuity between Years 6 and 7. It may be that the earlier and more individual transfer process that these children experience has prepared them better for the move and the work they will do in Year 7.

Most low SES children found difficulties with new routines, making settling in more difficult. However, low SES children were more likely to look forward to secondary school, which had a positive effect on them developing an interest in school and schoolwork.

Summary and Implications regarding transitions

Most children had positive transition experiences, but a noticeable minority did not. For children, parents and schools the factors that identify a successful transition can be summarised as social adjustment, institutional adjustment and curriculum interest and continuity.

Social adjustment

One important indicator of a successful transition was the extent that children have more and new friendships and higher self-esteem and report greater confidence after their transition to secondary school. There is a need to help children develop their social and personal skills (friendships, self-esteem and confidence). Secondary schools could involve older children to help Year 7 children settle and this strategy may alleviate children's and parents' worries as well as reduce bullying. It is appropriate to develop clear systems to identify bullying and offer guidelines for Year 7 tutors, in order to refer those who appear to have problems to a support system or a scheme of 'buddies'. Older children in the school could assume the role of 'an older sister/brother' since children with older siblings adjusted better in this regard. Using the PSHE (Personal, Social and Health Education) curriculum to develop these skills, as well as using the period after the KS2 National Assessments as a key period to help prepare children could help both in the transition process as well as the PHSE skills of older pupils.

Institutional adjustment

Settling well into school life and getting used to new routines were two important elements of a successful transition. These aspects can be improved by encouraging children in the same class to work collaboratively and help each other even if they are not always together in the same lessons. Most secondary schools are structured around a 'form' system. Whilst this is usually used as a 'registration' group and as a PSHE group, Heads of Year could use this time more constructively to enhance children's social skills and self-esteem. A possible way forward may be to establish smaller 'tutor/focus' groups with the 'form'.

The most successful schools, identified in case studies, were those with very close links and co-ordination between primary and secondary schools. A variety of opportunities for induction, taster days and visits between schools appear to improve the transition experience for children. Choice Advisors targeting families that may need additional help seems to be helpful in the areas where they have been used, but the initiative was not yet widespread.

Curriculum interest and continuity
A child's curriculum interest and continuity were two further indicators of a successful transition. Children need to understand what is expected of them in secondary school, be prepared for the level and style of work, and be challenged to build on progress at primary school. This helps to ensure a growing interest in school and work. Teachers wanted more information and a better understanding of the different approaches to teaching between primary and secondary schools. Parents also want to see schools better preparing their children for secondary school work. Interestingly, children with health problems reported higher curriculum interest and continuity, which may reflect focused transition support for these children. Where the Inspectorate/Advisory team had a stronger role/interest in the process, there was a higher likelihood of innovative curriculum practices and continuity (such as working on the same texts in Year 6 and Year 7). The Inspectorate/Advisory service has a key role in promoting good communication and sharing good practice between clusters/pyramids of schools. The Inspectorate/Advisory service might be encouraged further in such practices and in taking a more active interest in the pupils' experiences of transition. Creating strategies and ideas for the Inspectorate/Advisory service to help promote curriculum continuity could be beneficial for ensuring pupils' interest and avoiding the learning 'dip' associated with Year 7.

To ensure that children's transitions are successful (and improved where needed), all three areas (social adjustment, institutional adjustment and curriculum interest and continuity) need to be taken into account when planning transition strategies at Local Authority and school levels.

The full research report and research brief for this sub-study is available at:
Research Brief - http://www.dfes.gov.uk/research/data/uploadfiles/DCSF-RB019.pdf
Full Report - http://www.dfes.gov.uk/research/data/uploadfiles/DCSF-RR019.pdf

Term of birth (Summer born children)

EPPE 3-11 has typically used age standardised tests when measuring cognitive attainment and progress as the exact age of a pupil (within an academic year group) can exercise an influence on their cognitive performance. Specifically, the younger the pupil (in their academic year) the poorer their performance tends to be, compared to the older pupils: older pupils having a developmental advantage (Crawford, Dearden & Meghir, 2007).

An analysis was conducted placing pupils into *seasons* (roughly equating to academic *terms)* of birth from oldest to youngest as follows:
Autumn born (September, October, November and December) for a September academic intake;
Spring (January, February, March, April);
Summer (May, June, July, and August);
for attainment, in Key Stage 2 English and Mathematics (by level achieved).

Tables 7 and 8 (below) indicate a greater frequency of Level 5 attainment (the highest level at KS2) for older pupils compared to Summer born.

Table 7: English Attainment Level at KS2 and Season of Birth (n=2810)

Key Stage 2 Academic level	Season/Term Child Born					
	Autumn		Spring		Summer	
	n	%	n	%	n	%
No level awarded	39	4.2	57	5.5	60	7.0
Level 2	8	0.9	9	0.9	12	1.4
Level 3	116	12.6	166	16.1	148	17.2
Level 4	448	48.5	511	49.7	438	51.0
Level 5	313	33.9	285	27.7	200	23.3
Total	924	100	1028	100	858	100

Table 8: Mathematics Attainment Level at KS2 and Season of Birth (n=2810)

Key Stage 2 Academic level	Season/Term Child Born					
	Autumn		Spring		Summer	
	n	%	n	%	n	%
No level awarded	44	4.8	64	6.2	60	7.0
Level 2	8	0.9	14	1.4	8	0.9
Level 3	151	16.3	206	20.0	174	20.3
Level 4	393	42.5	436	42.4	408	47.6
Level 5	328	35.5	308	30.0	208	24.2
Total	924	100	1028	100	858	100

One possible consequence of the difference in cognitive performance by age is a greater likelihood of younger children being identified, possibly erroneously, as having special educational needs (SEN). Table 9 (below) indicates that there is such a difference, with a greater proportion of younger pupils being identified as SEN compared to older pupils.

Table 9: SEN Identified Up to End KS2 by Season of Birth (n=2718)

Table 9: SEN Status	Season/Term Child Born					
	Autumn		Spring		Summer	
	n	%	n	%	n	%
SEN identified	318	35.8	402	40.4	375	45.0
No SEN identified	64.2	73.7	593	59.6	459	55.0
Total	889	100	995	100	834	100

Section 9: Concluding discussion

The EPPE 3-11 study set out to answer two overarching questions:

- Do the cognitive and social/behavioural benefits of pre-school that were found at ages 5 and 7 years last to the end of Key Stage 2 at age 11?
- How do experiences in primary school, especially in Key Stage 2, interact with the effects of pre-school to shape pupils' developmental trajectories?

Although these were the key research questions, there was also interest in special groups of children such as those from disadvantaged backgrounds, girls/boys, children from minority ethnic groups, and those with special educational needs (SEN). We have considered the influences related to the individual child, family demographics, to the Early years home learning environment (HLE) and to the community in which the pupil lives. In this report we have shown that the patterns of individual and social influence can change over time. Some background influences are more powerful than pre- or primary school effects but others are not. And some influences seem to be somewhat stronger early on, but less so as children progress through primary school. After taking background characteristics into account, EPPE 3-11 has shown that the contribution of pre-school continues to have significant though modest effects through to age 11.

Primary school matters too, and by age 11 its effects are stronger than those of pre-school or of family characteristics like low income. In addition, the results show that the effects of primary school are relatively stronger for Mathematics than English attainment at age 11. EPPE 3-11 investigated the kinds of classroom practices and school processes that contribute to positive development in children. This focus on primary education was very important in the research because pre-school effects are not stamped indelibly on a child's life but interact with home and subsequent phases of education.

Key Findings

1 The lasting effects of pre-school, including the contribution of quality
Attendance at pre-school was beneficial in Key Stage 2 (KS2) for both academic and social/behavioural outcomes, as well as pupils' self-perceptions. Importantly the quality of the pre-school (measured on the Early Childhood Environment Rating Scales) was positively associated with pupils' developmental outcomes for English, Mathematics, 'Self-regulation', 'Pro-social' behaviour, (reduced) 'Hyperactivity' and 'Anti-social' behaviour. For all social outcomes, the benefits of pre-school were higher for boys, for pupils with special educational needs (SEN), and for pupils from disadvantaged backgrounds. However, for some of the outcomes, notably English, Mathematics and 'Hyperactivity', only pre-schools of medium or high quality had lasting effects.

The longer term effects of different kinds of quality have become apparent:
First, the quality of the pre-school has a positive impact not only on children's attainment at the start of school but also on their value-added *progress* up to the age of 11. This suggests that pre-school not only enhances skills at the start of school, it also appears to support children in learning-how-to-learn. It is this that enables them to make more progress during primary school compared to the home children.

Second, the contribution of different kinds of quality in the pre-school become clear. EPPE used two measures of pre-school quality. The ECERS-R measures a care-oriented 'child centred' approach during the pre-school years while the ECERS-E measures the quality of specific educational provision related to language, literacy, mathematics, science/environment and means of catering for diversity in children. At age 7 we found that the more global child-centred quality was positively related to children's social behavioural development but less so to cognitive development.

At the end of Key Stage 2 the kind of educational (curricular) quality measured by the ECERS-E continued to have a positive effect on cognitive outcomes but the effects of the more global ECERS-R had faded. However, for social behavioural outcomes, the effect of the ECERS-R was still significant, although the ECERS-E also had a positive impact on some social behavioural measures. We concluded that the more educational aspects of pre-school quality assessed on the ECERS-E contributed to children's academic and social-behavioural outcomes whereas the care-oriented quality measured on the ECERS-R contributes over the longer term mostly to social behavioural development. Both kinds of quality are therefore important.

Finally, the higher the 'value added' effectiveness of each individual pre-school, the better the longer term outcomes for its children.

2 The contribution of child/family characteristics and the Early years HLE
Although taken together the overall effects of child and family factors were less powerful at age 11 than at age 7, there were still very strong effects of mother's highest qualification level and the Early years home learning environment (HLE) on academic outcomes. Gender was particularly important for 'Pro-social' behaviour and 'Hyperactivity', with girls being more pro-social and boys more hyperactive. Gender effects for cognitive outcomes were much weaker. However, for Mathematics boys have higher attainment at age 11, although the difference is small, and girls still have better outcomes in English. These findings are not new but what is surprising is the continuing strong influence of the Early years HLE. The support for learning that parents provided in the early years continues to show effects on several outcomes (attainment in English and Mathematics, 'Self-regulation', 'Pro-social' behaviour and 'Hyperactivity') at the end of primary school.

3 The contribution of primary schools to children's development
The academic effectiveness of schools between Key Stage 1 and 2 was measured independently of the EPPE 3-11 longitudinal sample, by analysing National Assessments for all pupils in all state primary schools in England (Melhuish et al., 2006a; 2006b). Academic effectiveness of the schools attended by EPPE 3-11 pupils was found to have a positive influence on their scores in English and Mathematics, and the effects are stronger than those of pre-school. The effects are particularly notable for Mathematics. Not only was the effectiveness of the primary school linked to pupils' absolute attainment at age 11, it also predicted the amount of progress the EPPE 3-11 pupils made between the ages of 7 and 11. For social/behavioural outcomes, however, the academic effectiveness of the school did not show a significant effect across all pupils (but in no cases was any negative impact found). Importantly, certain groups of pupils, such as those with special educational needs (SEN) or those whose mothers had low educational qualifications, had better social/behavioural outcomes if they attended schools that were higher on academic effectiveness. This indicates that academic effectiveness in a primary school may be particularly important for the social/behavioural development of vulnerable pupils.

4 The changing pattern of background influences on development
Background influences, overall, are less strong on academic outcomes towards the end of primary school than they were towards the beginning. However, for reading and Mathematics parental qualifications and FSM have both become stronger in their effects on Reading and Mathematics. On the other hand, the effect of birth weight weakens across primary school in both cognitive outcomes. There are mixed trends on the relative influence of SES and ethnicity; the effect of SES becomes stronger over time for Reading but weaker for Mathematics. Finally, the effects of minority ethnic status becoming weaker for some groups but not for others. Of particular importance is the effect of the Early years HLE which remains relatively constant across primary school for Reading but weakens somewhat for Mathematics.

For social/behavioural outcomes the patterns of effects also change. Some background effects tend to weaken over time, e.g., the effect of gender on 'Self-regulation'. However, the effects of gender strengthen over time for boys' 'Hyperactivity' and 'Anti-social' behaviour.

The effect of marital status also strengthens over time, with the effect of a single parent family becoming stronger in its negative impact on Hyperactivity. Finally the effect of the Early years HLE on social/behavioural outcomes diminishes over time, except in the case of the very highest scoring families where their positive impact does not diminish at all.

The EPPE study shows how difficult it is to make sweeping generalisations about influences on development because the factors that aid or hinder children's development can vary over time and across developmental domains.

5 Classroom and school processes
Classroom observations revealed considerable variation in the quality of EPPE 3-11 pupils' educational experiences during Year 5. The measure of overall *Teaching quality* was a significant predictor of cognitive progress in both Reading and Mathematics over Key Stage 2 (age 6-10). The *Quality of Pedagogy (*which includes richness of instruction and evaluative feedback) and *Classroom Control* predicted more progress in Mathematics. *Quality of Pedagogy was* also related to reduced 'Hyperactivity' and better 'Pro-social' behaviour and 'Self-regulation'. High levels of classroom *Disorganisation* predicted poorer progress in both pupils' Reading and Mathematics and also in (increased) 'Hyperactivity'.

An analysis of teachers' views of their school (particularly factors concerning *Use of homework and school standards, Pupils' agency and voice, Anti-academic ethos, School communication with parents* and *Parental support of their child's learning*) revealed that children in schools where teachers reported better practices associated with homework, setting high standards, establishing an academic ethos and involving pupils in activities had pupils who made better progress in Mathematics and had better social outcomes. In schools where teachers reported active *communication with parents,* pupils made better academic progress, and showed better 'Self-regulation'. In addition, where teachers reported strong *parental support*, pupils made better progress in Reading and 'Pro-social' behaviour.

The Ofsted inspection measure of overall 'School effectiveness' was a predictor of children's progress in Reading, Mathematics and 'Self-regulation' whilst the judgment on the 'Quality of school leadership' showed a positive relationship with Mathematics progress. Ofsted's judgement on a school's 'Improvement since last inspection' was a significant predictor of higher children's Mathematics progress, and better development in 'Self-regulation', 'Pro-social' and 'Anti-social' behaviour.

Also there was evidence that school context (in terms of level of disadvantage) can have an impact. The percentage of pupils eligible for FSM in a school was found to predict somewhat poorer children's progress in Mathematics, and increased 'Hyperactivity' and 'Anti-social' behaviour and decreased 'Self-regulation' (comparing those in schools below and above the mean on this factor). However the effects are somewhat weaker than those found for the Ofsted measures of overall 'School effectiveness', 'Improvement since last inspection', or those related to quality of teaching. Nonetheless they suggest (unsurprisingly) that schools in disadvantaged contexts face greater challenges in raising standards.

6 How pre-school and primary school interact to affect pupils' *learning and development*
EPPE 3-11 is the first study to investigate the combined effects of pre-school and primary school on a wide range of child outcomes. The combination of attending a higher quality pre-school and then moving on to an academically effective primary school had clear benefits for pupils' cognitive outcomes to age 11, especially so in Mathematics. High quality pre-school appears to provide some 'protection' against attending a less effective primary school; pupils who attended higher quality pre-schools fared better in low effective primary schools than pupils who had not attended pre-school or those who had attended pre-schools of lower quality. The reverse was also true, pupils who were lucky enough to attend a primary school of high academic effectiveness managed to do well in Key Stage 2 even if they had not attended a pre-school or if their pre-school was of low quality.

7 Influence are different for English, Mathematics and social/behavioural development
By Year 6 the influences on English were somewhat different from Mathematics. For English, child, family and home background mattered relatively more than for Mathematics. For English, the effects of mothers' highest qualification (degree versus no qualification) and the Early years HLE (high versus low) were more than twice as large as those of pre-school or primary school. For Mathematics, mothers' highest qualification was the strongest predictor, but school influences (pre-school and primary school effectiveness) were relatively more influential than for English. The effects of attending a highly effective primary school were on a par with the influence of a mother having A-levels versus no qualifications.

Patterns of influence are also different for social/behavioural development. In Year 6, background characteristics were found to be better predictors of 'Self-regulation' than for other social/behavioural outcomes. In addition, gender effects were particularly strong for 'Pro-social' behaviour and 'Hyperactivity' outcomes, having 3-4 times as large an effect as pre-school quality and effectiveness. Mother's highest qualification was also an important predictor and had the strongest effects for 'Self-regulation' and 'Hyperactivity' outcomes. Thus the patterns of influence do vary for different outcomes, as well as for different groups of pupils. Only a large scale and longitudinal study could reveal such subtle differences, along with the interacting effects of pre-school and primary education.

8 Pupils' self-perceptions: what influences them and their effects on future development?
Influential factors linked to pupils' self-perceptions were different for each self-perception measure. Gender was the strongest predictor of 'Behavioural self-image', whereas the strongest precursors for 'Academic self-image' were father's highest qualification and the Early years HLE. 'Enjoyment of school' was higher for pupils eligible for FSM and for those who had previously attended high quality pre-schools.

The various self-perception factors were differentially associated with pupils' cognitive and social/behavioural outcomes. Pupils' 'Academic self-image' was the strongest predictor of cognitive outcomes in Reading and Mathematics and 'Self-regulation', whereas pupils' 'Behavioural self-image' was the strongest predictor of 'Hyperactivity', 'Pro-social' behaviour and 'Anti-social' behaviour in Year 5. However, the reverse is also the case; earlier attainment (Year 1) predicted better 'Academic self-image' later on in Year 5. These findings indicate that there are strong *reciprocal* relationships between 'Academic self-concept' and academic achievement and between 'Behavioural self-image' and social/behavioural outcomes.

Some background factors also predicted pupils' views of primary school. Pupils' perceptions of a 'Positive social environment' in primary school were significantly but moderately associated with higher family salary, Early years HLE and the quality of pre-school attended. Girls were more likely to perceive their Headteacher as interested in pupils in their school, whereas pupils who received FSM felt that they had more 'support for learning from their teachers'.

Pupils' views of primary school were also related to their cognitive and social/behavioural outcomes. Pupils' positive view about their social environment was a predictor of better outcomes for all measures (cognitive and social behavioural) in Year 5. Pupils' perceptions of 'Teachers' support for pupils' learning' were positively related to 'Self-regulation' and 'Pro-social' behaviour, whereas perceptions of 'Headteacher qualities' were related to 'Pro-social' behaviour and 'Hyperactivity', and to Reading attainment in Year 5. These analyses broadly support the conclusion that the quality of pupils' experiences in terms of feeling supported in schools provides measurable benefits in terms of all round child development.

Section 9: Concluding discussion

9 How pre-schools, schools and families can support the development of pupils from disadvantaged backgrounds

Disadvantaged children and boys in particular benefit significantly from good quality pre-school experiences. If disadvantaged children attended centres that included children from mixed social backgrounds they made more progress than if they attended centres serving predominantly disadvantaged children. Children identified as 'at risk' of learning or behavioural difficulties are helped by pre-school, with integrated settings and nursery schools being particularly beneficial in providing a better start to primary school. Irrespective of the level of disadvantage, 'home' children (those with little or no pre-school experience) show poorer cognitive and social/behavioural outcomes at age 5 and at age 7, and poorer academic outcomes and 'Pro-social' behaviour at age 11 compared to those who attended pre-school. They are also more likely to be identified by teachers as having some form of SEN during KS1.

The Early years home learning environment (HLE) and staff support for parents in providing a quality HLE have been found to promote intellectual and social development in all children. While the social class and levels of education of parents were related to child outcomes, the Early years HLE was also found to be more important than family SES and income effects. Moreover HLE is only moderately associated with social class or mothers' qualification levels. What parents *do* is therefore vitally important and can counteract other disadvantaging influences, particularly during pre-school. For this reason pre-school and school settings that do not include provision for parent support and education are missing an important element in raising achievement and enhancing social/behavioural development over the longer term.

The case study findings on children at age 10 who 'succeed against the odds' (selected for high attainment, low SES, higher Early years HLE, and across ethnic and white groups) showed that they shared with their families: higher expectations, and a strong belief in the value of education and schooling. Interviews with parents and pupils to explore what might account for their pupils' success revealed: a) a range of family members provided support for pupils' learning, b) pupils themselves being active in maintaining these practices and c) education being valued highly by the family as a means of improving life chances. Both the disadvantaged parents providing higher scoring Early years home learning environments, and their children, argued that the reason some pupils do better in school is because they are more 'attentive' and 'make more of an effort'. Parents of these resilient pupils also had high expectations for them. They saw education as important for achieving economic independence and improved employment opportunities in the future and many hoped their children would attend higher education and have a professional career.

The evidence supports the focus on initiatives that provide family and/or child mentoring (e.g. Learning Mentorship) as these may have a strong role in supporting the development of social capital. Community focused supplementary schools and classes also provide important educational resources. Schools and pre-schools could do much more to encourage the involvement of parents and the wider family, particularly in the education of disadvantaged children.

EPPE 3-11 pupils who attended an academically more effective primary school showed significantly better outcomes, net of their own child and family background. At KS2 the primary school effects are stronger than those related to income and on a par with those of a mother having an A-level versus no qualification. Certain groups such as those with special educational needs (SEN), or whose mothers had low educational qualifications, also had better social/behavioural outcomes if they attended schools that were more academically effective. Our results show that achieving high academic standards does not adversely impact on children's enjoyment of school, or on affective or social outcomes. Indeed for more vulnerable groups it seems to be especially beneficial. 'Affective' in this study refers to a range of non cognitive outcomes including academic and behavioural self image.

Section 9: Concluding discussion

If a child experiences no, or poor quality, pre-school and then moves to a less academically effective primary school their prospects of good outcomes are significantly reduced. This is of particular concern for those already experiencing other disadvantages and who are already at higher risk of poor outcomes. Thus educational influences have the capacity to mitigate or further exacerbate inequalities. It is particularly important therefore to ensure that the most disadvantaged groups have access to high quality educational experiences from pre-school up.

Unfortunately at a national level disadvantaged children are over represented in less effective primary schools (as measured by value-add). But an experience of high quality pre-school appears to provide 'protection' against attending an ineffective primary school; pupils who attended high quality pre-schools fared better in low effective primary schools than pupils who had not attended pre-school or those who had attended pre-schools of lower quality.

The observational data in Year 5 classes showed that the quality of teaching tends to be poorer in schools with higher levels of social disadvantage (measured by the percentage of pupils eligible for FSM) and this has implications for the social inclusion and raising standards agendas. In schools with a higher percentage of pupils eligible for FSM, Year 5 classes scored lower on particular aspects of teaching 'quality', although the differences were modest. In Mathematics, there were fewer opportunities for pupils to practice basic skills in the context of problem solving (which encourages higher order thinking). There was also less 'social support for learning' and fewer opportunities for children to demonstrate their subject knowledge. In literacy, pupils in schools serving more disadvantaged intakes spent more time in 'off-task' talk (less student engagement) and their classrooms were less likely to be well organised, with transitions between activities poorly managed. In addition, the classroom climate (the extent to which pupils are respected and have autonomy) and the social support for learning (high academic expectations) were significantly and negatively associated with the level of social disadvantage (measured by percentage of pupils eligible for FSM). Behaviour also tended to be worse in schools where there were relatively more children eligible for free school meals. The results also indicated that poor organisation of work by some Year 5 teachers was associated with level of social disadvantage (e.g. on the item 'chaos').

These results warrant further investigation, given concerns about the gap in attainment related to pupil background, a gap that increases as children progress through school, particularly as we show that the overall quality of teaching is a moderately strong predictor of better academic progress over and above background factors. Our findings may reflect the influence of lower teacher expectations, or the recruitment of less experienced or poorly performing teachers in schools serving more disadvantaged communities. They may also link to difficulties relating to pupil behaviour, attitudes and attendance that teachers face in schools serving poorer families. In fact it may be all of these, 'expectations' do not have to be 'self-fulfilling' to constitute a problem, as Good and Brophy (1997) have argued: "*Expectations tend to be self-sustaining. They affect both* perception*, by causing teachers to be alert for what they expect and less likely to notice what they do not expect, and* interpretation*, by causing teachers to interpret (and perhaps distort) what they see so that it is consistent with their expectations. Some expectations persist even though they do not coincide with the facts*" (Good & Brophy, 1990, p441). The good news is that higher quality teaching effects on pupils' progress over KS2 are positive and stronger than the influence of pupil background factors for our sample.

Certain characteristics of pre-school and primary schools have been identified that enhance children's learning, they are therefore valuable in supporting all children but they are particularly important for those from disadvantaged backgrounds. These characteristics include pre-school and primary school quality and effectiveness; the provision of more qualified staff in pre-school; support for parents as educators as well as carers; additional, targeted, support for disadvantaged pupils and the pre-schools they attend; balancing academic and socio-emotional emphasis within the curriculum; and treating health, education and care as inseparable.

In primary school greater academic effectiveness improves outcomes for those at greater risk of SEN as well as benefitting all children. The quality of teaching and other 'whole school' aspects such as use of homework and academic emphasis and communication with parents are also important. Where children feel supported by teachers their social/behavioural outcomes benefit.

EPPE 3-11 findings relevant to policy

EPPE 3-11 research findings continue to inform policy debates in education by highlighting:

1. *The importance of quality in the pre-school*. The quality findings in this study, especially differential aspects of quality measured on the ECERS-R and the ECERS-E, are relevant to continuous professional development and initiatives to implement, monitor and evaluate practice: the mechanisms in quality assurance. Findings related to quality are also related to issues of 'upskilling' the workforce, in particular the use of qualified teachers, and its impact on child outcomes. When the children in this study were in pre-school the new 'Early Years Professional Status' (EPS) did not exist and nearly all the staff with relevant HE degrees had 'Qualified Teacher Status' (QTS). EPPE found that quality was higher in settings with managers who had QTS and also that the percentage of pre-school staff with QTS was predictive of positive child development. Because EPPE studied the effects of QTS staff and not of EPS, it can show the beneficial effects of trained teachers on the staff but not of other professionals with higher degrees. It is difficult to generalise the positive effects of QTS to staff with EYPS: although the two kinds of professional have similar degree status, the nature of the content of their first degrees and their supervised practice differs as do their entry requirements. This important issue calls out for future research. Although the positive contribution of QTS is evident, the contribution of EYPS staff to quality of provision and children's development cannot be established in this study.

2. *The need to support parents not only as carers but also as the first and enduring educators of their children*. This has implications for the development of programmes to support parents, particularly those most 'at risk' of poor parenting. Educational influences are particularly important for more disadvantaged pupils, although the Early years HLE is the most important of all, for this reason pre-school and primary education can be expanded through partnerships with families which aim at bringing parents 'on board' as educators. Parents (and carers) should benefit from having additional skills to enable them to support their child's learning at home. Increasing the support to parents to provide a good HLE for their child from birth will require support from professionals in health as well as education and care sectors.

3. *The importance of the academic effectiveness of the primary school and its impact on children's progress and development*. Primary schools vary in the contextual value added and pupils who are fortunate to attend a medium or high effective primary school do significantly better than those who attend the least effective schools. Ways to target, monitor and promote improvement of less effective schools and those judged low quality by Ofsted are likely to be important to reduce the overall variation between schools in their effectiveness and quality.

4. *Professional development of staff*. The variation in the quality of teaching identified in Year 5 suggests that teaching requires further attention through professional development and teacher education and sharing good practice. Lower teaching quality and pupil attainment was found in schools with high levels of FSM. These schools would benefit from targeted programmes of support, not only for pupils but with additional continuous professional development for teaching staff to improve the overall quality of teaching and pedagogy.

5. *Balancing cognitive and social/behavioural education in primary school*. Government policy/initiatives need to maintain a balance so they target academic standards alongside those that support the social/emotional aspects of development. EPPE 3-11 shows that the two complement one another. Importantly, there is no evidence that schools that are more effective academically are less good at fostering other areas such as children's enjoyment or their social behaviour.

6. *'Enjoyment of school' is not enough*. Pupils with the highest levels of enjoyment had lower academic scores than similar pupils reporting medium levels of enjoyment of school. This suggests that higher levels of 'Enjoyment of school' on their own will not promote better learning, behaviour or self-perceptions. Improving the school culture in terms of 'a safe and supportive (learning) environment' and improving the quality of teaching is more likely to promote social/behavioural development over time.

7. *Social and economic divides in children's access to 'Out of school hours learning' (OSHL).* Mother's and fathers educational level were linked to different aspects of 'Out of school hours learning'. Mother's education predicts children's engagement in learning experiences outside school hours. Father's qualifications are also important as they predict engagement in practical areas such as sports. Ethos led groups and Private music tuition as well as having Extra tuition in a school subject (even after the mother's education has been taken into account) are positively related to some outcomes. These findings suggest that there needs to be a greater emphasis on convincing parents, especially those who have not had full access to education themselves, that OSHL activities are worthwhile. For school age children, a rich learning environment is not restricted to school hours or even to learning at home, but to challenging activities in the wider community.

8. *Age in year is important*. The younger the pupil (e.g. summer born compared to others in their academic year), the poorer their performance tends to be, with older pupils having a developmental advantage. One possible consequence of the difference in cognitive performance due to age is a greater likelihood of younger children being identified, possibly erroneously, as having special educational needs (SEN). Children with birthdays in the summer term were 10-18% more likely to be identified as having SEN. It is possible that teachers are not taking the differences in developmental status within a year into account adequately. This suggests that more assessments need to be age-normed so that immaturity is not mistaken for learning difficulty.

How EPPE 3-11 has contributed to the research literature

The EPPE 3-11 project has highlighted the importance of large scale mixed method longitudinal studies; its rich longitudinal data provide a detailed picture of factors related to different trajectories. The various influences on development can be compared in terms of the relative magnitude of each influence and also the developmental stage in which particular influences have the strongest impact.

Longitudinal studies of this nature can demonstrate the ways that different phases of education interact with one another. This interaction is important as it points to the importance of investment in early years, especially for children moving on to less effective primary education. Those who attended higher quality pre-schools seem resilient as learners even if they move on to a low effectiveness primary school. It has been suggested that children who attended high quality pre-school provision have 'learned how to learn'. Conversely, in the case for English, those who attended a low quality pre-school do no better at age 11 in a medium or highly effective primary school than in a low effective school. Perhaps the children from low quality settings had not 'learned how to learn' and so are unable to 'latch on' to the opportunities in a medium to highly effective primary school.

Such findings allow a deeper understanding than previous research, especially in regard to the interaction of influences. In particular it has provided a unique insight into the importance, and enduring impact of early experiences, especially the Early years HLE and the quality of pre-school. Understanding the family's contribution to development requires more than demographics; it needs a description of the cultural and social capital transmitted through the Home Learning Environment (HLE).

The EPPE 3-11 project has drawn attention to the importance of pedagogy (as observed, and as reported by teachers). It has established how classroom practices relate to the overall climate of the school. There is increasing evidence of the importance of teacher and classroom effects in school effectiveness studies. However, the EPPE 3-11 research has been able to monitor progress over longer periods and take account of other influences in the home and in the neighbourhood.

Through the use of complex data analyses EPPE has provided evidence that the 'quality of school' (measured by Ofsted inspection) and the academic effectiveness of schools (measured by value added) are important in shaping progress over Key Stage 2. Efforts to improve school effectiveness and raise quality over the last decade are therefore likely to have benefitted pupils' outcomes (Sammons – forthcoming 2008), although the extent of variation found indicates that more remains to be done to ensure all pupils experience high quality teaching and educational experiences.

The project originally over-sampled children from disadvantaged groups because they were important for policy. EPPE 3-11 has revealed that the characteristics of disadvantage are complex and that multiple disadvantages interact and are key sources of inequality. The poor performance of some groups is related to a range of factors including parents' educational experiences (or lack of these), the quality of the Early years HLE, the continued need for English as an additional language (EAL) support, developmental problems early in life and other factors such as socio-economic status (SES) and low income. Pupils who experience multiple disadvantage are at greater risk of poor outcomes. If a child with disadvantage does not attend pre-school or goes to one of poor quality, then moves on to a less effective primary school, these early disadvantages are likely to be amplified by the combination of early experiences.

At every phase of the development, EPPE has shown that quantitative findings can be illuminated and expanded by case studies of settings and of children and their families. This study has thus demonstrated the value of a mixed methods approach (e.g. Siraj-Blatchford et al., 2006; Sammons et al., 2005).

Relationship of the EPPE 3-11 findings to other research studies

Many of the EPPE 3-11 findings replicate other studies; for example the adverse impact of social disadvantage on children's development has been established wherever it has been studied (e.g. Feinstein, 2004; Sacker, Schoon & Bartley, 2002). The positive effects of pre-school education have also been established in other countries e.g. the U.S., Argentina, Uruguay (Magnuson, Meyers, Ruhm, & Waldfogel, 2004; Berlinski, Galiani & Gertler, 2006; Berlinski, Galiani, & Manacorda, 2007). Other areas in which the EPPE 3-11 findings are supported elsewhere include:

1. The effects of greater staff training and qualifications have been shown in the U.S. (Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg et al., 2001), Wales (Siraj-Blatchford et al., 2007b) and in Northern Ireland (Melhuish et al., 2002a; 2002b).

2. The contribution of quality to children's development has been shown in many studies, often using the ECERS observational scales (Melhuish, 2004a; 2004b).

3. Early attendance at pre-school settings was found in EPPE 3-11 to relate to increased cognitive outcomes better 'Independence and Concentration' and 'Peer sociability' at age rising 5, but also increased 'Anti-social' behaviour in a small number of children. These findings are similar to those in the U.S. (NICHD, 2002) Norway (Borge & Melhuish, 1995) and Northern Ireland (Melhuish et al., 2002a; 2002b) and in other UK research (Mathers & Sylva, 2007). However, by age 11 the negative effects of early attendance at pre-school settings were no longer present in EPPE 3-11.

4. The contribution of pre-school to improving life chances for disadvantaged groups are mirrored elsewhere (see Melhuish, 2004a) and influence many policy initiatives (Young, 1996; Melhuish & Petrogiannis, 2006; Sylva et al., 2007b).

5. The EPPE 3-11 project is one of few studies (the only in the UK) to demonstrate the role of pre-school education as an effective means of early intervention for special educational needs (SEN) (Sammons et al., 2002b; Anders et al., forthcoming).

6. The EPPE 3-11 project is the first study to demonstrate, in a large representative sample that individual pre-school centres have lasting effects on children's development, as Bruner (1996), and McCain and Mustard (1999), had previously argued.

7. 'Sustained Shared Thinking' (SST) (Siraj-Blatchford et al., 2002; 2003) is broadly comparable with a range of similar terms applied in other education contexts such as Alexander's (2004) 'dialogic teaching', Bruner's 'mutualist and dialectical pedagogy', Wells' (1999) 'dialogic enquiry', Mercer's (1995) 'interthinking', and Wells Lindfor's (1999) 'dialogue of enquiry' and is compatible with Vygotsky's (1978) 'theories on children's development'. However, SST is derived from real life, group contexts and is focussed on pedagogical interactions in early years.

8. The EPPE 3-11 project has found that structured approaches to curriculum, e.g., use of the plenary in Literacy and Numeracy lessons is strongly associated with observed quality of primary teaching. The quality of teaching is a moderately strong predictor of better progress in Reading and Mathematics. Classroom disorganisation by contrast predicts poorer social/behavioural and academic outcomes.

9. In line with much educational effectiveness research the EPPE 3-11 study has pointed to the importance of institutional effects of pre-school and primary school. The combination of educational influences can either boost or, in poor quality/less effective settings or schools, reduce developmental trajectories and academic and social/behavioural outcomes.

10. EPPE 3-11 has shown that pupils' self-perceptions (such as 'Academic self-image') are related to later attainment and behavioural adjustment. These probably operate in a reciprocal manner, with good performance in Key Stage 1 leading to more positive 'Academic self-image' and this in turn has an impact on subsequent performance in national assessments at Key Stage 2.

EPPE 3-11 becomes EPPSE - Effective Pre-school, Primary and Secondary Education

Although the primary school phase of the EPPE 3-11 study came to an end in 2008, the research continues. The Effective Pre-school, Primary and Secondary Education Project (EPPSE 3-14) follows the same students to the end of Key Stage 3 (age 14) and will report findings in 2011 on the way interactions between home, pre-school, primary and secondary schooling shape the development and destinations of young people.

References

Alexander, R. (2004), *Towards Dialogic Teaching: Rethinking Classroom Talk*. Cambridge: Dialogos.

Anders, Y., Sammons, P., Taggart, B., Sylva, K., Melhuish, E. and Siraj-Blatchford, I. (Forthcoming), 'Special educational needs at age 10 assessed by teachers: A longitudinal investigation of the influence of child, family, home factors and preschool education on the identification of SEN.'. *Paper submitted to The Journal of Special Education*.

Arnett, J. (1989), 'Caregivers in Day-Care Centres: Does training matter?'. *Journal of Applied Developmental Psychology,* 10*,* 541-552.

Ball, C. (1994), *Start Right: The Importance of Early Learning*. London: RSA.

Barnes, J. & Freude-Lagevardi, A. (2003), *From pregnancy to early childhood: early interventions to enhance the mental health of children and families*. London: Mental Health foundation.

Barnett, W. S. (1996), *Livers in the balance: Age 27 Benefit-cost analyses of High Scope/Perry Pre-school Programme, Monographs of the High Scope Educational Research Foundation, 11*. Ypsilanti: High/Scope Press.

Berlinski, S., Galiani, S., & Gertler, P. (2006), *The effect of pre-primary education on primary school performance*. London Institute for Fiscal Studies. http://www.ifs.org.uk/wps/wp0604.pdf

Berlinski, S., Galiani, S., & Manacorda, M. (2007), *Giving children a better start: Pre-school attendance and school age profiles*. London: Institute of Fiscal Studies. http://www.ifs.org.uk/wps/wp0618.pdf

Black, P. and Wiliam, D. (1998), 'Assessment and classroom learning'. *Assessment in Education: Principals, Policy and Practice,* 5 (1)*,* 7-73.

Blatchford, P. (2004), 'Improving the effectiveness of pupil group work'. In A. Pollard and M. James (eds), *Personalised Learning: A Commentary by the Teaching and Learning Research programme*. Swindon: ESRC.

Bloom, B. (1964), *Stability and Change in Human Characteristics*. New York: Wiley.

Borge, A. I. H. and Melhuish, E. C. (1995), 'A longitudinal study of childhood behaviour problems. Maternal employment, and day care in a rural Norwegian community'. *International Journal of Behavioral Development,* 18*,* 23-42.

Bouchard, J.-M., Talbot, L., Pelchat, D. and Sorel, L. (1998), 'Les parents et les intervenants, où en sont leurs relations?'. *(deuxième partie). Apprentissage et Socialisation,* 17 (3)*,* 41-48.

Bradley, R. (2002), Environment and Parenting. In M. Bornstein (Ed.) *Handbook of Parenting*, 2nd Ed. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Bradley, R. H., Corwyn, R. F., Burchinal, M., McAdoo, H. P. and Coll, C. G. (2001), 'The home environments of children in the United States Part II: Relations with behavioral development through age thirteen'. *Child Development,* 72*,* 1868-1886.

Brandon, M., Howe, A., Dagley, V., Salter, C., Warren, C. and Black, J. (2006), *Evaluating the Common Assessment Framework and Lead Professional Guidance and Implementation. Research Report RR740*. Nottingham: DfES Publications.

References

Bronfenbrenner, U. (1986), Ecology of the Family as a Context for Human Development. *Developmental Psychology, 22*, 723-742.

Bronfenbrenner, U. (1994), '*Ecological models of human development'*, In T. Husen & T. N. Postletwaite (Eds.), International encyclopedia of education (2nd ed.), (Vol. 3, pp. 1643-1647). Oxford, England: Pergamon Press/Elsevier Science.

Bronfenbrenner, U., & Morris, P. A. (1998), '*The ecology of developmental process'*, In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed.), Handbook of child psychology: Vol. 1 Theoretical models of human development (5th ed., pp. 993-1028). New York: Wiley.

Brooks-Gunn, J., G, D. a. and Aber, L. (eds) (1997), *Neighborhood Poverty: Context and Consequences for Children*. (Vol. 1). New York: Russell Sage Foundation.

Brown, A. (2000), 'Positioning, pedagogy and parental participation in school mathematics: an exploration of implications for the public understanding of mathematics'. *Social Epistemology,* 14 (1)*,* 21- 31.

Brown, G. (2004), *Speech to parliament in support of 2004 Spending Review. Full text* [Online]. Available at: http://news.bbc.co.uk/2/low/uk_news/politics/3887877.stm. Last accessed 16th October 2008.

Bruner, J. (1996), *The Culture of Education*. Cambridge, Mass: Harvard University Press.

Carroll, A. and Purdie, N. (2007), 'Extra-curricular involvement and self-regulation in children'. *The Australian Educational and Developmental Psychologist,* 24 (1)*,* 19-35.

Chase-Lansdale, P. L., Gordon, R., Brooks-Gunn, J. and Klebanov, P. K. (1997), 'Neighbourhood and family influences on the intellectual and behavioural competence of preschool and early school-age children'. In G. J. D. J. Brooks-Gunn, and J.L. Aber (ed.), *Neighborhood Poverty. Volume 1: Context and Consequences for Children* (pp. 79-119). New York: Russell Sage Foundation.

Civil, M. (1996), *'Connecting Home and school: Funds of Knowledge for Mathematics Teaching*'. In PME 19, PME 20, published by the Working Group: Cultural Aspects in the Learning of Mathematics, 20th Conference of the International Group for the Psychology of Mathematics Education, University of Valencia, Spain. July 8–12.

Cohen, L., Manion, L. and Morrison, K. (2000), *Research Methods in Education* (5th ed.). London: Routledge.

Crawford, C. Dearden, L, & Meghir, C. (2007), *When you are born matters: the impact of date of birth on child cognitive outcomes in England*. London: The Institute of Fiscal Studies.

Creemers, B. P. M. and Kyriakides, L. (2008), *The Dynamics of Educational Effectiveness*. London: Routledge.

Croll, P. (2004), 'Families, social capital and educational outcomes'. *British Journal of Educational Studies,* 52 (4)*,* 390-416.

Crozier, G. and Davies, J. (2005), 'British Bangladeshi and Pakistani Families and Education Involvement: Barriers and Possibilities'. *Research Digest*.

Darling-Hammond, L. (2002), *Access to quality teaching: An analysis of inequality in California's public schools*: Santa Clara Law Review.

References

Dauber, S. L. and Epstein, J. L. (1993), 'Parents' attitudes and practices of involvement in inner-city elementary and middle schools'. In N. F. Chavkin (ed.), *Families and schools in a pluralistic society* (pp. 53-71). Albany: State University of New York Press.

Davie, R., Butler, N. and Goldstein, H. (1972), *From Birth to Seven: A report of the National Child Development Study*. London: Longman.

Denton, K., West, J. and Walston, J. (2003), *Reading - Young children's achievement and classroom experiences*. Washington, DC: U.S. Dept. of Education, NCES 2003-070.

DES. (1988), *The National Curriculum*. London: HMSO.

DES. (1990), *Starting with Quality: report of the committee of inquiry into the quality of educational experience offered to three and four year olds (Rumbold report)*: HMSO.

DES and Welsh Office. (1988), *Task Group on Assessment and Testing*. London DES.

DfEE. (1998), *The National Literacy Strategy*. Department for Education and Employment Publications: Suffolk.

DfEE. (1999), *The National Numeracy Strategy*. Department for Education and Employment Publications: Suffolk.

DfES. (2002), *Delivering for Children and Families: Inter-Departmental Childcare Review*. London: DfES/DWP/HM Treasury/Women and Equality Unit. HMSO.

DfES. (2003a), *Green Paper: Every Child Matters*. Norwich: HMSO.

DfES. (2003b), *Excellence and Enjoyment: A Strategy for Primary Schools*. Nottingham: Department for Education and Skills Publications.

DfES. (2006), *Ethnicity and Education: The Evidence on Minority Ethnic Pupils aged 5-16 (Research Topic Paper: 2006 edition)*. London: Department for Education and Skills Publications.

Dunn, J., (2002), The adjustment of children in stepfamilies: Lessons from community studies. *Child and Adolescent Mental Health, 7,* 154-161.

Dunn, J., Deater-Deckard, K., Pickering, K., O'Connor, T. G. & Golding, J. (1998), Children's adjustment and Pro-social behaviour in step- single and non-step family settings: Findings from a community study. *Journal of Child Psychology and Psychiatry 39, 8,* 1083-1095.

Dweck, C. S. (1986), Motivational processes affecting learning. *American Psychologist*, 41 (10), 1040-48.

Effective Pre-school and Primary Education 3-11 (EPPE 3-11) Team. (2007), *Promoting Equality in the Early Years: Report to The Equalities Review*. London.

Elliot, C., with Smith, P. and McCulloch, K. (1996), *British Ability Scales Second Edition (BAS II)*. Windsor: NFER-Nelson Publishing Company Limited.

Elliot, K. and Sammons, P. (2004), 'Exploring the use of effect sizes to evaluate the impact of different influences on child outcomes: possibilities and limitations, Chapter 2 '. In K. Elliot and I. Schagen (eds), *What Does it Mean? The Use of Effect Sizes in Educational Research* (pp. 6-24). Slough: NFER.

References

The English Indices of Deprivation 2004: Summary (revised), (2007). Retrieved on 29/08/07 from http://www.ccsr.ac.uk/sars/2001/indiv-cams/codebook/odpmimd.pdf.

Epstein, J. L. (1996), 'Family-school links: How do they affect educational outcomes?'. In A. Booth and J. Dunn (eds), *Family-School Links: How do they affect educational outcomes?* Hillsdale, NJ: Lawrence Erlbaum Associates.

Epstein, J. L. and Dauber, S. L. (1991), 'School programs and teacher practices of parent involvement in inner-city elementary and middle schools'. *Elementary School Journal,* 91 (3), 289-305.

Evangelou, M., Taggart, B., Sylva, K., Melhuish, E., Sammons, P. and Siraj-Blatchford, I. (2008a), *Effective Pre-school, Primary and Secondary Education 3-14 Project (EPPSE 3-14): What Makes a Successful Transition from Primary to Secondary School? Research Report No. DCSF-RR019*. Nottingham: DfES Publications. http://www.dfes.gov.uk/research/data/uploadfiles/DCSF-RR019.pdf

Evangelou, M., Taggart, B., Sylva, K., Melhuish, E., Sammons, P. and Siraj-Blatchford, I. (2008b), *Effective Pre-school, Primary and Secondary Education 3-14 Project (EPPSE 3-14): What Makes a Successful Transition from Primary to Secondary School? Research Brief No. DCSF-RB019*. Nottingham: DfES Publications. http://www.dfes.gov.uk/research/data/uploadfiles/DCSF-RB019.pdf

Feinstein, L. (2004), 'Mobility in Pupils' Cognitive Attainment During School Life'. *Oxford Review of Economic Policy,* 20 (2: Education), 213-229.

Galton , M., Simon, B. & Croll, P. (1980), *Inside the Primary Classroom.* Routledge and Keegan Paul.

Galton, M., Hargreaves, L., Comber, C., Wall, D. and Pell, A. (1999), *Inside the Primary Classroom: 20 Years On*. London: Routledge.

Goldman, R. (2005), *Fathers' Involvement in their Children's Education*. London: National Family and Parenting Institute.

Goldstein, H. (1995) *Multilevel Statistical Models (2nd Edition)*, London: Edward Arnold.

Good, T. and Brophy, J. (1997), *Looking in classrooms* (7th 4.). New York: Longman.

Goodman, R. (1997), 'The Strengths & Difficulties Questionnaire: A Research Note'. *Journal of Child Psychology & Psychiatry, 38,* 581-586.

Great Britain. (1988), Education Reform Act 1988. London: HMSO.

Grosin, L. and McNamara, P. (2001), *Bedömningsinstrument för skolklimat*, http://www.mdh.se/isb/pedagogik/personal/peter_mcn/sv1.html [Accessed: 17 April 2002].

Hall, J., Sylva, K., Sammons, P., Melhuish, E., Taggart, B. and Siraj-Blatchford, I. (2008), *Can pre-school protect?: Identifying resilience in the development of pre-schoolers, Symposium 1294.* Paper presented at the British Educational Research Association (BERA) Annual Conference, Heriot-Watt University, Edinburgh, Scotland.

Hannon, P., Nutbrown, C. & Morgan, A. (2005), *Early literacy work with families*. London: Sage.

Harms, T., Clifford, M. and Cryer, D. (1998), *Early Childhood Environment Rating Scale, Revised Edition (ECERS-R)*. Vermont: Teachers College Press.

References

Harpham, T., Grant, E. and Thomas, E. (2002), 'Measuring social capital in health surveys'. *Health Planning and Policy,* 17 (1)*,* 106-111.

Haynes, N. M. (1990). Influence of Self-concept on School Adjustment among Middle-School Students. *The Journal of Social Psychology, 130 (2)*, 199-207.

Heckman, J. and Wax, A. (2004), 'Home Alone'. *Wall Street Journal,* January 23, 2004*,* 14.

Hess R.D, Holloway S., Price G., & Dickson W.P. (1982), Family environments and the acquisition of reading skills*.* In L.M. Laosa, & I.E. Sigel, (Eds.). *Families As Learning Environments of Children* (pp. 87–113). New York: Plenum.

Hewison, J. (1988), 'The long term effectiveness of parental involvement in reading: A follow-up to the Haringey reading project'. *British Journal of Educational Psychology,* 58 (2)*,* 184-190.

Humes, W. and Bryce, T. (2001), 'Scholarship, Research and the Evidential Basis of Policy Development in Education'. *British Journal of Educational Studies* 49 (3)*,* 329-352.

Hunt J. M. (1961), *Intelligence and Experience*. New York: Ronald Press.

Hurry, J. & Sylva, K. (2007), Long term outcomes of reading interventions. *Journal of Research in Reading, 30, (2),* 1-22.

Jones, L. and Allebone, B. (1998), *Researching 'Hard to Reach' Groups: Some Methodological Issues.* Paper presented at the First Mathematical Education and Society Conference, Nottingham University, September: revised paper published 1999 in the International Journal of Inclusive Education, 3, (4) / October 1, 353-62.
http://www.nottingham.ac.uk/csme/meas/papers/jones.html

Labour Party Manifesto. (1997), *http://www.labour-party.org.uk/manifestos/1997/1997-labour-manifesto.shtml.* Last accessed 16th October 2008.

Lareau, A. (2003), *Unequal Childhoods: Class, Race and Family Life*. Berkeley: University of California Press.

Leventhal, T. and Brooks-Gunn, J. (2000), 'The neighborhoods they live in: The effects of neighbourhood residence on child and adolescent outcomes'. *Psychological Bulletin,* 126*,* 309 - 337.

Love, J.M., Kisker, E.E., Ross, C., Constantine, J., Boller, K., Chazan-Cohen, et al., (2005), The effectiveness of Early Head Start for 3-year-old children and heir parents: Lessons for policy and programs. *Developmental Psychology, 41*, 885-901.

Macbeath, A. (1996), *Parent Teacher partnership in the individual child's learning: Research Implications.* Paper presented at the Education is Partnership Conference, Copenhagen, Denmark, November 21-24.

MacBeath, J., Kirwan, T., Myers, K., McCall, J., Smith, I., McKay, E., Sharp, C., Bhabra, S., Weindling, D. & Pocklington, K. (2001), *The Impact of Study Support: A report of a longitudinal study into the impact of participation in out-of-school-hours learning on the academic attainment, attitudes and school attendance of secondary school students.* London: DfES*.*

Machin, S., Telhaj, S. and Wilson, J. (2006), *The Mobility of English School Children*. London: Centre for the Economics of Education, London School of Economics.

References

Magnuson, K., Meyers, M., Ruhm, C., & Waldfogel, J. (2004), Inequality in preschool education and school readiness. *American Educational Research Journal, 41*, 115–157.

Mantzicopoulos, P. and Knutson, D. J. (2000), 'Head start children: School mobility and achievement in the early grades'. *The Journal of Educational Reseach,* 93 (5)*,* 305-311.

Margo, J., Dixon, M., Pearce, N. and Reed, H. (2006), *Freedom's Orphans: Raising youth in a changing world*. London: ippr.

Marsh, H. W. (1994), Using the National Educational Longitudinal Study of 1988 to evaluate theoretical models of self-concept: The Self-Description Questionnaire. *Journal of educational Psychology, 86,* 439-456.

Marsh, H. W. (2006), *Self-concept theory, measurement and research into practice: The role of self-concept in educational psychology*. Leicester: The British Psychological Society.

Marsh, H. W. & Yeung, A. S. (1997), Causal Effects of Academic Self-concept on Academic Achievement: Structural Equation Models of Longitudinal Data. *Journal of Educational Psychology, 89(1)*, 41-54.

Mathers, S. and Sylva, K. (2007), *National Evaluation of the Neighbourhood Nurseries Initiative: The Relationship between Quality and Children's Behavioural Development. Research Report No: SSU/2007/FR/022.* . London: DfES.
http://www.dcsf.gov.uk/research/data/uploadfiles/SSU2007FR022%20REV.pdf

McBride, B., Bae, J. and Blatchford, K. (2003), 'Family-School-Community Partnerships in Rural PreK At-Risk Programs '. *Journal of Early Childhood Research,* 1 (1)*,* 49-72.

McCaffrey, D., Lockwood, J., Koretz, D., Louis, T. and Hamilton, L. (2004), 'Models for Value-Added Modelling of Teacher Effects'. *Journal of Educational and behavioural Statistics,* 29 (1)*,* 67-101.

McCain, M. N. and Mustard, J. F. (1999), *Early Years Study, Final Report: Reversing the Real Brain Drain*. Toronto: Publications Ontario.

McCall, R. B. (1981), 'Nature-nurture and the two realms of development: a proposed integration with respect to mental development'. *Child Development,* 52*,* 1-12.

McCulloch, A. and Joshi, H. E. (2001), 'Neighbourhood and family influences on the cognitive ability of children in the British National Child Development Study'. *Social Science and Medicine,* 50*,* 579-591.

Melhuish, E. (2004a), *A literature review of the impact of early years provision upon young children with emphasis given to children from disadvantaged backgrounds. Report to the Controller and Auditor General* London National Audit Office. Available at http://www.nao.org.uk/publications/nao_reports/03-04/268_literaturereview.pdf.

Melhuish, E. (2004b), *Child Benefits: The importance of investing in quality childcare*. London: Daycare Trust.

Melhuish, E. (2006), 'Policy & Research on pre-school care and education in the UK'. In E. Melhuish and K. Petrogiannis (eds), *Early Childhood Care and Education: International perspectives on policy and research*. London: Routledge.

References

Melhuish, E. and Hall, D. (2007), 'The policy background to Sure Start'. In J. Belsky, J. Barnes and E. Melhuish (eds), *Evaluating Sure Start: Does area-based early intervention work?* Bristol: Policy Press.

Melhuish, E. and Petrogiannis, K. (eds) (2006), *Early Childhood Care and Education: International perspectives on policy and research*. London: Routledge.

Melhuish, E., Quinn, L., McSherry, K., Sylva, K., Sammons, P., Siraj-Blatchford, I., Taggart, B. and Guimares, S. (2002a), *The Effective Pre-School Provision Northern Ireland (EPPNI) Project: Technical Paper 1 - Characteristics of Pre-school Environments in Northern Ireland: An analysis of observational data*. Belfast: The Stranmillis Press.

Melhuish, E. C., Quinn, L., Sylva, K., Sammons, P., Siraj-Blatchford, I., Taggart, B. and Shields, C. (2002b), *The Effective Pre-School Provision Northern Ireland (EPPNI) Project: Technical Paper 5 - Pre-school experience and Cognitive Development at the Start of Primary School*. Belfast: The Stranmillis Press.

Melhuish, E., Romaniuk, H., Sammons, P., Sylva, K., Siraj-Blatchford, I. and Taggart, B. (2006a), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): The Effectiveness of Primary Schools in England in Key Stage 2 for 2002, 2003 and 2004. Full Report*. London: Institute of Education, University of London. http://www.ioe.ac.uk/schools/ecpe/eppe/eppe3-11/eppe3-11pubs.htm

Melhuish, E., Romaniuk, H., Sammons, P., Sylva, K., Siraj-Blatchford, I. and Taggart, B. (2006b), *Effective Pre-school and Primary Education 3-11 (EPPE 3-11): The Effectiveness of Primary Schools in England in Key Stage 2 for 2002, 2003 and 2004, Research Brief No. RBX06-06*. Nottingham: DfES Publications.

Melhuish, E., Sylva, K., Sammons, P., Siraj-Blatchford, I., Taggart, B. and Phan, M. (2008a), 'Effects of the Home Learning Environment and pre-school center experience upon literacy and numeracy development in early primary school.' *Journal of Social Issues, 64,* 157-188.

Melhuish, E., Sylva, K., Sammons, P., Siraj-Blatchford, I., Taggart, B., Phan, M. and Malin, A. (2008b), 'Preschool influences on mathematics achievement'. *Science,* 321*,* 1161-1162.

Mercer, N. (1995), *The Guided Construction of Knowledge: Talk Amongst Teachers and Learners*. Clevedon: Multilingual Matters.

Mercer, N**.** and Littleton, K. (2007*), Dialogue and the Development of Children's Thinking: a sociocultural approach*. London: Routledge

Mercy J. A. and Steelman L. C. (1982), Familial influence on the intellectual attainment of children. *American Sociological Review, 47*, 532–42.

Muijs, D. and Reynolds, D. (2005), *Effective Teaching*. London: Sage.

Mullis, I. V. S., Martin, M. O., Gonzalez, E. J. and Kennedy, A. M. (2003), *PIRLS 2001 International Report: IEA's Study of Reading Literacy Achievement in Primary Schools*. Chestnut Hill, MA: Boston College.

National Institute of Child Health & Development (NICHD). (2002), 'Early Child Care and Children's Development Prior to School Entry: Results from the NICHD Study of Early Child Care.'. *American Educational Research Journal,* 39 (1)*,* 133-164.

References

Niles, M.D., Reynolds, A.J., & Roe-Sepowitz, D. (2008). Early childhood intervention and early adolescent social and emotional competence: Second-generation evaluation evidence from the Chicago Longitudinal Study. *Educational Research, 50 (1)*, 55-73.

Office of Population Censuses and Surveys. (1995), *Classification of occupations and coding index*. London: HMSO.

Ofsted. (2007), *The Annual Report of Her Majesty's Chief Inspector of Education, Children's Services and Skills 2006/07*. London: The Stationery Office.

Ofsted. (2008), *Sustaining Improvement: the journey from special measures*. London: Ofsted.

Parcel, T. and Menaghan, E. (1990), 'Maternal Working Conditions and Children's Verbal Facility: Studying the Intergenerational Transmission of Inequality from Mothers to Young Children'. *Social Psychology Quarterly,* 53*,* 132-147.

Peisner-Feinberg, E. S. and Burchinal, M. R. (1997), 'Relations between preschool children's child-care experiences and concurrent development: The Cost, Quality, and Outcomes Study'. *Merrill-Palmer Quarterly,* 43 (3)*,* 451-477.

Peisner-Feinberg, E. S., Burchinal, M. R., Clifford, R. M., Culkin, M. L., Howes, C., Kagan, S. L. and Yazejian, N. (2001), 'The relation of preschool child-care quality to children's cognitive and social developmental trajectories through second grade'. *Child Development,* 72 (5)*,* 1534-1553.

Pianta, B. and National Institute of Child Health & Development (NICHD) (2001), *'Fifth Grade School Observation Procedures Manual.' NICHD Study of Early Child Care and Youth Development*: NICHD Study of Early Child Care and Youth Development.

QCA/DfEE. (2000), *Curriculum Guidance for the Foundation Stage*. London: QCA/DfEE. HMSO London.

Quek, C., Wong, A. & Fraser, B (2002),Gender differences in the perceptions of chemistry laboratory classroom environments, *Queensland Journal of Educational research*, 18.

Ramey, C. T. and Ramey, S. L. (1998), 'Early intervention and early experience'. *American Psychologist,* 53 (2)*,* 109-120.

Reynolds, T. (2006a), 'Caribbean young people, family relationships and social capital, Special Issue: Social capital, migration and transnational families'. *Journal of Ethnic and Racial Studies,* 29 (6)*,* 1087-1103.

Reynolds, T. (2006b), 'Bonding social capital within the Caribbean family and community, Special Issue: Ethnicity and Social Capital'. *Journal of Community, Work and Family,* 9 (3)*,* 273-290.

Reynolds, D., Harris, A., Clarke, P., Harris, B. and James, S. (2006), 'Challenging the Challenged: developing an improvement programme for schools facing exceptionally challenging circumstances'. *School Effectiveness and School Improvement,* 17 (4)*,* 425-440.

Ross, A. and Hutchings, M. (2003), *Attracting, Developing and Retaining Effective Teachers in the United Kingdom and Northern Ireland: OECD Country Background Report*: Institute of Policy Studies in Education, London Metropolitan University.

Runyan, D., Hunter, W., Socolar, R. and Amaya-Jackson, L. (1998), 'Children who prosper in unfavourable environments: the relationship to social capital'. *Paediatrics,* 101*,* 12-18.

References

Sacker, A., Schoon, I. and Bartley, M. (2002), 'Social inequality in educational achievement and psychosocial adjustment throughout childhood: magnitude and mechanisms'. *Social Science & Medicine,* 55*,* 863–880.

Sammons, P. (1995), 'Gender, ethnic and socio-economic differences in attainment and progress: a longitudinal analysis of student achievement over nine years'. *British Education Research Journal,* 21 (4)*,* 465-485.

Sammons, P. (forthcoming - 2008), 'Zero Tolerance of Failure and New Labour Approaches to School Improvement in England'. *Paper submitted to Oxford Review of Education*.

Sammons, P., Sylva, K., Melhuish, E. C., Siraj-Blatchford, I. and Taggart, B. (1999), *The Effective Provision of Pre-School (EPPE) Project: Technical Paper 2 - Characteristics of the EPPE project sample at entry to the study*. London: DfEE / Institute of Education, University of London.

Sammons, P., Sylva, K., Melhuish, E. C., Siraj-Blatchford, I., Taggart, B. and Elliot, K. (2002a), *The Effective Provision of Pre-School Education (EPPE) Project: Technical Paper 8a - Measuring the Impact of Pre-School on Children's Cognitive Progress over the Pre-School Period*. London: DfES / Institute of Education, University of London.

Sammons, P., Smees, R., Taggart, B., Sylva, K., Melhuish, E. C., Siraj-Blatchford, I. and Elliot, K. (2002b), *The Early Years Transition and Special Educational Needs (EYTSEN) Project: Technical Paper 1 - Special Needs Across the Pre-School Period*. London: DfES / Institute of Education, University of London.

Sammons, P., Sylva, K., Melhuish, E. C., Siraj-Blatchford, I., Taggart, B. and Elliot, K. (2003), *The Effective Provision of Pre-School Education (EPPE) Project: Technical Paper 8b - Measuring the Impact of Pre-School on Children's Social/Behavioural Development over the Pre-School Period*. London: DfES / Institute of Education, University of London.

Sammons, P., Sylva, K., Melhuish, E. C., Siraj-Blatchford, I., Taggart, B., Elliot, K. and Marsh, A. (2004a), *The Effective Provision of Pre-School Education (EPPE) Project: Technical Paper 11 - Report on the continuing effects of pre-school education at age 7*. London: DfES / Institute of Education, University of London.

Sammons, P., Smees, R., Taggart, B., Sylva, K., Melhuish, E. C., Siraj-Blatchford, I. and Elliot, K. (2004b), *The Early Years Transitions and Special Educational Needs (EYTSEN) Project: Technical Paper 2 - Special Educational Needs in the Early Primary Years: Primary school entry up to the end of Year 1*. London: DfES / Institute of Education, University of London.

Sammons, P., Siraj-Blatchford, I., Sylva, K., Melhuish, E., Taggart, B. and Elliot, K. (2005), 'Investigating the Effects of Pre-school Provision: Using mixed methods in the EPPE research'. *International Journal of Social Research Methodology special issue on Mixed Methods in Educational Research, 8 (3),* 207-224.

Sammons, P., Taggart, B., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Barreau, S. and Manni, L. (2006a), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): Variations in Teacher and Pupil Behaviours in Year 5 Classrooms and Associations with School Characteristics. Full Report*. London: Institute of Education, University of London. http://www.ioe.ac.uk/schools/ecpe/eppe/eppe3-11/eppe3-11pubs.htm

Sammons, P., Taggart, B., Siraj-Blatchford, I., Sylva, K., Melhuish, E., Barreau, S. and Manni, L. (2006b), *Effective Pre-school and Primary Education 3-11 (EPPE 3-11) Summary Report: Variations in Teacher and Pupil Behaviours in Year 5 Classes. Research Report No. 817*. Nottingham: DfES Publications.

Sammons, P., Taggart, B., Siraj-Blatchford, I., Sylva, K., Melhuish, E. and Barreau, S. (2006c), *Effective Pre-school and Primary Education 3-11 (EPPE 3-11): Variations in Teacher and Pupil Behaviours in Year 5 Classes, Research Brief No. RB817*. Nottingham: DfES Publications.

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., Grabbe, Y., and Barreau, S. (2007a), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): Influences on Children's Attainment and Progress in Key Stage 2: Cognitive Outcomes in Year 5. Full Report*. London: Institute of Education, University of London.
http://www.ioe.ac.uk/schools/ecpe/eppe/eppe3-11/eppe3-11pubs.htm

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B. and Barreau, S. (2007b), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): Influences on Children's Development and Progress in Key Stage 2: Social/behavioural Outcomes in Year 5. Research Report no. DCSF-RR007*. Nottingham: DfES Publications

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., Grabbe, Y. and Barreau, S. (2007c), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11) Summary Report: Influences on Children's Attainment and Progress in Key Stage 2: Cognitive Outcomes in Year 5. Report No. DCSF-RR828*. Nottingham: DfES Publications.

Sammons, P., Sylva, K., Siraj-Blatchford, I., Taggart, B., Smees, R. and Melhuish, E. (2008a), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11) Influences on pupils' self-perceptions in primary school: Enjoyment of school, Anxiety and Isolation, and Self-image in Year 5*. London: Institute of Education, University of London.

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B. and Hunt, S. (2008b), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): Influences on Children's Attainment and Progress in Key Stage 2: Cognitive Outcomes in Year 6. Research Report No. DCSF-RR048*. Nottingham: DCSF Publications.

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B. and Jelicic, H. (2008c), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): Influences on Children's Development and Progress in Key Stage 2: Social/behavioural outcomes in Year 6. Research Report No. DCSF-RR049*. Nottingham: DCSF Publications.

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., Barreau, S. and Grabbe, Y. (2008d), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): The Influence of School and Teaching Quality on Children's Progress in Primary School. Research Report No. DCSF-RR028*. Nottingham: DCFS Publications.

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., Jelicic, H., Barreau, S., Grabbe, Y. and Smees, R. (2008e), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): Relationships between pupils' self-perceptions, views of primary school and their development in Year 5*. London: Institute of Education, University of London.

Sammons, P., Sylva, K., Siraj-Blatchford, I., Taggart, B., Smees, R. and Melhuish, E. (2008f), *Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): Exploring pupils' views of primary school in Year 5*. London: Institute of Education, University of London.

Sampson, R. J., Ruadenbush, S. W. and Earles, F. (1997), 'Neighborhoods and violent crime: A multi-level study of collective efficacy'. *Science,* 277, 918-924.

Scheerens, J. and Bosker, R. (1997), *The Foundations of Educational Effectiveness*. Oxford: Pergamon.

References

Schweinhart, L. J., Barnes, H. V. and Weikart, D. P. (1993), *Significant Benefits: The High Scope Perry pre-school study through age 27. Monograph of the High Scope Educational Research Foundation, No. 19*: High Scope Press.

Scott, K. and Carran, D. (1989*), 'Identification and Referral of Handicapped Infants'.* In M. C. Wang, M. C. Reynolds and H. J. Walberg (eds*),* Handbook of Special Education Research and Practice/Vol.3, Low Incidence Conditions (pp. 227-242).

Siraj-Blatchford, I. (1995), 'Expanding Combined Centre Provision: Bridging the gap between care and education'. In P. Gammage and J. Meighan (eds), *The Early Years: The Way Forward*. Nottingham: Education New Books.

Siraj-Blatchford, I. and Clarke, P. (2000), *Supporting Identity, Diversity and Language in the Early Years*. Buckingham: Open University Press.

Siraj-Blatchford, I. and Sylva, K. (2004), 'Researching pedagogy in English pre-schools'. *British Education Research Journal,* 30 (5)*,* 713-730.

Siraj-Blatchford, I., Sylva, K., Muttock, S., Gilden, R. and Bell, D. (2002), *Researching Effective Pedagogy in the Early Years (REPEY): DfES Research Report 356*. London: DfES, HMSO.

Siraj-Blatchford, I., Sylva, K., Taggart, B., Sammons, P., Melhuish, E. C. and Elliot, K. (2003), *The Effective Provision of Pre-School Education (EPPE) Project: Technical Paper 10 - Intensive Case Studies of Practice across the Foundation Stage*. London: DfES / Institute of Education, University of London.

Siraj-Blatchford, I., Sammons, P., Taggart, B., Sylva, K. and Melhuish, E. (2006), 'Educational Research and Evidence-Based Policy: The Mixed-method Approach of the EPPE Project'. *Evaluation of Research in Education, 19 (2),* 63-82.

Siraj-Blatchford, I., Siraj-Blatchford, J., Taggart, B., Sylva, K., Melhuish, E., Sammons, P. and Hunt, S. (2007a), 'Qualitative Case Studies: How low SES families support children's learning in the home'. In Effective Pre-school and Primary Education 3-11 (EPPE 3-11) Team, *Promoting Equality in the Early Years: Report to The Equalities Review*. London.
Siraj-Blatchford, I., Milton, E., Sylva, K., Laugharne, J. and Charles, F. (2007b), 'Developing the foundation phase for 3-7 year olds in Wales'. *Welsh Journal of Education,* 14 (1)*,* 43-68.

Spreadbury, J. (1995), 'Why parents read to children'. *Australian Journal of Early Childhood,* 20 (1)*,* 1-6.

Stipek, D. (1999), *Instructional Environment Observation Scale.* University of California: MacArthur Pathways through Middle Childhood Network.

Strand, S. and Demie, F. (2006), 'Pupil mobility, attainment and progress in primary school'. *British Educational Research Journal, 32 (4),* 551-568.

Strand, S. and Demie, F. (2007), 'Pupil mobility, attainment and progress at secondary school'. *Educational Studies, 33 (3),* 313-331.

Sylva, K. (1994), 'The impact of early learning on children's later development '. In C. Ball (ed.), *Start Right: the importance of early learning*. London: RSA.

Sylva, K. and Pugh, G. (2005), 'Transforming the early years in England'. *Oxford Review of Education,* 31 (1)*,* 11-27.

References

Sylva, K., Siraj-Blatchford, I., Melhuish, E. C., Sammons, P., Taggart, B., Evans, E., Dobson, A., Jeavons, M., Lewis, K., Morahan, M. and Sadler, S. (1999a), *The Effective Provision of Pre-School Education (EPPE) Project: Technical Paper 6 - Characteristics of the Centres in the EPPE Sample: Observation Profiles*. London: DfEE / Institute of Education, University of London.

Sylva, K., Siraj-Blatchford, I., Melhuish, E. C., Sammons, P. and Taggart, B. (1999b), *The Effective Provision of Pre-School Education Project: Technical Paper 6a - Characteristics of Pre-School Environments*. London: DfEE / Institute of Education, University of London.

Sylva, K., Sammons, P., Melhuish, E. C., Siraj-Blatchford, I. and Taggart, B. (1999c), *The Effective Provision of Pre-School Education (EPPE) Project: Technical Paper 1 - An Introduction to The Effective Provision of Pre-School Education (EPPE) Project*. London: DfEE / Institute of Education, University of London.

Sylva, K., Siraj-Blatchford, I. and Taggart, B. (2003), *Assessing Quality in the Early Years: Early Childhood Environment Rating Scale Extension (ECERS-E): Four Curricular Subscales*. Stoke on Trent: Trentham Books.

Sylva, K., Melhuish, E. C., Sammons, P., Siraj-Blatchford, I. and Taggart, B. (2004), *The Effective Provision of Pre-School Education (EPPE) Project: Final Report*. London: DfES/ Institute of Education, University of London.

Sylva, K., Siraj-Blatchford, I., Taggart, B., Sammons, P., Melhuish, E., Elliot, K. and Totsika, V. (2006), Capturing Quality in Early Childhood Through Environmental Rating Scales. *Early Childhood Research Quarterly, 21* (1), 76-92.

Sylva, K., Taggart, B., Siraj-Blatchford, I., Totsika, V., Ereky-Stevens, K., Gildena, R. and Bell, D. (2007a), 'Curricular quality and day-to-day learning activities in pre-school'. *International Journal of Early Years Education, 15 (1),* 49-64.

Sylva, K., Taggart, B., Melhuish, E., Sammons, P. and Siraj-Blatchford, I. (2007b), 'Changing models of research to inform educational policy'. *Research Papers in Education,* 22 (2)*,* 155-168.

Sylva, K., Scott, S., Totsika, V., Ereky-Stevens, K. and Crook, C. (2008), 'Training parents to help their children read: A randomised control trial'. *British Journal of Educational Psychology,* 78*,* 435-455.

Teddlie, C. and Reynolds, D. (2000), *The International Handbook of School Effectiveness Research*. London: Routeledge Falmer.

Teddlie, C. and Stringfield, S. (1993), *Schools Make a Difference: Lessons Learned from a 10 Year Study of School Effects*. New York: Teachers College Press.

The Treasury and Department of Education and Skills. (2003), *Every child matters* (London, The Stationery Office).

USA Government. (1965), Elementary and Secondary Education Act. http://usinfo.state.gov/usa/infousa/educ/educover.htm

USA Government. (2001), No Child Left Behind. Public Law 107-110 115STAT.1425. http://www.ed.gov/policy/elsec/leg/esea02/107–110.pdf.

Vygotsky, L.S. (1978), *Mind in Society.* Cambridge, MA: Harvard University Press.

Wells, G. (1999), *Dialogic Inquiry: towards a sociocultural practice and theory of education*. Cambridge: Cambridge University Press.

References

Wells Lindfor, J. (1999), *Children's Inquiry: Using language to make sense of the world*. New York: Teachers College Press.

White K.R. (1982), 'The relation between socioeconomic status and academic achievement'. *Psychological Bulletin,* 91*,* 461–481.

Wikeley, F., Bullock, K., Muschamp, Y. and Ridge, T. (2007), *Educational Relationships Outside School*. York: Joseph Rowntree Foundation.

Wirt, J., Choy, S., Gerald, D., Provasnik, S., Rooney, P., Watanabe, S. and Tobin, R. (2002), *The Condition of Education 2002.* Washington DC: National Center for Education Statistics, U.S. Department of Education.

Wirt, J., Choy, S., Gerald, D., Provasnik, S., Rooney, P., Sen, A. and Tobin, R. (2003), *The Condition of Education 2003*. Washington DC: National Center for Education Statistics, U.S. Department of Education.

Yates, S (2001) Students' Achievement and Perceptions of School Climate During the Transition from Single Sex Education to Co-education, *International Education Journal, 2 (4), 2001 Educational Research Conference 2001 Special Issue.*

Glossary of terms

Age standardised scores Assessment scores that have been adjusted to take account of the child's age at testing. This enables a comparison to be made between the performance of an individual pupil, relative to a representative sample of children in the same age group throughout the country or, in this case, the relative achievement of the EPPE sample.

Baseline measures Assessments taken by the EPPE child at entry to the study. These assessment scores are subsequently employed as prior attainment measures in a value added analysis of pupils' cognitive progress.

Birth weight Babies born weighing 2500 grams (5lbs 8oz) or less are defined as below normal birth weight, foetal infant classification is below 1000 grams, very low birth weight is classified as 1001-1500 grams and low birth weight is classified as 1501-2500 grams (Scott and Carran, 1989).

British Ability Scales (BAS) This is a battery of assessments specially developed by NFER-Nelson to assess very young children's abilities. The assessments used at entry to the EPPE study and entry to reception were:
Block building - Visual-perceptual matching, especially in spatial orientation (only entry to EPPE study)
Naming Vocabulary – Expressive language and knowledge of names
Pattern construction – Non-verbal reasoning and spatial visualisation (only entry to reception)
Picture Similarities – Non-verbal reasoning
Early number concepts – Knowledge of, and problem solving using pre-numerical and numerical concepts (only entry to reception)
Copying – Visual–perceptual matching and fine-motor co-ordination. Used specifically for children without English
Verbal comprehension – Receptive language, understanding of oral instructions involving basic language concepts.

Centre/School level variance The proportion of variance in a particular child outcome measure (i.e. Pre-reading scores at start of primary school) attributable to differences between individual centres/schools rather than differences between individual children.

***Child background* factors** Child background characteristics such as age, birth weight, gender, ethnicity.

Caregiver Interaction Scale (CIS) This scale (Arnett, 1989) of adult-child interaction was completed after a sustained period of observation with the 26 items forming 4 sub-scales: 'Positive relationships', 'Permissiveness', 'Punitiveness' and 'Detachment'. The 'Positive relationships' identifies favourable aspects of adult-child interaction whereas the other 3 sub-scales represent unfavourable aspects.

Contextualised models Cross-sectional multilevel models exploring children's cognitive attainment at entry to primary school, controlling for child, parent and home learning environment characteristics (but not prior attainment).

Controlling for Several variables may influence an outcome and these variables may themselves be associated. Multilevel statistical analyses can calculate the influence of one variable upon an outcome having allowed for the effects of other variables. When this is done the net effect of a variable upon an outcome controlling for other variables can be established.

Correlation A correlation is a measure of statistical association between two measures (e.g. age and attainment) that ranges form + 1 to -1.

Duration of pre-school In terms of the value added models, the duration of pre-school covers the time period between date of BAS assessment at entry to the EPPE study until entry to primary school. Note that the number of months of pre-school attended before the child entered the EPPE study is not included in this duration measure. A separate 'duration' measure of amount of time in pre-school prior to entering the study was tested but was not found to be significant (note that this 'duration' measure is confounded with prior attainment). In the contextualised models, duration of pre-school refers to the time period between entry to the target pre-school until entry to primary school. These duration measures provide a crude indication of length of pre-school experience.

ECERS-R and ECERS-E The Early Childhood Environment Rating Scale (ECERS-R) (Harms et al., 1998) is based on child centred pedagogy and also assesses resources for indoor and outdoor play. The rating scale developed in England (ECERS-E) (Sylva et al., 2003; 2006) was intended as a supplement to the ECERS-R and was developed specially for the EPPE study to reflect the Desirable Learning Outcomes (which have since been replaced by the Early Learning Goals), and more importantly the Curriculum Guidance for the Foundation Stage which at the time was in trial stage.

Educational effectiveness Research design that seeks to explore the effectiveness of educational institutions in promoting a range of child/student outcomes (often academic measures) while controlling for the influence of intake differences in child/student characteristics (see Teddlie & Reynolds, 2000).

Effect sizes (ES) Effect sizes (ES) provide a measure of the strength of the relationships between different predictors and the child outcomes under study, usually measured in standard deviation units. For further discussion see Elliot and Sammons (2004).

Family factors Examples of family factors are mother's qualifications, father's employment and family SES.

Hierarchical nature of the data Data that clusters into pre-defined sub-groups or levels within a system (i.e. young children within pre-school centres/primary schools, within LAs).

Home learning environment (HLE) characteristics Measures derived from reports from parents (at interview or using parent questionnaires) about what children do at home, for example, playing with numbers and letters, singing songs and nursery rhymes.

Intervention study A study in which researchers 'intervene' in the sample to control variables i.e. control by setting, the adult:child ratios in order to compare different specific ratios in different settings. EPPE is not an intervention study in that it investigates naturally occurring variation in pre-school settings.

Intra-centre/school correlation The intra-centre/school correlation measures the extent to which the scores of children in the same centre/school resemble each other as compared with those from children at different centres/schools. The intra-centre/school correlation provides an indication of the extent to which unexplained variance in children's progress (i.e. that not accounted for by prior attainment) may be attributed to differences between centres/schools. This gives an indication of possible variation in pre-school centre/school effectiveness.

Multiple Disadvantage Based on three child variables, six parent variables, and one related to the home learning environment which were considered 'risk' indicators when looked at in isolation. A child's 'multiple disadvantage' was calculated by summing the number of indicators the child was at risk on.

Multilevel modelling A methodology that allows data to be examined simultaneously at different levels within a system (i.e. young children within pre-school centres/primary schools, within LAs)., essentially an extension of multiple regression.

Multiple regression A method of predicting outcome scores on the basis of the statistical relationship between observed outcome scores and one or more predictor variables.

Net effect The unique contribution of a particular variable upon an outcome while other variables are controlled.

Pre-reading attainment Composite formed by adding together the scores for phonological awareness (rhyme and alliteration) and letter recognition.

Prior attainment factors Measures which describe pupils' achievement at the beginning of the phase or period under investigation (i.e. taken on entry to primary or secondary school or on entry to the EPPE study).

Quality of pre-school Measures of pre-school centre quality collected through observational assessments (ECERS-R, ECERS-E and CIS) made by trained researchers.

Quality of teaching Measures from Year 5 classroom observations using the IEO (Stipek) and COS-5 (Pianta) instruments.

Sampling profile/procedures The EPPE sample was constructed by:
- Five regions (six LAs) randomly selected around the country, but being representative of urban, rural, inner city areas.
- Pre-schools from each of the 6 types of target provision (nursery classes, nursery schools, local authority day nurseries, private day nurseries, play groups and integrated centres) randomly selected across the region.

Significance level Criteria for judging whether differences in scores between groups of children, schools or centres might have arisen by chance. The most common criteria is the 95% level ($p<0.05$) which can be expected to include the 'true' value in 95 out of 100 samples (i.e. the probability being one in twenty that a difference might have arisen by chance).

Social/behavioural development A child's ability to 'socialise' with other adults and children and their general behaviour to others measured by teachers'/pre-school staff ratings.

Socio Economic Status (SES) Parental occupation information was collected by means of a parental interview when children were recruited to the study. The Office of Population Census and Surveys OPCS (1995) Classification of Occupations was used to classify mothers and fathers current employment into one of 8 groups: professional I, other professional non manual II, skilled non manual III, skilled manual III, semi-skilled manual IV, unskilled manual V, never worked and no response. Family SES was obtained by assigning the SES classification based on the parent with the highest occupational status.

Standard deviation (sd) A measure of the spread around the mean in a distribution of numerical scores. In a normal distribution, 68% of cases fall within one standard deviation of the mean and 95% of cases fall within two standard deviations.

Total BAS score By combining 4 of the BAS sub-scales (2 verbal and 2 non-verbal) a General Cognitive Ability score or Total BAS score at entry to the study can be computed. This is a measure of overall cognitive ability.

Value added models Longitudinal multilevel models exploring children's cognitive progress, controlling for prior attainment and significant child, parent and home learning environment characteristics.

Value added residuals (pre-school effectiveness) Differences between predicted and actual results for pre-school centres (where predicted results are calculated using value added models).

Value added residuals (primary school academic effectiveness) Differences between predicted and actual results for primary schools measuring pupil progress across KS1 – KS2 (see Melhuish et al., 2006a; 2006b).

Appendix 1: The policy context of the EPPE 3-11 study

Prior to the election of 'New Labour' in 1997 policy in early years had a discernable split between 'care' and 'education'. Unlike some European countries (notably in Scandinavian countries but also in France) pre-school provision in the UK was patchy also, with 'education' and 'care' the responsibility of different government departments. Non-statutory pre-school provision had grown according to the laws of supply and demand, with a growing voluntary and private sector alongside the maintained (public) sector. Moreover children admitted to nursery schools and classes run by the local authority attended for free, while parents of children attending in the voluntary and private sector paid fees ranging from modest (in playgroups) to substantial (in private day nurseries). There were considerable geographical and socio-economic differences in the amount of free provision on offer and in the nature of the provision itself (Sylva and Pugh, 2005).

The 1997 Labour Government was committed to 'concentrate resources on the essential tasks of combating unemployment and poverty' (Labour Party Manifesto, 1997), with a promise to lower the number of workless households and improve public services. If women were to be tempted into the workforce, they needed 'organised' provision for young children. This was to be brought about by a raft of social policies including the introduction of Working Families Tax Credits and expanding child care (DfES, 2002). Thus the expansion and improvement of services to working families was central to this social reform. This bold commitment was summed up as follows:

'While the nineteenth century was distinguished by the introduction of primary education for all and the twentieth century by the introduction of secondary education for all, so the early part of the twenty first century should be marked by the introduction of pre-school provision for the under fives and childcare available to all' Rt. Hon Gordon Brown, MP, Chancellor of the Exchequer, (Brown, 2004).

In addition, the end of the twentieth century saw an increased focus on educational 'standards' across all curriculum subjects and phases of education in the UK. The introduction of a National Curriculum (Great Britain, 1988; DES, 1988) and national statutory assessments (DES and Welsh Office, 1988) for children 7, 11 and 14 years old provided the backdrop to the debate about how well our young children were performing. The publication of international comparisons of standards in Literacy, Mathematics and Science[19] was a wake-up call to many Governments concerned with a 'standards' agenda. The relative position of different countries on these international 'league tables' has added much to the debate about effective teaching, particularly in Reading and Mathematics. This increased focus on standards during statutory schooling (age 5 onwards), together with the need to reduce educational inequality, led to a keen interest in children's skills, attitudes and dispositions to learning when they entered school. There was considerable interest in the contribution of pre-school provision to preparing children, especially those from disadvantaged backgrounds for a good start on the National Curriculum that lay ahead for them. This turned the policy searchlight on early years education as one means of raising standards in primary schools.

The 1997 Labour Government made clear that its social reforms would be informed by research evidence (Humes & Bryce, 2001; Melhuish, 2006). The policy challenge was to transform services available for England's youngest children (aged 0-5), through a range of policy initiatives and legislation, i.e., to change the 'early years' sector from a 'patchwork quilt' to a 'seamless cover' of joined-up service under a single government department. These services were to combine education and care, provide a smooth transfer from non-statutory to statutory schooling, and offer early education for free to all three and four year olds whose parents wished it.

[19] PISA (Programme for International Student Assessment), TIMSS (Trends in International Mathematics and Science Study, and PIRLS (Progress in International Reading Literacy Study) see Mullis et. al., 2003.

Appendix 1: The policy context of the EPPE 3-11 study

The oldest EPPE 3-11 children entered primary school in September 1997 and our youngest cohort left primary school in July 2007. During the ten years our children were in primary school (all under a 'New Labour' Government) there have been significant changes to national educational policy and practices designed to raise standards and offer children more equality of opportunity. Listing all of these changes is outside of the remit of this report but it is important to note the following as they are relevant to the EPPE 3-11 findings particularly concerned with pupil outcomes.

A major change has come about under the Every Child Matters (DfES, 2003a) agenda. This has transformed local authorities and the way they work for children and young people by establishing a Children's Services structure rather than separating education, social services and health. Schools have had to take on their share of extended services to support children in ways they had not had to before, for instance, in terms of out-of-school care and provision. However, the emphasis has remained on improving outcomes for all children and especially those from more disadvantaged backgrounds in an attempt to improve social mobility. There are currently several reviews of primary education and curriculum taking place and an increased desire to gain empirical evidence which can help to shape policy developments and evaluate key policies too.

In England there has been a prescribed National Curriculum dating back to 1988 but during the 1990s/early 2000s there was a huge investment in large scale national reforms designed to raise Literacy and Numeracy outcomes for primary aged children. The National Literacy (DfEE, 1998) and later the National Numeracy Strategies (DfEE, 1999) were ambitious in not only prescribing specific pedagogical strategies but also providing structured activities for teachers to deliver. The two strategies were later combined in to a National Primary Strategy. The National Strategies have been part of the curriculum and pedagogy experienced by our EPPE 3-11 pupils. Following the National Strategies, schools have been encouraged to adopt approaches to the curriculum identified in a paper called Excellence and Enjoyment (DfES, 2003b) which sought to establish a broader and balanced curriculum outside of the specific focus on the 'core' subjects advocated by the National Strategies.

The research context

The international research literature abounds with studies demonstrating the positive benefits of early childhood education (Melhuish, 2004a; Melhuish & Petrogiannis, 2006). Two influential randomised control trials; the Perry Pre-school study (Schweinhart, Barnes and Weikart, 1993) and the Abecedarian study (Ramey & Ramey, 1998) both demonstrated positive effects of early education and care for children from disadvantaged backgrounds. The Perry Pre-school study was particularly important because, as a longitudinal study, it was able to provide evidence about the long term benefits that pre-school can bestow (for disadvantaged children in the US context). The study showed that early education (ages 3-5 years) improved high school grades, decreased delinquency and adult crime, and improved employment status and earnings. The often quoted economic argument that for each $1 invested in pre-school, $7.16 was saved in social, health and justice systems costs later on was persuasive in encouraging expansion in early years in the US (Barnett, 1996), and also was influential on emerging UK governmental thinking (Melhuish & Hall, 2007). However, in the UK there was little research evidence to suggest that our patchwork system of pre-schooling would lead to such positive outcomes.

Research studies such as those above led to new interest in early years services. The Rumbold Report (DES, 1990) highlighted the potential for pre-school education to give children a better start at school. This was followed by the Start Right Report (Ball, 1994) that called for investment in universal pre-school education. In this influential report Sylva, (Sylva, 1994, Appendix C) reviewed the research evidence and made a convincing case for the positive effects of early education on motivation as well as academic attainment.

In the period of the EPPE 3-11 study, there have been major research studies aimed at improving education in England. These have been reviewed by Sammons (forthcoming – 2008) and many feature educational effectiveness designs.

The impact of EPPE on policy and practice

From the outset the Effective Provision of Pre-School Education (EPPE) Project was designed to inform policy and everyday practice (Siraj-Blatchford et al., 2007a). An expert steering committee contributed to the 'policy steer' and it included policy makers at national and local level as well as practitioners, academics and researchers. In this way, the EPPE project continually adjusted its aims and methods to emerging policy issues (Sylva et al., 2007b). When integrated provision came into the policy realm, the EPPE project added this pre-school type to its sample. When the UK government turned its attention to combating social exclusion, the EPPE project undertook analysis of the effects of different kinds of pre-school on vulnerable children. When new forms of qualification were devised, the EPPE project analysed the contribution of staff training to children's learning.

The case studies have always been a vital part in the design; they show in detail and 'on the ground' how staff teams can function effectively, how children's play can be extended and lifted to new heights of intellectual challenge, and how parents and staff can work together so that the 'learning environments' of home and pre-school are harmonized and stretched.

The impact has been seen at four levels:

1. National policy–through evidence at Parliamentary Select Committees, Ministerial Briefings and contributions to the Spending Review at departmental and Treasury briefings and evidence to teams preparing government reports and policy documents.
2. Local Authority policy – through disseminations to officers and Elected Members of local authorities seeking to reconfigure their early years services, and locally through workshops and training, usually organised by the Early Years Development and Care Partnerships.
3. Practitioners and Parents – through lectures, seminars and workshops focused on practical pedagogies. The EPPE findings have been reported widely in practitioner publications e.g. Nursery World, Primary Practice, etc. One unanticipated impact of the EPPE project has been the way it has raised awareness of rigorous methods in carrying out 'policy-sensitive research', with people at every level increasingly asking 'How do you know it works?'
4. Academic/Research community – The EPPE project Team have published 12 Technical papers (from the original project), showing details of analyses and research instruments. There are papers in research journals that have contributed to the debate about effective early years schooling at many academic conferences in a number of countries. The EPPE project team developed a new instrument for assessing the quality of curricular provision; the ECERS-E (see Sylva et al., 2006), which is now widely used. In addition to developing the ECERS-E, the team developed the interview schedule for assessing the 'home learning environment', and this measure is being used in other research studies. The project is affiliated to the Economic and Social Research Council (ESRC) Teaching and Learning Research Programme (TLRP).

The EPPE project set out to contribute to the debate about the education and care of young children; the EPPE project design targeted issues that could 'make a difference' to the lives of young children and their families. A question that arises is whether the effects of early education, which were so evident at ages 5 and 7, continue through to the age 11. Another question concerns the way in which educational experiences in Key Stage 2 (KS2) interact with the earlier pre-school experiences in the shaping of cognitive and social/behavioural outcomes for children. The Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11) has provided answers to these questions and others and this Final Report brings all previous EPPE 3-11 findings together with new findings relating to outcomes at the end of KS2 (Year 6, age 11).

Appendix 2: Summary of data collected

Table 10: Summary of data/measures collected in the EPPSE 3-11 project

Child Factors	Data collection source
Gender Ethnicity Developmental problems Behavioural problems Health problems Siblings Need of EAL support Birth weight	Parent interviews during pre-school Parent questionnaires during KS1 and KS2
Family factors	**Data collection source**
Free school meals (FSM) Family earned income Mother's qualification level Father's qualification level Family SES Parent's employment Language spoken at home Marital Status	Parent interviews during pre-school Parent questionnaires during KS1 and KS2 Teachers questionnaire reporting about each individual child during KS1 and KS2
Home Learning Environment (HLE)	**Data collection source**
Early years HLE Key Stage 1 HLE	Parent interviews during pre-school Parent questionnaires during KS1
Neighbourhood and Mobility	**Data collection source**
Mobility Neighbourhood deprivation	Tracking children's moves in pre-school and primary school Parent questionnaires Nationwide Index of Multiple Deprivation (IMD)
Child outcomes	**Data collection source**
Cognitive outcomes (Mathematics and English) Social/behavioural outcomes ('Self-regulation', 'Pro-social' behaviour, 'Hyperactivity' and 'Anti-social' behaviour) Self-perceptions and views of primary school	Tests and assessments Teacher ratings Pupils' self-report
Pre-school experience	**Data collection source**
Attending a pre-school Type of pre-school Duration Observed quality of pre-school Pre-school effectiveness	Pre-school study
Primary School experience	**Data collection source**
Primary school academic effectiveness School ratings School and Teaching quality	Value added measures of academic effectiveness Ofsted ratings of school Classroom observations

Appendix 3: Home Learning Environment (HLE) measures

The EPPE 3-11 Project - Children's activities at home

The Early years HLE index is composed of the first seven of the measures below (see Box 9), specifically those deemed the most educationally orientated, and has a scale of 0-49; the frequency of each of the activities being coded on a scale of 0-7 (0 = *not occurring*, 7 = occurring *very frequently*) (Melhuish, Phan, Sylva, Sammons, Siraj-Blatchford, & Taggart, 2008).

Box 9: The specific items associated with the Early years Home Learning Environment (HLE) measure

The Early Years Home Learning Environment (HLE)

- Going to the library;
- being read to;
- learning activities with the alphabet
- learning activities with numbers/shapes
- learning activities with songs/poems/nursery rhymes
- playing with letters/numbers
- painting or drawing
- playing with friends at home
- playing with friends elsewhere
- visiting relatives or friends
- shopping with parent
- watching TV
- eating meals with the family
- having a regular bedtime.

Box 10: The specific items associated with the Key stage 1 Home Learning Environment (HLE) measure

The Key Stage 1 Home Learning Environment (HLE)

HLE Factors and the items loading on these factor:

- **Home Computing**
  - The Child plays on computer by themself.
  - Respondent plays computer games with the child.
  - Respondent uses computer with the child in educational ways.
- **Parent-Child enrichment outing/activity outside home.**
  - Respondent visits library with the child.
  - Respondent does sport/physical activity with the child.
  - Respondent goes on educational visits with the child.
- **Parent-child one-to-one interactions at home**
  - Respondent plays with the child using toys/games/puzzles.
  - Respondent reads to the child.
  - Respondent listens to the child read.
- **Expressive play**
  - The Child plays 'make believe' or pretend games.
  - The Child paints/draws/makes models.
  - The Child enjoys dance music and movement.

Appendix 4: The Multiple Disadvantage Index

The Multiple Disadvantage Index was developed as part of the Early Years Transition & Special Educational Needs (EYTSEN) Project which focuses on the identification of children 'at risk' of SEN (see Sammons et al., 2004b). An index was created based on 10 indicators in total: three child variables, six parent variables, and one related to the Early years Home Learning Environment (HLE). All the variables were chosen because they related to low baseline attainment when looked at in isolation. Where indicators were closely related, such as first language and ethnic groups, only the most significant was included.

Child variables

- First language: English as an additional language (EAL)
- Large family: 3 or more siblings
- Pre-maturity / low birth weight

Parent variables

- Mother's highest qualification level: no qualifications
- Social class of father's occupation: Semi-skilled, unskilled, never worked, absent father
- Father not employed
- Young Mother (Age 13-17 at birth of EPPE child)
- Lone parent
- Mother not working / unemployed
- Low Early years Home Learning Environment (HLE)

Appendix 5: Investigating the academic effectiveness of all primary schools in England

The Key Findings of an analyses into the child, family and school factors associated with pupils' academic progress in all primary schools in England for the years 2002 to 2004 are reported in full in Melhuish et al., (2006a; 2006b). Here are a summary of findings.

Key findings

- For all subjects, the prior attainment of pupils measured by Key Stage 1 (KS1) assessments is an important contributor to their performance in Key Stage 2 (KS2) assessments. KS1 performance in Reading is most important for predicting KS2 English performance and KS1 Mathematics is the most powerful predictor for KS2 Mathematics, Science and average score.
- Measures of school effects on English are most variable between schools and across years, while measures involving Mathematics are most stable.
- There are marked differences in the amount of progress that different schools produce between KS1 and KS2, depending on the initial level of ability of pupils - this is termed differential effectiveness. Analysis suggests that a major differentiating feature between effective and ineffective schools (in terms of contextualised pupil progress) resides in their degree of success with low ability pupils in particular. Also while all children benefit from being in an effective school rather than an ineffective one, the consequences are markedly greater for low ability children than for high ability children.
- Pupils who are eligible for free school meals (FSM) and pupils with special educational needs (SEN) show substantially less progress across all subjects between KS1 and KS2 in all three years. As these pupils also have lower KS1 attainment, the gap is widening between them and others over time.
- In English, girls from all ethnic groups made increasingly better progress than boys from KS1 to KS2 in all subjects in all three years. Bangladeshi and Chinese boys and girls made more progress than white boys and girls.
- In Mathematics, boys made consistently more progress than girls for all three years and in all ethnic groups. Chinese children did better than white children in all years. Black Caribbean boys did worse than white boys, while progress of Black Caribbean girls is comparable to white girls.

For more details see the full report –Melhuish et al., (2006a).

Appendix 6: The relationship between classroom observations and teachers' perceptions

In the 125 schools in which the observations took place, class teachers were asked to complete a questionnaire on their classroom practices and views of the school. This was then analysed to explore:

1 the variation in the self-report of Year 5 teachers concerning their teaching practices and perceptions of their schools and pupils

2 the relationships between self-reported *teaching practices* (what they do) and measures of their pupils' perceptions, Ofsted inspection judgements, classroom observational data, the value added measures of the primary school academic effectiveness and the percentage of disadvantaged pupils in their school and

3 the underlying dimensions of teachers' perceptions (what they think about their school and being a teacher) and how these dimensions relate to their pupils' perceptions, Ofsted inspection judgements, classroom observational data, the value added measures of the primary school academic effectiveness and the percentage of disadvantaged pupils in their school.

This analysis helped to triangulate data from a variety of sources to give a much more rounded picture of Year 5 classrooms (Cohen, Manion & Morrison, 2000). In earlier reports (Sammons et al., 2008d) EPPE 3-11 has reported how teachers' perceptions related to some pupils' cognitive and socio/behavioural outcomes. The key findings of the full analyses are reported below:

Variation in Year 5 teachers' reports of teaching practices and perceptions of schools and pupils

- Overall most teachers were extremely positive about working in their schools. There was little variation in teachers' views about standards and teaching quality in their schools. However, there was some variation in teachers' reports on school resources and the environments they are working in.
- There was considerable variation in teachers' views about pupils' behaviour in classrooms and parental support for learning, as well as school communication with parents.

Classroom observational data and self-reported teaching practice and perceptions

Teachers' views were related to factors, identified through the classroom observations undertaken by independent trained EPPE 3-11 observers, to explore the relationships between teachers' reports of their classroom practices and their actual observed practice.

- Data suggests that large amounts of extra curriculum activities were related to less positive engagement seen in classroom observations.
- Classroom observational data on positive engagement was associated with setting more and better homework as reported by teachers.
- Better *Quality standards and rules* and *Rewards* factors as perceived by teachers were also related to less disorganisation in a classroom as measured in observations.
- Positive pupil behaviour as reported by teachers was associated with better pedagogy and less disorganisation in a classroom as measured by observations. Yet, it is interesting that *Pupils' agency and voice* was related to smaller amounts of pupils' positive engagement.
- *Parental support of their child's learning* was associated with less disorganisation in a classroom.

Appendix 6: The relationship between classroom observations and teachers' perceptions

Links between pupils' and teachers' perceptions
Teacher's views were also related to the views of pupils and the following was of note:

- Better resources as reported by teachers were also associated with better pupils' views about overall behaviour in school, their own 'Behaviour self-image' and learning and the teaching support they receive.
- Larger amounts of extra curriculum activities were related to lower 'Academic self-image' and 'Enjoyment of school' as reported by pupils.
- When teachers reported better *Quality standards and rules* in their schools their learners also reported better 'Behaviour self-image', learning and teaching support and better pupil behaviour. Yet at the same time pupils in those schools report more 'Anxiety and isolation'.
- Higher levels of reward system as reported by teachers also positively corresponded to pupils' own views about pupil behaviour and learning and teaching support. Yet higher levels of rewards were associated with higher levels of 'Anxiety and isolation' as reported by pupils.
- Teachers' perceptions of better overall pupils' behaviour correlated with learners' self-perceptions, that is, better 'Academic self-image', 'Behaviour self-image' and overall behaviour in school. Whereas, when teachers reported higher levels of *Anti-academic ethos* in their classrooms learners also reported worse pupils' behaviour.
- *School communication with parents* as reported by teachers was related to better 'Academic self-image' of pupils as well as pupils' behaviour as perceived by pupils.
- *Parental support of their child's learning* as perceived by teachers was associated with better pupils' behaviour, but lower 'Enjoyment of school' as reported by pupils.

In schools with high levels of disadvantaged pupils:
Teacher reports were analysed according to the levels of disadvantage of their school (measured by FSM). Higher levels of disadvantage were related to the following:

- more pupils involved in School Action/Action Plus, pupils who have been excluded from school fixed term and pupils from homes where English is not the first language;
- more pupils who receive English as an additional language (EAL) support and those who receive help because of persistent behavioural problems;
- more mixed age classes;
- higher levels of noise in their classrooms;
- pupils not having enough books and computers; poorer quality of sports equipment and playground areas as well as lower quality and cleanliness of pupils' toilets and the quality of the school library;
- higher reported levels of teachers' absenteeism and higher levels of supply cover staff;
- homework not being marked and returned to pupils quickly;
- more reports on tolerance of poor performance of teachers, less agreement about what effective teaching looks like and less agreement in applying rules on pupil behaviours;
- more teachers reporting behaviour problems in class and more bullying where name calling is more frequent, there were also more pupils whose behaviour in class prevents other pupils from learning and more pupils not doing as well as they could because they are afraid that other pupils won't like them.
- fewer pupils being interested in learning and willing to do well in school and getting on well with teachers. Overall teachers from these schools reported worse behaviour of pupils, less *Pupils' agency and voice* as well as higher *Anti-academic ethos*;
- poorer attendance at parents evenings and receive less support from parents regarding their child's learning at school as well as the overall work of a school.

Appendix 6: The relationship between classroom observations and teachers' perceptions

Additionally the relationship between teacher's views and Ofsted judgements were explored:

- Better school resources as reported by teachers were associated with better Ofsted inspection judgments on attendance, leadership and management and teaching in Key Stage 1.
- Larger amounts of extra curriculum activities as reported by teachers were associated with better attendance and teaching in Key Stage 1 as judged by the Ofsted inspections
- Better use of homework was positively correlated with Ofsted judgments of attendance and improvement of schools from last inspection.
- *Quality standards and rules* in the school as seen by teachers were positively associated with better Ofsted inspection judgements in leadership and management and better pupils' attendance.
- *Reward system* at school was positively associated with better grades of Ofsted inspection on quality and use of ongoing assessment.
- Ofsted grades regarding learner behaviour and attendance were related to perceptions of better pupil behaviour by teachers. *Anti-academic ethos* as reported by teachers was related to worse Ofsted inspection grades in leadership and management. *Pupil agency and voice* was associated with better Ofsted grades regarding attendance.
- Higher *parental support of their child's learning* was related to better Ofsted inspection grades regarding overall effectiveness of the school, improvement since last inspection, leadership and management, learner behaviour and attendance.
- *School communication with parents* as reported by teachers was related to better Ofsted inspection grades in leadership and management.

Finally teachers' views were analysed in relation to the value added measures of the primary school academic effectiveness and the results revealed:

- Significant positive associations were found between the academic effectiveness of the school in science and better use of homework as reported by teachers.
- *Parental support of their child's learning* was associated with better academic effectiveness in Mathematics and Science.

Appendix 7: The Key Stage 1 Home Learning Environment (HLE)

As the home learning environment (HLE) during the pre-school period was shown to have a strong impact on children's academic attainments during pre-school, parents were again surveyed during Key Stage 1 (KS1) about their interactions with their EPPE 3-11 child at home via a parent questionnaire. They reported on activities such as the frequency of reading to the child, taking the child out on educational visits, computing activities etc. (see Appendix 3 for all items).

The individual measures have been aggregated to form four factors representing different parental activities during KS1: 'Home computing', 'One-to-one interaction', 'Expressive Play' and 'Enrichment Outings' (see Appendix 3). These factors were tested with respect to their influence on cognitive attainments at the end of Year 6 (age 11). The models continued to control for the impact of the Early years HLE as this remained the stronger predictor even when the KS1 HLE measures were included. The relationship between Early years HLE and Home computing at KS1 is quite weak: the correlation between the two measures failed to reach significance, rho=0.03. The relationship between Early years HLE and 'One-to one interaction' was significant but still modest: rho=0.17.

Taking previous findings into account the reference group here was very high levels of 'One-to-one interaction'. For English the results indicate that very high scores on the One-to-one interaction' factor are associated with lower attainment in English at the end of Year 6, when compared to any other amount of interaction (ES=0.17 for low; ES=0.18 for moderate and moderate to high). This effect might be explained by the fact that a lot of parental involvement during Key Stage 1 (when the data was gathered) is indicative of poor reading skills, e.g. where child is a poor reader the child may receive more parental support, even to the extent of replacing the child's efforts to read themselves. On the other hand, children who scored low on this factor were not read to a lot by their parents during Key Stage 1, probably due to the fact that they were already good readers and read on their own.

High levels of 'Home computing'[20] (compared to all other amounts) are associated with significantly lower attainment in English (ES=0.17 for low; ES=0.18 for moderate, and ES=0.05 for moderate to high). Presumably this is because very high levels of 'Home computing' may replace or displace reading, for example, as an out of school activity, and may involve lesser learning opportunities if high levels involve non–educational games.

We also tested to see whether the HLE measured during Key Stage 1 had a significant impact on social/behavioural outcomes at age 11. Contrary to what was expected none of the KS1 HLE factors were related to children's social outcomes at age 11. The findings suggest that the Early years HLE is a better predictor of later children's outcomes than KS1 HLE. This may be because early experiences are more important than later ones, or it may be due to difference in way the data were collected. The Early years HLE was measured by a 1-to-1 interview whilst the KS1 HLE was accessed by postal questionnaire.

[20] Playing on the computer or using the computer in educational ways.

Appendix 8: Classroom observation instruments

The IEO (Stipek)

Instructional Environment Observation Scale (IEO) (Stipek)

Researchers using the IEO observed one complete Literacy and Numeracy lesson. There are four main areas of this instrument: General Classroom Management and Climate Scales for both subjects, General Instruction Scales for both subjects, and Mathematical Instruction Scales for Numeracy, and Reading / Writing Instruction Scales for Literacy.

Literacy

1. Classroom climate
2. Classroom routines
3. Cross-Disciplinary connections
4. Linkage to life beyond the classroom
5. Social support for student learning
6. Student engagement
7. Reading as meaning making
8. Basic skills development in the context of reading
9. Higher order thinking in writing
10. Purposeful development of writing skills
11. Instructional conversations

Numeracy

1. Classroom climate
2. Classroom routines
3. Cross-Disciplinary connections
4. Linkage to life beyond the classroom
5. Social support for student learning
6. Student engagement
7. Use of maths analysis
8. Depth of knowledge and student understanding
9. Basic skill development in the context of problem solving
10. Maths discourse and communication
11. Locus of maths authority

The COS-5 (Pianta)

Classroom Observation System for Fifth Grade (COS-5) (Pianta)

This instrument is divided into two main parts: The Frequency of Behaviour Coding System, and the Measures of Quality Coding System.

The Frequency of Behaviour Coding System
The Frequency of Behaviour Coding System is used in the first of the two 10-minute observation segments. This part includes the coding of child and teacher behaviours across a range of classroom and curriculum settings. For the duration of this part of the observation, a target child (TC) is observed and recorded during a sequence of ten 60-second intervals (30-seconds observing, 30-seconds recording) during which focus is placed upon capturing information in five general areas of the target child's classroom behaviour and experience.
The categories are:

Child level setting - the classroom setting in which the target child is working:

1. Whole class
2. Large group >6
3. Small group - 6 or fewer
4. Individual

Content of target child's activity - The nature of the activity in which the target child is engaged in including:

1. Subject areas (e.g. Literacy, Numeracy, etc.),
2. Sub categories within a sub area (e.g. Word-Level and Comprehension in Literacy)
3. Part of Literacy and Numeracy hour as describe by the NLS or NNS (specifically adapted for use in the UK)
4. Non-curricular activities such as Enrichment and Free Time

Teacher behaviour - Interaction with the target child:

1. Attending to target child (directly)
2. Teaching basic skills
3. Teaching analysis
4. Managerial instructions
5. Monitoring and checking work
6. Displaying positive or negative effect and discipline.

Child academic behaviour:

Type of behaviour	**Degree of involvement**
1. Learning/performing basic skills	1. Engaged
2. Learning/performing analysis	2. Highly engaged
3. Collaborative work	3. Unproductive
4. Requesting attention/help/information	4. Off-task or alternative academic behaviour
5. Volunteers	

Child social behaviour - social interactions with peers and adults in the classroom:

1. Positive/neutral engagement with peers
2. Negative/aggressive engagement with peers
3. Positive affect towards teacher
4. Negative affect towards teacher
5. General disruptive behaviour.

The Measures of Quality Coding System
This part of the observation instrument is dedicated to ten minutes continuous observation of behaviours and characteristics of the target child and the teacher in the classroom at a more global level. This section contains two broad categories: Child Codes and Classroom Codes. Under these main headings there are a number of sub-headings or constructs (behaviours, characteristics) that must be rated.

Child codes	**Classroom codes**
1. Positive Affect	1. Richness of instructional methods
2. Self-Reliance	2. Over-Control
3. Sociable/Co-operative with peers	3. Chaos
4. Attention	4. Teacher Detachment
5. Disruptive	5. Positive classroom climate
6. Activity level	6. Negative classroom climate
7. Child-Teacher Relationship	7. Productive use of instructional time
	8. Evaluative Feedback
	9. Teacher sensitivity (Main teacher only)

Items are rated on a seven-point scale (1 very uncharacteristic to 7 very characteristic).