

## International early learning and child well-being study (IELS): national report for England

Research brief

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<sup>&</sup>lt;sup>1</sup> The role of the National Advisory Committee was to provide independent advice, guidance and constructive feedback to DfE and NFER on the development and implementation of the study.

### **Executive summary**

#### Introduction

The International Early Learning and Child Well-being Study (IELS) is a new international study by the Organisation for Economic Co-operation and Development (OECD). It aims to further our understanding of children's abilities at age 5² and the influence of individual and family demographic characteristics, the home learning environment and early education experiences on their learning and development. IELS assessed children's emergent literacy, emergent numeracy, self-regulation and social-emotional development (including empathy and trust). In England only, children were also assessed on their physical development.

Children were assessed both directly through the use of tablet-based games and stories, and indirectly through questionnaires completed by parents and teachers. These questionnaires also collected contextual information on children's early learning experiences and individual and familial characteristics. Three OECD countries participated in IELS: England, Estonia and the United States. In England, the IELS fieldwork was conducted from October to December 2018, with a nationally representative sample of 2,577 children from 191 schools.

This report builds on the OECD publication Early learning and child well-being in England (OECD 2020b) by further contextualising the findings for England by linking the IELS data with the national pupil database (NPD). The NPD provides information on individual characteristics of children in IELS, including whether they have an identified special educational need (SEN), their ethnicity, English as an additional language (EAL) status and their eligibility for free school meals (FSM). This report also includes an additional national measure of physical development, created from a suite of 8 questions in the teacher survey covering both gross and fine motor skills. The report also looks at the results for IELS in relation to the home learning environment (HLE), with the inclusion of a question only asked in England on how often parents helped their child to learn to read words or sentences, and the early childhood education and care (ECEC) experiences of those involved. Finally this report includes analysis of the IELS measures in relation to children's persistence (to what extent the child continues his/her planned course of action in spite of difficulty or obstacles).

<sup>2</sup> Note that although the majority of the children were aged 5, the sample also included some younger children who were aged 4 years 11 months and some older children who were aged 6 years 0 months at the time of assessment.

Where there were statistically significant age-related differences on IELS measures i.e. where children who were older at the time of the study showed greater development, this was used to calculate the average gain in points for each additional month of age. This estimate of months' difference was, in turn, used to calculate the approximate difference between the scores of two groups (for example girls and boys). In this way, the analysis has been used to indicate in relative terms how many months ahead, or behind, one group is compared to another.

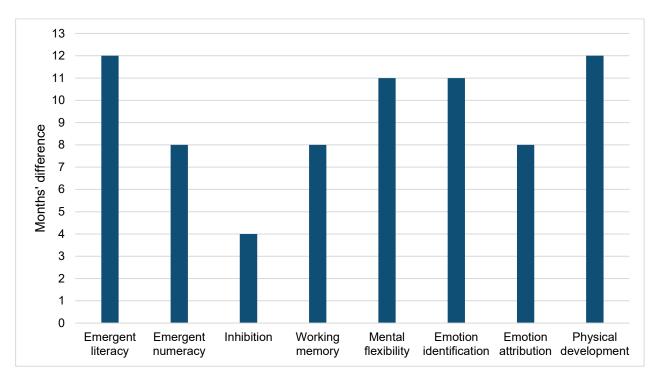
## Girls showed greater development than boys in emergent literacy, social-emotional measures and physical development

Girls were on average 9 months ahead of boys in physical development, 2 months ahead of boys in emergent literacy, 5 months ahead in emotion identification and 7 months ahead in emotion attribution. However, boys had greater development in inhibition, equating to 1 months' difference. There were no gender differences in emergent numeracy, mental flexibility and working memory. The lack of a gender difference in emergent numeracy was unexpected, given the higher performance of girls in mathematics in the Early Years Foundation Stage Profile (EYFSP) results (DfE, 2018b).

## Children with SEN identified in the NPD had lower average scores in all measures, except trust

Overall, 12% of the children in the sample had a SEN identified in the NPD. The majority of these children had difficulties with communication and interaction. They showed markedly lower scores across all measures with the exception of trust, in which they showed higher levels when compared with children with no identified SEN. The greatest differences in outcomes for SEN were in physical development in which those with a SEN identified in the NPD were over 12 months behind their peers; emergent literacy in which they were approximately 12 months behind; mental flexibility in which they were approximately 11 months behind; and emotion identification in which they were 11 months behind.

Figure 1 Months' difference across a range of IELS measures between children without an identified SEN and those with

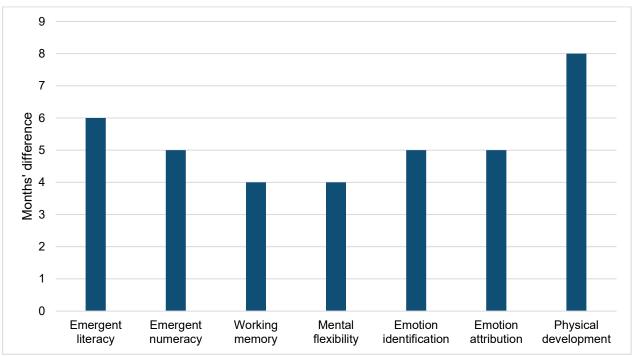


Source: IELS assessment of 2463 children (2192 for physical development) age 5, England, matched to the NPD

### Children eligible for free school meals showed lower development than their peers in almost all measures

Overall 17% of children in the sample were eligible for FSM and there was a clear relationship between eligibility for FSM and lower development across measures covered by IELS. Inhibition was the only measure in which there was no statistically significant difference between children eligible for FSM and those who were not.

Figure 2 Months' difference on a range of IELS measures between those who are not eligible for FSM and those who are



Source: IELS assessment of 2462 children (2191 for physical development) age 5, England, matched to the NPD

The differences in development by FSM were equivalent to approximately 8 months for physical development; 6 months for emergent literacy; 5 months for emergent numeracy, emotional identification and emotional attribution; and 4 months for both working memory and mental flexibility.

### Children with English as an additional language were behind their peers in the cognitive measures but less so in other measures

Children with English as an additional language (EAL) made up 17% of the sample and showed lower development than their peers in cognitive, self-regulation and social-emotional development but not in physical development. The differences in cognitive development were equivalent to approximately 8 months for emergent literacy and approximately 3 months for emergent numeracy.

Within self-regulation, children with EAL showed lower development in mental flexibility and working memory (by the equivalent of approximately 3 months' difference on both

measures), however there was no difference in inhibition when compared to their peers. Children with EAL also showed lower development in 3 of the social-emotional measures (emotion attribution, prosocial behaviour and trust). The difference was equivalent to approximately 3 months in emotion attribution. There were no significant differences related to EAL status in non-disruptive behavior, emotion identification or physical development.

### Low birthweight was associated with lower physical and cognitive development, but not social-emotional development

One of the interesting features of IELS was the ability to investigate the influence of low birthweight on children's development, as this information is not routinely collected by ECEC settings or schools. Children whose parents had reported them as having low birthweight (11% of the sample for whom information was available) had statistically significantly lower levels of emergent literacy, emergent numeracy, working memory and physical development compared to their peers. The largest development gap associated with low birthweight was found in physical development (equivalent to approximately 9 months). The other gaps were around 3 months (emergent literacy) and 4 months (emergent numeracy and working memory). Low birthweight was not significantly related to development in any of the social-emotional measures in IELS.

### Older children showed greater development in cognitive, selfregulation and physical development

As would be expected, the oldest children (aged 6 years 0 months) showed greater development than the youngest children (aged 4 years 11 months) in emergent literacy and numeracy, all 3 self-regulation measures and in the measure of physical development. The picture was more complicated within the social-emotional measures. The oldest children in the sample had significantly greater development than the youngest in the direct measures of emotion identification and emotion attribution but there was no significant difference by age in the teacher-rated measures of trust, prosocial behaviour and non-disruptive behaviour.

### Children's development in emergent literacy and emergent numeracy varied by ethnic group but other areas of development did not

There were statistically significant differences between children of different ethnic backgrounds in emergent literacy and emergent numeracy, though not in the other domains measured by IELS. Children from a White ethnic background showed greater

development in emergent literacy than children from Asian and Black ethnic backgrounds (approximately 7 and 5 months' difference, respectively), and greater development in emergent numeracy compared to children from Black ethnic backgrounds (equating to approximately 3 months' difference).

#### Children's development did not appear to vary by region

IELS investigated the relationship between outcome measures and region (North, Midlands, Greater London and South). There were no significant differences between regions for any of the outcome measures, with the exception of inhibition. For inhibition, children in Greater London showed statistically significantly greater development than children in the South of England, equivalent to approximately 3 months' difference.

# At age 5, parents/carers reading to children, helping them read words and sentences, and having back-and-forth conversations is associated with greater development in a range of domains

IELS gathered information on children's home learning environment (HLE) through a set of questions in the parent questionnaire. The key findings, after controlling for socioeconomic status (SES), are summarised below.

Reading to children at least 5 days a week (accounting for 59% of those who responded) was associated with greater development in emergent literacy and all measures within the self-regulation and social-emotional domains, when compared to those who did this less than once a week (3% of those who responded). Furthermore, children whose parents helped them to read words and sentences<sup>3</sup> on 3 or more days a week (73% of the sample) had greater development in both emergent literacy, emergent numeracy, and the self-regulation measures than children whose parents did so less than once a week or never (6% of those who responded).

Having a larger number of children's books in the home, including library books, was related to greater levels of emergent literacy, emergent numeracy, social-emotional development, working memory, mental flexibility and physical development. In particular, when compared to the 9% of children with fewer than 10 books in the home, those with over 10 books (91% of the sample) had higher levels of development in emergent literacy, those with over 25 books in the home (79% of the sample) had higher levels of

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<sup>&</sup>lt;sup>3</sup> This was a national question for England only and has not been adjusted for SES.

development in emergent numeracy, and those with other 100 books in the home (29% of the sample) had higher levels of physical development and mental flexibility.

Children whose parents had a back-and-forth conversation with them about their feelings most often (at least 5 days a week, 53% of the sample) had greater development in emergent literacy than children whose parents did so less than once a week (3% of the sample). Additionally those who had these conversations at least 3 days a week (81% of the sample) had greater development in emotion identification than children who did so less than once a week (3%).

## Parental engagement with schooling was associated with greater development, particularly in social-emotional measures

Children whose teachers rated their parents as more engaged in their schooling (e.g. by attending parents' evenings and activities at the school, accounting for 69% of the sample) showed greater development in emergent literacy, emergent numeracy and all social-emotional measures than those whose parents were rated as slightly or not involved in their child's schooling (31%). This difference remained significant after controlling for SES.

## Attending special or paid-for activities every week was associated with greater development across social-emotional and cognitive measures

Attending special or paid-for activities (such as sports clubs, dance, swimming or language lessons) regularly was associated with greater development in a number of measures, although it was not necessarily the case that those attending these activities most often showed greater development across the IELS measures. For example, a positive difference was seen for emotion identification, emotion attribution and prosocial behaviour when children attended such activities 1-2 times a week (accounting for 47%) compared to those who went less than once a week or never (35%), whereas for emergent literacy and emergent numeracy, the difference was seen when children attended such special activities 3 to 4 times a week (16%) compared to those who did this less than once a week or never. For physical development, children who attended special or paid-for activities between 1 and 4 times a week showed greater development than those who attended less than once a week or never. It is important to note that these differences were present even after controlling for SES.

### The use of digital devices was associated with greater development in some areas

The study collected information on the frequency of use of digital devices by asking parents how often their child uses a desktop or laptop computer, tablet device or smartphone with the response options of 'never or hardly ever', 'at least once a month, but not every week', 'at least once a week, but not every day' and 'every day'. After accounting for SES, greater development in working memory was seen in those children using electronic devices most often (weekly, accounting for 46% of children or daily, 39%) compared to those who used such devices 1 to 3 times a month (9%) or never (6%). However, low use of digital devices (1 to 3 times a month, accounting for 9%) was associated with greater development in emergent literacy, compared to those who never used them (6%) or used them 1 to 6 times a week (accounting for 46%), both of which were associated with significantly lower development in emergent literacy. Using digital devices more than once a month but less than every week was also associated with the highest levels of trust, compared to those who used them at least once a week (46%) or every day (39%).

There were no significant differences in physical development between children who did educational activities on a computer, tablet or smartphone regularly and those who did not.

## Greater physical development was not related to more frequent physical activities outside the house but was related to more frequent drawing and painting

Children who drew pictures or painted on 3 or 4 days a week (37% of the sample) showed significantly greater physical development than children who drew pictures or painted less than once a week or never (7% of the sample). The difference between these groups was equivalent to approximately 5 months. However, IELS found no significant differences in physical development between children who regularly did physical activities outside and those who did not. The reason for this is unclear and would warrant further investigation.

## After accounting for socio-economic status, there were very few differences by ECEC type, intensity or age of attendance

The parent questionnaire collected extensive information on early childhood education and care (ECEC), including age of attendance, type of setting and intensity of attendance. The IELS study (OECD, 2020b) found few statistically significant differences by ECEC factors after adjusting for SES, which may reflect that the majority of children in

England attended ECEC (98% of children in the sample attended some form of ECEC with 71% of these children first attending before the age of 3 and 29% attending at age 3 or 4). This is also partly consistent with the Study of Early Education and Development (SEED, Melhuish and Gardiner, 2020), which found no association (across the whole study sample) between ECEC take up and EYFSP outcomes for literacy, numeracy and physical development. However, the SEED study found that for the 40% most disadvantaged children, starting to use a minimum of ten hours per week of formal ECEC no later than age two, combined with a mean use of over twenty hours per week of formal ECEC between age two and the start of school, increases the chances of achieving expected EYFSP levels in school reception year and improves children's verbal ability in school year one.

The few statistically significant findings for ECEC found in IELS are summarised below:

- Children who started ECEC earlier (those attending for more than 20 hours before the age of 1) showed greater development in emergent literacy and working memory and higher levels of trust than those who attended for less than 20 hours or did not attend at age 1. The association with higher levels of trust was statistically significant for girls but not for boys. This is partly consistent with findings from the SEED study (Melhuish and Gardiner, 2020) which found small effects on overall EYFSP scores and verbal ability in year one of school for the most disadvantaged 40% of children starting to use a minimum of ten hours per week of formal ECEC no later than age two, combined with a mean use of over twenty hours per week of formal ECEC. SEED also found a significant positive association between more hours per week of informal individual childcare between ages 2 and 5 and the verbal ability of 5-year-old children in England.
- On the other hand, attending ECEC later (children who first attended at age 3 or more) was associated with greater levels of non-disruptive behaviour compared with children who started ECEC before the age of 3. This finding is consistent with the SEED study (Melhuish and Gardiner, 2020) which found that using more formal childcare between age 2 and start of school was associated with socialemotional problems at age 5.

It should be noted that in the United States where a much larger proportion of children did not attend ECEC (20% of children) compared to England, IELS found these children had lower emergent literacy and emergent numeracy scores than those who had attended, even after controlling for SES (OECD, 2020d).

### At the age of 5, children's development in one area of learning is related to their development in other areas of learning

IELS measures are, to differing extents, correlated with each other. The strongest relationships are highlighted below.

- Children's development in emergent literacy at age 5 was most strongly related to their development in emergent numeracy. Both emergent literacy and emergent numeracy were strongly correlated with the outcome measures of mental flexibility, working memory and emotion identification.
- Mental flexibility and working memory were strongly related.
- Emotion identification and emotion attribution were strongly correlated with each other; and prosocial behaviour was strongly correlated with trust and non-disruptive behaviour.
- Physical development was strongly correlated with prosocial behaviour and trust.

#### Persistence is associated with early development

Children's persistence was measured through a question on the teacher questionnaire. Teachers were asked to rate the child's ability to 'continue on his or her planned course or action in spite of difficulty or obstacles'. Just over one third (34%) of children were rated as having high levels of persistence ('often' or 'always' continuing their planned course of action), while 48% were rated as having medium levels ('sometimes') and 18% were rated as having low persistence ('rarely' or 'never' continuing their planned course of action).

Persistence was statistically significantly related to all of the 11 IELS outcome measures. It was correlated most strongly with prosocial development, trust and physical development, although the strength of these correlations were moderate. It was also moderately correlated with all other measures, with the exception of inhibition, emotion identification and emotion attribution, which had relatively weak correlations with persistence.

When comparing the differences between those rated as having high levels of persistence and those rated as having low levels of persistence, it was found that children's persistence was associated with statistically significantly greater development across all IELS measures. The differences were particularly pronounced for physical development, emergent literacy and mental flexibility. Where possible these differences have been converted into differences in months, which are summarised below:

- Children whose teachers rated them as 'often or always' persistent were over 12
  months ahead of their peers rated as 'rarely or never' persistent in physical
  development.
- Children whose teachers rated them as 'often or always' persistent were approximately 11 months ahead of their peers rated as 'rarely or never' persistent in emergent literacy and 8 months ahead in emergent numeracy.

- Children whose teachers rated them as 'often or always' persistent were approximately 10 months ahead of those rated as 'rarely or never' persistent in mental flexibility, 7 months ahead in working memory and 3 months ahead in inhibition.
- Children whose teachers rated them as 'often or always' persistent were approximately 8 months ahead of their peers rated as 'rarely or never' persistent in emotion identification and approximately 6 months ahead in emotion attribution.

### Children in England showed greater development in emergent numeracy than the other two counties but lower development in inhibition

The IELS international report (OECD, 2020a) found that children in England showed greater development in emergent numeracy than their counterparts in Estonia and the United States. Children in England showed similar development in emergent literacy to children in Estonia and greater development than children in the United States.

In 2 of the 3 areas of self-regulation measured in IELS (working memory and mental flexibility), children in England showed similar development to children in Estonia and greater development than children in the United States. However, for the third measure in self-regulation (inhibition), children in England showed significantly lower development than children in both the United States and Estonia.

Overall, children in England showed similar social-emotional development to children in the other 2 countries, although results differed across the 5 measures included in IELS (namely emotion identification, emotion attribution, pro-social behaviour, non-disruptive behaviour and trust).

#### Conclusion

The IELS study was successfully implemented in England for the first time in 2018 and provides findings for a nationally representative sample of 5-year-olds in England. Comparisons with the other participating countries suggest that, broadly speaking, children in England had similar development to children in Estonia and greater development than those in the United States. There were 2 statistically significant differences between results in England and both the other 2 countries: children in England showed greater development in emergent numeracy and lower development in inhibition.

The findings have identified a set of risk factors for lower development in children's family and individual characteristics which could potentially benefit from additional support, including deprivation, SEN, EAL and low birthweight.

IELS also adds to the existing evidence on the importance of the home learning environment, suggesting that there are many simple activities that parents can do (such as reading to their children every day, making sure they have access to children's books, having regular conversations with children about their feelings and being involved in their child's school) which are positively associated with children's early development. The findings related to children's ECEC participation are consistent with the importance of continuing to provide a spectrum of high quality ECEC experiences for all children.

IELS is an innovative study which successfully engaged children, their parents and teachers, achieving high response rates from participants (please see section 1.4 for details). The findings provide a robust and vivid picture of the development of 5-year-olds in England.

### **IELS** outputs overview

Below are a list of the main reports produced for IELS.

### Reports published by OECD

- <u>Early learning and child well-being</u>: A study of five year olds in England, Estonia and the United States (OECD, 2020a). This report looks at the findings as a whole and compares and contrasts the findings across the three countries.
- <u>Early learning and child well-being in England</u> (OECD, 2020b). This report focuses on the findings in England.
- <u>Early learning and child well-being in Estonia</u> (OECD, 2020c). This report focuses on the findings for IELS in Estonia
- <u>Early learning and child well-being in the United States</u> (OECD, 2020d). This
  report focuses on the findings for IELS in the United States.

#### Report published by Department for Education

 IELS national report for England (this report), which builds on the OECD country report for England by further contextualizing the findings for England by linking the IELS data with the national pupil database (NPD) and reporting on national questions and an additional measure of physical development.

### **Glossary**

**Early Years Foundation Stage profile (EYFSP)** – summarises and describes children's attainment at the end of Reception Year. Children's level of development is assessed against the early learning goals (ELGs) and practitioners indicate whether children are meeting expected levels of development, exceeding them or not yet reaching expected levels.

**Emergent literacy** - IELS tablet-based measurement focused on 3 areas of language and literacy: listening comprehension, vocabulary knowledge, and phonological awareness.

**Emergent numeracy** - IELS tablet-measurement defined as the ability to recognise numbers and to undertake numerical operations and reasoning in mathematics. The measure focused on simple problem-solving and the application of concepts and reasoning in: numbers and counting, working with numbers, shape and space, measurement, and pattern.

**Fine motor skills** – the use of the smaller muscle of the hands, commonly in activities like using pencils and scissors.

**Gross motor skills** - the use of the large muscles of the body for walking, running, sitting, jumping and other activities.

**Home learning environment** - The combination of both the physical characteristics of the home and the quality of the implicit and explicit learning support children receive from parents<sup>4</sup>.

IELS - International Early Learning and Child Well-being Study.

**Inhibition** - An IELS measurement within the self-regulation domain of a child's ability to inhibit an impulsive response in favour of an alternative response.

**Low birthweight** - IELS identified low birthweight as a being less than 2.5kg.

**Mental flexibility** - An IELS measurement within the self-regulation domain focused on a child's ability shift between rules according to changing circumstances or to apply different rules in different settings.

**National Pupil Database (NPD)** - a longitudinal database for all children in maintained schools in England. The NPD is compiled and controlled by the Department for

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<sup>&</sup>lt;sup>4</sup> In this report, the term 'parents' is used to refer to children's parents and carers.

Education (DfE) and contains data from a number of distinct datasets. The NPD includes data on pupil and school-level characteristics (such as age, gender, ethnicity, attendance, eligibility for free school meals) linked to data on national curriculum tests and public examinations results.

**Persistence** - The extent to which a child continues his/her planned course of action in spite of difficulty or obstacles.

**Self-regulation** - Characterised by a child's ability to think before acting, persist at an activity, follow directions, remain calm, and control their impulses. In IELS, the self-regulation domain focused on 3 distinct measurements: Inhibition, Working Memory and Mental Flexibility. These are primarily measures of children's cognitive function (sometimes called 'executive function'), rather than measures of behavioural self-regulation.

**Social-emotional domain** - A child's ability to begin forming positive relationships with others, to understand and develop behavioural expectations for both themselves and others, and to understand appropriate behaviour in different settings. IELS measured 5 aspects of children's social-emotional development, namely: emotion identification, emotion attribution; prosocial behaviour; trust; and non-disruptive behaviour.

**Socio-economic status (SES)** – in IELS, a SES index was derived from responses given in the parent questionnaire relating to parents' level of education, income and type of employment (OECD, 2020b).

**Working memory** - An IELS measurement within the self-regulation domain focused on a child's ability to store information and manipulate it to complete a given task.

NFER was contracted to carry out IELS in England on behalf of the Department for Education (DfE) and this report includes analysis of pupil administrative data from the DfE's National Pupil Database (NPD). However the views expressed in this report are the authors' and do not necessarily reflect those of the DfE.

Please note that this work was produced using statistical data from ONS. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.



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