



Department  
for Education

# **Study of Early Education and Development (SEED): Impact Study on Early Education Use and Child Outcomes up to Age Three**

**Research brief**

**July 2017: revised November 2021**

**Edward Melhuish, Julian Gardiner & Stephen Morris**

**University of Oxford**



**Study of Early Education  
& Development**



**Social Science in Government**

# Contents

List of tables	3
Summary	4
Introduction	5
Background	5
Aims	6
Sample	6
Measures	6
The impact of funded early education on ECEC use	9
Findings	9
Conclusions	9
The relationship between variations in ECEC use and cognitive and socio-emotional development at age three	10
Findings	10
Conclusions	11
The relationship between variations in home environment and cognitive and socio-emotional development at age three	13
Findings	13
Conclusions	14
Overall conclusions	16
References	17

## List of tables

Table 1: Summary of the associations between children's time (hours per week) in early education and care aged two to three and children's outcomes at age three 11

Table 2: Summary of the associations between home environment variables and children's outcomes at age three. 14

# Summary

## Introduction

From September 2013, two-year-old children living in the 20% most disadvantaged households became eligible for 15 hours of funded early childhood education and care (ECEC) per week. This was extended in September 2014 to two-year-old children living in the 40% most disadvantaged households.

This report aims to explore the impact of this new policy on take-up of ECEC for two- to three-year-old children, and to study whether differing types of ECEC between ages two and three, as well as aspects of the home environment, are associated with child cognitive and socio-emotional development at age three.

## Methods

This report presents findings for 4,583 children from the Study of Early Education and Development (SEED) longitudinal study. Demographic characteristics and factors of the home environment included in these analyses were measured at an average age of two (Wave 1), while child cognitive development and childcare provider rated socio-emotional development outcomes were measured at age three (Wave 2). Type and duration of ECEC use was measured between ages two to three.

## Results

Take-up of ECEC did not increase in the year following the introduction of the two-year-old policy, however subsequent census data from later years (DfE, 2017) indicates increased take up, suggesting that it took time for policy impacts to be seen.

Cognitive development at age three was associated with use of formal and informal individual ECEC between ages two and three. Socio-emotional development at age three was associated with use of group and individual formal ECEC between ages two and three. ECEC was beneficial across all levels of family disadvantage/advantage.

A number of factors in the home environment were also associated with cognitive and socio-emotional development including aspects of the parent-child relationship, although the relationships between ECEC and outcomes were largely independent of the advantages of a rich home learning environment.

## Conclusions

Early cognitive and socio-emotional developmental benefits are associated with use of ECEC between ages two and age three. Furthermore, the benefits of ECEC were seen regardless of family disadvantage level, and regardless of the quality of the home learning environment.

# Introduction

## Background

Early childhood education and care (ECEC) refers to non-parental childcare and early education occurring before school-age. This may include care by relatives, childminders and group or centre based provisions which may or may not have an explicit educational component. Several studies have shown that good quality ECEC can have a positive effect on the educational, cognitive, behavioural and social outcomes for children in both the short and long term, including those who are most deprived in terms of household income (Sylva et al., 2010; Melhuish et al., 2015).

From 2005 all three- and four-year-olds in England have been entitled to funded early education for 12.5 hours per week for 38 weeks of the year, increasing to 15 hours per week (570 hours per year) in 2010. More recently the Government has expanded this entitlement to benefit two-year-old children living in the most disadvantaged households in England.<sup>1</sup> From September 2013, two-year-old children living in the 20% most disadvantaged households became eligible for 15 hours of funded early education per week. This was extended in September 2014 to two-year-old children living in the 40% most disadvantaged households.

The Study of Early Education and Development (SEED)<sup>2</sup> is a major longitudinal study designed to help the Department for Education (DfE) provide evidence on the effectiveness of early years education and to identify any short- and longer-term benefits from this investment. The study is being undertaken by a consortium including NatCen Social Research, the University of Oxford, Action for Children and Frontier Economics.

Beginning in 2013, SEED aims to follow the progress of children from approximately 6,000 families, from age two up to the age of seven. This report is part of SEED, and focuses on the take-up of the newly introduced early education offer for two-year-olds, and explores how use of ECEC between age two and age three may be related to children's cognitive and socio-emotional development at age three.

---

<sup>1</sup> Further information about the way in which disadvantage is categorised is available in the accompanying analytical report

<sup>2</sup> Further information about the SEED study and reports published to date are available at <http://www.seed.natcen.ac.uk/>.

## Aims

This report addresses two main objectives:

1. To explore the impact of introducing a policy of free early education for disadvantaged two-year-olds on take-up of early education for two- to three-year-old children, in the year following the introduction of the policy.
2. To study the associations between the amount of differing types of early childhood education and care (ECEC) and child cognitive and socio-emotional development, as well as associations between child development and aspects of the home environment.

The analyses do not consider the quality of ECEC, which will be dealt with in a subsequent SEED report.

## Sample

Beginning in September 2013, the SEED baseline survey was undertaken with 5,642 families with preschool children, sampled across six consecutive cohorts based on the term in which they turned two years of age. Families consisted of three groups varying in their level of disadvantage by income<sup>3</sup>:

1. **Most disadvantaged group** - from the 20% most disadvantaged families
2. **Moderately disadvantaged group** - from the 20-40% most disadvantaged families
3. **Least disadvantaged** - from the 60% least disadvantaged families

This report presents findings on child development at three years of age for 4,583 children in the study for whom data were available from both Wave 1 (approx. two years old) and Wave 2 (three years old).

## Measures

### Early childhood education and care (ECEC) use

Children in SEED may attend any form of ECEC, although only those settings referred to here as 'formal' are eligible for government funding. Settings classified in this report as 'group' based are those that are non-domestic, whilst those classified as 'individual' are

---

<sup>3</sup> Further detail on the inclusion criteria for these groups is available in the accompanying analytical report

in a domestic (e.g., home) setting. A three-way classification of ECEC was used for this report:

1. **Formal group** - ECEC in a non-domestic setting and eligible for government funding (e.g. day nurseries, nursery classes or schools and playgroups)
2. **Formal individual** - ECEC in a domestic setting and eligible for government funding (e.g. childminders)
3. **Informal individual** - ECEC in a domestic setting and not eligible for government funding (e.g. friends, relatives, neighbours and nannies)

## Child outcomes

The Wave 2 assessment measured child developmental outcomes at age three for cognitive development in terms of verbal and non-verbal abilities, and socio-emotional development in terms of a range of emotional, behavioural and social strengths and difficulties.

### Cognitive Development

British Ability Scales (BAS)

1. Naming Vocabulary – a measure of verbal ability or language development
2. Picture Similarities – a measure of non-verbal ability

### Socio-Emotional Development

Strengths and Difficulties Questionnaire (SDQ)

1. Prosocial Behaviour (e.g. shares toys, shows empathy)
2. Hyperactivity (e.g. restless, fidgets, easily distracted)
3. Emotional Symptoms (e.g. worries, unhappy, nervous)
4. Conduct Problems (e.g. loses temper, aggressive, takes other children's things)
5. Peer Problems (e.g. often alone, poor sociability)

Additional measures used in the National Evaluation of Sure Start

1. Behavioural Self-regulation (e.g. thinks before acting, persistent)
2. Emotional Self-regulation (e.g. even mood, calm, not impulsive)
3. Co-operation (e.g. calm, plays easily with others, waits turn)

## Home environment measures

Each child's home environment was assessed using six measures of household, parenting and relationship factors, measured at Wave 1 when the children were aged two to three.<sup>4</sup>

1. Home Learning Environment (HLE) index (i.e. home activities that allow learning opportunities for the child; e.g., child read to, taken to library, painting/drawing, play with letters/numbers, songs/rhymes)
2. Household Disorder (CHAOS scale including confusion, hubbub and disorder scale)
3. Parent's Psychological Distress (using the Kessler scale)
4. Limit Setting (i.e. how often parents use various measures to set limits when a child is naughty)
5. Parent/child Closeness (i.e. affectionate bond, child seeks comfort, child shares feelings)
6. Parent/child Conflict (i.e. parent-child struggles, child easily angry with parent)

## Demographic measures

Demographic measures were assessed at the Wave 1 interview carried out with parents when the children were aged two to three.

1. Child's sex
2. Child's ethnic group
3. Child's birth weight
4. Child's birth order
5. Maternal age at birth of child
6. Number of siblings living in the same household as child
7. Whether child is living in a couple or lone parent household
8. Whether child is living in a workless or working household
9. Household income
10. Index of multiple deprivation (IMD)
11. SEED disadvantage group (most, moderately or least disadvantaged)
12. Type of accommodation tenure
13. Mother's highest academic qualification
14. Highest parental socio-economic status

---

<sup>4</sup> The age range was 2.06 to 3.27, with a mean of 2.52.



## The impact of funded early education on ECEC use

Prior to September 2013, 15 hours of funded support was available universally from the term after a child's third birthday. Funding became available for 15 hours per week of ECEC for two-year-old children from the 20% 'most disadvantaged' families in September 2013, and was extended to families from the 20% to 40% 'moderately disadvantaged' families from September 2014.

This analysis considered the effect of these policy changes on take-up of ECEC, utilising the varying duration of eligibility for age two funding across the sample. Analysis specifically considered the impact of eligibility for funded childcare on ECEC use between age two (Wave 1) and age three (Wave 2).

### Findings

Although a general increase in ECEC use over time was observed for families across all three levels of disadvantage, there was limited evidence of increased use of funded ECEC between ages two and three years by those families who became eligible for 15 hours of free early education in the year following the policy introduction.

The only notable, albeit modest, increase in ECEC use was among moderately disadvantaged families whose child was eligible for three terms of free ECEC; these families increased their ECEC use by 4.7 hours a week.

### Conclusions

There is no strong evidence that the introduction of fifteen hours of funding for two-year-olds from disadvantaged families led to increased take-up of ECEC in the year following the introduction of the policy. Limited impact in the short term may indicate local variation in adjusting to policy changes, where some local authorities experienced barriers to ensuring sufficient provision and promoting awareness among eligible families. However, national census data indicate improved take-up since the study data was collected (DFE, 2017a) suggesting that barriers appear to have been overcome over time. The time taken for policy change to become evident is in line with findings from the introduction of Sure Start Local Programmes (Meadows & NESS team, 2006).

# The relationship between variations in ECEC use and cognitive and socio-emotional development at age three

This analysis aimed to consider the relationship between the amount and type of ECEC use aged between two and three and children's cognitive and socio-emotional outcomes at age three.<sup>5</sup> Analyses controlled for six home environment measures and 14 demographic measures.<sup>6</sup> Further analyses considered whether the relationship between ECEC use and outcomes were moderated by household level of disadvantage.

## Findings

After controlling for home environment and demographic factors, the amount of ECEC received between ages two and three years was associated with differences in cognitive and socio-emotional outcomes at age three. Positive impacts were observed across all types of ECEC use. Positive impacts were found regardless of a child's household income disadvantage level, the level of disadvantage in their area or the region within which they live. However, given the lower starting point among disadvantaged children (Speight et al., 2015), ECEC may be of particular importance for this group.

The relationship between each type of ECEC and the cognitive and socio-emotional outcomes measured are summarised here and in Table 1<sup>7</sup>:

- ✓ Higher verbal ability was associated with individual ECEC settings (formal and informal).
- ✓ Better socio-emotional outcomes were associated with use of formal ECEC, including formal group ECEC (e.g., nursery, playgroup), which was associated with more prosocial behaviour and fewer emotional symptoms and peer problems. In addition to formal individual ECEC (e.g., childminders), which was associated with more behavioural self-regulation.
- ✗ For formal ECEC, poorer socio-emotional outcomes were seen for conduct problems and emotional self-regulation, however further sub-group analyses indicated that these findings were particularly related to children with the highest level of 'formal group' ECEC use (greater than 35 hours per week over the 38 annual weeks of the school terms, 3.25% of sample). This small group of children

---

<sup>5</sup> Details of analyses are available in the accompanying analytical report and technical report.

<sup>6</sup> Details of home environment and demographic measures are available in the measures section earlier in this brief and in further detail in the accompanying analytical report.

<sup>7</sup> Further details of findings are available in the accompanying analytical report and technical report

typically started formal group ECEC use early in their lives, suggesting that it may be that this combination of particularly high formal group ECEC use aged two to three and an early start in formal group ECEC that explains these poorer child outcomes at age three.

**Table 1: Summary of the associations between children’s time (hours per week) in early education and care aged two to three and children’s outcomes at age three**

Child outcome	Type of early education and care (ECEC)		
	Formal ECEC		Informal ECEC
	Group	Childminders	Friends, relatives and nannies
<b>Cognitive development</b>			
Naming Vocabulary (verbal)		+	+
Picture Similarities (non-verbal)			
<b>Socio-emotional problems</b>			
Hyperactivity			
Emotional Symptoms	+		
Conduct Problems	-‡	-‡	
Peer Problems	+		
<b>Socio-emotional strengths</b>			
Prosocial Behaviour	+		
Behavioural Self-regulation		+	
Emotional Self-regulation	-‡		
Co-operation			

Sample size = 4,583

+ indicates a beneficial association between time in ECEC and an outcome (i.e. higher cognitive score; more favourable socio-emotional outcomes)

- indicates a detrimental association between time in ECEC and care and an outcome (i.e. lower cognitive score; less favourable socio-emotional outcomes)

Where a cell is empty (blank) there was no statistically significant association.

‡ Later subgroup analysis indicated that these negative associations were found only for children with high formal group ECEC use, i.e. over 35 hours per week of term time (3.25% of the sample)

## Conclusions

These findings indicate that after controlling for a number of home environment and demographic factors, ECEC received between the ages of two and three is associated with a number of positive cognitive and socio-emotional outcomes measured at age three.

Higher verbal ability in children attending individual settings, both formal and informal, may relate to previous indications that high quality adult/child interactions are particularly important in speech and language development (DfE, 2017b). Whether better cognitive

outcomes are observed for children attending group based ECEC in the longer term will be addressed in future SEED reports.

Better socio-emotional outcomes associated with formal settings, both group (e.g. nurseries, playgroups) and individual (e.g. childminders), corresponds with previous studies of the beneficial effects of formal group ECEC (Melhuish et al., 2015). Previous research has also indicated higher levels of conduct problems associated with greater group ECEC use, but that this association gradually reduced with child age and disappeared during the primary school years (Melhuish et al., 2010).

Findings also suggest that ECEC is beneficial for children from a range of family backgrounds, not just those who are most disadvantaged. Some previous research has found that the benefits of ECEC are greater for children from more disadvantaged families (e.g. Reynolds et al., 2011) but other research has found similar effects of ECEC use for different levels of family disadvantage (e.g., the EPPE study, Sylva et al., 2004). Although findings may indicate that ECEC is beneficial regardless of disadvantage, it may be of particular importance to disadvantaged children who are often seen to have a lower starting point than advantaged children (Speight et al., 2015), and who can be less likely to take up childcare (Speight et al., 2010).

# The relationship between variations in home environment and cognitive and socio-emotional development at age three

Analyses also considered the effects upon child outcomes associated with various home environment and parent-child relationship variables, controlling for demographic factors and type of ECEC use. Further analyses also considered the interaction between ECEC use and the home environment.

## Findings

Several factors within the home environment were associated with differing cognitive and socio-emotional outcomes at age three. A summary of findings is presented below and in Table 2<sup>8</sup>:

- ✓ A higher Home Learning Environment (HLE) score was associated with higher verbal and non-verbal cognitive ability and better Prosocial Behaviour and Behavioural Self-regulation.
- ✗ More household disorder was associated with reduced Prosocial Behaviour and Co-operation.
- ✗ Higher parent Psychological Distress was associated with poorer verbal ability.
- ✓ A higher Limit Setting score was associated with higher verbal and non-verbal ability and with fewer Emotional Symptoms and Peer Problems and better Prosocial Behaviour and Behavioural Self-regulation, although was also associated with higher Conduct Problems.
- ✓ Higher Parent/child Closeness was associated with higher verbal ability, and more Prosocial Behaviour and lower Hyperactivity and Peer Problems scores.
- ✗ Higher Parent/child Conflict was associated with lower verbal ability, in addition to higher levels of Hyperactivity, Peer Problems and Conduct problems and less Emotional Self-regulation.

It was also found that overall the beneficial effects at age three years of ECEC use and of a rich home environment were relatively similar in terms of size of effect, particularly in their impact on social-emotional outcomes.

Furthermore the effects of ECEC and the Home Learning Environment (HLE) were largely independent of each other. A positive association between formal individual ECEC (childminders) use and non-verbal ability (Picture Similarities) was only found for

---

<sup>8</sup> Further details of these relationships are available in the accompanying analytical report and technical report.

children with low HLE scores. In all other cases there was no interaction between the effects of ECEC use and those of HLE, indicating their effects are largely independent from one another.

**Table 2: Summary of the associations between home environment variables and children’s outcomes at age three.**

Child outcome	Home environment variables					
	Home Learning Environment	Household CHAOS	Parent's psychological distress	Limit Setting scale	Parent/child Closeness	Parent/child Conflict
<b>Cognitive development</b>						
Naming Vocabulary	+		-	+	+	-
Picture Similarities	+			+		
<b>Socio-emotional problems</b>						
Hyperactivity					+	-
Emotional Symptoms				+		
Conduct Problems				-		-
Peer Problems				+	+	-
<b>Socio-emotional strengths</b>						
Prosocial Behaviour	+	-		+	+	
Behavioural Self-regulation	+			+		
Emotional Self-regulation						-
Co-operation		-				

Sample size = 4,583

+ indicates a beneficial association between a home environment variable and an outcome (i.e. higher cognitive score; more favourable socio-emotional outcomes).

- indicates a detrimental association between a home environment variable and an outcome (i.e. lower cognitive score; less favourable socio-emotional outcomes).

Where a cell is empty (blank) there was no statistically significant association.

## Conclusions

In line with previous research (e.g., Sammons et al., 2003), aspects of the home environment, parenting and parent-child relationship were found to be associated with a range of cognitive and socio-emotional outcomes. This suggests there are considerable benefits of encouraging active, positive parenting strategies and limit setting.

Overall findings also suggest that the advantages of a rich home learning environment and the beneficial effects of time in ECEC are largely independent, indicating that in most

instances, even children having very rich home environments still stand to benefit from spending time in ECEC.

## Overall conclusions

This study has considered whether the policy of 15 hours of funded ECEC for two-year-olds from the most and moderately disadvantaged families had an impact on take-up of ECEC between ages two and three in the year following its introduction. Furthermore, it considered the relationship between the amount of ECEC used between ages two and three and cognitive and socio-emotional developmental outcomes at age three for children from families of varying levels of disadvantage, as well as whether these developmental outcomes also relate to factors of the home environment.

Overall, there was no clear evidence that the introduction of the policy of free early education for disadvantaged two-year-olds influenced the take-up of early education by the intended families in the year following its introduction. However, subsequent census data from later years (DfE, 2017a) indicate that take-up did increase after a lag. This indicates that potential family and service-level barriers are overcome as local authorities, providers and parents adjust to the change. The time taken for policy change to become evident is in line with findings from the introduction of Sure Start Local Programmes (Meadows & NESS team, 2006).

The study also found that higher language development at age three was related to use of individual ECEC between ages two and three, in both formal ECEC with childminders and informal ECEC with friends, relatives, neighbours and nannies. In addition, more favourable socio-emotional outcomes at age three were associated with formal ECEC in a group setting (e.g. day nurseries, nursery classes or schools and playgroups), and higher levels of behaviour self-regulation were associated with formal ECEC in an individual setting (e.g. childminders). Although effects were seen across families whether or not they were disadvantaged, given the lower starting point among disadvantaged children (Speight et al., 2015), and reduced likelihood to take up childcare (Speight et al., 2010), ECEC may be of particular importance for this group.

Furthermore, a number of variations in the home environment, parenting and the parent/child relationship were found to be related to cognitive and socio-emotional outcomes for three-year-old children. It was also found that the effects of ECEC are largely independent of the advantages of a rich home learning environment. These findings indicate that spending time in ECEC can be beneficial for children from all families.

These findings are indicative of outcomes at age three, and it remains to be seen whether and how ECEC use and the home environment are associated with child development in the longer term. These issues will be considered in later reports using data collected as part of the longitudinal studying of the children from the Study of Early Education and Development (SEED).



## References

Department for Education (DfE) (2017a). *Provision for children under five years of age in England, January 2017*. SFR 29/2017, 29 June, 2017. London: DfE.

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/622632/SFR29\\_2017\\_Text.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/622632/SFR29_2017_Text.pdf)

Department for Education (2017b). *Study of Early Education and Development: Good Practice in Early Education*. January 2017. London: DfE.

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/586242/SEED\\_Good\\_Practice\\_in\\_Early\\_Education\\_-\\_RR553.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/586242/SEED_Good_Practice_in_Early_Education_-_RR553.pdf)

Melhuish, E., Quinn, L., Sylva, K., Sammons, P., Siraj-Blatchford, I., and Taggart, B. (2010). Pre-school Experience and Key Stage 2 performance in English and Mathematics. Belfast: DfE, Northern Ireland. [www.deni.gov.uk/no\\_52\\_2010.pdf](http://www.deni.gov.uk/no_52_2010.pdf)

Melhuish, E., Ereky-Stevens, K., Petrogiannis, K., Ariescu, A., Penderi, E., Rentzou, K., Tawell, A., Slot, P., Broekhuizen, M., & Leseman, P. (2015). A review of research on the effects of early childhood Education and Care (ECEC) upon child development. CARE project; Curriculum Quality Analysis and Impact Review of European Early Childhood Education and Care (ECEC). <http://ecec-care.org/resources/publications/>

Reynolds, A. J., Temple, J. A., Ou, S.-R., Arteaga, I. A., & White, B. A. B. (2011). School-based early childhood education and age-28 well-being: Effects by timing, dosage, and subgroups. *Science*, 333(6040), 360-364. doi: 10.1126/science.1203618

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., & Elliot, K. (2003). Measuring the impact of pre-school on children's social/behavioural development over the pre-school period. *The Effective Provision of Pre-School Education (EPPE) Project. Technical Paper 8b*. University of London, Institute of Education. London.

Speight, S., Smith, R., Lloyd, E., and Coshall, C. (2010) *Families Experiencing Multiple Disadvantage: Their Use of and Views on Childcare Provision*, Research Report DCSF-RR191, London: Department for Children, Schools and Families.

Speight, S., Maisey, R., Chanfreau, J., Haywood, S., Lord C., and Hussey, D. (2015). *Study of Early Education and Development: Baseline survey of families. Research Report, July 2015*. DFE-RR480. ISBN: 978-1-78105-509-0. London: DfE.

[http://www.seed.natcen.ac.uk/media/5645/Study\\_of\\_early\\_education\\_and\\_development\\_survey\\_of\\_families.pdf](http://www.seed.natcen.ac.uk/media/5645/Study_of_early_education_and_development_survey_of_families.pdf)

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., and Taggart, B. (2004). *Effective Pre-school Provision*. London: Institute of Education.

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2010). *Early childhood matters: Evidence from the effective pre-school and primary education project*. Oxon: Routledge.



Department  
for Education

© NatCen Social Research & University of Oxford 2021

**Reference: DFE-RB706**

**ISBN: 978-1-78105-785-8**

The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Education.

Any enquiries regarding this publication should be sent to us at:

[ey.analysisandresearch@education.gov.uk](mailto:ey.analysisandresearch@education.gov.uk) or [www.education.gov.uk/contactus](http://www.education.gov.uk/contactus)

This document is available for download at [www.gov.uk/government/publications](http://www.gov.uk/government/publications)