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# Influences on children's cognitive and social development in Year 6

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# Influences on children's cognitive and social development in Year 6

## **Abstract**

The Effective Pre-School and Primary Education 3-11 project (EPPE 3-11) investigates the impact of background factors, pre-school and school experiences on a national sample of young children in England between the ages of 3 and 11 years. This Research Brief focuses on the relationships between various child, family, home, pre-school and primary school characteristics and children's subsequent cognitive (English and Mathematics) and social/behavioural outcomes ('Self-regulation', 'Pro-social' behaviour, 'Hyperactivity' and 'Anti-social' behaviour) at age 11 in Year 6 of primary school. It also investigates children's academic and developmental progress across Key Stage 2 (between Year 2 and Year 6). The brief explores the continuing influence of pre-school and the combined influence of pre-school and primary school experience on children's cognitive and social/behavioural outcomes. These findings update and extend earlier analyses of pupils' outcomes in Year 2 and 5 (see Sammons et al., 2004; 2007a; 2007b) and form the end point of the primary phase of the research.

## **Keywords**

cognitive, influences, children, social, 6, development, year

## **Disciplines**

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## EFFECTIVE PRE-SCHOOL AND PRIMARY EDUCATION 3-11 PROJECT (EPPE 3-11) INFLUENCES ON CHILDREN'S COGNITIVE AND SOCIAL DEVELOPMENT IN YEAR 6

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The Effective Pre-School and Primary Education 3-11 project (EPPE 3-11) investigates the impact of background factors, pre-school and school experiences on a national sample of young children in England between the ages of 3 and 11 years. This Research Brief focuses on the relationships between various child, family, home, pre-school and primary school characteristics and children's subsequent cognitive (English and Mathematics) and social/behavioural outcomes ('Self-regulation', 'Pro-social' behaviour, 'Hyperactivity' and 'Anti-social' behaviour) at age 11 in Year 6 of primary school. It also investigates children's academic and developmental progress across Key Stage 2 (between Year 2 and Year 6). The brief explores the continuing influence of pre-school and the combined influence of pre-school and primary school experience on children's cognitive and social/behavioural outcomes. These findings update and extend earlier analyses of pupils' outcomes in Year 2 and 5 (see Sammons et al., 2004; 2007a; 2007b) and form the end point of the primary phase of the research.

### Key findings

#### Child and Family Background characteristics

- The most important background predictors of English and Mathematics attainment and Self-regulation in Year 6 are: mothers' highest qualification levels, the Early years Home Learning Environment (HLE) measured at age 3-4 and continued need for support with English as an Additional Language (EAL).
- Gender has a strong effect on both 'Pro-social' behaviour and 'Hyperactivity', a moderate effect on Anti-social behaviour (girls have more favourable scores on all) but weaker effects on English (girls have higher attainment) and Maths (boys have higher attainment).
- Background factors are generally more important for academic than social/behavioural outcomes. Taken together, the combined influence of child, family and background factors on children's outcomes is weaker at age 11 than it is at age 7.
- The influence of neighbourhood disadvantage as a predictor of children's cognitive and social behavioural outcomes is non-significant after taking into account child and family characteristics, particularly HLE.

#### Continuing Pre-school effects

- Pre-school quality and effectiveness remain statistically significant predictors of attainment and social/behavioural outcomes in Year 6 and of progress across Key Stage 2, after the influence of background factors has been taken into account.

- Children gained most benefit from having attended high quality pre-school provision, but medium quality provision also led to better Mathematics and social/behavioural outcomes in Year 6 than low quality or no pre-school (the 'home' group).
- Children who had attended low quality pre-school did no better in Mathematics and English than those who had not attended a pre-school, and showed slightly higher levels of Hyperactivity in Year 6, whereas children who had not attended pre-school continued to show poorer Pro-social behaviour compared to those who had gone to pre-school.
- Although having attended any pre-school versus none shows positive benefits for a range of educational outcomes in Year 6, the impact is carried mainly by the pre-school quality and effectiveness effects, except for Pro-social behaviour where attending any provision shows sustained benefits compared with none.
- Comparing the size of various influences for children's outcomes, early HLE and support with EAL are twice as strong as the influence of pre-school quality on English attainment, and mother's highest qualification (degree versus none) is twice as strong as the influence of pre-school quality for Mathematics and Self-regulation.
- For academic outcomes, particularly Mathematics, and for all social/behavioural outcomes, having attended a high quality pre-school is found to be of particular benefit for boys, children with special educational needs (SEN) and disadvantaged children. While higher quality pre-school benefits all children, the benefits are greater for these groups. The difference between attending a high quality or high effectiveness pre-school and attending a low quality or effectiveness pre-school is larger for children who come from more disadvantaged backgrounds than the difference of attending high versus low quality or effectiveness pre-school for children who come from less disadvantaged backgrounds.

### **Primary school academic effectiveness**

- Attending a more academically effective primary school (measured by value-added)<sup>1</sup> had a significant positive influence on EPPE children's English and particularly Mathematics attainment in Year 6. The impact of attending a highly academically effective school versus a low one is on a par with the impact of family income for English and as strong as that for Early years HLE for Mathematics, and it is stronger than the influence of pre-school quality.
- By contrast, the academic effectiveness of the primary school did not show a statistically significant relationship with social/behavioural outcomes across the whole sample. However it was important for particular sub-groups of children; those identified as having SEN in primary school and those with mothers who had low qualification levels showed better Self-regulation and reduced scores for Anti-social behaviour if they attended highly academically effective primary schools.

### **Combined pre-school quality and primary school academic effectiveness**

- Although pre-school and primary school effects are moderate when studied separately, further analyses of their combined influence show stronger positive effects on a range of educational outcomes.
- The experience of high quality pre-school continues to provide some protection against the disadvantage of later attending a less academically effective primary school in terms of subsequent cognitive attainment (particularly for Mathematics), and Self-regulation. Similarly attending a highly academically effective primary school helps to compensate for the disadvantage of not attending pre-school or attending a low quality pre-school in terms of later cognitive attainment and Self-regulation. Moreover, both the experience of high quality pre-school and highly academically effective primary schools offer similar degrees of protection in terms of promoting better outcomes in Year 6 individually, and in combination for academic outcomes and Self-regulation.

<sup>1</sup> The contextualised value added analyses have been undertaken independently of the EPPE 3-11 research for three full cohorts of pupils (2002 – 2004) in all primary schools in England, in order to create a value added measure of academic effectiveness of for every school attended by an EPPE child (Melhuish et al., 2006).

## Academic and social behavioural Progress over Key Stage 2

- In addition to attainment in Year 6, EPPE also measures progress over Key Stage 2 (from age 7-11). Pupils' academic and social/behavioural progress over Key Stage 2 is also influenced by background factors such as gender, mother's qualifications and Early years HLE, although the effects are much weaker than those found for attainment.
- Educational influences related to pre-school quality and primary school academic effectiveness show a stronger impact on cognitive progress over Key Stage 2 than most background factors. The impact of attending a high academically effective primary school versus a low effective primary is on a par with the effect of a mother having a degree versus no qualification (slightly stronger for Maths, slightly weaker for English). The pre-school quality influence on progress is also still evident, although not as strong as that of the primary school academic effectiveness. The effect of a high quality experience versus none is on a par with the influence of a child's eligibility (or not) for free-school meals.
- High quality and highly effective pre-schools have a similar positive impact on social/behavioural progress across Key Stage 2 as they do on developmental levels in Year 6. Similar to progress in cognitive outcomes, the effect of a high quality pre-school experience versus none is comparable with the effect of a child's eligibility (or not) for free-school meals (FSM) for all social/behavioural outcomes, except for Pro-social behaviour, for which there was no FSM effect, but pre-school quality remains significant. However primary school academic effectiveness had no significant influence on social/behavioural progress, just as it showed no significant effect for social/behavioural developmental levels.

### The EPPE 3-11 Research: Background

The original EPPE study investigated children's intellectual and social/behavioural development between the ages of 3-7 years (Sylva et al., 2004). The EPPE 3-11 extension follows up the sample to the end of primary school (age 11 years, the end of Key Stage 2). The EPPE technical reports and the website: [www.ioe.ac.uk/projects/eppe](http://www.ioe.ac.uk/projects/eppe) provides further details about the study and the sample. This Research Brief summarises the main results of analyses of children's cognitive and social/behavioural development for the EPPE 3-11 sample in Year 6. The study investigates the long

term impact of child, family, the Early years Home Learning Environment (HLE) and pre-school on children's English and Mathematics outcomes at age 11 (Year 6) as well as four dimensions of social/behavioural development: 'Self-regulation', 'Pro-social' behaviour, 'Hyperactivity' and 'Anti-social' behaviour.

In addition, we explore the influence of the academic effectiveness of the primary school attended, and the combined impact of pre-school and primary school on children's developmental outcomes.

For further details see the two full Research reports: 'Influences on Children's Attainment and Progress in Key Stage 2: Cognitive Outcomes in Year 6' and 'Influences on Children's Development and Progress in Key Stage 2: Social/behavioural outcomes in Year 6' (Sammons et al., 2008b; 2008c).<sup>2</sup>

### Data and Analysis Strategy

The findings reported here are based on analyses of data on children's cognitive and social/behavioural outcomes and relationships with a range of child, family and home learning environment (HLE) characteristics and the characteristics of the pre-schools and schools attended.

Children's National Assessment scores in English and Mathematics in Year 6 (age 11) were standardised and used as outcome measures (English and Mathematics). In addition, earlier measures of cognitive attainment in National assessments in Year 2 (age 7) in Reading and Mathematics were collected and standardised to explore progress across Key Stage 2. The sample included 2701 children in over 950 primary schools.

Individual measures of social/behavioural development in Year 6 were obtained from class teachers' assessments using an extended version of Goodman's *Strengths and Difficulties Questionnaire* (1997). Four dimensions of social/behavioural development: 'Self-regulation', 'Pro-social' behaviour, 'Hyperactivity' and 'Anti-social' behaviour were identified and reported here.

<sup>2</sup> For information on outcomes at age 10 (Year 5) and information on variations in teacher and pupils behaviours (Year 5) and their impact on child outcomes see [www.ioe.ac.uk/projects/eppe](http://www.ioe.ac.uk/projects/eppe)

Pre-school quality was measured using two internationally recognised observation instruments: ECERS-R (Harms et al., 1998); focuses on emotional and social care and ECERS-E (Sylva et al., 2006); focuses on the pre-school curriculum.

Effectiveness indicators for individual pre-school settings were also calculated using value added models of children's progress during the pre-school period (age 3 to 5). These included several aspects covering cognitive and social/behavioural outcomes during pre-school (Pre-reading, Early number concepts, 'Independence & Concentration', 'Peer sociability', 'Co-operation and Conformity' and reducing 'Anti-social' behaviour).

Additional value added measures of overall primary school academic effectiveness in English and Mathematics were derived from independent statistical analyses of National assessment data sets for all primary schools in England in 3 successive years (2002-2004) (Melhuish et al., 2006). These school level value added results were incorporated into the EPPE 3-11 data sets to provide independent indicators of the quality of the primary school attended by children in this sample (measured in terms of academic progress of pupils in three successive national cohorts 2002-2004).

Statistical analyses (using multilevel models) investigated the influence of different child, family and HLE background factors as predictors of children's attainment and development at age 11 and progress over Key Stage 2 from age 7 to 11. These analyses identify the unique (net) contribution of particular factors to variations in children's outcomes, while other background influences are controlled. For example, the impact of family socio-economic status (SES) is established while taking into account the influence of mothers' qualification levels, low income, ethnic group, age, gender, HLE, etc. This is important because much of the apparent difference in children's outcomes associated with certain characteristics, for example, income is attributable to the impact of other factors such as HLE and parents' qualification levels. It also means that analyses of any continuing pre-school effects and primary school influences on children's outcomes (as well as their joint effects) include appropriate control for different background influences. Further value added multilevel analyses were conducted, to investigate EPPE 3-11 children's progress over Key Stage 2 in each of the outcomes studied by controlling for earlier attainment or earlier prior social behaviour.

The analyses presented here have used age standardised tests when measuring cognitive

attainment and progress. Findings on the influence of season of birth will be presented in the final report which summarises the 3-11 findings (Sylva et al, 2008 forthcoming).

## The Findings

### Child, Family and Background effects

Child, family and Early HLE factors remain significant predictors of children's cognitive and social/behavioural development at age 11 (although their combined influence is generally weaker than when children were age 7). This may reflect the growing importance of primary school and peer influences. The influence of Early years HLE, for example, reduced between age 7 (ES=0.56) and age 11 (ES=0.42) for Mathematics.

At age 11, girls' attainment is significantly higher than that of boys in English (ES=0.29) but boys attainment is better in Mathematics (ES=-0.19). This is in contrast to findings on gender differences at earlier time points where girls showed higher attainment than boys in both subjects. Parents' (especially mothers') highest qualification levels remains a key predictor of attainment (ES=0.76 for English and 0.71 for Maths), as does low birth weight (ES=-0.47 for English and ES=-0.48 for Maths), continued need for support with English as an additional language (EAL) (ES=-0.64 for Maths), early developmental problems (as reported by parents at the start of the study; ES=-0.24 for English), family socio-economic status (SES) (ES=-0.36 for Maths) and fathers' qualification level (ES=0.39 for English). See Table 1 at the end of the Research Brief for all the effect sizes.

The strongest background predictors of social/behavioural development in Year 6 are: gender, early development/behaviour problems, higher parental qualification levels and income, all associated with 'Self-regulation' outcome in Year 6. Girls (ES=0.30) and those children whose parents have higher qualification levels (ES=0.55) have better outcomes for 'Self-regulation'. Girls (ES=0.71) and children with highly qualified mothers (ES from 0.36 to 0.53) also show better 'Pro-Social' behaviour and lower 'Hyperactivity'. Gender also predicted 'Anti-social' behaviour, with girls showing significantly lower scores (ES=0.38).

The Early years home learning environment (HLE) is still one of the most important predictors of later attainment in English (ES=0.69) and Mathematics (ES=0.42) in Year 6 as well as 'Self-regulation' (ES=0.42). Experiencing a better Early years HLE shows a significant positive long term impact after controlling for other influences such as parents'

qualification levels, family SES and income. A measure of Key Stage 1 HLE (age 5-7) has a weaker impact (only a third to a quarter of the influence) but still has some predictive power over and above the Early years HLE. High levels of 'Home Computing' (probably on computer games), is linked with poorer attainment in English (ES=0.23).

'Neighbourhood' influence, measured in terms of the Index of Multiple Deprivation (IMD), was non-significant after taking into account child and family characteristics, particularly HLE.

## **Continuing Pre-school effects**

### ***Pre-school quality and effectiveness***

Attending a pre-school compared with not attending one (the 'home' group) shows a positive effect on children's later outcomes in English (ES=0.22), Mathematics (ES=0.26) and 'Pro-social' behaviour (ES=0.19) at the end of Year 6. Although having attended any pre-school versus none continues to show positive benefits for a range of later educational outcomes in Year 6, the impact is carried mainly by the pre-school quality and effectiveness effects except for Pro-social behaviour where attending any provision shows sustained benefits.

The quality of the pre-school attended is important with high quality leading to a stronger and more enduring effect on outcomes for attainment in both English and Mathematics (ES=0.29 & ES=0.34).

Similarly, pre-school effectiveness (defined as the promotion of Early number concepts) still showed a positive influence on later attainment, particularly for better outcomes in Mathematics (ES=0.40).

Disadvantaged pupils (and those with less well qualified parents) show higher attainment in Year 6 if they had previously attended a high quality or highly effective pre-school. Nonetheless the results suggest that it is the more advantaged pupils (and those with more highly qualified parents) who still continue to show better Year 6 outcomes in relation to pre-school experience.

Children who had attended low quality pre-schools no longer show a significant cognitive benefit in attainment after six years in primary school, i.e. their scores are not significantly different from the 'home' group. The same is found in English for those who had previously attended medium quality pre-schools.

High and medium quality pre-school still shows a lasting benefit on children's social behaviour for

most outcomes in Year 6, being particularly important for boys (ES from 0.28 to 0.45 depending on the social/behavioural outcome), those children later identified as having SEN in primary school (ES from 0.23 to 0.39) and the more disadvantaged (ES from 0.29 to 0.34). By Year 6 the children who attended low quality pre-school show very little difference to the 'home' group, except in terms of 'Pro-social' behaviour where outcomes were significantly better (ES from 0.16 to 0.28). By contrast, the 'home' children had significantly lower levels of 'Hyperactivity' compared to children who only attended low quality pre-school (ES=0.24). There were no significant differences between the 'home' group and others in terms of 'Anti-social' behaviour except for children who attended a pre-school identified as being more effective in reducing 'Anti-social' behaviour (ES=0.25). These still showed long term benefits with reduced 'Anti-social' behaviour at age 11.

Significant differences were found when the combined interaction of pre-school and Early years HLE was studied. Having previous experience of a high quality Early years HLE appears to act as a protective factor for children who had not attended pre-school (the 'home' group) in terms of promoting higher levels of 'Self-regulation' (still evident at age 11; ES=0.42). Similarly past experience of high quality pre-school is predictive of later improved 'Self-regulation' for children who had only experienced a low Early years HLE (ES=0.29). Thus the disadvantage of not attending pre-school is countered if children have good early years learning experiences at home. Similarly, the disadvantage of poor Early years HLE is ameliorated by high quality pre-school. Both aspects of early influence still show an impact on longer term development up to age 11.

Similar to findings for Year 5 (see Sammons et al., 2007a), at the end of Year 6 there are no longer statistically significant net effects for type of pre-school attended, duration in attending pre-school or age of starting pre-school on all outcomes.

### **Primary school academic effectiveness**

The academic effectiveness<sup>3</sup> of the primary school EPPE 3-11 children went on to attend had a positive influence on their later attainment in English and Mathematics in Year 6, taking account of the influence of other background influences.

<sup>3</sup> 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., 2006).

For English, attending a high academically effective primary school was associated with a moderate 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.

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 is also an important predictor of better outcomes. Mathematics (ES=0.38) in Year 6 appears to be especially sensitive to the academic effectiveness of the primary school attended more so than English in Year 6. This is in line with findings from other school effectiveness research which indicates that school effects tend to be stronger for outcomes such as Mathematics and Science.

Attending a highly academically effective primary school is a predictor of better cognitive outcomes particularly for disadvantaged pupils when compared to those disadvantaged pupils who attend academically less effective primary schools (English ES=0.25; Mathematics ES=0.43). It is a predictor of better Mathematics outcomes for children with low qualified parents. Such children who attend a high or medium academically effective primary school have significantly better scores in Mathematics than those who attend a low effectiveness primary school.

Primary school academic effectiveness did not show a statistically significant relationship with social/behavioural outcomes across the whole sample. However, it was important for particular sub-groups of children: children identified as having SEN in primary school and children with mothers who have low qualification levels. Attending a highly academically effective primary school is a predictor of increased 'Self-regulation' and reduced 'Anti-social' behaviour for children with SEN in primary school (ES=0.37) and those with mothers who had a low qualification level (ES=0.33) compared to those who attend academically low effective primary school.

### **The combined impact of pre-school and primary school**

For English the quality of the pre-school helps protect against the disadvantage of moving on to a less academically effective primary school (ES=0.12). Similarly for Mathematics, a better quality pre-school reduces the disadvantage of attending a less academically effective primary school (ES=0.61).

Attending a highly effective pre-school and primary school is the most advantageous combination of educational experiences (English ES=0.22; Mathematics ES=0.83). Going to an academically effective primary school also helped compensate for the disadvantage of not going to pre-school or attending a low quality pre-school.

Attending a highly academic effective primary school is also important for the 'home' group for predicting better 'Self-regulation' (ES=0.51). Attending high quality pre-school appears to act as a protective factor for children who subsequently attend a less academically effective primary school for 'Self-regulation' (ES=0.41).

### **Mobility during primary school**

Mobility is defined here as a change of primary school that does not result from a school closure, amalgamation, or transfer across phases of schooling, and about a fifth of the sample were mobile in this way during KS2. Analysis indicated mobility in the KS2 period is predictive of less progress in Mathematics after controlling for background characteristics (ES=-0.27), but not significantly so with English.

In addition, KS2 mobility and particularly if a child changed schools during both KS1 and KS2, is associated with poorer social/behavioural development across Key Stage 2: less progress in 'Self-regulation' (ES=-0.28) and 'Pro-social' behaviour (ES=-0.35) and less reduction in 'Hyperactivity' (ES=0.32) and 'Anti-social' behaviour (ES=0.48).

The results show that mobility during primary school is predictive of poorer child outcomes. However, these results do not show whether or not KS1 and/or KS2 mobility causes poorer progress in Mathematics and social/behavioural development; it may be instead that children with poorer outcomes are more likely to change schools.

For a detailed description on mobility during pre-school, KS1 and KS2 please refer to the separate technical report (Melhuish et al., 2008).

### **Pupils' progress across Key Stage 2**

Children's academic and developmental progress over Key Stage 2 was measured using contextualised value added approaches and takes account of prior attainment at age 7.

Like Year 6 outcomes, pupils' academic and social/behavioural progress is also influenced by background factors, such as gender, mother's qualifications and Early years HLE, although effects on progress are much weaker than those on outcomes.

By contrast, educational influences related to pre-school quality and primary school academic effectiveness show a rather stronger impact on progress during KS2 than on Year 6 outcomes (Pre-school quality for English  $ES=0.05-0.23$ ; Mathematics  $ES=0.05-0.20$ ; Pre school effectiveness for English  $ES=0.09-0.27$ ; Mathematics  $ES=0.10-0.32$ ) 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). Similarly children attending more academically effective primary schools make significantly more progress during KS2 than those at less academically effective schools (English  $ES=0.37$ ; Mathematics  $ES=0.52$ ).

For progress over Key Stage 2, the impact of attending a high academically effective primary school versus a low effective primary is on a par with the effect of a mother having a degree versus no qualification (slightly stronger for Maths, slightly weaker for English, in line with findings in other educational effectiveness studies, see Teddlie & Reynolds 2000). This indicates 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.

The pre-school quality influence on progress was also still evident, although not as strong as that of the primary school academic effectiveness. The effect of a high quality experience versus none is on a par with the influence of a child's eligibility for free-school meals (a measure of low family income) versus none.

In terms of progress in social/behavioural outcomes, pre-school quality and effectiveness had a significant impact on social/behavioural progress, which was similar to the effect of pre-school on social/behavioural developmental levels in Year 6. High quality and highly effective pre-schools, therefore, have a similar positive impact on social/behavioural developmental progress as well as on social/behavioural developmental level. Similar to the progress in cognitive outcomes, the effect of a high quality pre-school experience versus none is comparable with the effect of a child's eligibility for free-school meals versus none. However, there were no significant influences of primary school academic effectiveness on social/behavioural progress just as there was no influence on social/behavioural developmental levels.

The present findings accord with previous EPPE research on the same pupils in Year 5, although by Year 6 effects such as the influence of pre-school tend to be stronger.

## Implications

The findings of this Year 6 follow up are broadly in line with those identified when the EPPE 3-11 sample were age 10 (Sammons et al, 2007b). At age 10 standardised assessments (NFER tests) were adopted to measure children's attainments in Year 5. In both years teachers' assessments of social behaviour were collected. The consistency in findings for the academic as well as those for social/behavioural outcomes provides greater confidence in the robustness of the results (since Year 5 was not a National assessment year and the NFER tests are constructed differently).

EPPE 3-11 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.

High (and in some cases medium) quality pre-school still benefits children's cognitive and social/behavioural outcomes at age 11. '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', which is consistent with Year 5 findings, but the effects are stronger in Year 6. Low quality pre-school has little enduring benefit in terms of academic and social/behavioural outcomes in the longer term and was even associated with some poorer social outcomes in comparison with the 'home' group, although not for 'Pro-social' behaviour.

A high Early years HLE seems 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.

Children's academic outcomes in English and particularly Mathematics are boosted by attending an academically more effective primary school, 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. The finding that primary school academic effectiveness is a particularly significant influence for disadvantaged pupils (especially those who did not have the

advantage of attending a medium or better pre-school, those with low qualified parents, and those with SEN) is 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) is needed to make a difference to outcomes for the most disadvantaged children (and has been a focus in more recent policy development). In addition, the present findings suggest that there may be a need for specially targeted interventions for those children who are identified as being well behind their peers in cognitive and social/behavioural profiles at the start of primary school, particularly since many of these children are likely to have missed 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 & Sylva, 2004b; Hurry & Sylva, 2007; Sylva et al., 2008).

In terms of mobility schools need to pay attention to continuity of education, given mobile children's higher risk of poorer outcomes.

Efforts to improve the quality of pre-schools and schools over the last decade are likely to be of benefit in combating disadvantage (Sammons, 2008 forthcoming). It should be noted that since the EPPE sample were in pre-school (1997-2000) there has been a major expansion of pre-school and significant additional investment in early years.

A final report summarising all the EPPE 3-11 findings is in preparation (Sylva et al., 2008-forthcoming). The research continues to follow the pupil sample up to the end of Key Stage 3 under the new title Effective Pre-school, Primary and Secondary Education (EPPSE 3-14).

## Methodology

The EPPE 3-11 research contains a series of three 'nested' sets of analyses which help answer specific research questions.

The first set investigates the academic effectiveness of the approximately 950 primary schools in 155 local authorities the EPPE 3-11 children attended. It used statistical data (matched KS1 and KS2 National assessment results) for successive pupil cohorts derived from every primary school in the country (over three consecutive years 2002-2004) for English and Mathematics to provide value added estimates of the academic effectiveness of each school in these subjects and matched the resulting value added measures to the EPPE 3-11 child data set (Melhuish et al., 2006).

The second set of analyses involved the collection of information on academic and social/behavioural development for every child in the sample. The sample of 2701 pupils originated from 141 pre-school centres covering six types of provision (nursery classes, nursery schools, integrated settings, playgroups, private day nurseries and local authority day nurseries) in six local authorities and included a group of 'Home' pupils who had not attended pre-school. Multilevel analyses investigated the effects of child, family and HLE, and pre and primary schooling on children's developmental outcomes.

The third analyses explored classroom practice in a sample of 125 Year 5 classes through two different but complementary classroom observations. These analyses showed the variation in teachers and pupils behaviours and the impact of this on children's outcomes (see Sammons et al., 2006; 2008a).

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## **Additional Information**

*Copies of the full reports (DCSF-RR048 - Cognitive Outcomes and DCSF-RR049 – Social/Behavioural Outcomes) are available by phoning the DCSF Publications Orderline on 0845 60 222 60. Reports are priced at £4.95.*

*Research Briefs and Research Reports can also be accessed at [www.dcsf.gov.uk/research/](http://www.dcsf.gov.uk/research/)*

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*The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Children, Schools and Families.*

**Table 1: Summary of background factors and pre- and primary school influences on cognitive attainment and social behaviour at Year 6**  
(Only the largest effect sizes are reported; comparison group in brackets)

|  | English | Mathematics | 'Self-regulation' | 'Pro-social' behaviour | 'Hyperactivity'            | 'Anti-social' behaviour |
|--|---------|-------------|-------------------|------------------------|----------------------------|-------------------------|
| <b>Child Factors</b>                     |         |             |                   |                        |                            |                         |
| Gender (boys)                            | 0.29    | -0.19       | 0.30              | 0.71                   | -0.71                      | -0.38                   |
| Ethnicity (White UK heritage)            | 0.17    | 0.45        | 0.37              | -0.28                  | -0.55                      | -0.27                   |
| Early Developmental problems (none)      | -0.24   | -0.15       | -0.47             |                        |                            |                         |
| Early Behavioural problems (none)        |         |             | -0.25             | -0.24                  | 0.31                       | 0.24                    |
| Need of EAL support (none)               | -0.59   | -0.64       | -0.65             |                        | 0.46                       |                         |
| Birth weight (normal)                    | -0.47   | -0.48       |                   |                        |                            |                         |
| <b>Family factors</b>                    |         |             |                   |                        |                            |                         |
| Free school meals (FSM) (non-FSM)        | -0.23   | -0.15       | -0.23             |                        | 0.21                       | 0.27                    |
| Family earned income (none)              | 0.26    | 0.25        | 0.38              | 0.25                   | -0.24                      |                         |
| Mother's qualification level (none)      | 0.76    | 0.71        | 0.55              | 0.36                   | -0.53                      | -0.27                   |
| Father's Qualification level (none)      | 0.39    | 0.34        | 0.29              |                        | -0.30                      |                         |
| Family SES (professional non-manual)     | -0.26   | -0.36       |                   |                        |                            | 0.28                    |
| Marital Status (married)                 |         |             |                   | -0.18                  |                            |                         |
| Change in Marital Status (couple-couple) |         |             |                   |                        | 0.24                       | 0.25                    |
| <b>Home Learning Environment</b>         |         |             |                   |                        |                            |                         |
| Early years HLE (low)                    | 0.69    | 0.42        | 0.42              | 0.22                   | -0.23                      |                         |
| Key Stage 1 HLE (low)                    | 0.18    | 0.17        |                   |                        |                            |                         |
| <b>Pre-school*</b>                       |         |             |                   |                        |                            |                         |
| Attending (not attending)                | 0.22    | 0.26        |                   | 0.19                   |                            |                         |
| <b>Pre-school quality*</b>               |         |             |                   |                        |                            |                         |
| ECERS-E                                  | 0.29    | 0.34        | 0.25              | 0.23                   | 0.22 (Low quality)**       | -0.22                   |
| ECERS-R                                  |         |             | 0.24              | 0.28                   | 0.22 (Low quality)**       | -0.23                   |
| <b>Pre-school effectiveness*</b>         |         |             |                   |                        |                            |                         |
| Early number concepts                    |         | 0.40        | 0.29              | 0.27                   |                            |                         |
| Pre-reading                              | 0.25    |             |                   | 0.22                   |                            |                         |
| 'Co-operation and Conformity'            |         |             | 0.20              | 0.21                   |                            |                         |
| 'Independence & Concentration'           |         |             | 0.19              | 0.26                   | 0.24 (Low effectiveness)** |                         |
| 'Peer Sociability'                       |         |             | 0.21              | 0.21                   | 0.20 (Low effectiveness)** |                         |
| 'Anti-social' behaviour                  |         |             | 0.24              | 0.38                   |                            | -0.25                   |
| <b>Primary School Effectiveness***</b>   |         |             |                   |                        |                            |                         |
| English                                  | 0.24    |             |                   |                        |                            |                         |
| Mathematics                              |         | 0.38        |                   |                        |                            |                         |

\*The reference group for all pre-school quality and effectiveness comparisons is the 'home' group. The effect sizes represent differences between the 'home' group and the 'high quality/effectiveness' group unless stated otherwise.

\*\*The effect sizes represent differences between the 'home' group and the 'low quality/effectiveness' group.

\*\*\* The reference group for primary school is 'low effectiveness'. The effect sizes represent differences between the 'low effectiveness' group and the 'high effectiveness' group. \*\*\* The reference group for primary school is 'low effectiveness'. The effect sizes represent differences between the 'low effectiveness' group and the 'high effectiveness' group.