Early Learning and Child Well-being in the United States

OECD

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Foreword

It is not always easy for policy makers to make decisions in education that are focused on the future, on what our children need from education. It is easier to rely on what has worked in the past, at least for some children, than to continuously question and try to understand how children are really faring.

The United States has often been an international leader in promoting the need for evidence to support sound decision-making in education. The United States has also been a leader in advocating for internationally comparable data on education. As one of a small group of countries, the United States championed the development and implementation of the OECD Programme for International Student Assessment (PISA). Similarly, the United States has championed the International Early Learning and Child Well-being Study (IELS). While PISA provides countries with comparative information on students' skills towards the end of school, IELS complements this with comparative information on children's learning as they enter school. In combination, these two sources of information help countries to better understand the strengths, weaknesses and value-add of their schooling systems from an international perspective.

The United States was one of three OECD countries that participated in the International Early Learning and Child Well-being Study. The study provides policy makers, education leaders, parents, and the wider community with insights on how well five-year-old children in the United States are faring. The study moves beyond speculation and beliefs, and enables children to show us how they are doing. The findings are enriched by comparisons with children in England (United Kingdom) and in Estonia.

The study investigated how well five-year-old children were developing across the range of skills they need to be well-positioned to succeed in education and grow up into happy, healthy and responsible citizens. These skills include both early cognitive development and social and emotional development. Children without this balance of skills will struggle to do well in school and in other areas of their lives.

The study highlights early differences between groups of children, such as between boys and girls and between children from advantaged and disadvantaged families. This helps us to see how we can better support children and their families, both in the earliest years and in the first years of schooling. Education systems that orient their priorities from an institutional lens to children's actual needs will have greater success overall and will be better able to achieve improved equity.

Children love to learn, and supportive, caring environments help them to do so. Our job is to ensure that we are providing such environments.

Andreas Schleicher
Director for Education and Skills
Special Advisor on Education Policy to the Secretary-General

Acknowledgements

The International Early Learning and Child Well-being Study (IELS) was a collaborative effort between participating countries and the OECD Secretariat.

The development of this report was guided by Andreas Schleicher and Yuri Belfali and managed by Rowena Phair. The lead author of the report was Lauren Kavanagh, with chapters contributed by Malek Abu-Jawdeh (Chapter 4) and Javier Suarez-Alvarez (Chapter 5). The publication was edited by Sally Hinchcliffe and designed by Fung Kwan Tam. Administrative support was provided by Valentine Bekka and Matthew Gill. Communications support was provided by Rachel Linden.

To support the technical implementation of IELS, the OECD contracted an international consortium of institutions, led by Maurice Walker at the Australian Council for Educational Research (ACER). The consortium also included the International Association for the Evaluation of Educational Achievement (IEA), led by Anja Waschk, and cApStAn, under the lead of Roberta Lizzi.

To help to ensure that the study was rigorous and valid, IELS was guided and supported in its work by a Technical Advisory Group (TAG) and a Measurement Advisory Group (MAG). The members of the TAG were Iram Siraj (Chair), Rosemary Cahill, and Szilvia Papp. The members of the MAG were Ray Adams, Alla Berezner, Dan Cloney, Wolfram Schulz, Maurice Walker, and Nathan Zoanetti.

This report was prepared in close collaboration with the United States IELS team, of which Mary Coleman from the US Department of Education was project lead. Many reviewers from Mary's team provided feedback on earlier chapter drafts; their help in improving this volume is gratefully acknowledged.

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Reader's guide

WHAT IS IELS?

The International Early Learning and Child Well-being Study (IELS) puts a spotlight on how children are faring at five years of age. IELS directly measures key indicators of children's learning, as well as collecting a broad range of development and contextual information from children's parents and teachers.

WHAT ASPECTS OF LEARNING AND DEVELOPMENT WERE OF FOCUS IN IELS?

IELS conceptualises early learning as holistic, involving cognitive and socio-emotional skills whose development are interrelated and mutually reinforcing. The study does not measure everything. Instead, it focuses on those aspects of development and learning that are predictive of children's later education outcomes and wider well-being. These are: emergent literacy and emergent numeracy, self-regulation, and social-emotional skills. Across these main early learning domains, 10 dimensions of children's development and learning were assessed in the study.

WHO PARTICIPATED IN IELS?

Three OECD countries participated in the study: England, Estonia and the United States. This report uses "England" as shorthand for England (United Kingdom). IELS covered children who were aged between five and six years of age during the study administration period of October to December 2018 and who were enrolled in a registered school or early childhood education centre. Samples were drawn and weighted to be representative of the target populations in each of the three participating countries. This report uses "five-year-olds" as shorthand for the IELS target population.

Educators and parents also participated in IELS by providing contextual information about children's learning and lives. "Educators" is the term used to describe the teachers or early childhood education and care (ECEC) staff members who responded to staff questionnaires in IELS. The report uses "parents" as shorthand for the parents, guardians or others who completed the IELS parent questionnaire with respect to participating children.

WHAT DOES THIS VOLUME CONTAIN?

The results from IELS are presented in four reports: an international report and an in-depth report on each of the three participating countries. This volume focuses on the findings for the United States.

A GUIDE TO INTERPRETING FINDINGS IN THIS REPORT

Data underlying the report

IELS results are based on direct and indirect assessment of children's skills in a range of learning domains. The metric for all learning scales in IELS is the same and the metric used for the scales does not have a substantive meaning (unlike physical units of measure, such as ounces or yards). There is theoretically no minimum or maximum score in IELS; rather, the data are scaled to have approximately normal distributions, with the means around 500 and standard deviations (see below) around 100. A one-point difference on the IELS scale therefore corresponds to an effect size of .01 of a standard deviation and a 10-point difference to an effect size of .1. Results are presented for a subgroup of children only when estimates are based on at least 30 children from at least five ECEC centres or schools. Important contextual information about children's lives and learning was collected from their parents and educators. Some information was collected only from educators, some only from parents, and in some cases, parents and educators both provided perspectives on the same issue (e.g. how well a child is developing in a particular domain). When parent and educator reports are compared in tables, figures or text in this report, those analyses are based on the subsample of children for whom both parents and educators provided information.

Overall IELS averages

Where cross-country averages are provided in any of the IELS volumes, these averages correspond to the arithmetic mean of the three country estimates.

Statistically significant differences

Unless otherwise stated, a difference reported as statistically significant is significant at the .05 level. This means there is a less than 5% probability that the reported difference occurred by chance; a statistical test has been carried out to establish this. Statistically significant differences in this report are denoted by darker tones in figures and by bold font in tables.

Interpreting correlations

A correlation coefficient is a measure of the degree to which two variables tend to move together. The coefficient has a value between plus and minus 1, which indicates the strength and direction of association. If a correlation is positive, it means that as one variable increases, so does the other. If a correlation is negative, it means that as one variable increases, the other decreases. In this report, a correlation coefficient with an absolute value between 0 and 0.19 is interpreted as weak, between 0.20 and 0.49 as moderate, between .50 and 0.79 as strong, and between 0.80 and .99 as very strong.

Standard deviation

The standard deviation is a measure of the dispersion of a set of data from its mean. The more spread apart the data, the higher the deviation. In a normal distribution, 68% of the scores are within one standard deviation of the mean, 95% within two standard deviations, and 99% within three. As mentioned above, IELS learning scales all have an approximate standard deviation of 100.

Standard Error

Scores reported in this volume are population estimates, based on the sample of children selected. However, it is unlikely that the 'true' or population mean is exactly the same as the sample. Some variation or error around estimates is to be expected. Thus, each mean has a standard error, which allows us to estimate how accurately the mean found in our sample reflects the 'true' mean in the population. The 'true' mean score can be found in an interval that is 1.96 standard errors on either side of the obtained mean, 95% of the time.

Rounding figures

As a result of rounding, some figures in tables may not add up exactly to the totals. Totals, averages and differences are calculated on the basis of exact numbers and are rounded only after calculation. Percentages and mean scores are rounded to whole numbers, and standard errors are rounded to two decimal places.

ADDITIONAL TECHNICAL INFORMATION

Readers interested in additional technical detail regarding IELS are directed towards the short technical note at the end of this volume and to the IELS Technical Report (OECD, forthcoming).

This report uses the OECD StatLinks service, meaning that all tables and figures are assigned a URL leading to an Excel workbook containing the underlying data. These URLs are stable and will remain unchanged over time. In addition, readers of the e-books will be able to click directly on these links, and the workbook will open in a separate window if their Internet browser is open and running.

Abbreviations and acronyms

CCDBG	Child Care and Development Block Grant
CCDF	Child Care and Development Fund
DC	District of Colombia
ECEC	Early childhood education and care
ECLS	Early Childhood Longitudinal Study
ELL	English-language learner
FMLA	Family and Medical Leave Act
LEA	Local education authority
KEA	Kindergarten entry assessment
IDEA	Individuals with Disabilities Education Act
IELS	International Early Learning and Child Well-being Study
ISCED	International Standard Classification of Education
GDP	Gross domestic product
GED	General Educational Development
K-12	Kindergarten to 12th grade
NAC	National Accreditation Commission for Early Care and Education Programs
NAEP	National Assessment of Educational Progress
NAEYC	National Association for the Education of Young Children
NCES	National Center for Education Statistics
NIEER	National Institute for Early Education Research
Pre-k	Pre-kindergarten
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
ROR	Reach Out and Read
QRIS	Quality rating and improvement systems
SEL	Social-emotional learning
SES	Socio-economic status
TANF	Temporary Assistance for Needy Families
TIMSS	Trends in Mathematics and Science Study
WHO	World Health Organization

Executive Summary

The earliest years of a child's life are a period of great opportunity and great vulnerability. Children are learning faster than at any other time in their lives, building the foundations for their future cognitive and social-emotional development. Without a strong early foundation, it is harder for children to build advanced cognitive and social-emotional skills. Education systems wishing to achieve a substantive change in student outcomes are well advised to increase their focus on the quality, responsiveness and effectiveness of their early years policies.

The International Early Learning and Child Well-being Study (IELS) puts a spotlight on how children are faring at five years of age. The study directly measures key indicators of their learning, as well as collecting a broad range of developmental and contextual information from their parents and teachers. The study focuses on those aspects of early development and learning that are predictive of children's later education outcomes and wider well-being. These are: emergent literacy and emergent numeracy, self regulation, and social-emotional skills.

Three OECD countries participated in this study: England (United Kingdom), Estonia and the United States. They each participated to enhance the body of international evidence available to policy makers, education leaders, practitioners, and parents on children's early learning outcomes. The study provides each country with information on their children's earliest years in order to inform decision making.

The results from IELS are presented in four reports: an international report and an in-depth report on each of the three participating countries. This volume focuses on the findings for the United States.

MAIN FINDINGS

Five-year-olds in the United States are doing less well than those in England and Estonia across a range of cognitive, self-regulation and social-emotional domains

Children in the United States had lower emergent literacy and emergent numeracy scores, on average, than those in England and Estonia. They were also less able to respond appropriately when rules changed (i.e. they had lower mental flexibility scores) and had poorer working memory than their counterparts in England and Estonia.

The picture was more mixed regarding social-emotional skills. Five-year-olds in the United States were reported as having similar levels of trust to their peers in England and Estonia and were equally able to identify how they felt and to exaplin why they felt that way in a given scenario. They displayed less prosocial behaviour than on average in IELS, but also less disruptive behaviour, as rated by their educators. Finally, children in the United States were less accurate than children in Estonia at identifying the feelings of characters in stories presented in the IELS assessments, but were about as accurate as children in England.

ECEC attendance was associated with higher emergent literacy and emergent numeracy scores, regardless of children's socio-economic background

Children in the United States who had ever attended early childhood education and care (ECEC) had higher mean emergent literacy and emergent numeracy scores at age five than those who had never attended, and the differences in mean scores remained significant after accounting for socio-economic status (SES). According to parents in the United States, 80% of the five-year-olds had attended an ECEC setting, and 51% had attended by the age of three. These participation rates were lower than in England and Estonia, where there was close to universal participation by age five. There was a significant association between ECEC attendance and SES in the United States, with over 90% of five-year-olds in the top SES quartile having attended before the age of five, compared to 73% in the bottom quartile.

Girls do better than boys in many of the cognitive, self-regulation, and social-emotional skills assessed by the study

In the United States, five-year-old girls had a significantly higher average emergent literacy score than boys. This gender gap was similar in size and direction to the gender differences for emergent literacy found in Estonia and England. In contrast, there was no significant gender difference in emergent numeracy scores in the United States (or in either of the other countries). Gender differences in favour of boys have been found in large-scale mathematics assessments with older students in the United States, however, suggesting that these gender gaps may emerge as children progress through school.

Girls in the United States had significantly higher mean scores than boys on all measures of social-emotional skills included in the study. Girls displayed greater ability to identify others' emotions and take others' perspectives, skills that were directly assessed in IELS. Girls were also more trusting and showed more prosocial and less disruptive behaviour than boys, as reported by their educators. The gender gaps in social-emotional learning were somewhat smaller in the United States than in either England or Estonia.

In the United States, as in England and Estonia, boys were significantly more likely than girls to be reported as having experienced learning difficulties or social, emotional or behavioural difficulties. Boys from disadvantaged backgrounds were particularly likely to have experienced these challenges, and represent a group that may be at risk for later educational and social difficulties. Particular attention may need to be paid to the literacy development and the social and emotional learning of boys in order to bring their early outcomes in line with those of girls or to prevent further widening of gaps.

By the age of five, wide gaps in skills are already evident between children from advantaged and disadvantaged backgrounds, but not among racial and ethnic groups

Socio-economic status was positively correlated with IELS scores in the United States. The mean emergent numeracy score for five-year-olds in the top SES quartile in the United States, for example, was 110 points (more than a standard deviation) higher than for those in the bottom quartile. The relationships between SES and scores in many of the domains were stronger in the United States than in either Estonia or England.

There were no significant differences in the United States between the mean scores of White, Black and Asian children or those of two or more races in any of the learning domains assessed in IELS. After accounting for SES and home language, the mean emergent literacy, emergent numeracy and mental flexibility scores of Hispanic children did not differ significantly from those of White children. This finding contrasts with assessments of older children in the United States which have consistently shown gaps in student achievement in reading and mathematics between White and Black children and between White and Hispanic children, although the size of these gaps has been closing over time. That IELS did not find significant racial or ethnic gaps in learning outcomes soon after school entry suggests that these gaps emerge as children progress through school.

Many parental practices are positively associated with children's early learning scores, suggesting practical ways in which parents can support their children's learning

IELS identified a number of parental practices that are positively associated with children's early learning. For example, regardless of socio-economic background, five-year-olds in the United States who were read to on at least five days each week by their parents had a significantly higher mean emergent literacy score than other children, and were also better at identifying the emotions of the characters in the IELS vignettes. Similarly, children whose parents sang songs or nursery rhymes to them most frequently had a higher mean emergent literacy score than other children. For some activities, moderate rather than daily frequency was associated with higher IELS scores. For example, attending special activities (such as sport, dance or scouts) on one or two days a week was associated with higher literacy scores than never attending such activities and doing so most days.

Parental involvement at school was also associated with higher early learning scores in the United States: children whose parents were rated as moderately or strongly involved in activities at school by their teachers had higher mean scores across a range of assessment domains than those whose parents were less involved, regardless of socio-economic background. Access to greater numbers of children's books at home was also associated with higher scores across a range of cognitive and social-emotional subdomains.

In the United States, moderate use of digital devices is associated with higher emergent literacy scores

In the United States, five-year-olds who never or hardly ever used digital devices such as a laptop computer, tablet or smartphone had a mean emergent literacy score that was significantly lower than the mean scores of children who used them monthly or weekly, but not significantly different from the mean of children who used them daily. In the United States, almost half of five-year-olds (49%) used such devices every day, a larger percentage than in either England or Estonia (both 39%).

Children's skills in each of the learning domains assessed in IELS were interrelated in the United States

Children's emergent literacy and emergent numeracy scores were positively and strongly correlated with one another, and each was moderately to strongly positively correlated with scores in self-regulation (working memory and mental flexibility) and with children's abilities in identifying others' emotions. The correlations were weaker between each of emergent literacy and emergent numeracy and the other social-emotional skills assessed in the study. The correlations between either emergent literacy or emergent numeracy and teacher ratings of disruptive behaviour were negligible.

Early learning matters: The International Early Learning and Child Well-being Study

The International Early Learning and Child Well-Being Study (IELS) puts a spotlight on how children are faring at age five. This chapter presents the rationale for focusing on children's learning and development in the earliest years, and outlines the importance of having evidence on early learning that is comparable across countries. The chapter also provides information on the overall design of the study.

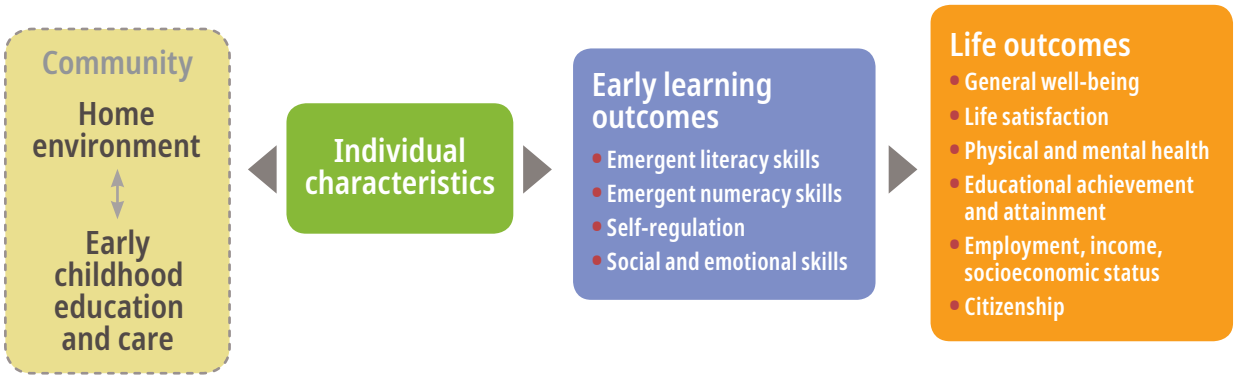
THE EARLY YEARS: A WINDOW OF OPPORTUNITY ... AND RISK

The first few years of a child's life is a period of great opportunity, but also one of great risk. The cognitive and social-emotional skills that children develop in these early years have long-lasting impacts on their later success throughout schooling and adulthood. Although the quality of later schooling is important, strong early learning accelerates later development whereas a poor start can inhibit it (Bartik, 2014[1]; Heckman, 2006[2]; Schoon et al., 2015[3]; Sylva et al., 2008[4])

Early learning and child well-being are interrelated and mutually reinforcing. Children thrive in caring families, where they feel safe and happy, and where they are supported to learn about themselves and their social, cultural and physical environments. The day-to-day interactions and activities between young children and their parents and other family members foster children's well-being and their emerging cognitive and social-emotional skills (Melhuish et al., 2008[5]).

Children also learn in settings outside of their homes, including in their wider family networks, their neighbourhood communities, in early childhood education and care (ECEC) settings, and in school. Children from even the most socially deprived homes can thrive when they have sustained access to high-quality and responsive learning environments. A positive early platform of learning enables children to develop the skills they need to succeed in school and later life (Figure 1.1).

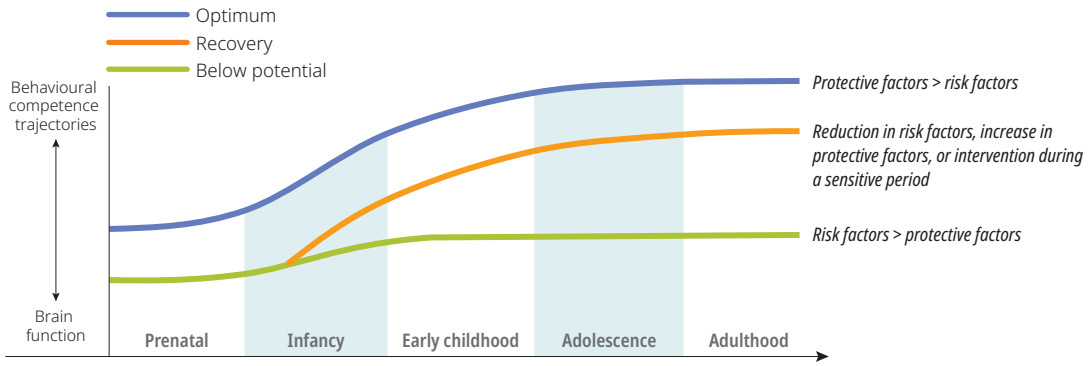
Figure 1.1 **Children's early learning and later life outcomes**



Source: Shuey and Kankaraš (2018[6]), The Power and Promise of Early Learning, https://doi.org/10.1787/f9b2e53f-en.

The window of positive early learning starts to close when children are around seven years old, due to a sharp decrease in brain malleability at this point (World Bank, 2018[7]). Investment in children's early learning enables normal, timely development, and shapes children's long-term ability to learn (Figure 1.2). If children have not developed core foundation skills by this point, they will struggle to progress well at school, and may also have social and behavioural difficulties in adolescence and in adulthood. Seeking to ameliorate a poor start at older ages is complex, challenging and costly, and yields low success rates (Heckman, 2006[2]). At a system level, the proportion of children with poor early development constrains the extent to which any education system can achieve success for these children and perform well as a whole.

Figure 1.2 **Risk and protective factors affect development trajectories**

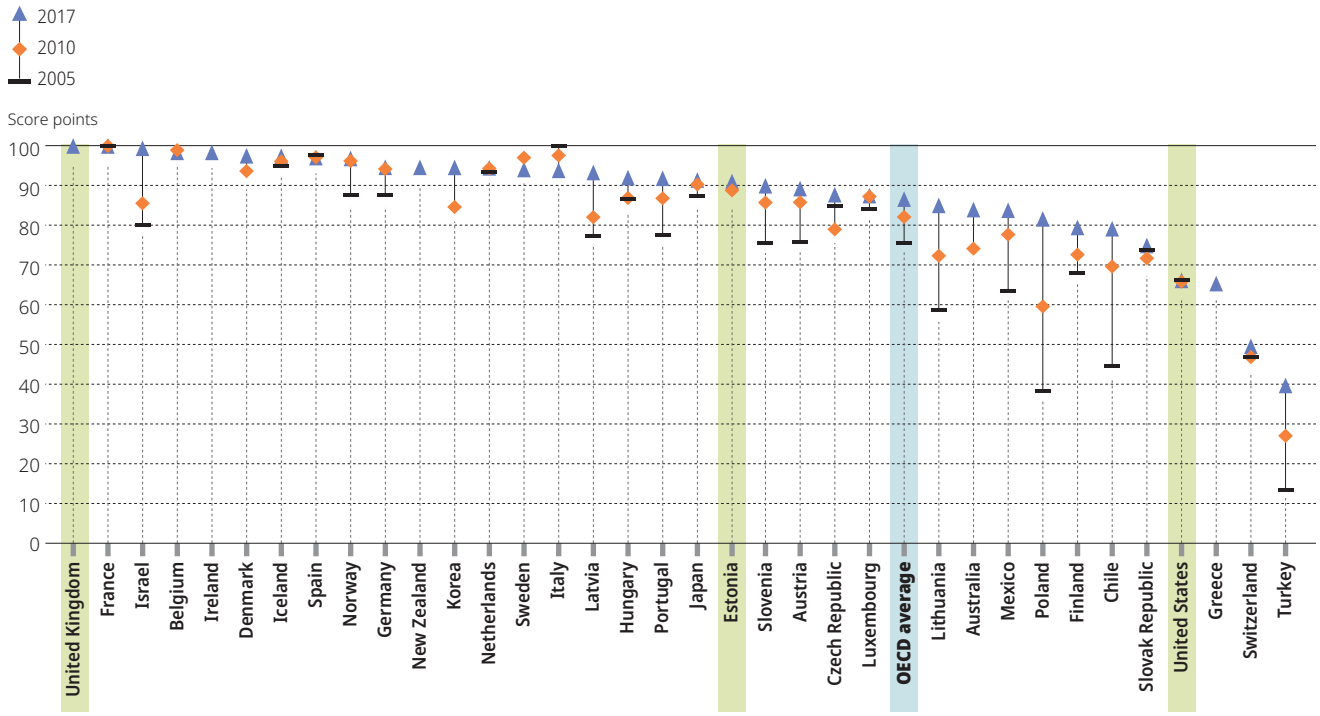


Source: Adapted from Walker et al. (2011[8]), Early Childhood Stimulation Benefits Adult Competence and Reduces Violent Behavior, https://doi.org/10.1542/peds.2010-2231.

Countries are increasingly focusing on early years policies as a means to lift overall educational performance and mitigate disadvantage. Many countries have increased ECEC participation rates and their overall investments in early years policies (Figure 1.3). Yet early learning remains a relatively neglected area of international education research. As a consequence, there is little internationally-based evidence on how to improve early years policies and achieve better results for children.

The promise of early childhood education may not always deliver for all children. This may be due to, for example, the quality and responsiveness of provision, the extent to which provision focuses on the types of skill development children need most in the early years, and the timeliness and continuity of provision. At a system level, countries could learn a great deal from each other on how to enhance early learning outcomes for all children, by using a common framework for doing so.

Figure 1.3 **Change in enrolment rates of children aged 3 to 5 years (2005, 2010 and 2017)**



StatLink https://doi.org/10.1787/888934099979

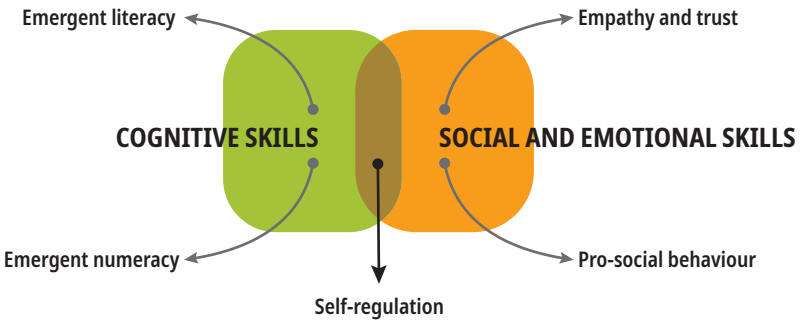
COUNTRIES CAN LEARN FROM EACH OTHER TO IMPROVE CHILDREN'S EARLY LEARNING OUTCOMES

The International Early Learning and Child Well-Being Study (IELS) was designed to help countries assess their children's skills and development and to increase understanding of how these relate to children's early learning experiences and well-being. The study provides countries with comparative data on children's early skills, along with a framework to foster the growing interest in early childhood outcomes. Using this information, countries can better identify factors that promote or hinder children's early learning. The study analyses the associations between children's early skills and elements of their individual characteristics, home learning environments and education experiences.

IELS directly assessed the cognitive, self-regulation and social-emotional skills of a representative sample of five-year-olds enrolled in registered school or preschool settings in each participating country. Three countries participated in IELS in 2018: England (United Kingdom), Estonia and the United States. IELS assessed children's abilities through developmentally appropriate interactive stories and games delivered on a tablet device. It was carried out in the school or ECEC setting the children attended, and participating children were supported on a one-to-one basis by trained study administrators. The assessments did not involve any reading or writing, and prior experience with digital devices was not needed. The parents of participating children and the staff member or teacher who knew each child best were also asked to participate, in order to provide fuller information on each child.

IELS took a holistic approach to understanding a child's early learning development at the age of five (Figure 1.4). It consisted of a play-based direct assessment of children's abilities in the four early learning domains of emergent literacy, emergent numeracy, self-regulation and empathy. In addition, IELS collected information from parents and educators to better understand children's early skills across a wider set of early learning domains, including children's prosocial behaviour and levels of trust.

Figure 1.4 **IELS approach to gathering direct and indirect information**



IELS emphasises the well-being of children participating in the study above all else. Tasks were engaging and age appropriate. Participation was voluntary. Trained professionals – who also liaise with staff in the child's school – administered the assessment. The study minimised the level of input required from participating schools, teachers, children and parents, while still collecting the relevant information.

The results from IELS are presented in an international report and in a series of in-depth reports for each of the three participating countries. This volume focuses on the findings for the United States.

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2

The context of early learning in the United States

This chapter provides contextual information to inform the interpretation of the IELS results in the United States. It highlights demographic information about children and their families in the United States; the early learning policies of the federal and state governments; and an overview of the early childhood education and care services available, including discussion of their quality and impact. The chapter concludes with an overview of major issues and debates relating to the early learning sector in the United States and a statement about what IELS can contribute to a growing body of international evidence on early learning.

In the United States, as in many countries worldwide, there has been an increasing recognition in recent decades of the importance of early childhood experiences in shaping outcomes throughout life. Of the approximately 74 million children currently living in the United States, around 24 million are aged five and under, the time when learning and development happen at a greater rate than at any other time of life. Generally, the cognitive skills that a child displays at the age of five are associated with a range of later outcomes, including educational attainment, socio-economic status and general well-being. Early social and emotional competencies predict later emotional health, physical well-being and life satisfaction. In addition to their associations with later outcomes, children's cognitive and social-emotional skills are important for their current well-being and the success with which they navigate relationships and their environments.

This chapter provides contextual information to inform the interpretation of the International Early Learning and Child Well-being Study (IELS) results for five-year-olds in the United States. Specifically, it highlights demographic information about children and their families in the United States; the early learning policies of the federal and state governments; and an overview of the early childhood and care services available, including levels of participation in these services and discussion of their quality and impact. The chapter concludes with an overview of major issues and debates relating to the early learning sector in the United States and a statement about what IELS can contribute to a growing body of international evidence on early learning.

PROFILE OF CHILDREN AND FAMILIES IN THE UNITED STATES

Birth rates in the United States are in decline. In 2017, the number of births was the lowest recorded in more than 30 years and the general fertility rate was at a record low of 1 765.5 births per 1 000 women (Martin et al., 2018[1]). Birth rates vary across racial and ethnic groups in the United States, and this, combined with increased inward migration, means that the population has been characterised by increasing racial and ethnic diversity and multiculturalism in recent years (Devine, 2017[2]). In 2017, 51% of children in the United States were White, 25% were Hispanic (of any race), 14% were Black, 5% Asian, 4% were of two or more races, 0.8% were American Indian or Alaska Native and 0.2% were Native Hawaiian or Other Pacific Islander (Federal Interagency Forum on Child and Family Statistics, 2018[3]). The proportion of children who were White (non-Hispanic) fell from 62% in the year 2000 to 51% in 2017 (Musu-Gillette et al., 2017[4]) and it is projected that less than half of the US population will be White (non-Hispanic) by 2044 (Colby and Ortman, 2015[5]).

Currently, one-quarter (25%) of children living in the United States live with at least one parent who was born outside the country (Federal Interagency Forum on Child and Family Statistics, 2018[3]) and close to one-quarter (23%) of children speak a language other than English at home. Although there is no official language in the United States, English is the primary language spoken in the country and is the language of instruction in most schools. In 2016, close to one in ten students in the kindergarten to twelfth grade (K-12) public school system (9.6% or 4.9 million students) were classified as English language learners (ELLs), up from 8.1% (or 3.8 million students) in the year 2000. Students identified as ELLs typically receive specialised or modified instruction at school. Generally, children in the lower grades of the public school system are more likely to be ELL than those in the upper grades. In 2016, for example, 16% of children in kindergarten were ELLs, compared to 9% of students in sixth grade, 7% in eighth grade and 4% in twelfth grade. This is partly explained by students who started school with limited English proficiency going on to develop their English proficiency as they progress through to the later grades (NCES, 2019[6]). The most commonly spoken language among ELL students in 2016 was Spanish (approximately 3.8 million students), followed by Arabic (129 386 students), Chinese (104 147 students) and Vietnamese (78 732 students) (NCES, 2019[6]). ELL children in English-speaking early childhood education and care (ECEC) and kindergarten settings bring unique experiences and learning strengths to these settings, but also have different needs to their non-ELL peers (Baker and Páez, 2018[7]) and may face challenges to their readiness to attend school (Gottfried, 2014[8]). States vary considerably in their share of ELLs, ranging from less than 1% of students in West Virginia in 2016 to 20% of students in California. Traditionally, ELL children were concentrated in a small number of states (such as California and Florida), but changes in immigration patterns have meant that some of the states experiencing the greatest increases in the share of ELL students have been in the South and the Midwest. The learning needs of ELL children can therefore no longer be viewed as a regional issue, but one that is of widespread relevance across the United States (Gottfried, 2014[8]).

In 2015, household net adjusted income[1] in the United States was higher than that in any other OECD country, at USD 44 049, and considerably higher than the OECD average of USD 30 563. The country's gross domestic product (GDP) was USD 20.494 trillion in 2018, making it the world's leading economy in GDP terms. The distribution of wealth in the United States, however, is highly unequal[2] (OECD, 2017[9]). The 20% of the population with the highest incomes earn approximately 8.5 times more than those in the bottom 20% (OECD, 2015[10]). In 2017, 17.5% of children in the United States lived in families experiencing poverty (defined as an annual income below USD 25 283 for a family of four), meaning children are the poorest age group in the United States (Fontenot, Semega and Kollar, 2018[11]). With 20% of children under six living in poverty, the youngest children are the poorest (Children's Defense Fund, 2018[12]). Child poverty rates vary considerably by race and ethnicity, with White children less likely to live in poverty. In 2017, 12% of White children up to the age of five were from families below the poverty line, compared to 36% of American Indian/Native Alaskan children of that age, 34% of Black children, 26% of Hispanic children, and 16% of Asian/Native

Hawaiian/Pacific Islander children (Children's Defense Fund, 2018[12]). The child poverty rate in the United States is higher than the OECD average and higher than in most other OECD countries. In 2016, children in the United States were approximately twice as likely to live in relative poverty (21%) as children in Estonia (10%); the corresponding child poverty rate in the United Kingdom was 12% (OECD, 2018[13]).

In 2018, 69% of children in the United States lived with two parents, 27% lived with one parent, and 4% lived with someone other than a parent, whether relatives or non-relatives (United States Census Bureau, 2018[14]). Of those living with one parent, 83.5% lived with their mother and 16.5% with their father (United States Census Bureau, 2018[14]). These percentages have changed little in the last 20 years, although the proportion of children living with two *unmarried* parents has increased somewhat, from one in five children in 1997 to one in four in 2017 (Pew Research Center, 2018[15]). The share of single parents who are fathers has also increased (United States Census Bureau, 2018[14]). Family structure varies somewhat by racial and ethnic background in the United States, with Black children more likely to live with their mothers only (48% in 2017) than Hispanic children (25%) or White children (18%) (United States Census Bureau, 2018[14]).

Record numbers of children in the United States now live in multigenerational households. In 2016, 20% of the population, or 64 million people, lived in households with more than two generations. Multigenerational family living is growing among nearly all racial groups and Hispanics (Pew Research Center, 2018[16]). Such changes in household structure and living arrangements may have implications for the types of care and supervision children receive in early childhood.

In 2017, the labour-force participation rate of all women with children under the age of 18 in the United States was 71%, up from 47% in 1975 but unchanged since 2004; the equivalent rate for fathers in 2017 was 93% (Bureau of Labor Statistics, 2019[17]). Women with younger children are less likely to be part of the workforce: just over three-quarters (76%) of mothers with children aged 6-17 years old were in employment, compared to 65% of women with children aged five or younger. Labour-market participation varies by race and ethnic origin. Black mothers of young children have significantly higher participation rates than White, Hispanic, Asian American/Pacific Islander and American Indian mothers of young children (Center for American Progress, 2018[18]). Black mothers' labour-market participation rates do not increase as quickly as their children age as they do among mothers from other racial and ethnic groups, rather they are high soon after their children are born and remain high as their children age. Black mothers' consistently high labour-force participation rate is likely a result of necessity rather than choice, resulting from lower incomes and a greater likelihood of being the primary earners in their households (Center for American Progress, 2018[18]).

In 2017, 18% of all parents did not work outside of the home, with mothers more likely to be stay-at-home parents (29%) than fathers (7%) (Pew Research Center, 2018[19]). In a nationally representative survey conducted in 2017, 63% of fathers indicated that they did not believe that they spent enough time with their children, primarily citing work obligations as the reason for this; mothers were much more likely to indicate that they spent the optimal amount of time with their children (Pew Research Center, 2018[20]).

The majority of adults in the United States (60%) have completed high school (OECD, 2019[21]). Approximately one-third (32%) of adults have completed at least a bachelor's degree. Levels of educational attainment are higher among parents than among adults with no children (Table 2.1).

Table 2.1 **Educational attainment of adults aged 16 to 65 by whether or not they have children, United States**

	Adults with no children (%)		Adults with children (%)	
Educational attainment	Female	Male	Female	Male
Below upper secondary[1]	19.5	23.5	13.1	13.9
Upper secondary completed[2]	39.9	44.5	42.8	44.9
Post-secondary, non-tertiary[3]	4.9	4.5	10.9	9.2
Bachelor's degree and above[4]	35.6	27.5	33.2	32.0

Note: 1: Less than high school completion; 2: High school diploma or equivalent; 3: Vocational or technical institute (one-year certificate programme) or associate's degree; 4: Undergraduate degree or higher.
Source: OECD (2015[22]), *PIAAC: Public Data and Analysis*, www.oecd.org/skills/piaac/publicdataandanalysis/.
StatLink https://doi.org/10.1787/888934102867

In the 2015/16 school year, 13% of all students in public schools received special education services under the Individuals with Disabilities Education Act (IDEA). More students received these services for specific learning disabilities than for any other disability type (34% of those receiving support, or 4.5% of the total student population). The IDEA defines a specific learning

disability as, "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations." [Sec. 300.8 (c) (10)]. One in five students who were receiving support under the IDEA did so as a result of a speech or language impairment, while a further 14% received services for another health impairment (such as having limited strength, alertness or vitality due to a chronic or acute health condition). Other disabilities leading to services for students under IDEA included autism (9%), developmental delay (6%), intellectual disability (6%), emotional disturbance (5%), multiple disabilities (2%), hearing impairment (1%) and orthopaedic impairment (1%) (NCES, 2018[23]). There is some variation in the proportion of students receiving services under IDEA by race or ethnicity. In 2015-16, for example, 17% of American Indian/Alaska Native students, 16% of Black students, 14% of White students, 13% of students of two or more races, 12% of Hispanic students, 12% of Native Hawaiian or Other Pacific Islander students and 7% of Asian students were in receipt of special education services (NCES, 2018[23]).

STRATEGIC INTENT FOR EARLY LEARNING

Federal policy

According to the United States Department of Education (n.d.[24]), the federal goals for early learning are to:

> ...improve the health, social-emotional, and cognitive outcomes for all children from birth through 3rd grade, so that all children, particularly those with high needs, are on track for graduating from high school college- and career-ready. To enhance the quality of programs and services and improve outcomes for children from birth through 3rd grade, including children with disabilities and those who are English Learners, the Department will promote initiatives that increase access to high-quality programs, improve the early learning workforce, build the capacity of states and programs to develop and implement comprehensive early learning assessment systems, and ensure program effectiveness and accountability.

This statement of strategic intent refers to supporting the health, social-emotional and cognitive development of all children from birth. The federal government primarily supports this initiative indirectly, by providing grants to states to support young children and their families.

On average, women in OECD countries are entitled to 18 weeks of paid maternity leave to support families in the lead up to and after the birth of a child, and almost all OECD countries offer at least 3 months of paid maternity leave (OECD, 2017[25]). The United States is unique among OECD countries in having no statutory entitlement to paid maternity, paternity or parental leave (OECD, 2017[25]). In 1993, the US Congress passed the Family and Medical Leave Act (FMLA) with the intention of balancing "the demands of the workplace with the needs of families" and acknowledging that "it is important for the development of children and the family unit that fathers and mothers be able to participate in early childrearing". Under the FMLA, employees of public agencies, public or private elementary or high schools and private enterprises with more than 50 employees are entitled to 12 weeks job-protected unpaid leave for specified family or medical reasons, including the birth of a child. Approximately 40% of the workforce is not covered by the FMLA (Klerman, Daley and Pozniak, 2012[26]). Seven states have enacted their own family and medical leave acts with lower thresholds for employer coverage (for example, in Vermont, private companies with 10 or more employees must provide job-protected unpaid parental leave). California, New Jersey, New York, Rhode Island, Washington, Massachusetts and the District of Columbia have laws that guarantee paid family and medical leave.[3] In 2015, just 12% of workers in the private sector in the United States were entitled to paid maternity leave (United States Department of Labor, 2015[27]). In a survey conducted by the Department of Labor in 2012 of approximately 3 000 employees who had taken leave under the FMLA in the previous year, close to 1 in 4 (23%) women who took this leave for the birth of a child returned to work within two weeks of having the baby, with 12% returning within one week (Klerman, Daley and Pozniak, 2012[26]).

In addition to their implications for women's physical and psychological well-being, maternity and parental leave policies have important implications for children's development. The World Health Organization (WHO) recommends that, where possible, children be exclusively breastfed for the first six months of life to achieve optimal growth, health and development (World Health Organization, 2011[28]). Data from 2015 indicated that fewer than half of infants (47%) in the United States were exclusively breastfed for three months, with just one in four (25%) exclusively breastfed for the recommended six months (CDC, 2018[29]). Comparative data from 2005 showed that rates of excusive breastfeeding at six months were higher in countries with longer periods of maternity or parental leave, such as the Nordic countries. The United States had some of the lowest rates of exclusive breastfeeding at three, four and six months of all OECD countries (OECD, 2009[30]).

The US Department of Education's statement of strategic intent for early learning presented above also contains the goal of improving children's outcomes through building capacity among the states to provide effective early learning programmes and assessment systems. Indeed, there is no real *national* ECEC policy in the United States, as individual states have responsibility for and control over their education and care systems, with responsibility often further devolved to local authorities. For kindergarten to twelfth grade (K-12) education in the United States, the main federal law is the Every Student Succeeds Act, which replaced the No Child Left Behind Act when it was introduced in 2015. There is no equivalent law for pre-kindergarten (pre-k) education and care.

State policies

The vast majority of states lack the level of robust infrastructure for early childhood education and care that all states have for K-12 education (Atchison and Diffey, 2018[31]). As Table 2.2 shows, governance, finance, professional certification and regulation are less coherent and formalised in the ECEC sector than in K-12 education. In terms of governance, multiple state agencies administer early childhood education services and programmes. Local authorities can also administer these programmes and services directly, as can private providers. States rarely have formal governance structures that direct who makes high-level decisions about eligibility, regulation and accountability for public early childhood services across different state departments. This fragmentation may be at least partly attributable to how ECEC has developed in the United States over recent decades. Welfare reforms in the 1990s, particularly under the Personal Responsibility and Work Opportunity Reconciliation Act of 1996, dramatically reduced the number of individuals in receipt of welfare assistance, many of whom then moved into employment, which was predominantly low-income and potentially precarious (Child Trends, 2002[32]). Increased labour market participation, disproportionately among single mothers, led to increased demand for childcare (Child Trends, 2002[32]). The main purpose of many of the programmes and services which met this demand was the provision care and supervision for young children while their parents worked, and these day care services fell and continue to fall under the remit of departments of health and human services. In more recent years, educators, policy makers and parents have increasingly recognised the importance of high-quality early learning experiences for child development and later outcomes. The potential education function of early childhood services began to grow in importance relative to care and supervision, and departments of education at both state and federal levels increased their involvement in and support for ECEC services. Consequently, multiple entities are often contributing simultaneously to an early learning vision, "with little attention paid to potential duplication or collaboration", leading to gaps in provision and uneven quality (Atchison and Diffey, 2018, p. 1[31]). The complexity of the administration, financing and oversight of early childhood programmes creates policy challenges, as "convoluted administrative structures create natural limits to addressing policy issues in an efficient manner" (Atchison and Diffey, 2018, p. 1[31]).

Table 2.2 **Comparison of characteristics of the early childhood and K-12 education systems in the United States**

	ECEC	K-12
Governance	Nothing formalised in most states	State boards of education and local school boards
Finance	Multiple, chaotic funding	Guaranteed tax base
Professional certification	None universally required	Required to teach
Regulation	Minimum health and safety standards are state required; all else is voluntary	Required accreditation

Source: Atchison and Diffey (2018[31]), *Governance in Early Childhood Education*, www.ecs.org/governance-in-early-childhood-education/.

Where states do express goals for early learning, they tend to be in terms of the skills that children should have developed by the time they start school. Thirteen states[4] and the District of Columbia (DC) have explicit statutory definitions of school readiness, or have school readiness programmes or assessments that allow such definitions to be easily inferred (Education Commission of the States, 2018[33]). According to these definitions, children will be deemed ready for school if they have demonstrated learning or development as specified in state standards in areas such as literacy/language (11 states and DC), social and emotional competence (11 states and DC), motor/physical development or health (9 states and DC), approaches to learning (5 states and DC), numeracy or mathematical thinking (5 states and DC), and self-regulation (Minnesota only). What constitutes an acceptable level of learning in each of these areas varies across jurisdictions (Education Commission of the States, 2018[33]). State departments of education write learning standards (also referred to as content standards, content area standards or academic standards, depending on the state) that they would like students to meet at different ages. In many states, these learning standards are set for children from pre-kindergarten through to twelfth grade and serve as a guide for parents and teachers with respect to children's learning and development in a range of domains.

Many kindergarten programmes use assessments to understand what children know and can do upon entry to kindergarten. The number of states requiring kindergarten assessments is growing. As of 2018, 33 states required kindergarten entry assessments (KEAs) and at least 7 other states were piloting or exploring such assessments (Education Commission of the States, 2018[34]). Although there is no single agreed-upon KEA definition, the following definition was used in the Race to the Top, Early Learning Challenge, a federal funding competition that has driven much of the development of KEAs over recent years (Ackerman, 2018[35]):

> [A kindergarten entry assessment is]…administered to children during the first few months of their admission into kindergarten; covers all Essential Domains of School Readiness; is used in conformance with the recommendations of

> the National Research Council reports on early childhood; and is valid and reliable for its intended purposes and for the target populations and aligned to the Early Learning and Development Standards. Results of the assessment should be used to inform efforts to close the school readiness gap at kindergarten entry and to inform instruction in the early elementary school grades. The assessment should not be used to prevent children's entry into kindergarten (United States Department of Education, 2011[36]).

While this definition provides clarity on the intended purposes of KEAs and when they should be administered, it does not prescribe the type of assessment measure to be used, meaning states which receive federal funding have autonomy to draw on a range of direct and observational approaches to their assessments, although the selected measure should be valid and reliable (Ackerman, 2018[35]). If kindergarten entry assessments are well designed and appropriately implemented they can be useful tools for improving teaching and learning in kindergarten programmes, leading to better child outcomes (Shields, Cook and Greller, 2016[37]). However, collecting KEA data can present challenges to teachers. One such challenge is the amount of time that administering these assessments can take. Generally, KEAs are designed to be implemented 30-60 days after children enter kindergarten and, particularly in cases where assessments are based on the observation of individual children, it can be difficult for teachers to complete the assessments successfully within this period (Ackerman, 2018[35]). Policy makers in Florida removed the requirement for a language and literacy assessment to be carried out as a result of teacher objections to the amount of instructional time lost to the assessment (Ackerman, 2018[35]). Another challenge is the degree to which teachers are prepared or trained to administer the measures, both for the overall population and for subgroups for whom modifications might be needed, such as ELLs or children with special educational needs (Ackerman, 2018[35]). An additional issue is teachers' capacity to use the collected assessment data to guide their pedagogical decisions. Kindergarten entry assessments are intended to be formative assessments, and the usefulness of the collected data will depend on how well teachers are trained and prepared to use the data to inform their teaching.

State policies also differ with respect to the age at which schooling is compulsory, ranging from five to eight years of age. By the age of six, schooling is compulsory for children in most states (see Table 2.3). Seventeen states[5] and DC require children to attend kindergarten (the year before primary school) (Education Commission of the States, 2018[38]).

In 42 states and DC, school districts are required to offer kindergarten. Thirteen states and DC require the district to offer full-day kindergarten, a further 26 require districts to offer half-day provision, with the remaining two states requiring either half-day or full-day kindergarten.[6] Twenty states[7] and DC have policies or programmes aimed at supporting transitions from pre-kindergarten settings to kindergarten. This guidance involves elements such as family engagement, written transition plans, sharing of assessment data, and meetings between providers and teachers (Education Commission of the States, 2018[39]).

Table 2.3 **Distribution of state compulsory school starting ages**

Age at which school attendance is compulsory	Number of states (including Washington DC)
5	10
6	26
7	13
8	2[1]

1. Pennsylvania and Washington.

Source: Education Commission of the States (2018[38]), *Does the State Require Children to Attend Kindergarten?*, http://ecs.force.com/mbdata/MBQuest2RTanw?rep=KK3Q1804.

StatLink https://doi.org/10.1787/888934102886

PROVISION OF EARLY LEARNING SERVICES

Types of early childhood provision

The provision of early years services in the United States is not easily described. The early childhood landscape is highly fragmented. Provision includes 1) centre-based ECEC services (i.e. those administered in non-residential settings in day care centres, nurseries, churches, preschools, pre-kindergartens, etc.); 2) home-based programmes (including in-home preschools as well as regulated or unregulated childminding of multiple children in a residential setting); and 3) relative care (care provided by a non-parental relative, typically in the relative's home and/or the child's own home). There are also auxiliary services such as parenting and home-visiting programmes aimed at supporting families with young children. Within each of these categories there is also wide variation. Centre-based ECEC programmes, for example, comprise:

> ...a wide range of part-day, full-school-day, and full-work day programs, under educational, social welfare, and commercial auspices, funded in a variety of ways in both the public and private sectors, designed sometimes with an emphasis on

the "care" component of ECEC and at other times with stress on "education" or with equal attention to both (Kamerman and Gatenio-Gabel, 2007, p. 23[40]).

The International Standard Classification of Education (ISCED) distinguishes between ECEC programmes catering for the very youngest children (under three years of age) and those for children from the age of three until entry to primary school. ISCED classifies the former as Level 01 programmes (early childhood educational development programmes) while the latter are classified as ISCED Level 02 (pre-primary education programmes). To be classified at all under ISCED, an early childhood programme must contain an educational component. For example, programmes for children under three that provide supervision and care without any explicit educational focus (e.g. some day care or nursery programmes) are not classified as ISCED 01.

Prevalence and spread of services

In 2014, the Office of Planning, Research and Evaluation, an office of the Administration for Children and Families, administered a representative National Survey of Early Care and Education in the United Sates. The survey indicated that there were approximately 129 000 centre-based ECEC programmes in the United States, serving just under 7 million children aged five or under and not yet in kindergarten (National Survey of Early Care and Education Project Team, 2014[41]).

Approximately 3.7 million home-based care providers were estimated to be caring for young children other than their own for a minimum of 5 hours a week. Approximately 118 000 of these, catering to more than 750 000 children aged five or under, were listed (i.e. they appear on national or state lists of early care and education services). Close to 1 million unlisted but paid providers were providing regular care to over 2.3 million children, while over 2.7 million unlisted and unpaid providers were providing care to over 4 million children in the 0-5 age bracket (National Survey of Early Care and Education Project Team, 2016[42]).

According to the Center for American Progress, more than half (51%) of US residents in 2018 lived in neighbourhoods where the availability of licensed childcare for infants and toddlers was low, i.e. with three or more children for every available licensed childcare slot (Malik et al., 2018[43]). The growing number of workers in the United States who work unpredictable or non-standard hours (nights, weekends, holidays) also face barriers to accessing childcare, not limited to the fact that they earn disproportionately low incomes (Enchautegui, 2013[44]). According to the National Survey of Early Care and Education, 8% of the centre-based providers surveyed offered care during non-standard hours, with 2% offering care during evening hours, 6% offering overnight care and 3% offering weekend care (National Survey of Early Care and Education Project Team, 2015[45]). However, it is estimated that one in five workers in the United States now work non-standard hours, and 45% of children have at least one parent working non-standard hours (National Survey of Early Care and Education Project Team, 2015[45]).

Funding and costs

The funding of early years programmes in the United States is complex, ranging from privately funded centres to services supported to varying degrees by local, state or federal funds (Hustedt, West and Barnett, 2011[46]). Overall, US public spending per child on pre-primary education is USD 10 830, higher than the OECD average of USD 8 426 (OECD, 2018[47]). On average, OECD countries spend 0.8% of their GDP on ECEC, three-quarters of which is spent on pre-primary (ISCED 02) education. The United States spends 0.4% of GDP on pre-primary education, a share which is unchanged since 2005 and the 26th lowest of 33 OECD and partner countries with available data on ECEC spending (OECD, 2018[47]).

In the United States, 26% of pre-primary education is privately funded, more than the OECD average of 17% and the seventh largest share of 35 OECD and partner countries with available data in 2013. While the share of private expenditure on pre-primary education has fallen on average across OECD countries, from 21% in 2005 to 17% in 2015, the share of private expenditure in the United States increased from 21% to 26% over the same period (OECD, 2018[47]). In several states, public-private partnerships are used as a mechanism to fund ECEC provision.

Childcare is expensive in the United States. Across the OECD, net childcare costs for a family with two earners (earning 100%+67% of average earnings) and two children aged 2 and 3 years old equate to 17.5% of average earnings. In the United States, the corresponding figure is 30%, the fifth highest of all OECD countries (lower only than in Ireland, New Zealand, Switzerland and the United Kingdom). In 15 OECD countries, the net cost is no more than 10% of average earnings – for example, it is 5% in Germany and Iceland. In 2016, the cost of full-time centre-based care for children from birth to four years old in the United States was estimated to be USD 9 589, higher than the cost of in-state college tuition (USD 9 410) and 85% of the median annual cost of rent (Schulte and Durana, 2016[48]). Childcare for infants costs 12% more than for older children and is higher than the cost of in-state college tuition in 33 states (Schulte and Durana, 2016[48]).

One driver of costs is staff salaries. Required staff-child ratios vary by state but tend to be low, meaning very high labour costs for ECEC provision. Although pre-primary teachers in the United States have higher salaries than their counterparts in most other

OECD countries (starting salaries were the 7th highest in the OECD in 2017, and salaries after 15 years of experience were the fifth highest) (OECD, 2018[47]), they are relatively poorly paid compared to educators of older children in the United States and many have salaries so low that they are eligible for or receive public financial assistance (United States Department of Health and Human Services and United States Department of Education, 2016[49]). Data from 2011 indicated that almost half of US childcare workers were in families enrolled in at least one public support programme annually, compared to one-quarter of all workers in the United States (Whitebrook, Phillips and Howes, 2014[50]).

Federal funding

Federal funding for early childhood care and education programmes in the United States is generally targeted at specific subgroups of children, primarily children from low-income families and children with disabilities. The US Department of Health and Human Services and the US Department of Education have primary responsibility for administering this federal funding.

Head Start is a federally funded programme that provides services to support the development of three- and four-year-old children from low-income families. Head Start is a programme of the Department of Health and Human Services, first introduced in 1965 as a means of addressing poverty. Head Start centres follow a federally mandated research-based curriculum, the goal of which is to promote school readiness among at-risk children who are eligible for the programme on the basis of low family income, by enhancing their cognitive, social and emotional development. The programme also focuses on health, nutrition and parental involvement. Eligibility for Head Start is determined locally, but families are likely to be eligible if their income falls below federal poverty levels (US Department of Health and Human Services, 2012[51]). Programmes may enrol some children from families whose income exceeds the poverty level if they meet other eligibility criteria (US Department of Health and Human Services, 2012[51]). Early Head Start was introduced in 1994 as a service for low-income families with children under three. Early Head Start offers a home-based option, involving weekly home visits, as well as centre-based services. Head Start first launched American Indian and Alaska Native Head Start programmes in 1965. Migrant and Seasonal Head Start serves the families of migrant farm workers. It started serving migrant children and families in 1969 and the programme was extended to seasonal children and families in 1999 (Schmit, 2014[52]).

In 2017, over USD 9.2 billion was allocated for Head Start, including Early Head Start (Head Start Early Childhood Learning & Knowledge Center, 2018[53]). Head Start grants are awarded directly to public agencies, private for-profit and non-profit entities, school systems, and tribal governments to operate Head Start in local communities Federal grants cover 80% of the programme's cost; the remaining 20% is funded by the community organisation administering the programme (by cash or in-kind donations) (National Center on Program Management and Fiscal Operations, 2014[54]). Head Start programmes must meet mandatory performance standards relating to staff qualifications, staff-child ratios, training and professional development. For example, Early Head Start programmes serving a majority of children under 36 months old must have two teachers for no more than eight children or three teachers with no more than nine. Classes with a majority of three-year-olds must have no more than 17 children with 2 teachers or with a teacher and a teaching assistant, while classes serving a majority of four- and five-year-olds must have no more than 20 children with 2 teachers or a teacher and a teaching assistant. Where more stringent requirements have been set locally, programmes must adhere to these (US Department of Health and Human Services, 2016[55]). It is required that 50% of Head Start teachers nationally have a bachelor's degree in early childhood development, early childhood education or equivalent. Programmes must offer opportunities for parents and families to be engaged in the services.

The Department of Health and Human Services provides childcare subsidies for low-income working families with children under the age of 13 under the Child Care and Development Block Grant (CCDBG) Act, which was first enacted in 1990. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 created the Child Care and Development Fund (CCDF), which consolidated the funds appropriated for the CCDBG with entitlement funds under the Social Security Act into a single source of federal childcare funding for states and territories. States use the CCDF to provide financial assistance to low-income families to access childcare so that parents can attend work, training and education, and also use funds to improve the quality of childcare. Congress approved a USD 2.37 billion increase in the CCDBG in March 2018, the largest ever increase. For the fiscal year 2019, CCDBG funding was USD 5.3 billion.

The CCDF also draws federal money from Temporary Assistance for Needy Families (TANF), a federal funding source aimed at supporting low-income families to become self-sufficient. Block grants are given to states in order to develop and operate programmes focused on supporting parental employment as well as child and family well-being, and some states use these funds to provide childcare assistance (Office of Child Care, 2014[56]). States are permitted to allocate up to 30% of their TANF grant to CCDF subsidies.

The Maternal Infant and Early Childhood Home Visiting Program is a federally funded programme that supports at-risk parents of children from birth to kindergarten entry to develop parenting skills that are supportive of children's physical, emotional and social health. The programme is allocated approximately USD 400 million per annum.

In addition to these funding sources from the Department of Health and Human Services, the Department of Education also funds early childhood services. Title 1, Part A of the Elementary and Secondary Education Act, as amended by the Every Student Succeeds Act (also known as Improving the Academic Achievement of the Disadvantaged) provides federal funds to local education authorities (LEAs) or schools with large concentrations of children from low-income families in order to support at-risk children to meet state academic standards. Title 1 funds may be used to operate preschool programs that "improve cognitive, health, and social-emotional outcomes for eligible children below the grade at which an LEA provides a free public elementary education".

The US Department of Education provides grants to all states, DC and Puerto Rico in order to provide special education and related services for children with disabilities aged between three and five years, under Section 619 of IDEA. Under IDEA Part C, states and territories are awarded grants to support the implementation of integrated, multidisciplinary, interagency early intervention programmes for children with disabilities from birth until the age of two.

The Preschool Development Grants competition is an initiative of the Department of Education that aims to 1) support states to develop or improve preschool infrastructure in order to deliver high-quality preschool education to children; and 2) to expand existing high-quality programmes in targeted communities that could serve as models for expanding provision to all four-year-olds in the state from low- or middle-income families. To date, development grants have been awarded to Alabama, Arizona, Hawaii, Montana and Nevada. Arkansas, Connecticut, Illinois, Louisiana, Maine, Maryland, Massachusetts, New Jersey, New York, Rhode Island, Tennessee, Vermont and Virginia have all received expansion grants.

There are also several other national initiatives aimed at promoting early learning or reducing gaps in early learning outcomes. Reach Out and Read (ROR) is a non-profit organisation that promotes childhood literacy. Founded by two paediatricians in response to a growing literacy problem in the United States in the late 1980s, ROR has received funding from the US Department of Education since 2001 and is endorsed by the American Academy of Pediatrics. The organisation's mission is to encourage parents to read regularly to their children and give them the tools (the books) to do so. Annually, ROR provides over 6 million books through more than 4 500 healthcare settings in the United States, reaching more than 3.8 million children. Another relevant national campaign is Too Small to Fail whose mission is to raise public awareness of the importance of brain and language development in the early years. Too Small to Fail aims to empower parents to support their young children's development at home by talking, reading and singing to and with their children from birth.

State funding

Publicly funded kindergarten is available to all children in the United States. The degree to which children have access to public pre-kindergarten education (other than those children in targeted federally funded programmes) varies considerably, from none at all in some states to universal provision in others. In the District of Colombia, Florida and Vermont, publicly-funded pre-k is available to all children, with no funding or enrolment caps or enrolment deadlines (Parker, Diffey and Atchison, 2018[57]). West Virginia is aiming for universal pre-k and is expanding its provision. Universal pre-k is in place in most districts in Oklahoma. In the states of Georgia, Illinois, Iowa, New York and Wisconsin, pre-k policies are in place that are commonly considered to be universal, but have limits meaning that, in practice, provision is not available to all children (Parker, Diffey and Atchison, 2018[57]). In New Jersey, universal pre-k is provided to children in 31 high-poverty districts. Alabama is also moving towards universal pre-k provision.

From 2013 to 2018, states collectively increased their spending on pre-kindergarten programmes by 47% (Parker, Diffey and Atchison, 2018[57]). Six states – Idaho, Montana, New Hampshire, South Dakota, North Dakota and Wyoming – did not contribute to pre-kindergarten programmes in 2016-17, meaning 44 states and DC funded preschool to some degree. Spending per child varies considerably by state. Seven states spent at least USD 7 000 per child in 2017, while seven states spent less than USD 3 000 per child (Parker, Diffey and Atchison, 2018[57]).

States use various revenue streams to fund pre-kindergarten programmes. In many states, this funding is neither stable nor guaranteed from year to year. Several states use funds collected through state sin taxes (e.g. taxes levied on alcohol or tobacco). Five states (Georgia, Virginia, Washington, Nebraska and North Carolina) use money from a state lottery to fund pre-k, while Missouri uses funds from non-lottery gambling revenue. Three states (Arizona, Connecticut and Kansas) use money from tobacco settlements to fund pre-k. Social impact bonds, where private funds are used to fund social initiatives, fund pre-k in some states. In Utah, for example, the Pay for Success pre-k programme is a partnership between the state of Utah and Goldman Sachs (Parker, Diffey and Atchison, 2018[57]).

Funds for pre-kindergarten are often administered by states via block grants to localities, with a high level of autonomy at the local level over how the grants are used (Parker, Diffey and Atchison, 2018[57]). Block grants are typically used to direct funding to specific communities or specific subgroups of children with high levels of need. Some local governments also adopt universal pre-k policies at the level of district, city or county (Parker, Diffey and Atchison, 2018[57]). In nine states[8] and DC, the funding formula for pre-kindergarten systems is similar to the formula used to fund state K-12 education systems. Typically, these funding formulae involve a per-student rate of funding; in three states (Maine, Oklahoma and West Virginia), the funding allocated to pre-k students is at least as much per child as in the K-12 system.

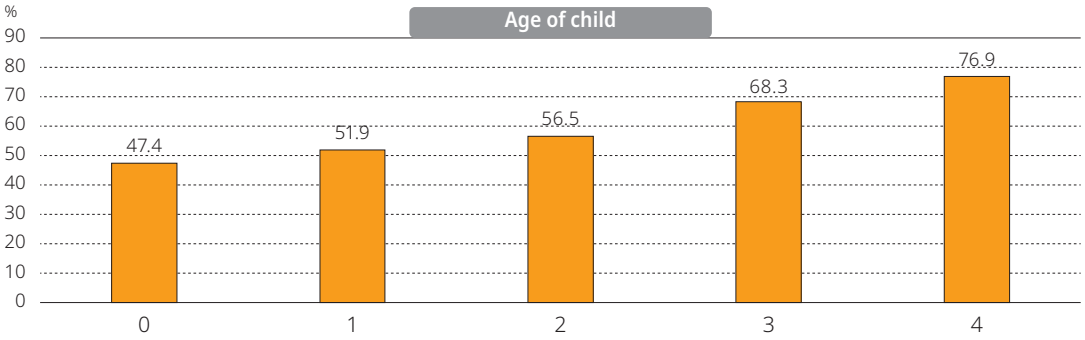
Other features of provision

Another notable feature of the pre-primary sector is that the number of days in a pre-primary school year is especially low in the United States; in line with the K-12 school year, the pre-primary school year is 180 days, shorter than most OECD countries (OECD, 2018[47]). In the United States, 6% of pre-primary teachers are men. Although still low, this is one of the highest rates of male pre-primary teachers among OECD countries (OECD, 2018[47]).

PARTICIPATION

According to findings from the Early Childhood Program Participation Survey conducted as part of the National Household Education Surveys Program of 2016, approximately 60% of children under the age of five in the United States are in a regular non-parental childcare or early education arrangement at least once a week (Corcoran, Steinley and Grady, 2019[58]). The proportion of children in such an arrangement increases with the age of child, from 47% of infants under the age of one to 77% of four-year-olds (Figure 2.1).

Figure 2.1 **Attendance at any non-parental childcare or programme arrangement at least once a week by age, United States**



Source: Early Childhood Program Participation Survey 2016, NCES (2018[59]), *National Household Education Survey Programs of 2016: Public-Use Data Files*, https://nces.ed.gov/pubSearch/pubsinfo.asp?pubid=2018104.

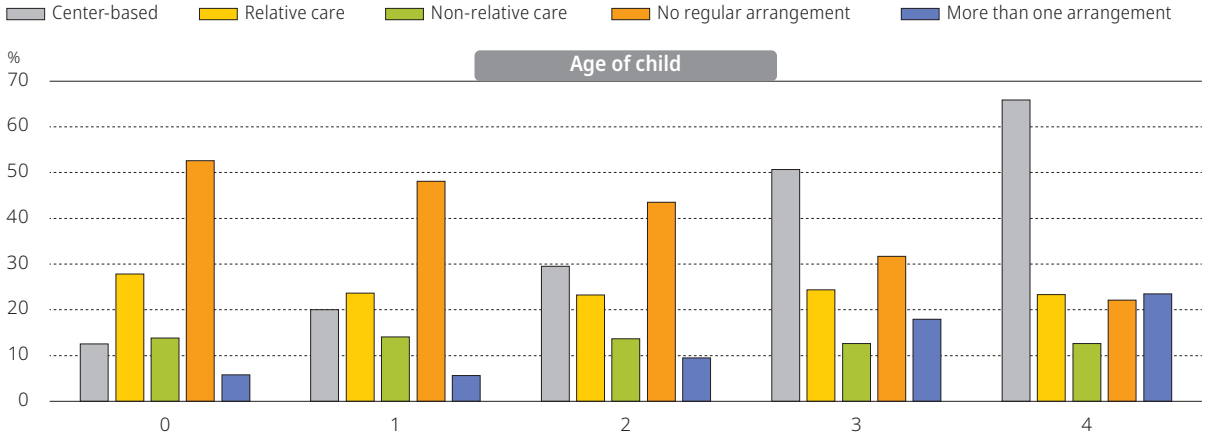
StatLink https://doi.org/10.1787/888934101651

The Early Childhood Program Participation Survey also collected information on the type of care or education settings that children are in at different ages. As Figure 2.2 shows, the proportion of children taken care of in the home of a relative is relatively stable across the different ages, around one in four children from 0 to 4. Similarly, there is little variation in the proportion cared for in the home of a non-relative by age of child, with 13-14% of children in this type of care arrangement at each of the ages from birth to four. The proportion of children in centre-based ECEC increases with age, from just under 13% of infants under the age of one to 66% of four-year-olds. The proportion of children in two or more different non-parental childcare arrangements also increases with the age of the child, from 6% of those under one to 26% of four-year-olds.

The survey also provided information on the intensity of children's participation in centre-based programmes. Only one in eight children under one and one in five children aged one spend any time in centre-based care, but those children who do attend spend a relatively large amount of time in there, on average. As Table 2.4 shows, at all ages from birth to four, children who attend centre-based settings most often spend 40 hours per week (the mode) in these settings as opposed to more or fewer hours. The mean number of hours spent in centre-based settings is highest among the youngest children (at 31 hours per week for those aged one and under one) and lowest among four-year-olds (22 hours per week). On the other hand, two-thirds of four-year-olds spend at least some time in centre-based care and there is greater variation amongst this age group in terms of

the number of hours they spend there. Four-year-olds are more likely to be in another care or education arrangement in addition to their centre-based arrangement than children aged one or under (24% of four-year-olds and 6% of those aged one and under), which may also explain the lower mean number of hours spent in centres. Infants and toddlers (i.e. children under the age of three) are likely to be looked after in centres where the primary emphasis is on care, probably while their parents are working. Older children (three- and four-year-olds) are likely to be attending preschool settings that have an educational component and emphasise the development of their cognitive and social skills. As the hours of these preschool programmes tend to vary (with some, for example, only offering half-day provision), older children are more likely to require additional care arrangements to supplement these hours.

Figure 2.2 **Attendance rates of different types of non-parental childcare or programme arrangement by age, United States**



Source: Early Childhood Program Participation Survey 2016, NCES (2018[59]), *National Household Education Survey Programs of 2016: Public-Use Data Files*, https://nces.ed.gov/pubSearch/pubsinfo.asp?pubid=2018104.

StatLink https://doi.org/10.1787/888934101670

Table 2.4 **Attendance rates and hours per week spent in centre-based programmes by age, United States**

Age	% attending	Min	Max	Mean	Median	Mode
0	12.5	2	60	30.8	36	40
1	20.1	2	60	31.1	40	40
2	29.5	1	50	25.1	24	40
3	50.7	2	60	21.6	16	40
4	65.8	1	70	20.9	15	40

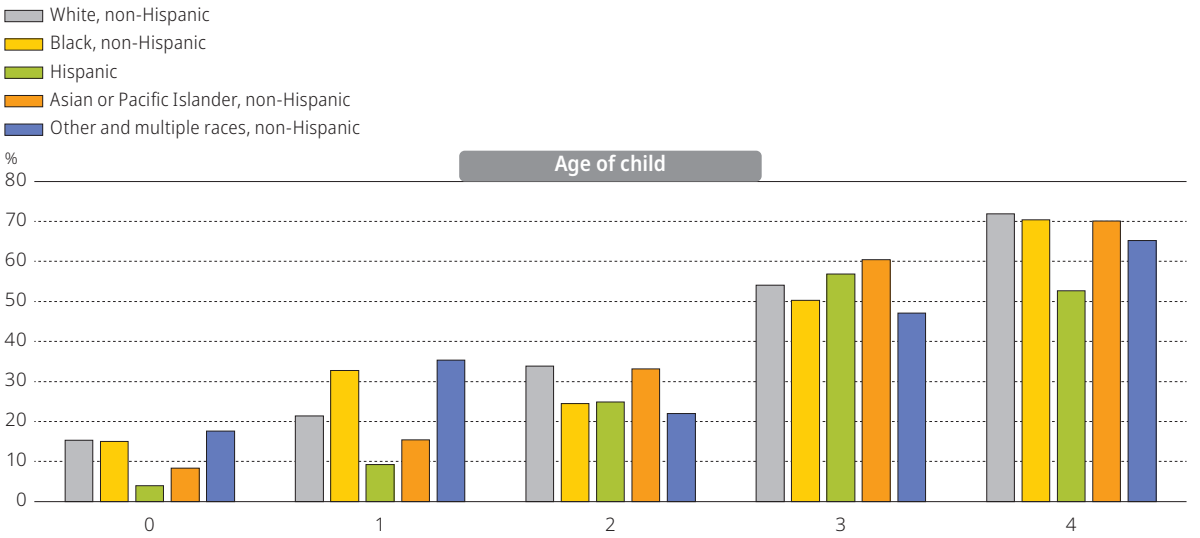
Source: Early Childhood Program Participation Survey 2016, NCES (2018[59]), *National Household Education Survey Programs of 2016: Public-Use Data Files*, https://nces.ed.gov/pubSearch/pubsinfo.asp?pubid=2018104.

StatLink https://doi.org/10.1787/888934102905

Centre-based programme attendance varies by racial and ethnic background (Figure 2.3). Children of Hispanic origin are less likely to attend centres than their peers. For example, 53% of Hispanic four-year-olds attended centre-based programmes in 2016, compared to 65-72% of children of other races or ethnicities.

Attendance at centre-based ECEC programmes is highest among children from high-income families. Figure 2.4 shows the percentage of three- and four-year-olds regularly attending ECEC centres by total family income level. Fewer than half of three-year-olds from households where the total income does not exceed USD 40 000 regularly attend ECEC centres, compared with over 80% of three-year-olds in households where the total income exceeds USD 150 000. Similarly, while attendance rates are higher at the age of four than at three for children from families at all income levels, they are highest among children from households with the highest income levels at both ages.

Figure 2.3 **Centre-based ECEC attendance rates among children under five by racial and ethnic background, United States**

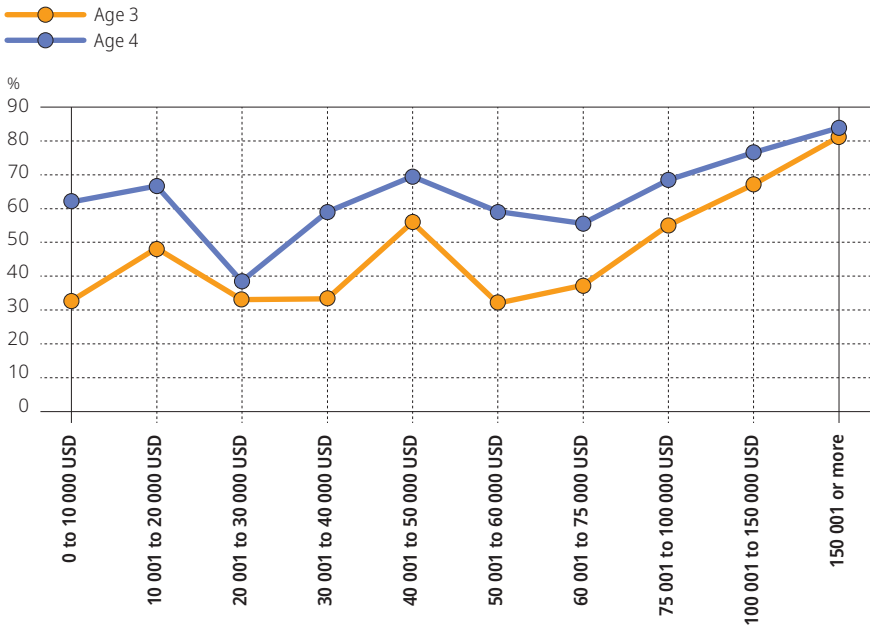


Source: Early Childhood Program Participation Survey 2016, NCES (2018[59]), *National Household Education Survey Programs of 2016: Public-Use Data Files*, https://nces.ed.gov/pubSearch/pubsinfo.asp?pubid=2018104.

StatLink https://doi.org/10.1787/888934101689

Figure 2.4 shows a dip in participation rates for children from families with a total household income of between USD 20 001 and USD 30 000. This probably reflects that a proportion of families in this income bracket lie just above the poverty line and may therefore miss out on eligibility for state- or federally funded programmes targeted at children in poverty.

Figure 2.4 **Attendance rates of any type of non-parental childcare or programme arrangement among children under five by total household income level, United States**

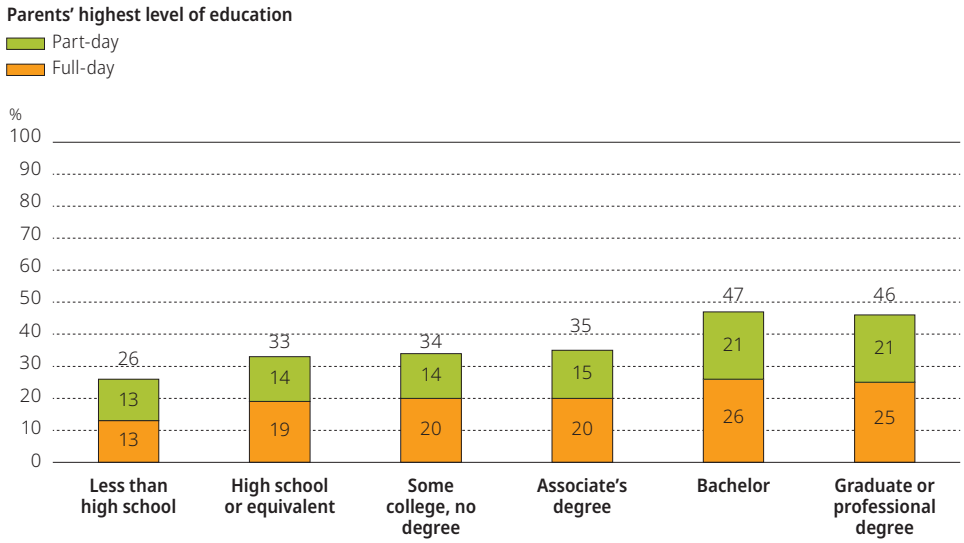


Source: Early Childhood Program Participation Survey 2016, NCES (2018[59]), *National Household Education Survey Programs of 2016: Public-Use Data Files*, https://nces.ed.gov/pubSearch/pubsinfo.asp?pubid=2018104.

StatLink https://doi.org/10.1787/888934101708

Enrolment in pre-primary education is also related to parents' educational attainment (NCES, 2019[60]). In 2017, the enrolment of three- to five-year-olds in full-day preschool programmes was higher for children whose parents held a graduate or professional degree (25%) or a bachelor's degree (26%) than for children whose parents highest level of educational attainment was a high school qualification (19%) or lower (13%) (Figure 2.5).

Figure 2.5 **Attendance rates for part-day and full-day pre-primary programmes among 3-5 year-olds by parents' educational attainment, United States**



Source: US Department of Commerce, Census Bureau, Current Population Survey, NCES (2019[60]), *Preschool and Kindergarten Enrollment Indicator, February (2019)*, https://nces.ed.gov/programs/coe/indicator_cfa.asp.

StatLink https://doi.org/10.1787/888934101727

In 2016-17, total enrolment in Early Head Start reached 211 000 children, the highest since the programme began, representing 7% of eligible children (children under the age of three living in poverty). In the same year, enrolment for Head Start was 848 000, a record low, representing 31% of three- to five-year-olds of children living in poverty[9] (Child Trends, 2018[61]). This drop may be attributable to increased public spending on pre-kindergarten programmes, which rose by 47% in the five years to 2016/17 (Diffey, Parker and Atchison, 2017[62]). Children who would have traditionally have attended Head Start programmes may instead be in other public pre-kindergarten programmes. Head Start enrolment rates vary considerably by race. In the 2016/17 school year, 79% of eligible American Indian and Alaska Native children were enrolled in Head Start, compared with 68% of children of two or more races, 42% of children of Black children, 27% of Asian children and 25% of White children (Child Trends, 2018[61]). In the same year, 17% of children aged five or under who were eligible for Migrant and Seasonal Head Start were enrolled in the programme.

Levels of ECEC participation are lower in the United States than in many other OECD countries. In 2016, 38% of three-year-olds and 67% of four-year-olds in the United States were enrolled in ISCED 02 programmes,[10] lower than the averages of 76% of three-year-olds and 88% of four-year-olds across OECD countries. Additionally, while the proportion of 3-5 year-olds attending ECEC has increased on average across OECD countries, from 75% in 2005 to 85% in 2016, participation has remained static in the United States, at 66% (OECD, 2018[47]). The cost of ECEC in the United States is likely to be one factor behind these relatively low participation rates.

QUALITY AND IMPACT OF EARLY CHILDHOOD SERVICES

In the United States, all states have licensing laws that establish minimum quality standards for early childhood care and education services. While these vary somewhat by state, they are generally designed to ensure the health and safety of children by establishing minimum requirements for the physical environments in which care and education are delivered, as well as maximum staff-child ratios. Given their limited focus on health and safety, these minimum quality standards may not be sufficient to ensure that adequate care and education of children is delivered in ECEC programmes (Horm, Barbour and Huss-Hage, 2019[63]).

Quality rating and improvement systems

In response to concerns that poor-quality programmes were being subsidised by public funds, quality rating and improvement systems (QRISs) for ECEC programmes began to be developed in the United States towards the end of the 1990s (Cannon et al., 2017[64]). The primary idea behind a QRIS is to offer incentives for programmes to improve the quality of the services that they provide which should, in turn, improve early cognitive and social-emotional outcomes. QRISs were intended to provide a means of directing higher childcare subsidy reimbursement rates towards higher quality providers and to encourage quality improvements. The first state-wide QRIS was introduced by Oklahoma in 1998. As of 2018, 43 states and DC had state-wide QRISs in place, with systems being piloted in a further 3 states. Regional or local QRISs were in operation in an additional three states (National Center on Early Childhood Quality Assurance, 2019[65]).

While each QRIS is different, they have some common features. In most cases, the systems are voluntary and most provide supports to ECEC programmes in order to improve their quality. QRISs generally involve 3-5 level rating scales (stars, steps, etc.) used to indicate overall programme quality, based on assessments of a number of quality indicators such as curriculum, staff qualifications and training, interpersonal interactions, health and safety, assessment, leadership, and programme administration. Given that indicators of structural quality (material, static features of programmes and staff working in them) are much easier to measure and monitor than indicators of process quality (staff-child and staff-staff interactions, child-child relationships and interactions), QRISs focus much more strongly on the former (Schulte and Durana, 2016[48]). The particular indicators selected and the ways in which these are combined to produce overall summary ratings of quality differ across states. For example, while the vast majority of QRISs include a measure on the classroom environment, it is rare for systems to include a quality standard relating to whether the programme has a written curriculum (Cannon et al., 2017[64]).

Multiple studies have been undertaken with the aim of validating QRISs, generally taking one of two approaches: 1) exploring how QRIS ratings correlate with external measures of quality; or 2) exploring how QRIS ratings correlate with children's developmental outcomes. On the whole, positive associations have been found between QRIS ratings and external measures of quality; while statistically significant, the associations are generally small (Tout et al., 2018[66]). Studies on the associations between QRIS ratings and children's development have also tended to show small positive associations, although the evidence is inconsistent; in some states, child development in some domains is significantly positively associated with QRIS ratings, but not in others (Tout et al., 2018[66]).

Accreditation of early childhood services

Another mechanism for promoting higher quality in early childhood education and care is through the accreditation of early childhood programmes. Accreditation can also help families to identify high-quality programmes for their children. An ECEC service is accredited if it is deemed by an external and recognised body to have met certain quality standards. Accreditation is currently voluntary in all states. Several organisations offer accreditation of early childhood programs in the United States, including the National Association for the Education of Young Children (NAEYC), the National Accreditation Commission for Early Care and Education Programs (NAC), the National Early Childhood Program Accreditation, Accredited Professional Preschool Learning Environment and the National Association for Family Child Care. There are also specialised accreditation bodies that accredited specific types of programmes, such as the American Montessori Society, the Association of Christian Schools International and the National Lutheran Schools Accreditation. The NAEYC is the largest accrediting organisation, deemed by many to represent the gold standard for quality. Approximately 7 000 programmes catering to close to 1 million children are accredited by the NAEYC, representing just 6% of all eligible programmes (Horm, Barbour and Huss-Hage, 2019[63]). In 2016, just 11% of childcare establishments were accredited by either the NAEYC or the NAC. Accreditation rates varied considerably across states, with just 1% of childcare centres and home-based providers in South Dakota accredited in 2016, compared to 46% in Connecticut (Schulte and Durana, 2016[48]).

Quality of state preschool programmes

Since 2002, the National Institute for Early Education Research (NIEER) has produced annual reports tracking preschool access, resources and quality in state preschool programmes. A programme qualifies as a state preschool programme if it is funded, directed and controlled by the state; serves children of preschool age (typically three- and four-year-olds); has early education as a primary focus; and offers a group learning experience to children on at least two days each week. Programmes meeting these criteria are evaluated against minimum quality standards benchmarks. For the year 2017, ten benchmarks were used to evaluate the quality of state preschool programmes (Table 2.5).

According to the NIEER, progress has been made across states since 2002 in adopting policies that are supportive of preschool quality. In 2002, no state programme met all ten of the quality standard benchmarks, just three programmes met nine, and ten state preschool programmes met fewer than half of the benchmarks (Friedman-Krauss et al., 2018[67]). In contrast, 5 programmes met all 10 quality standard benchmarks in 2017,[11] and a further 15 programmes met 9 of the 10 benchmarks. However, progress

can be characterised as uneven. Ten states have made no gains since 2002. Policy changes meant six state programmes met fewer benchmarks in 2017 than in 2002 (Friedman-Krauss et al., 2018[67]). In 2017, nine state preschool programmes met fewer than five of the NIEER's ten quality standards benchmarks. Some of the states that meet the fewest benchmarks of quality are those catering for very large numbers of children, (including large numbers of children living in poverty), such as California, Florida and Texas (Friedman-Krauss et al., 2018[67]).

Table 2.5 **National Institute for Early Education Research quality standards and benchmarks for state preschool programmes, 2017**

Benchmark	Description
Early learning and development standards	These are the goals of a state's preschool programme and should outline clear and appropriate goals for children's learning and development in a range of domains to meet this benchmark.
Curriculum support	States meet this benchmark if they 1) provide guidance or an approval process for curriculum selection; and 2) provide ongoing training or other assistance to facilitate implementation of the curriculum.
Teacher degree	States must require the lead teacher in every classroom to have at least a bachelor's degree to meet this benchmark.
Teacher specialised training	Programmes in which preschool lead teachers are required to have had specialised training in the area of child development or early childhood education meet this benchmark.
Assistant teacher degree	To meet this benchmark, programmes must require assistant teachers to have a Child Development Associate qualification or equivalent.
Staff professional development	Programmes meet this benchmark if both teachers and assistant teachers are required to have at least 15 hours of in-service training annually.
Maximum class size	A maximum class size of 20 is required to meet this benchmark.
Staff-child ratio	Classes must have no more than 10 children per adult to meet this benchmark.
Screenings and referrals	Programmes must require that children have hearing, vision and other health screenings and, where appropriate, referrals to meet this benchmark.
Continuous quality improvement system	In order to meet this benchmark, programmes must require that 1) data on quality is collected in a systematic way at least once per year and 2) the state and local programmes use these data to improve their policies and practices.

Source: Friedman-Krauss et al. (2018[67]), *State Preschool Yearbook: The State of Preschool 2017*, http://nieer.org/wp-content/uploads/2019/02/State-of-Preschool-2017-Full-2-13-19_reduced.pdf.

Quality and impact of Head Start

A body of evidence also exists relating to the quality and efficacy of Head Start and Early Head Start. As mentioned earlier, Head Start programmes must adhere to certain quality standards and, as a result, Head Start centres tend to be of higher quality than other centre-based options available to low-income families (Currie and Neidell, 2004[68]). Evidence on the effects of Head Start attendance on child outcomes, however, is mixed. The US Congress mandated an impact study of Head Start in 1998. The study commenced in 2002 and involved the random assignment of close to 5 000 three- and four-year-olds (who had not previously attended Early Head Start) to either Head Start or a comparison group. When assessed at the end of one year of Head Start, four-year-olds in the treatment group displayed language and literacy advantages over those in the control group (OPRE, 2010[69]). In the three-year-old cohort, benefits in language and literacy were also accompanied by superior performance on measures of perceptual motor skill and mathematics. Head Start attendees also displayed less hyperactive behaviour and less withdrawn behaviour than their peers assigned to the control. Other benefits of Head Start for three-year-olds included greater levels of parental reading to children and of family cultural activities (OPRE, 2010[69]). However, when the children were assessed again at the end of first grade, many of these early benefits were no longer discernible.

A randomised controlled trial conducted to evaluate the impact of Early Head Start on child outcomes such as attention, cognition, language, behaviour and health found that the programme did benefit children and families, with significant effects in all developmental domains when children were assessed at the ages of two and three (Love et al., 2013[70]). Effect sizes were modest, ranging from .10 to .20. When followed up at the age of five, children who had attended Early Head Start had better

approaches to learning and displayed better attention than children in the control group. Among Black children who attended the programmes, cognitive benefits were also found to have been sustained at the age of five, as were language impacts for Spanish-speaking Hispanic children (Love et al., 2013[70]).

Learning outcomes across the United States education system

Nationally representative information on early childhood outcomes in the United States is available from the Early Childhood Longitudinal Study (ECLS), a research programme of the National Center for Education Statistics (NCES). The ECLS programme comprises three cohorts: one nationally representative birth cohort (children born in 2001) and two representative kindergarten cohorts (the kindergarten classes of 1998/99 and of 2010/11). Data collected from the first kindergarten cohort (ECLS-K:1998) revealed the presence of group differences in outcomes at kindergarten entry, and so the ECLS Birth Cohort (ECLS-B) study was conducted to investigate children's early development and learning from birth through to kindergarten in order to identify the sources of these early differences. Data were collected from multiple informants, including care providers, teachers, parents and children themselves at around nine months, two years and at preschool age (around the age of four). Among four-year-olds, gender differences in learning and development were evident: girls had significantly higher levels of receptive and expressive language skills than boys and also scored significantly higher on measures of fine motor skills (Chernoff et al., 2007[71]). Some racial and ethnic disparities were also evident at the age of four. White and Asian children demonstrated significantly better colour knowledge than Black and Hispanic children, for example. Children in two-parent homes displayed better literacy skills than their peers in single-parent households. Mathematics ability varied significantly by family socio-economic status (SES): while 65% of all four-year-olds demonstrated proficiency in the number and shape assessment area, this ranged from 40% of children from lower SES families to 87% of children from higher SES backgrounds (Chernoff et al., 2007[71]). While the ECLS provides reliable and valid data on early childhood outcomes in the United States, it does not readily permit the evaluation of how they compare to those in other countries.

Many of the subgroup differences identified in ECLS are also evidenced in assessments of older students in the United States, where they appear even more pronounced. For example, the National Assessment of Educational Progress (NAEP) conducted by the NCES consistently shows academic achievement gaps along racial and ethnic lines among students in fourth and eighth grades. White (non-Hispanic) children significantly outperform Hispanic children and Black (non-Hispanic) children on the assessments, although the magnitude of the inequalities appears to be reducing over time. In fact, the racial and ethnic achievement gaps as assessed in NAEP have been narrowing at every grade level and every subject since the 1990s. However, the gaps may still be characterised as large, ranging from 0.6 to 0.8 standard deviations, or approximately one and a half years of typical average academic progress (Hansen et al., 2018[72]). Many more states have large achievement gaps (greater than 0.8 standard deviations) between White and Black students than between White and Hispanic students (Hansen et al., 2018[72]). Considerable research evidence indicates that focusing on children's earliest years has promise as a means of eradicating these gaps, by addressing their root causes before the gaps emerge. (Schweinhart, 2013[73]; Kautz et al., 2014[74]).

Children from poor backgrounds tend to have poorer educational outcomes in the United States. In 2017, the achievement gaps between children from poor families (based on their eligibility for free or reduced-price lunches in NAEP) and others were in the region of 0.75 standard deviations at both fourth grade and eighth grade (Hansen et al., 2018[72]). While racial and ethnic achievement gaps as measured in NAEP have been narrowing over time, income gaps have remained static (Hansen et al., 2018[72]). In fact, when comparing children in the lowest income decile to those in the highest, achievement gaps have actually widened over recent decades (Reardon, 2013[75]). In the 2015 Programme for International Student Assessment (PISA), US students classified as socio-economically disadvantaged were 2.5 times more likely to be low performers than their advantaged peers (OECD, 2016[76]). However, almost one in three (32%) disadvantaged students in the United States could be classified as "resilient", in that they performed significantly better than expected on the basis of their socio-economic circumstances. Disadvantaged US students were also in the top quartile of similarly disadvantaged students across the countries and economies that participated in PISA 2015, highlighting that socio-economic disadvantage does not necessarily consign students to poor academic outcomes in the United States (OECD, 2016[76]). Previous research has found attending high quality early childhood programmes to be a determinant of academic resilience among disadvantaged students (Reynolds et al., 2002[77]). IELS enables the nature of socio-economic gaps in early learning in the United States, and how these compare with gaps in other participating countries, to be explored.

In NAEP 2017, 11% of fourth grade and 6% of eighth grade students were categorised as English language learners. Students classified as English language learners in both grades performed significantly less well than their non-ELL peers in both reading (NCES, 2017[78]) and mathematics (NCES, 2017[79]), with larger score-point gaps in reading.[12] The size of these gaps between ELL students and others may be partly attributable to differences in their socio-economic backgrounds, but strong associations between students' linguistic profile and their academic achievement persist after controlling for socio-economic

status (Reardon and Galindo, 2009[80]). This suggests that this subgroup of students need additional support. IELS collects information on children's home languages and whether having a language at home that is different from the language of the school is associated with different early learning outcomes in a range of cognitive and social-emotional domains at the age of five.

Another group of children in the United States who tend to have poorer educational outcomes than their peers are those with disabilities. In the 2017 NAEP, the majority of students with disabilities performed in the "below basic" proficiency levels. The achievement gaps between students with disabilities and those without were substantial. There has been little evidence of improvement in the academic performance of children with disabilities in recent years. In NAEP 2017, average performance scores for students in fourth grade with disabilities were at their lowest level since 2003, while eighth grade students with disabilities had the same average score as a decade previously (Hansen et al., 2018[72]). The gaps in educational achievement between children with disabilities and those without have thus shown no signs of narrowing over recent years. IELS collects information from parents about whether children have experienced a range of early challenges or difficulties, such as low birth weight or premature birth and learning difficulties, and how each of these relates to children's learning at the age of five.

National data such as those collected as part of NAEP and the ECLS cannot tell us about how students' educational outcomes in the United States compare to students in other education systems. While the United States has up to now not had internationally comparable data on five-year-old's early learning, it does participate in a number of international large-scale assessments of the achievement of older students that allow the United States' education outcomes to be compared with those of other countries.

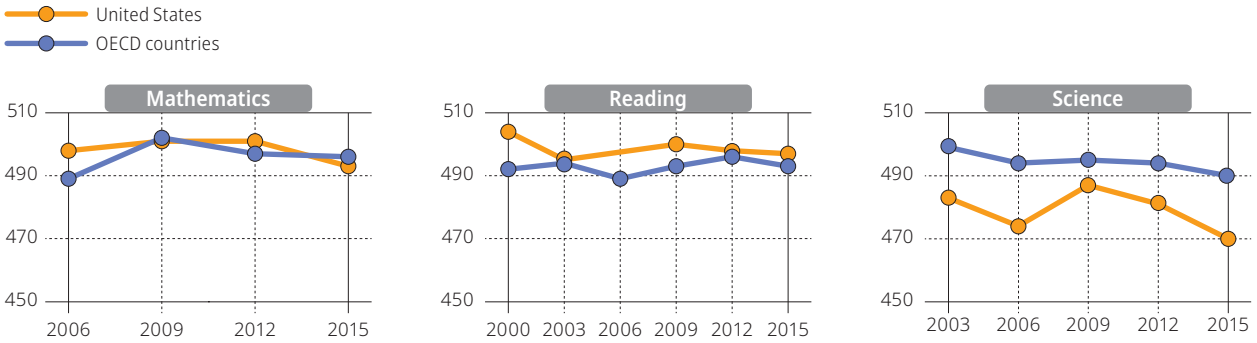
In the 2016 round of the Progress in International Reading Literacy Study (PIRLS 2016), the mean reading score of Grade 4 (fourth grade) students in the United States was significantly higher than the PIRLS centrepoint (the average score when the study first took place in 2001), and significantly higher than the mean scores of 26 other countries in 2016 (out of a total of 50 participating countries), including Germany, France and New Zealand. However, New Zealand was the only predominantly English-speaking country significantly outperformed by the United States in PIRLS 2016. The mean score in the United States was significantly lower than that of 11 education systems, including Finland, Hong Kong (China) and Norway, as well as English-speaking countries and economies such as Ireland, Northern Ireland and England. The United States' mean score did not differ significantly from those of 12 other countries, meaning that there were similar levels of reading achievement in the United States and countries such as Sweden and Slovenia, as well as English-speaking countries such as Canada and Australia (Mullis et al., 2017[81]). The mean score of US students in PIRLS 2016 was significantly lower than that of US students in 2011 and was not significantly different from the mean score in 2001.

In the 2015 round of the Trends in Mathematics and Science Study (TIMSS 2015), the mean mathematics score of Grade 4 (fourth grade) students was significantly higher than the TIMSS centrepoint and significantly higher than the average score of 34 education systems and significantly lower than that of 10 others. Grade 4 students in the United States had similar average scores to those in Denmark, England, Kazakhstan, Portugal and Quebec. The average score of US Grade 8 students was also significantly higher than the TIMSS centrepoint and they significantly outperformed their counterparts in 24 education systems and were significantly outperformed by those in 8. Similarly performing systems included Denmark, Finland and Kazakhstan (Mullis et al., 2016[82]). At both grade levels, average mathematics scores have increased since the first administration of TIMSS in 1995.

Of the 37 OECD countries that participated in PISA 2018, the United States ranked 9th in reading, 13th in science and 31st in mathematics. The mean reading score in the United States in 2018 (505) was not significantly different from the US score at the first administration of PISA in 2000 (500). The mean science score in the US in 2018 (502) was higher than the average score in 2006 (the earliest cycle to which 2018 scores can be compared), which was 489 (Figure 2.6). For mathematics, the earliest cycle to which 2018 scores can be compared is 2003. The mean mathematics score of 15-year-olds in the United States in 2018 (478) was not significantly different from the mean score in 2003. In PISA 2018, the mean reading and science scores in the United States were significantly higher than the OECD averages, but the mean mathematics scores was significantly below the OECD average (OECD, 2019[83]). The influence of socio-economic status on student performance is about the same in the United States as on average across OECD countries (OECD, 2019[83]).

In many countries and economies that participated in PISA 2018, having attended ECEC programmes had a positive effect on achievement at the age of 15, even after accounting for socio-economic status. In a number of countries, however, including Estonia and the United States, students who had attended ECEC programmes had lower average performance on PISA than their peers who had not attended (OECD, 2020[84]).

Figure 2.6 **Average scores in PISA mathematics, reading and science in the United States and in OECD countries**



Source: OECD (2019[85]), *Programme for International Assessments (PISA). Results from PISA 2018. Country Note for the United States*, http://www.oecd.org/pisa/publications/PISA2018_CN_USA.pdf

StatLink https://doi.org/10.1787/888934101746

ISSUES AND DEBATES AROUND EARLY LEARNING

As might be expected in an early childhood education landscape that is both decentralised and fragmented, a number of debates exist regarding the early learning sector in the United States. The debate over whether ECEC provision in the United States should be targeted on at-risk groups of children or whether it should be universally provided persists (Greenberg, 2018[86]). Whether Head Start is effective and represents value for money has also been contended for several decades (Barnett and Hustedt, 2005[87]). There has been debate over whether public funding allocated to ECEC would be better spent providing direct support to families via childcare subsidies or by increased government involvement in the establishment of early childhood programmes (Kamerman and Gatenio-Gabel, 2007[40]) There is also ongoing debate about whether early childhood programmes should have a primarily academic focus or should be concerned with the whole child, and about whether play-based methods are preferable to direct instruction approaches in early learning settings (Zigler, Gilliam and Barnett, 2011[88]). With regards to governance, there have been calls for increased cohesion and coherence of the sector (Atchison and Diffey, 2018[31]), as well as calls for mandatory accountability and quality monitoring systems for early childhood settings (Horm, Barbour and Huss-Hage, 2019[63]).

Despite these debates, supporting early childhood education and care is an issue that unites voters in the United States. In a national bipartisan poll conducted in 2017, 79% of voters (including 80% of voters for the Republican candidate and 79% of voters for the Democratic candidate in the 2016 presidential election) were in favour of increased co-operation between Congress and the administration to improve the quality and affordability of early childhood care and education. Only one in five (21%) voters believed that Congress and the president were paying sufficient attention to the issue of ECEC. Regardless of political affiliation, there was strong support for increasing funding directly supporting greater access to quality early childhood programmes for low- and middle-income earners (74% of Republicans, 79% of independents and 97% of Democrats). Only 10% of the electorate wanted to see cuts to federal funding for ECEC. Three-quarters (74%) of the electorate agreed that high-quality ECEC gives children a good foundation for academic success at elementary school (First Five Years Fund, 2017[89]).

CONCLUSIONS

The United States does not have a national strategy for the early years in general, nor for early childhood education and care in particular. There is substantial variation in the quality of learning experiences and services US children experience in their earliest years. Uneven access to quality early years services as a result of the fragmented, decentralised ECEC sector may contribute to different outcomes for the nation's children across geographic, socio-economic, and racial and ethnic lines, potentially compounding inequalities in opportunities and outcomes that arise as a result of differences in children's home backgrounds and individual characteristics.

There is little evidence of consistent improvement or progress in educational achievement in the United States over the last two decades as indicated by NAEP, or by international large-scale assessments such as PIRLS, TIMSS and PISA. The United States could be said to underperform in these international assessments relative to its expenditure on education. While there is some evidence that racial and ethnic gaps in achievement and attainment have been narrowing over time, the same cannot be said of socio-economic gaps in educational outcomes, which are either static or widening depending on how the gaps are measured. Achievement trends for students with disabilities and English language learners, as assessed in NAEP, have also been static over time. There is convincing evidence that providing high-quality learning experiences may be a promising avenue to improving

educational outcomes and educational equity. There is also strong public support in the United States for high-quality early education and care. Redoubling efforts to ensure that high-quality early learning experiences are available to children who need them might serve to raise overall levels of educational achievement as well as helping to narrow achievement gaps. Collecting evidence on early learning outcomes and their correlates, as IELS does, may be an important step in these efforts.

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Notes

1. Household net adjusted disposable income is the amount of money that a household earns or gains each year after taxes and transfers. It represents the money available to a household for spending on goods or services.
2. The Gini coefficient – a measure of income wealth distribution where 1 corresponds to maximal inequality and 0 represents perfect equality – for the United States is 0.39.
3. Leave is already available in California, New Jersey, New York and Rhode Island; it will be available from 2020 in Washington and the District of Columbia, and from 2021 in Massachusetts.
4. Colorado, Delaware, Illinois, Kentucky, Louisiana, Maryland, Minnesota, North Carolina, Oregon, South Carolina, Texas, Utah and West Virginia.
5. Arkansas, Connecticut, Delaware, Hawaii, Louisiana, Maryland, Nevada, Ohio, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Virginia, West Virginia, Wisconsin and West Virginia. In Louisiana and Nevada, children are required to either attend kindergarten or to pass an assessment of their readiness to enter First grade. In Wyoming, children are required to attend kindergarten in districts where it is offered. Children are also required to attend kindergarten in certain districts of New Jersey and New York.
6. While these districts are only required to offer half-day provision, some offer full-day programmes if parents pay for the other half of the day. In other instances, the other half of the day may be subsidised for some children.
7. Arkansas, California, Colorado, Connecticut, Maine, Massachusetts, Minnesota, Mississippi, Montana, Nebraska, New Jersey, New Mexico, New York, Oregon, Pennsylvania, South Carolina, Tennessee, Washington, West Virginia and Wyoming.
8. Colorado, Iowa, Kentucky, Maine, Oklahoma, Texas, Vermont, West Virginia and Wisconsin (Parker, Diffey and Atchison, 2018[57]).
9. Some children who attend Head Start are not living in poverty or their poverty status is not determined (e.g. children in foster care, children who are homeless). However, the number of children living in poverty and number of children eligible for Head Start in a given year are close equivalents of each other.
10. For a programme to count as an ISCED 0 programme, it must account for the equivalent of at least two hours per day and 100 days per year of educational activities (OECD/Eurostat/UNESCO Institute for Statistics, 2015[90]). For this reason, these OECD-reported participation rates differ somewhat from those reported based on data from the Early Child Participation Program survey (particularly for three-year-olds), which included children who attend centre-based programme for any amount of time on a weekly basis.
11. Alabama, Louisiana, Mississippi, Rhode Island and West Virginia.
12. NAEP assessments are administered in English, but accommodations can be allowed. One of the most common accommodations for English Language Learner (ELL) students is additional time to answer assessment questions.

3

Results of the early literacy and numeracy assessments in the United States

This chapter presents findings on the emergent literacy and emergent numeracy of five-year-olds in the United States. It describes how children's scores in each of these early learning domains relate to their individual characteristics, family backgrounds, home learning environments and early childhood education and care participation.

THE IMPORTANCE OF EARLY COGNITIVE DEVELOPMENT

The cognitive skills developed in early childhood are important for children's well-being in the present and foundational to their future success in life. Decades of longitudinal research have shown that early literacy and numeracy scores are strongly predictive of later cognitive and educational outcomes (Duncan et al., 2007[1]). Early literacy and numeracy skills are also associated with a range of social, emotional and economic outcomes throughout people's lives (Reynolds et al., 2002[2]). By the time children start school, gaps in their cognitive skills – determined by their individual characteristics, home environments, and early childhood education and care (ECEC) experiences – are already observable and, once they exist, become increasingly difficult and costly to close. There is ample research evidence to suggest that when societies intervene early, children's cognitive skills are amenable to improvement (Reynolds et al., 2002[2]; Schweinhart, 2013[3]).

Gaps in literacy skills require early attention

The consequences of not addressing cognitive skills gaps early are serious. Adequate literacy skills are integral to successful functioning in most societies worldwide, yet 23% of 15-year-old students across OECD countries fail to reach a baseline level of proficiency[1] in reading, including 18% of 15-year-olds in the United States (OECD, 2019[4]). Similarly, one in five (20%) adults on average across OECD countries have low reading performance,[2] including 17% in the United States (OECD, 2013[5]). These adults have poorer labour-market outcomes and poorer self-reported health than their peers with better literacy skills. They are also more likely to feel that they have little impact on the political process and are less likely to report that they have trust in others (OECD, 2013[5]).

The roots of low adult literacy are found in childhood. As skills beget skills, children who fall behind early in their literacy and language skill development are likely to fall further behind over time (Kautz et al., 2014[6]; Rigney, 2010[7]). Measuring the early literacy skills of children can provide important information on where societies should focus attention and resources in order to promote quality and equity in early literacy development and, in turn, in children's life outcomes. Assessing emergent literacy skills comprises an integral part of the International Early Learning and Child Well-being Study (IELS).

Early numeracy is also strongly predictive of a range of later outcomes

Although emergent numeracy has been subject to less research attention than emergent literacy, longitudinal research has also identified numeracy skills in early childhood as important for positive outcomes throughout schooling and into adulthood. Studies have shown that competence in mathematics as assessed at school entry is the strongest predictor of later mathematical achievement and strongly predicts achievement in other academic domains (Duncan et al., 2007[1]). Better numeracy skills in childhood are associated with higher socio-economic status in adulthood (Ritchie and Bates, 2013[8]) and with better self-reported health outcomes (OECD, 2016[9]). On average, 24% of adults in OECD countries do not develop numeracy skills that go beyond the most basic numerical operations, and in the United States the proportion is 26% (OECD, 2013[10]). In most countries, adults with worse information-processing skills, including numeracy skills, are less likely to be employed and, when employed, tend to earn lower wages (OECD, 2016[9]). The relationship between numeracy skills and wages is especially strong in the United States (OECD, 2013[10]). While the cost of innumeracy to individuals and societies is high now, it is likely to grow higher still in what is an increasingly technological and scientific world (Raghubar and Barnes, 2017[11]). Given its established importance for later outcomes, emergent numeracy was selected as an important learning domain to be assessed in IELS.

A comprehensive assessment of early cognitive development should include a range of skills predictive of later competence

Emergent cognitive skills can be broadly categorised as either constrained or unconstrained. Constrained literacy skills are those that are finite, such as alphabet knowledge, and these are typically easily assessed. Unconstrained skills are not limited in the same way, and include aspects of literacy such as vocabulary knowledge. Unconstrained skills develop over a longer period, and draw on constrained skills in their formation (Snow and Matthews, 2016[12]). A comprehensive assessment of emergent literacy skills should include an assessment of both types of skill, which was the approach taken in IELS. While unconstrained emergent literacy skills are generally more challenging to assess, they tend to be more strongly associated with later reading success and were therefore the primary focus of the IELS emergent literacy assessment. The assessment used innovative, play-based methods and was delivered on tablet devices.

IELS directly assessed three early language skills deemed fundamental to later literacy competence: the unconstrained skills of listening comprehension and vocabulary knowledge, and the constrained skill of phonological awareness. Listening comprehension aids reading comprehension. Vocabulary knowledge is important for later literacy achievement because knowing what words mean helps with both listening and reading comprehension. Phonological awareness relates to later

literacy, as sounding out words is a means of decoding text. The assessment of listening comprehension in IELS involved two main components: story-level listening comprehension and sentence-level listening comprehension. The former involved children listening to a story and responding to a series of audio-recorded items relating to that story, while the latter involved listening to a series of standalone sentences and responding to a single item about the meaning of each. Each vocabulary item in IELS required children to identify from a range of very common everyday word options (Tier 1 words) the synonym of a more complex (Tier 2) word.[3] Finally, phonological awareness items required children to identify the first, middle and final phonemes (sounds) of short words. IELS did not assess reading ability, but focused instead on the early language skills that are predictive of later reading success.[4]

The general principle of focusing on the assessment of unconstrained skills in IELS was also applied to the assessment of emergent numeracy. Emergent numeracy was defined in IELS as the ability to recognise numbers and to undertake numerical operations and reasoning in mathematics. The emphasis in the assessment was on simple problem solving and the application of concepts and reasoning in the following content areas: numbers and counting, working with numbers, shape and space, measurement, and patterns. As with emergent literacy, the emergent numeracy assessment was delivered on a tablet and involved children engaging with game-like activities. The emergent numeracy assessment used a mixture of drag-and-drop technology, where children moved items around the screen to construct solutions to problems, and hot-spot technology, where children tapped objects to indicate their preferred option when responding to an item.

This chapter presents the outcomes of the IELS assessments of children's emergent literacy and emergent numeracy skills in the United States. The metric for all learning scales in IELS is the same and the metric does not have a substantive meaning (unlike physical units of measure, such as ounces or yards). There is theoretically no minimum or maximum score in IELS; rather, the data are scaled to have approximately normal distributions, with the means around 500 and standard deviations around 100. The overall IELS mean of 500 score points represents the arithmetic mean of the means of the three participating countries. Only scale scores will be presented in this chapter; there are no subscale scores. Thus, two children with the same emergent literacy scale score may have scored differently on the three assessed emergent literacy skills, such that one was stronger in vocabulary and the other was stronger on listening comprehension. Two equal scale scores do not necessarily represent the same skill set.

In addition to directly assessing emergent literacy and emergent numeracy skills, the study collected indirect information on the children's emergent literacy and emergent numeracy development through questionnaires administered to the children's parents and educators, and this information is also presented in this chapter. Where parent and educator reports on aspects of children's development are compared in tables, figures or other text, these analyses are based on the children for whom both parent and educator ratings were available. Parent and educator questionnaires also collected contextual information about the children's lives at home and at school. This chapter reports how five-year-olds' emergent literacy and emergent numeracy scores relate to their individual characteristics, family background characteristics, home learning environments, and early childhood education and care (ECEC) histories in the United States. It also considers the relationships between children's emergent literacy and emergent numeracy scores and their scores in other learning domains assessed in IELS. Similarities and differences between the findings of IELS in the United States and those in the other participating countries, England and Estonia, are highlighted throughout. The chapter concludes with a summary and some preliminary conclusions.

EMERGENT LITERACY AND EMERGENT NUMERACY SCORES IN THE UNITED STATES

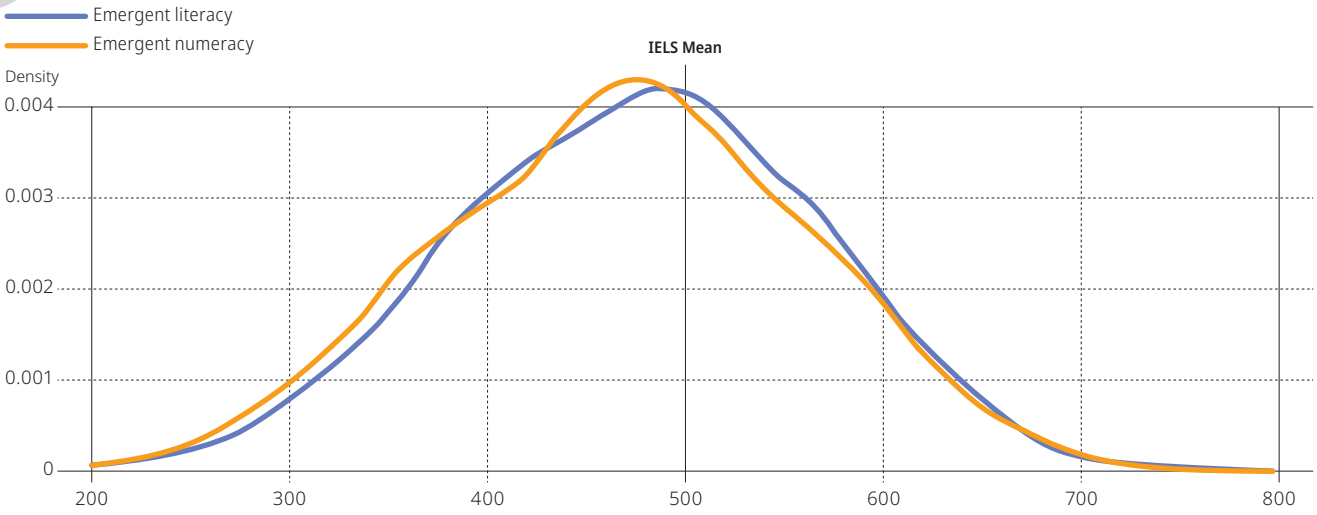
Five-year-olds in the United States have relatively low emergent literacy and emergent numeracy skills

In the IELS direct assessment of emergent literacy, the mean score for children in the United States was 477 points, significantly lower than the mean scores in Estonia (508 points) and England (515 points), which did not differ significantly from one another. The mean score of children at the 25th percentile in the United States was 414 points (compared with 452 in England and 440 in Estonia) and the mean score at the 75th percentile was 541 points (584 in England and 576 in Estonia).

For emergent numeracy, the mean score among US five-year-olds in the direct assessment was 471 points, 29 points lower than the overall emergent numeracy mean in IELS and significantly lower than the mean scores in Estonia (500 points) and England (529 points). The score of children at the 25th percentile in emergent numeracy in the United States was 409 points (compared to 465 in England and 435 in Estonia). For children at the 75th percentile the score was 537 points in the United States compared to 599 in England and 567 in Estonia.

The distributions of the emergent literacy and emergent numeracy scores of five-year-olds in the United States are shown in Figure 3.1.

Figure 3.1 **Distribution of emergent literacy and emergent numeracy scores, United States**



Note: Graph produced using the first plausible values. For more information on the use of plausible values in the study, please consult the IELS Technical Report.

Evaluations of language and numeracy skills by parents and educators are broadly in line with children's direct assessment scores, although parents tend to rate their children's development more highly

Both parents and educators are important sources of information about five-year-olds' emerging literacy and numeracy development. Parents know the most about their own children's development and educators are trained professionals who work with many young children on a daily basis. In IELS, both the parents and the educators of each child were asked to indicate whether they deemed that child's language and numeracy development to be less than average (either much less or somewhat less), average, or more than average (either somewhat more or much more).

According to their parents, just 6% of five-year-olds in the United States had below-average receptive language development (defined as the extent to which the child understands, interprets and listens) (Table 3.1). Over half (52%) of children in the United States had above-average receptive language skills according to their parents, and 42% had average receptive language development. In contrast, 29% of children were rated by their educators as having above-average receptive language skills, 51% were rated as having average receptive language skills, and one in five (20%) was rated as below average.

Children evaluated as having below-average receptive language development, whether by parents or educators, had significantly lower mean emergent literacy scores than those rated as average, who, in turn, had significantly lower mean emergent literacy scores than those rated as above average. Educators' evaluations of children's receptive language development were more strongly correlated with children's directly assessed emergent literacy skills (r = .42), than parents' evaluations (r = .22).

Table 3.1 **Receptive language development as reported by parents and educators and emergent literacy scores, United States**

	Parents		Educators	
	% of children	*Mean score*	*% of children*	*Mean score*
Below average	6	**428**	20	**419**
Average (reference category)	42	466	51	482
Above average	52	**505**	29	**533**

Note: Mean scores in **bold** are significantly different from those of children in the "average" category. The table is based on the subsample of children for whom both parent and educator ratings were available.

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In the United States, 7% of five-year-olds had parents who described their expressive language development (i.e. the degree to which the child uses language effectively, can communicate ideas, etc.) as being below average, while around one in five study children (21%) had expressive language skills rated as below average by their educators. A majority of study children (58%) had parents who rated their expressive language development as above average, compared to 30% of children rated as above average by their educators. Children evaluated as having average expressive language skills, whether by their parents or their educators, had significantly higher mean emergent literacy scores than children rated as below average and significantly lower mean scores than children rated as above average (Table 3.2). Educators' ratings were more strongly correlated with children's emergent literacy scores (r = .41) than parents' ratings (r = .29).

Table 3.2 **Expressive language development as reported by parents and educators and emergent literacy scores, United States**

	Parents		Educators	
	% of children	*Mean score*	*% of children*	*Mean score*
Below average	7	**413**	21	**414**
Average (reference category)	35	462	49	492
Above average	58	**508**	30	**523**

Note: Mean scores in **bold** are significantly different from those of children in the "average" category. The table is based on the subsample of children for whom both parent and educator ratings were available.

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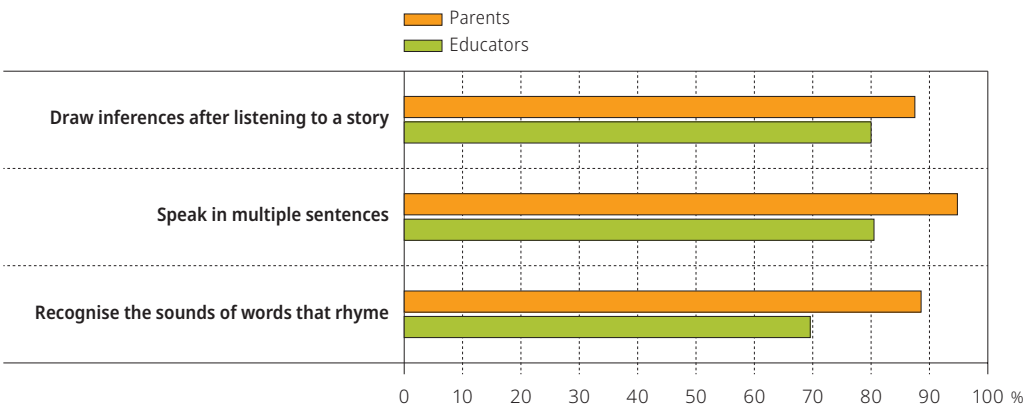
Most five-year-olds in the United States have mastered key language skills, according to their parents and educators

In addition to providing overall ratings of children's language development, parents and educators were asked to indicate whether the children had mastered a number of specific language and literacy-related skills. In the United States, 88% of five-year-olds could draw inferences after listening to a story about how a character felt or about what might happen next, according to their parents. Similarly, 89% of children could recognise the sounds of words that rhyme and 95% could speak in multiple sentences (at least three) to explain something that had happened to them, according to their parents. US educators were less likely to indicate that children had mastered each skill, as was also the case in England and Estonia. The largest gap between educator and parent reports in the United States related to children's ability to recognise rhyming sounds, with 89% of children able to do so according to parents, and 70% able to do so according to educators (Figure 3.2). In either case, children whose parents or teachers indicated that they had not mastered the skill had significantly lower mean emergent literacy scores than other children (Figure 3.3), with score-point gaps ranging from 73 to 95 points, depending on the skill and informant in question.

Figure 3.2 **Mastery of key language and literacy-related skills as reported by parents and educators, United States**



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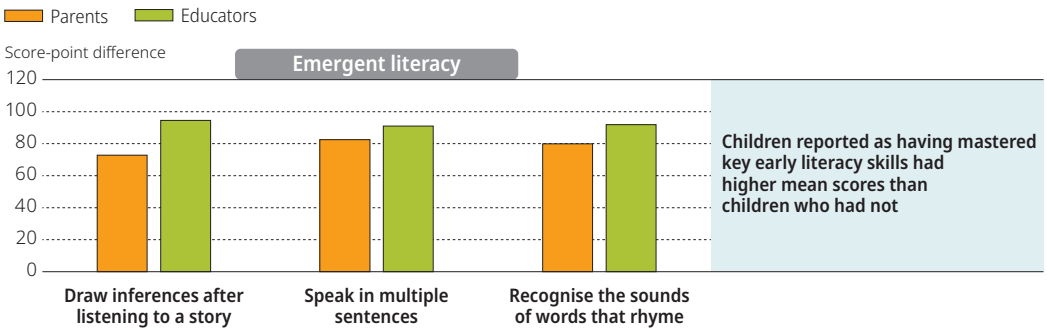
Parents also tend to rate their children's numeracy development more highly than educators

Parents and educators reported on their perceptions of their children's numeracy development relative to average development for a five-year-old. Nearly twice as many children were reported as having below average numeracy development by their educators (17%) than were rated below average by their parents (9%). Children whose numeracy development was rated as average by their parents or by their educators had significantly higher mean emergent numeracy scores than children whose development was rated as below average and significantly lower scores than children whose development was rated as above average (Table 3.3). The correlation between educator ratings and direct assessment emergent numeracy scores was moderately strong (r = .38) and was stronger than the correlation between parent ratings and direct assessment scores (r = .27).

Figure 3.3 Emergent literacy scores by reported mastery of key language and literacy-related skills, United States

Score-point differences between children who have and have not mastered each language skill, according to their parents and educators



Note: All score-point differences between children reported as having mastered the skill in question and those reported as not having mastered it are statistically significant.

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Table 3.3 Numeracy development as reported by parents and educators and emergent numeracy scores, United States

	Parents		Educators	
	% of children	*Mean scores*	*% of children*	*Mean scores*
Below average	9	**397**	17	**389**
Average (reference category)	45	466	56	482
Above average	46	**510**	27	**533**

Note: Mean scores in **bold** are significantly different from those of children in the "average" category. The table is based on the subsample of children for whom both parent and educator ratings were available.

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Parents and teachers were also asked to indicate whether the children had mastered each of a series of numeracy or mathematics-related skills. In all cases, parents were more likely than educators to indicate that their child had mastered the skill in question (Figure 3.4). The most common skills were being able to identify at least three different shapes (98% of the children according to their parents and 94% according to their educators) and to sort a group of objects by size, shape or colour (98% according to parents and 95% according to educators). The least common skill among five-year-olds was counting in multiples (mastered by 39% of children according to their parents and 33% according to educators). The largest gaps between parents' and educators' reports related to the children's ability to recognise numbers up to 20 (73% of children could do so according to their parents, compared to 56% according to educators), and to do simple addition with objects (80% of children according to their parents, compared to 65% according to educators). On the whole, the children reported as having mastered a particular skill had significantly higher mean emergent numeracy scores than children who were not. The gaps ranged from 50 points (between children who could and could not identify numerals up to 20 in familiar contexts or between children who could or could not do simple addition, as reported by their parents) to 129 points (between children who could and could not sort a group of objects by size, shape or colour, according to their educators; Figure 3.5).

Figure 3.4 **Mastery of key early mathematics skills as reported by parents and educators, United States**

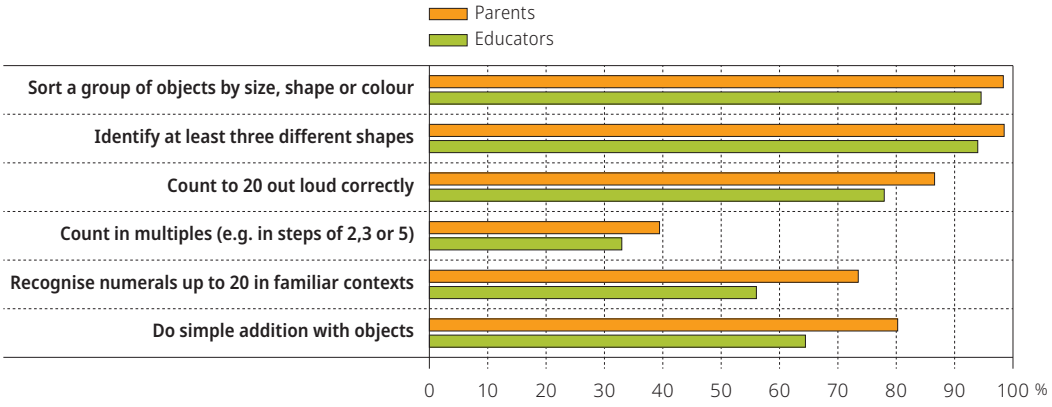

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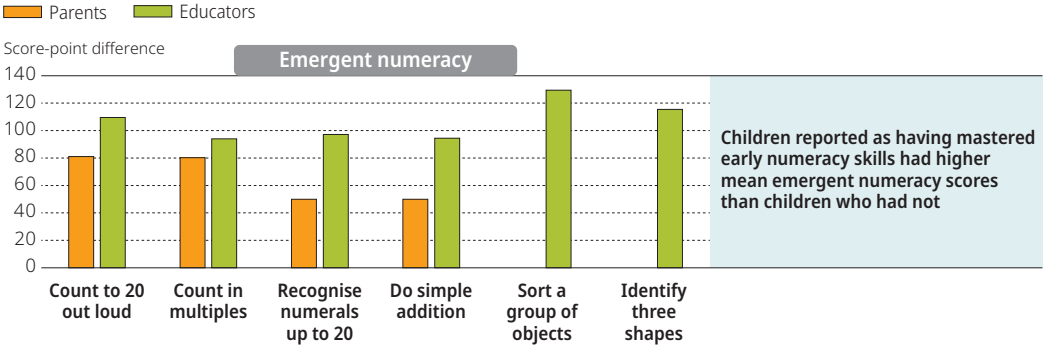
Figure 3.5 **Emergent numeracy scores by reported mastery of key early numeracy or mathematics-related skills, United States**

Score-point differences between children who have and have not mastered each early numeracy skill, according to their parents and educators



Note: All differences are statistically significant. The number of children whose parents reported they could not sort a group of objects or identify at least three shapes were very low. As their mean scores could not be reliably estimated, score-point differences between these and other children are not presented in this graph.

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INDIVIDUAL CHARACTERISTICS AND EMERGENT LITERACY AND EMERGENT NUMERACY SCORES

Five-year-old girls have higher emergent literacy scores than boys on average, but their emergent numeracy scores are similar

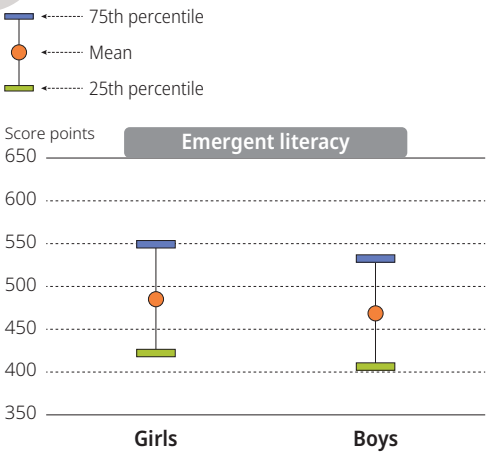
In the United States, girls scored higher than boys, on average, on the emergent literacy assessment (Figure 3.6). The 17-point difference in mean scores was statistically significant. There were similarly sized gender gaps in favour of girls in the other two countries participating in IELS: 16 points in England, 15 points in Estonia.

There was no significant difference between the mean emergent numeracy scores of girls and boys in the United States, at 471 points for both. There were also no significant gender differences in emergent numeracy in either England or Estonia.

Girls' language skills tend to be more highly rated by their parents and educators

In line with their better average score on the IELS emergent literacy assessment, girls were more likely than boys in the United States to have parents and educators who rated their receptive and expressive language development as above average. Girls were also less likely to have their language development rated as below average by their parents and educators (Figure 3.7 and Figure 3.8).

Figure 3.6 **Emergent literacy scores by gender, United States**



Note: The gender differences in scores at the mean and at the 75th percentile are statistically significant.

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Figure 3.7 **Receptive language development as reported by parents and educators, by gender, United States**

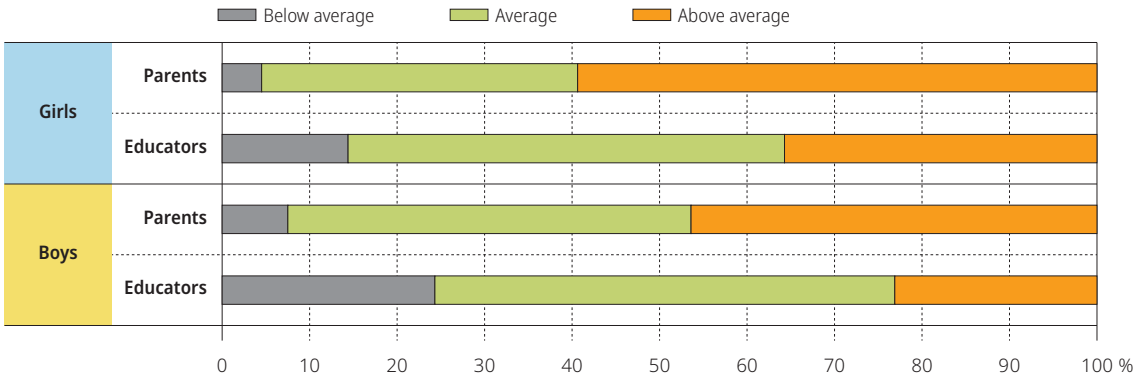

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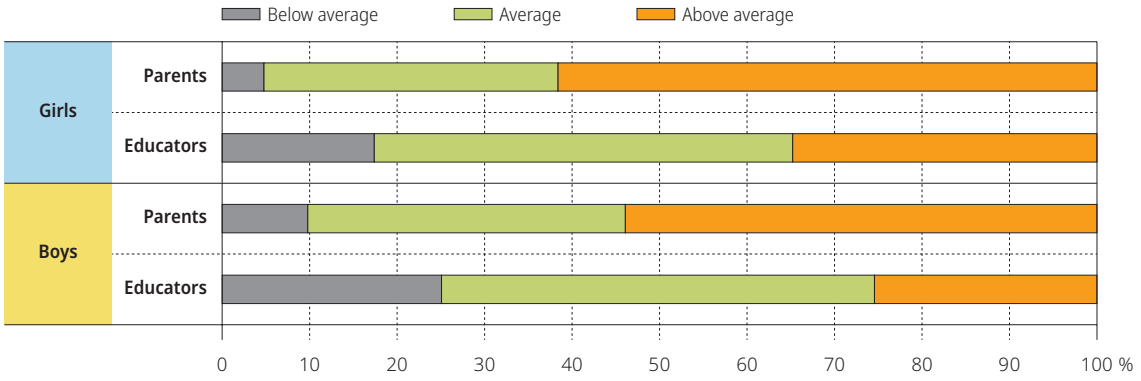
Figure 3.8 **Expressive language development as reported by parents and educators, by gender, United States**



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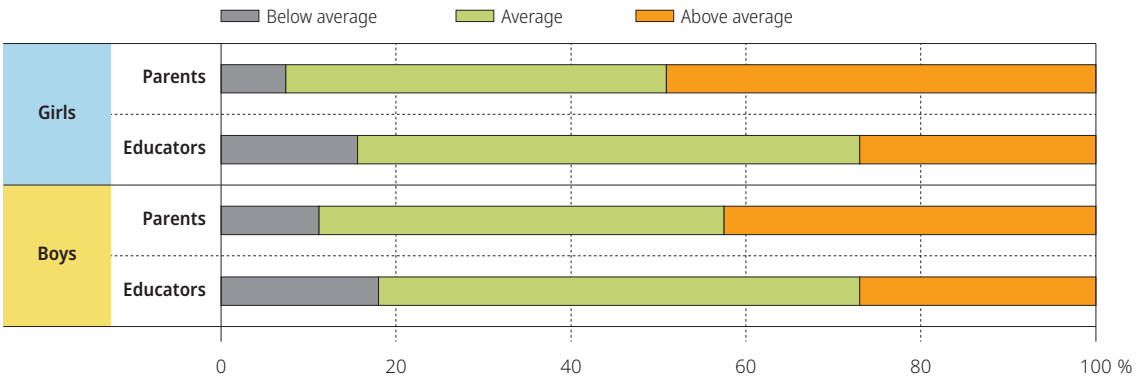
Parents are also more likely to rate girls' numeracy development as above average

Roughly equal proportions of girls and boys were rated as having average numeracy development by their parents and educators (Figure 3.9). Girls were somewhat more likely to be rated as above average in their numeracy development by their parents than boys were, and somewhat less likely to be rated as below average.

Figure 3.9 **Numeracy development as reported by parents and educators, by gender, United States**



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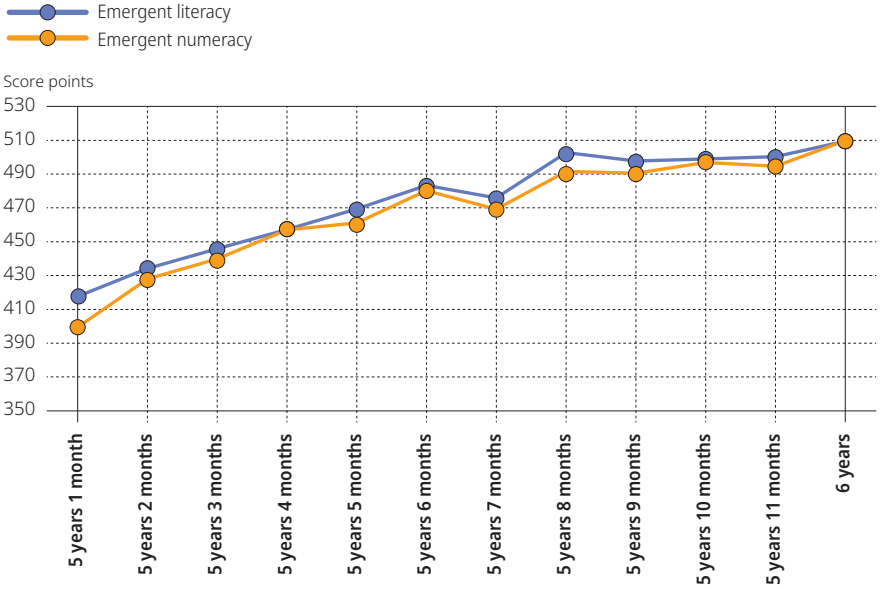
Age is positively related to emergent literacy and emergent numeracy scores in the United States

For both emergent literacy and emergent numeracy skills, there were significant correlations between children's ages in months and their scores in the direct assessments. In the United States, the correlation between age and emergent literacy scores was .27, and between age and emergent numeracy scores, it was .29. The difference in emergent literacy scores between the oldest children in the sample (6 years, 0 months) and the youngest children (5 years, 1 month)[5] was 92 points (87 points in England and 59 points in Estonia). For emergent numeracy, the corresponding gap in the United States was 110 points (126 points in England; 74 points in Estonia) (Figure 3.10).

Figure 3.10 **Emergent literacy and emergent numeracy scores by age of child in months, United States**



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Early difficulties are associated with lower scores at age five

Parents were asked to indicate whether their children had ever experienced each of a number of challenges or difficulties. In the United States, 10% of the children were reported by their parents to have had a low birth weight or to have been born prematurely[6] (compared with 11% in England and 8% in Estonia); these children had significantly lower mean emergent literacy and emergent numeracy scores than their peers who had not, after accounting for socio-economic status (SES). Approximately one in eight US children (13%) had experienced learning difficulties (such as a speech or language delay, or an intellectual disability), according to their parents (compared with 10% in both England and Estonia). These children

had significantly mean lower scores for both emergent literacy and emergent numeracy than other children. Additionally, around one in eight US children (12%) had social, emotional or behavioural difficulties, according to their parents (8% in England, 10% in Estonia). Again, these children had significantly lower mean emergent literacy and emergent numeracy scores than other children, after accounting for SES.

When each of the difficulties were examined in combination (i.e. examining the effects of each difficulty after accounting for the effects of other early difficulties) and after accounting for socio-economic status, having learning difficulties remained the only significant predictor of both emergent literacy and emergent numeracy (Figure 3.11).

Girls were more likely to have had a low weight at birth or have been born prematurely than boys were in the United States (12% of girls and 8% of boys). Significantly more boys were identified as having had learning difficulties by their parents (10% of girls and 17% of boys) and as having social, emotional or behavioural difficulties (8% of girls and 16% of boys).

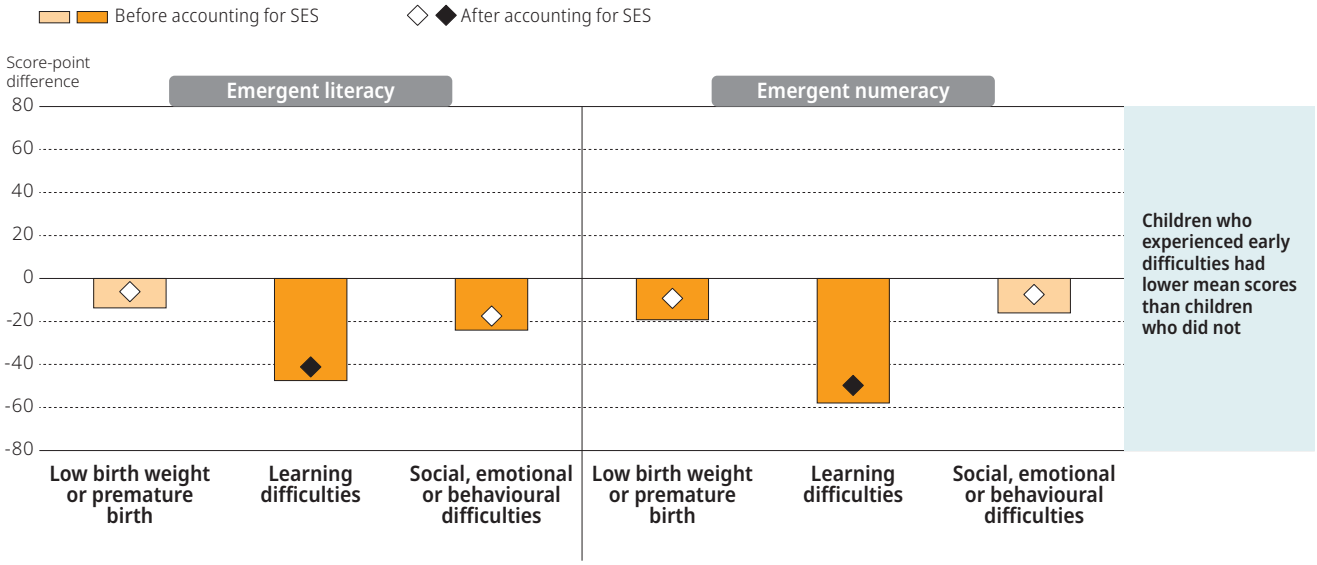
In the United States, 13% of children in the lowest SES quartile had a low birth weight or were born prematurely, compared to 7% of children in the highest quartile. Additionally, 18% of children in the lowest SES quartile had learning difficulties, according to their parents, compared to 8% of children in the top SES quartile. Finally, 16% of children in the lowest SES quartile had social, emotional or behavioural difficulties, according to their parents, compared to 7% of children in the top SES quartile.

In the United States, almost one in four boys (24%) in the lowest SES quartile were identified as having learning difficulties, compared to 11% of girls. Additionally, 20% of boys in the lowest SES quartile had social, emotional or behavioural difficulties, according to their parents, compared to 12% of girls in that SES quartile. There were no significant associations between race or ethnicity and low birth weight or prematurity; learning difficulties; or social, emotional or behavioural difficulties, before or after controlling for SES.

Overall in the United States, 27% of five-year-olds for whom information was available had experienced at least one of these challenges or difficulties, with 20% having experienced just one, 6% having experienced two and 1% having experienced all three.

Figure 3.11 **Relative associations between early difficulties and emergent literacy and emergent numeracy scores, United States**

Score-point differences between children who had and had not experienced an early difficulty, after accounting for the effects of other early difficulties, and before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

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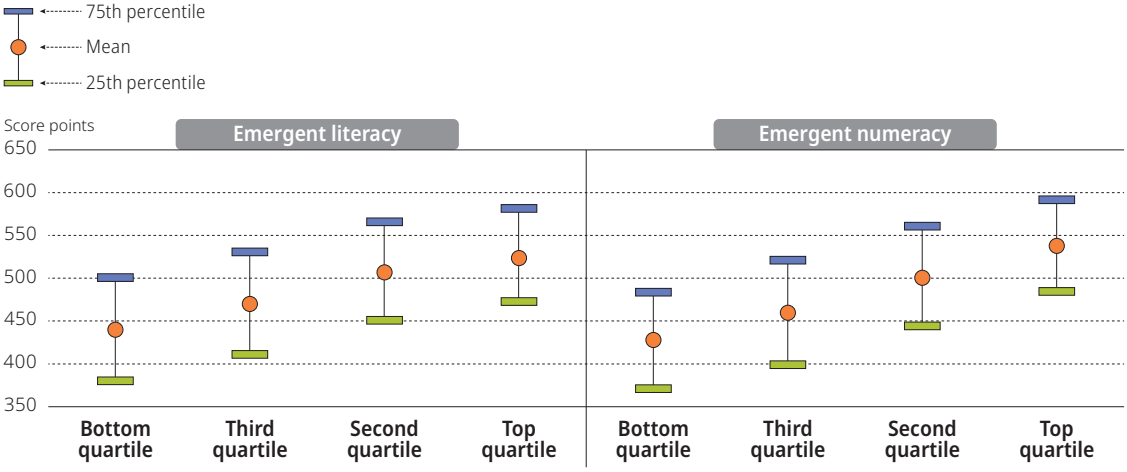
HOME AND FAMILY CHARACTERISTICS AND EMERGENT LITERACY AND EMERGENT NUMERACY SCORES

Higher socio-economic status is associated with higher emergent literacy and emergent numeracy scores

The index of socio-economic status (SES) constructed for use in IELS was based on household income, parental occupation and parental educational attainment.[7] Socio-economic status scores were significantly positively correlated with children's emergent literacy scores (r = .36) and emergent numeracy scores (r = .45) in the United States. Five-year-olds in the top SES quartile had a significantly higher mean emergent literacy score than children in the bottom SES quartile, by a margin of 84 points (Figure 3.12). The corresponding gap in emergent numeracy mean scores was 110 points, which is more than a standard deviation and similar to one year's typical numeracy development at age five in the United States. There were no significant interactions between SES and gender with respect to either emergent literacy or emergent numeracy skills in the United States, i.e. the strength of the association between SES and learning outcomes was not significantly different for boys and girls.

Figure 3.12 **Emergent literacy and emergent numeracy scores by socio-economic quartile, United States**



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The relationship between SES and emergent literacy was stronger in the United States than in Estonia and similar to that in England. However, the relationship between SES and emergent numeracy scores was stronger in the United States than in either of the other two participating countries. The gap between the mean emergent numeracy scores of those in the top and bottom SES quartiles in England was 86 points and 56 points in Estonia, considerably smaller than the 110-point gap in the United States. It should be noted that the United States has higher levels of income or wealth inequality than in the United Kingdom or Estonia (Gini coefficients of .39, .36 and .31, respectively).

A home language other than English is associated with lower average emergent literacy and emergent numeracy scores

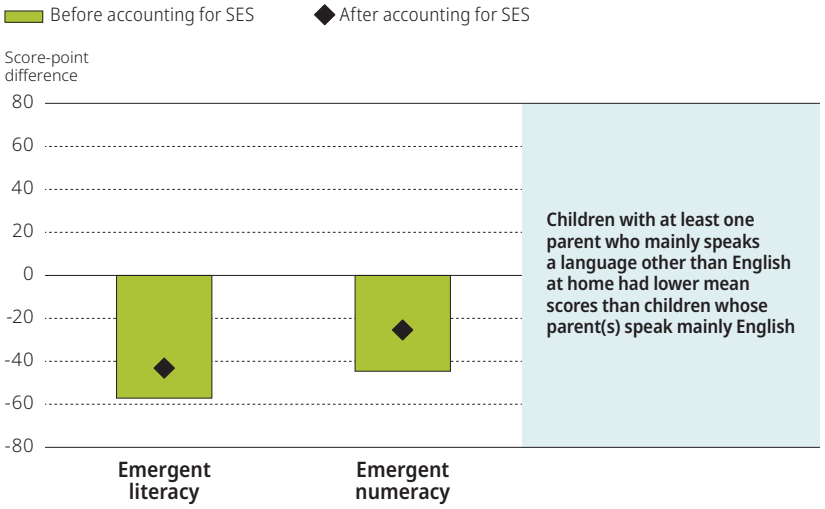
In the United States, 20% of children in the study for whom information on home language was available lived in homes in which at least one parent mostly spoke a language other than the assessment language (compared with 16% in England and 6% in Estonia). These children had significantly lower mean emergent literacy and emergent numeracy scores in IELS than other children, even after accounting for SES (Figure 3.13). The assessments were only available in English in the United States and were not translated into any of the other languages that children may use at home or in their communities.[9]

Children's immigration background is not related to their assessed emergent literacy and emergent numeracy skills after controlling for socio-economic status and home language

In the United States, 18% of the children had an immigrant background,[10] the same proportion as in England and higher than the 2% in Estonia. After controlling for socio-economic status and home language (whether at least one parent mainly spoke a language other than English), the mean scores of children with and without an immigrant background did not differ significantly from one another in either domain.

Figure 3.13 **Emergent literacy and emergent numeracy scores by home language, United States**

Score-point differences between children with at least one parent who speaks a language other than English at home and those whose parent(s) speak mainly English, before and after accounting for socio-economic status



Note: All differences are statistically significant.

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There are no differences in emergent literacy and emergent numeracy scores along racial or ethnic lines after accounting for socio-economic status

Just over half of five-year-olds in the United States were White (52%), 25% were Hispanic, 11% were Black, 7% were Asian, 5% were of two or more races and less than 1% were of another ethnicity, such as Pacific Islander or American Indian/Alaska Native. There were no significant differences in the mean emergent literacy scores of White children and Black children, Asian children or children of two or more races.[11] After accounting for SES, there was no significant difference in the mean emergent literacy scores of Hispanic and White children. There were no significant associations between children's racial or ethnic backgrounds and the likelihood of their parents or educators characterising their language development (receptive or expressive) as below average, average or above average.

A similar picture emerged for emergent numeracy. The mean scores of White children did not differ significantly from children who were Black, Asian or two or more races. After accounting for SES, there was no significant difference in the mean emergent literacy scores of Hispanic and White children. There were no significant associations between children's racial or ethnic backgrounds and how their parents and educators rated their numeracy development.

On the whole, children's family structures are not significantly associated with their early literacy and numeracy scores after accounting for socio-economic status

In the United States, 15% of five-year-olds for whom information was available lived in one-parent households. After accounting for SES, there were no significant differences between the mean scores of children in one-parent and two-parent households in either emergent literacy or emergent numeracy.

Additionally, 14% of five-year-olds in the study had no siblings, 40% had one sibling, 26% had two siblings, 11% had three siblings, 5% had four siblings and 5% had five siblings or more. Previous research has found family size to be negatively related to children's cognitive outcomes, regardless of family socio-economic status. This may be explained by the dilution of resources that can be given to any one child in larger families (Downey, 2001[13]). In the United States, such a negative effect[12] was only observed for children who had five or more siblings. These children had significantly lower mean emergent literacy and emergent numeracy scores than children with one sibling, after accounting for SES.

Children whose mothers have higher educational attainment have better early literacy and numeracy skills

In the United States, just 3% of the children had mothers who had not completed ninth grade. There was a strong relationship between mothers' educational attainment and their children's emergent literacy and emergent numeracy scores (Table 3.4).

In the United States, 39% of children in IELS had mothers who had completed a bachelor's degree or higher (a similar proportion as in England but lower than the 53% in Estonia). Children whose mothers held at least bachelor's degrees had higher mean

emergent literacy and emergent numeracy scores than children whose mothers had completed less formal education, even after accounting for household income (Figure 3.14)[13].

Table 3.4 **Maternal educational attainment and emergent literacy and emergent numeracy scores, United States**

	% of children	Emergent literacy	Emergent numeracy
Did not complete ninth grade	3	**409**	**414**
Completed ninth grade	5	**436**	**417**
Received high school diploma or GED (reference category)	35	469	454
Associate's degree	17	**493**	**487**
Bachelor's degree	26	**511**	**515**
Master's degree, professional degree or doctorate	13	**527**	**540**

Note: Mean scores in **bold** are significantly different from those of children in the reference category (children whose mother has a high school diploma or General Education Diploma [GED]).

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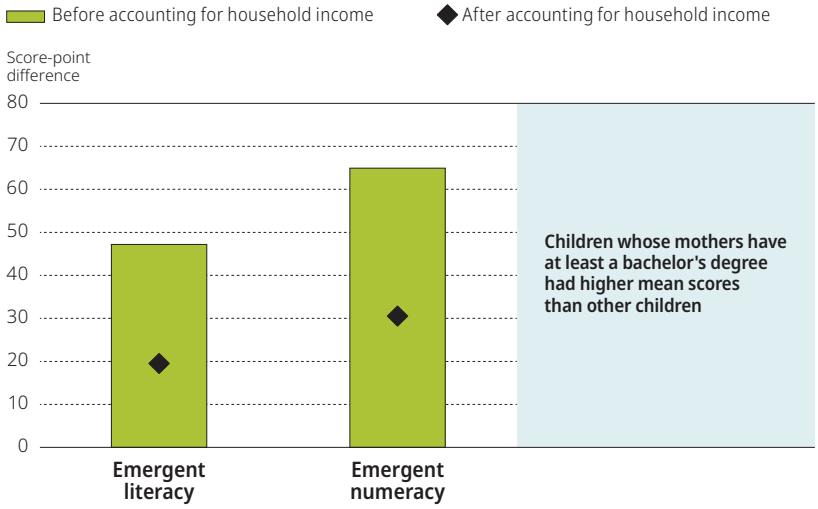
Figure 3.14 **Emergent literacy and emergent numeracy scores by mother's educational attainment, United States**

Score-point differences between children whose mothers hold at least a bachelor's degree and those whose mothers do not, before and after accounting for household income



Note: All differences are statistically significant.

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HOME LEARNING ENVIRONMENT AND CHILDREN'S EMERGENT LITERACY AND EMERGENT NUMERACY SCORES

The home is the first major context in which children learn, develop and grow. A home environment that is supportive of early learning, in terms of both stimulating resources and interactions, is an important determinant of children's early cognitive outcomes. Collecting information on children's home learning environments was an important focus of IELS.

Children from homes with greater numbers of children's books have higher average emergent literacy and emergent numeracy scores

Approximately one in eight (12%) five-year-olds in the United States lived in homes that had 10 children's books or fewer (compared to 13% in Estonia and 9% in England), while 26% lived in homes with more with 100 (10% in Estonia; 29% in England). Children with access to more children's books in their homes – including those from a public or school library – had, on average, higher emergent literacy and emergent numeracy scores than children with fewer books (Table 3.5). The gaps in emergent literacy and emergent numeracy scores between the children with 10 or fewer books and those with more than 100 books were large in the United States, even after accounting for SES (Figure 3.15).

Table 3.5 **Number of books in the home and emergent literacy and emergent numeracy scores, United States**

	% of children	Emergent literacy	Emergent numeracy
0-10	12	**422**	**407**
11-25	17	**437**	**440**
26-50 (reference category)	23	478	464
51-100	22	**502**	**505**
More than 100	26	**522**	**520**

Note: Mean scores in **bold** are significantly different from those of children in the reference category (children with 26-50 children's books at home).

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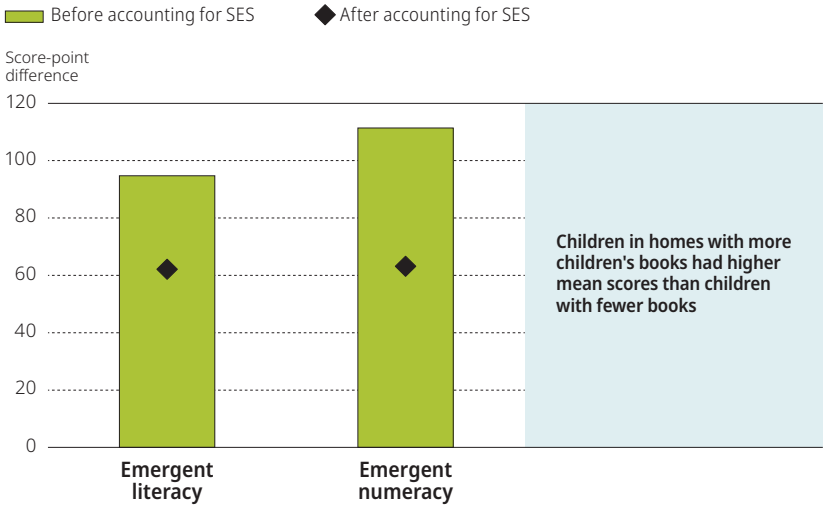
Figure 3.15 **Emergent literacy and emergent numeracy scores by number of books in the home, United States**

Score-point differences between children with access to 100 or more children's books in the home and those with access to 10 or fewer, before and after accounting for socio-economic status



Note: All differences are statistically significant

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Children whose parents read books and sing songs to them at home most frequently have higher mean emergent literacy scores than other children

Figure 3.18 shows the percentages of children whose parents engage in each of a range of language and literacy-related activities with the child at home with varying frequency. The most common activities parents reported engaging in on five or more days per week were back-and-forth conversations with children about how they feel and why they feel that way (59% of children), followed by reading to the child from a book (43%) and singing songs, nursery rhymes or poems (39%).

There were no significant associations between a child's gender and the frequency with which they were read to from a book, told a story, went to the library or engaged with activities at home to learn the alphabet. There were, however, significant associations between a child's gender and the frequency with which their parents sang songs, nursery rhymes or poems to them, and the frequency with which their parents had back-and-forth conversations with them about their feelings. In the United States, 44% of five-year-old girls had parents who sang to them on five or more days a week, compared to 33% of boys. Additionally, 61% of girls had back-and-forth conversations about their feelings with their parents on at leave five days each week, compared to 56% of boys.

There were also some significant associations with socio-economic status. In the United States, 27% of children in the bottom SES quartile had parents who read to them from a book on 5-7 days per week, compared to 55% of children in the top quartile. There were statistically significant but weak associations between SES and frequency of going to the library (high-SES children

were more likely to never go), having back-and-forth conversations (children in the top SES quartile were somewhat more likely to have these with their parents on at least five days each week), and doing activities aimed at learning the alphabet (children in the lowest SES quartile were more likely to do these with their parents on at least three days a week).

Children whose parents read to them from a book on at least five days each week had a significantly higher mean emergent literacy score than children whose parents read to them less than once a week (Figure 3.19). Children read to on 3-4 days per week also had a significant point advantage over children whose parents read to them less than once a week. These differences were significant before and after accounting for SES and gender. Additionally, children whose parents sang songs or nursery rhymes to them more than once a week had significantly higher mean emergent literacy scores than children whose parents did so less than once a week. These differences were significant after controlling for SES and gender.

The frequency with which parents told children stories (not from a book), had back-and-forth conversations with them about their feelings, and engaged in activities aimed at learning the alphabet were not significantly related to emergent literacy scores (it should be remembered that alphabet knowledge was not assessed in IELS).

Figure 3.16 **Frequency of engagement in literacy-related activities at home, United States**

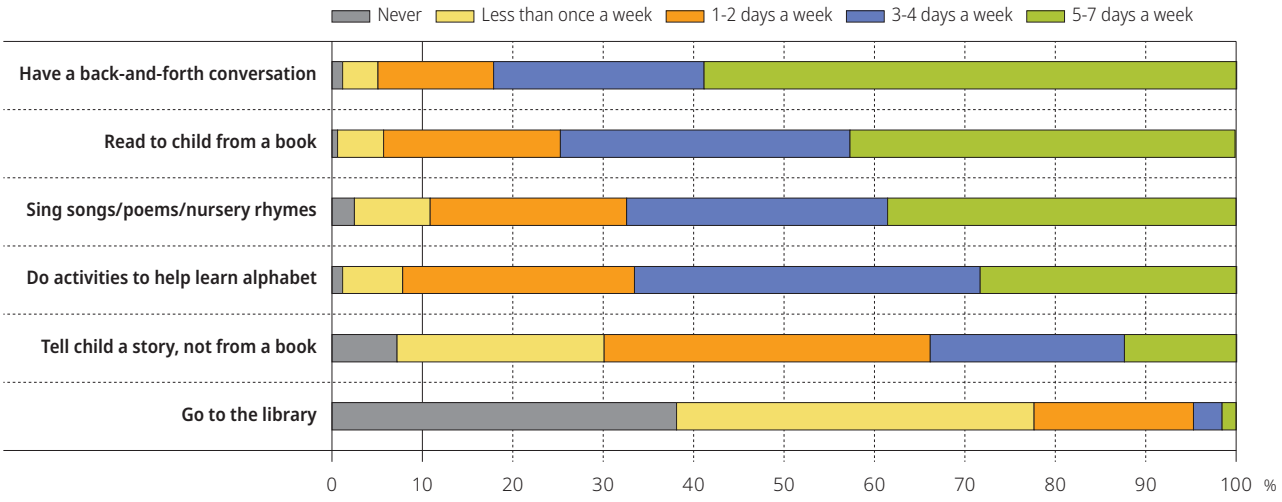

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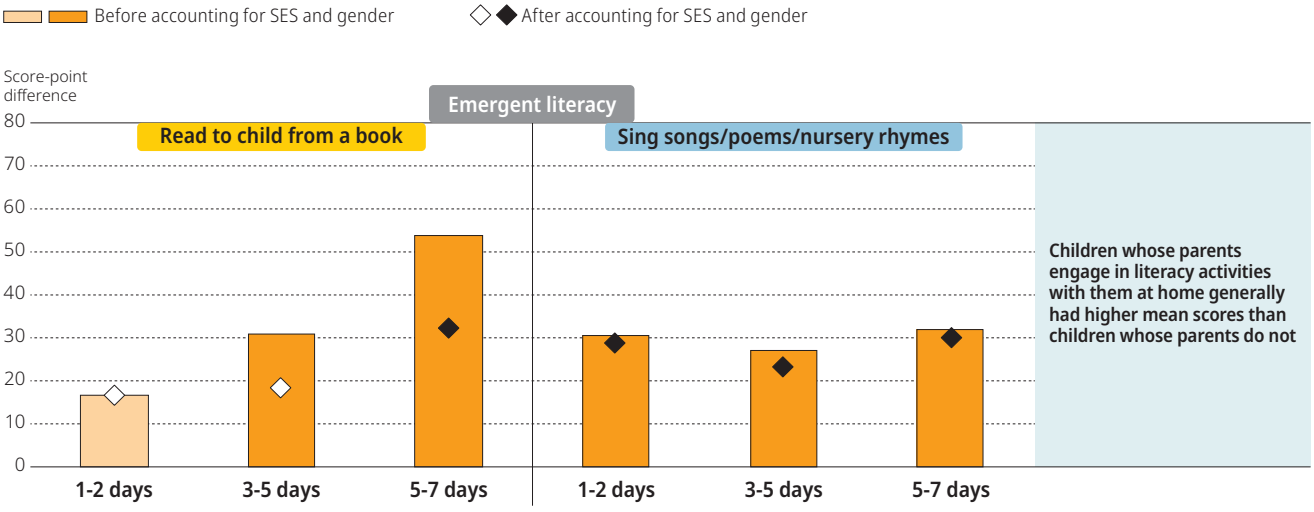
Figure 3.17 **Emergent literacy scores by engagement in literacy-related activities at home, United States**

Score-point differences between children whose parents engage in literacy-related activities with them at home with varying frequency and those who do so less than once a week, before and after accounting for socio-economic status and gender



Note: Statistically significant differences are shown in a darker tone.

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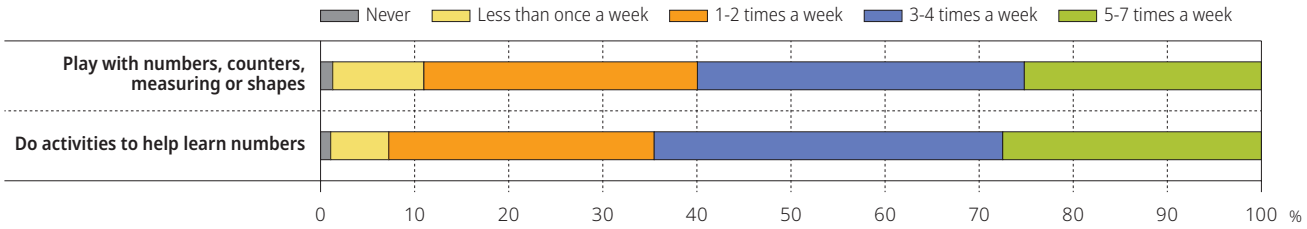
Most five-year-olds in the United States have parents who engage in numeracy-related activities with them at home at least once a week

Figure 3.18 shows the percentages of children whose parents engaged in numeracy-related activities at home with them with different frequency. Just one in ten children had parents who said they played with numbers, counting, measuring or shapes with them less than once a week and just 7% had parents who only engaged in activities designed to help them learn numbers less than once a week. There were no significant associations between a child's gender and the frequency with which a child's parents engaged in these activities with them at home. There was also no significant association between socio-economic status and frequency of activities at home to learn numbers. However, there was a statistically significant (but weak) association between SES and frequency of playing with numbers, counters, shapes or measuring, with 25% children in the bottom SES quartile doing so on at least five days a week with their parents, compared to 19% of in the top SES quartile.

Figure 3.18 **Frequency of engagement in numeracy-related activities at home, United States**



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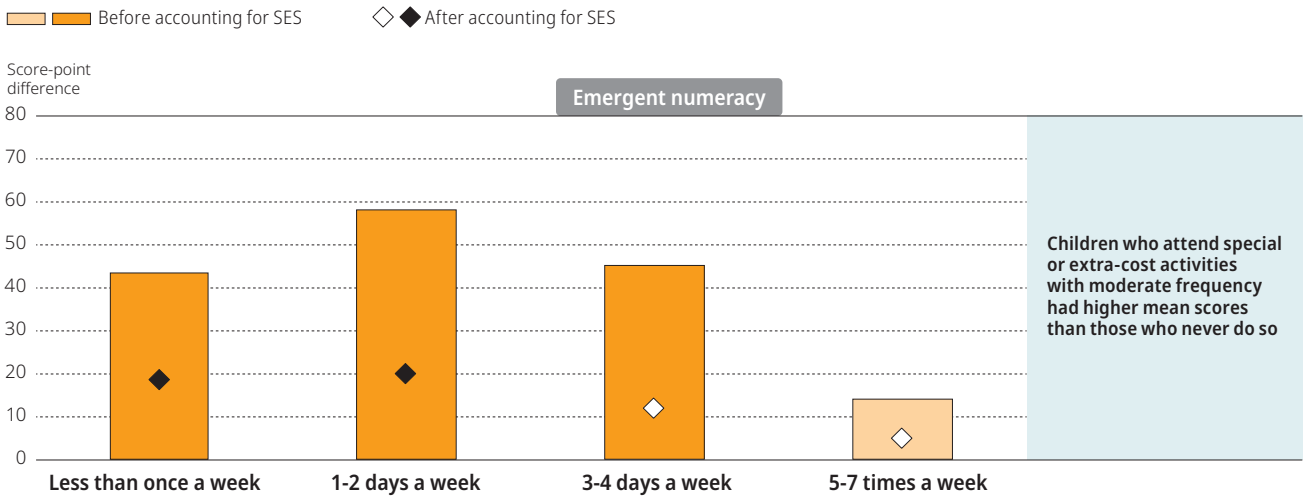
Children who attend special or extra-cost activities with moderate frequency have higher mean emergent numeracy scores than children who never attend

Parents were also asked how often their five-year-old attended a special or paid activity outside the home (such as a sports activity, dance, scouts, or swimming or language lessons). In the United States, 27% of five-year-olds in IELS never attended such activities, 20% did so less than once a week, 36% did so on 1-2 days a week, 14% on 3-4 days a week, and 4% attended on five or more days a week. After accounting for SES, the mean emergent literary score of children who never attended such was not significantly different from the mean scores of those who did attend, regardless of frequency. Children who never attended these activities did have a significantly lower mean numeracy score than children who attended less than once a week or on 1-2 days a week (Figure 3.21), but their scores did not differ significantly from those of children who attended more frequently (3-4 or 5-7 days per week), after accounting for SES.

Figure 3.19 **Emergent numeracy scores by engagement in special or extra-cost activities outside the home, United States**

Score-point differences between children who attend special or paid activities outside the home with varying frequency and those who never or hardly ever do so, before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

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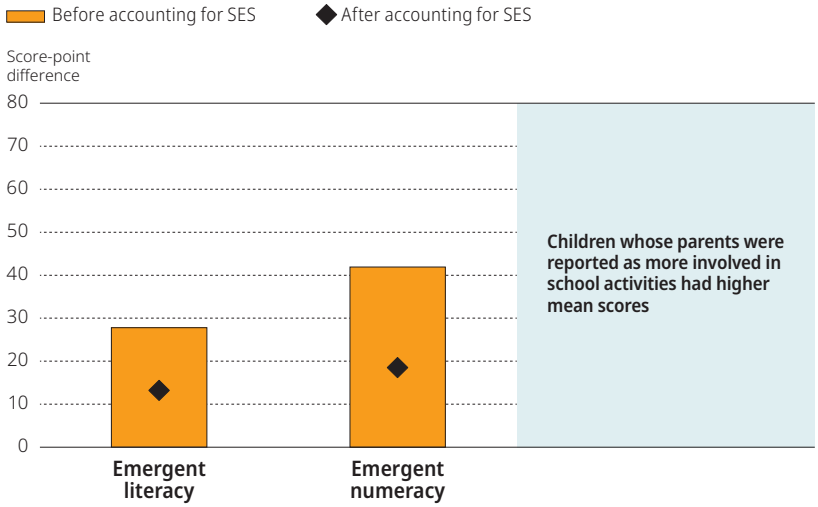
Children whose parents are more strongly involved in school activities score higher, on average, than other children

In the United States, 65% of five-year-olds had teachers who indicated that the child's parents were either moderately or strongly involved in activities taking place at the school, which is lower than in England (69%) and Estonia (80%). These children had significantly higher mean emergent literacy and emergent numeracy scores than the 35% of children whose teachers reported that their parents were not involved or were only slightly involved in school activities, even after accounting for SES (Figure 3.20).

Figure 3.20 **Emergent literacy and emergent numeracy scores by parental involvement in school activities, United States**

Score-point differences between children whose parents are moderately or strongly involved in activities at school and those whose parents are slightly or not involved, according to their teachers, before and after accounting for socio-economic status



Note: All differences are statistically significant.

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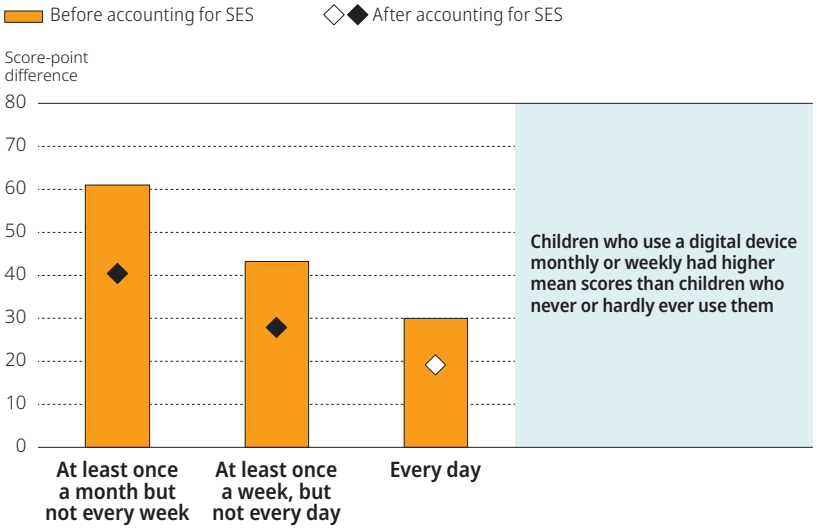
Moderate use of digital devices is associated with higher emergent literacy scores than both no use and frequent use

In the United States, approximately half (49%) of five-year-olds used a desktop or laptop computer, tablet device, or smartphone every day, according to their parents, more than the 39% in both England and Estonia. A further 40% of the US children used such devices at least once a week but not daily, while 7% did so monthly but not weekly, and 5% never or hardly ever did so. After accounting for SES, the mean emergent literacy score of children who never or hardly ever used devices was 40 points lower than those who used such devices monthly (a significant difference), and 28 points lower than those who used them weekly (also significant). Their mean scores did not differ significantly from those of children who used them every day (Figure 3.16). For emergent numeracy, the frequency of use of technological devices was not significantly associated with IELS scores after accounting for SES. There was no significant association between the frequency of device use and gender.

Parents were also asked to indicate how often children engaged in educational activities on a computer, tablet or smartphone (e.g. used an educational app). According to their parents, 20% of five-year-olds in the United States did so 5-7 days a week, 27% did so 3-4 days a week, 28% did so 1-2 days a week, 15% did so less than once a week, and 10% never did so. Children who never engaged in educational activities on devices had a significantly lower mean emergent literacy score than children who did so less than once a week or on 1-2 days per week, but were not significantly different from children who did so on either 3-4 or 5-7 days each week, after accounting for socio-economic status (Figure 3.17). There was no equivalent effect for numeracy.

Figure 3.21 **Emergent literacy scores by use of digital devices, United States**

Score-point differences between children who use digital devices with varying frequency and those who never or hardly ever do so, before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

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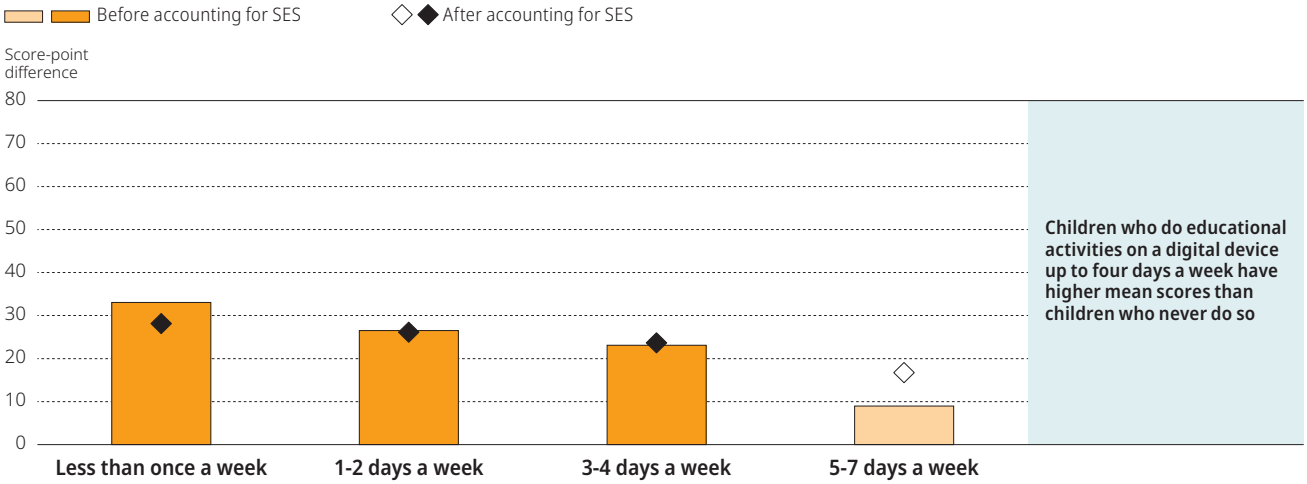
Figure 3.22 **Emergent literacy scores by educational activities on digital devices, United States**

Score-point differences between children who engage in educational activities on digital devices at home with varying frequency and those who never do so, before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

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ECEC BACKGROUND AND EMERGENT LITERACY AND EMERGENT NUMERACY SCORES

Five-year-olds who have attended ECEC have higher mean emergent literacy and emergent numeracy scores than those who have not

In the United States, 80% of the five-year-olds had attended an ECEC setting (ISCED 01 or 02)[14] before starting school. Attendance varied significantly by socio-economic status, with 73% of children in the lowest SES quartile having attended, compared to 91% of children in the top SES quartile (Figure 3.23). Attendance did not vary significantly by racial or ethnic group, and boys and girls were equally likely to have attended.

Children who had attended ECEC had significantly higher mean emergent literacy and emergent numeracy scores than children who had not: 28 points higher for literacy and 44 points for numeracy. After accounting for SES, the difference in mean scores between children who had attended ECEC and those who had not were 13 points for literacy and 26 points for numeracy, both statistically significant differences (Figure 3.24).

There were no significant interactions between ECEC attendance and socio-economic status, meaning that the strength of the relationships between attending ECEC and emergent literacy and emergent numeracy scores were similar for children from different socio-economic backgrounds in the United States.

Of those children who attended an ECEC programme before starting school, 38% started before the age of three and 62% started at three or four years old.[15] After accounting for SES, the scores of children who started earlier did not differ significantly from those who started later.

Figure 3.23 **Early childhood education and care attendance by socio-economic quartile, United States**

Percentage of children in each SES quartile who attended an ISCED 0 programme before the age of five

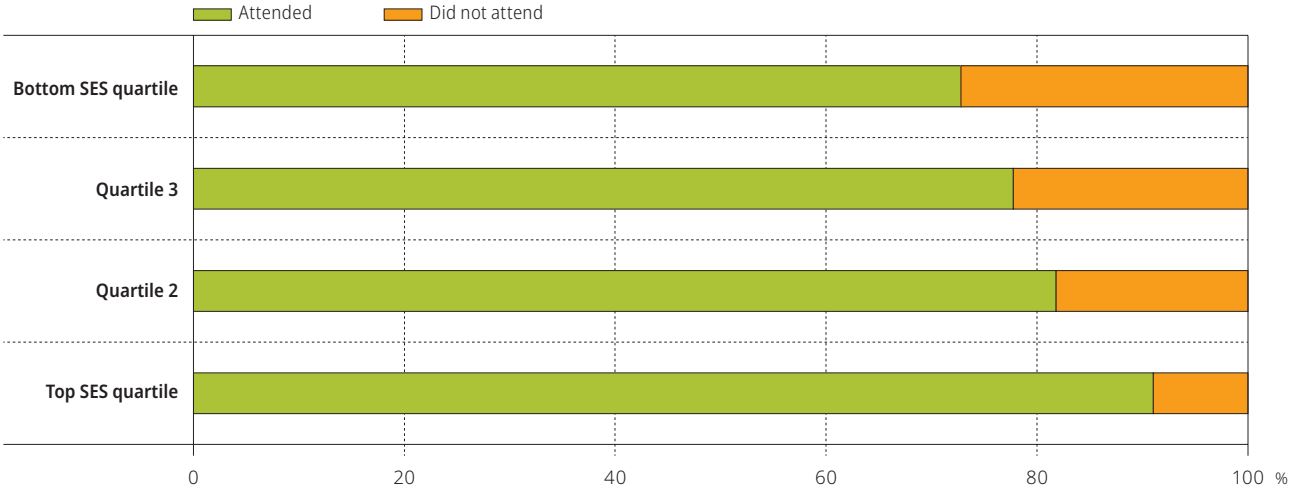

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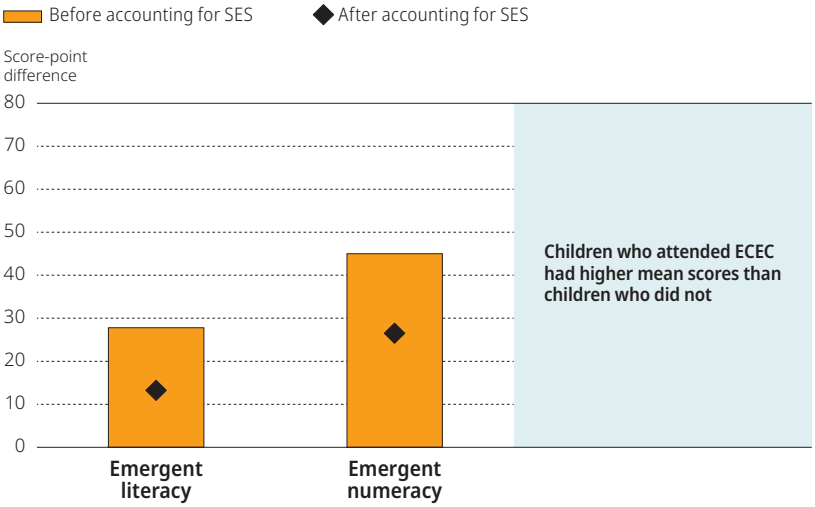
Figure 3.24 **Emergent literacy and emergent numeracy scores by early childhood education and care attendance, United States**

Score-point differences between children who had and had not attended an ISCED 0 programme before the age of five, before and after accounting for socio-economic status



Note: All differences are statistically significant.

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Figure 3.25 shows the ECEC participation rates of children in the top and bottom quartiles of SES. Participation was higher among children in the top quartile at every age. Figure 3.26 shows the breakdown of children who attended ECEC for longer or shorter hours at each age up to five.

Figure 3.25 **Early childhood education and care attendance by age and socio-economic quartile, United States**

Percentages of children in the top and bottom socio-economic quartiles who attended an ISECD 0 setting at each age before the age of five.

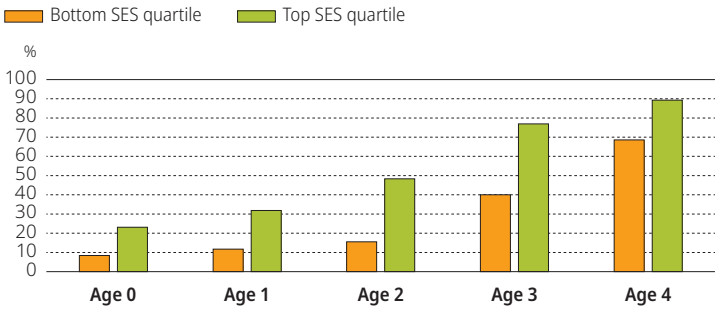

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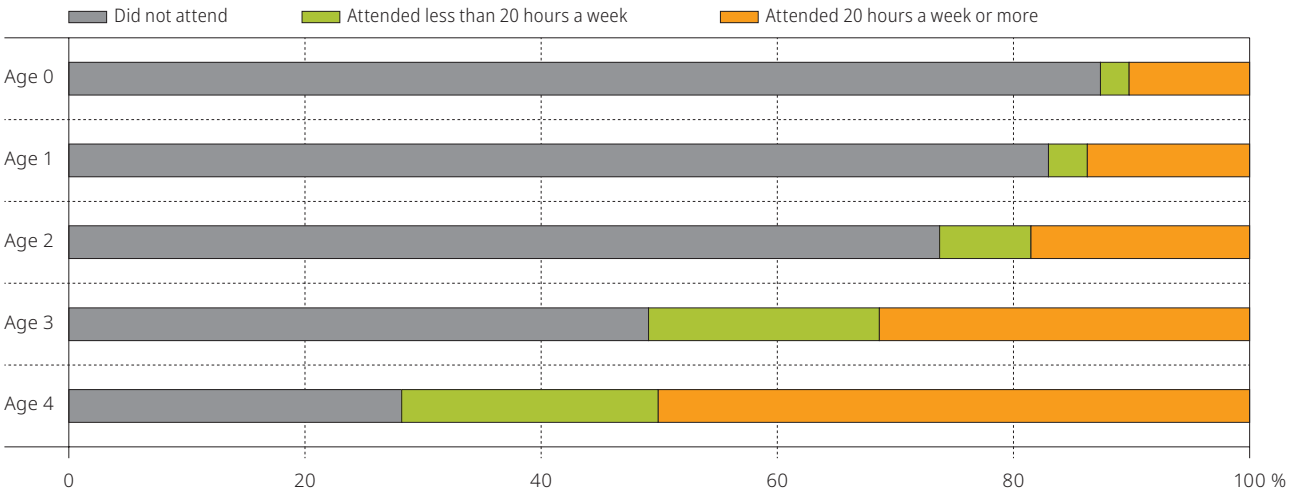
Figure 3.26 **Intensity of early childhood education and care attendance by age, United States**



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ASSESSING THE COMBINED EFFECTS OF CHILD, FAMILY AND ECEC CHARACTERISTICS ON EMERGENT LITERACY AND EMERGENT NUMERACY SCORES

So far, this chapter has analysed the relationships between children's scores and a series of characteristics individually or, in many instances, after accounting for the effects of a third variable (such as SES). It is also of interest to examine the statistical effects of these characteristics or factors in combination. In order to do so, variables that were significantly related to emergent literacy and emergent numeracy scores when examined individually were included in two regression models (one for emergent literacy and one for emergent numeracy) in order to assess how well they explained variation in the scores. Variables that were not significant in the models were removed one at a time[16] until all the remaining variables were significantly related to the outcome.

A range of individual characteristics and contextual factors significantly predict the emergent literacy scores of children in the United States when examined in combination

Seven variables were significant predictors in the final model of emergent literacy: age; home language; socio-economic status; learning difficulties; social, emotional or behavioural difficulties; number of children's books in the home; and frequency of use of digital devices at home (Table 3.7). Holding other variables in the model constant, children with learning difficulties had a

mean literacy score that was 35 points lower than children without; the corresponding point difference for social, emotional or behavioural difficulties was 26 points. Each month of increasing age was associated with an increase in emergent literacy scores of 8 points. Everything else being equal, children from homes where at least one parent mainly spoke a language other than English had a mean score that was 34 points lower than children whose parent or parents mainly spoke English. Children with 10 books or fewer at home had a mean emergent literacy score that was significantly lower than children with 26 to 50 books (by 32 points), 51 to 100 books (by 40 points), and over 100 books (by 51 points), when all other variables in the model were held constant. Children who never used digital devices had a mean emergent literacy score that was significantly lower than the means of children who used them monthly or weekly, but not significantly different from the mean of children who used them daily, all else being equal. A one standard deviation increase in the index of socio-economic status was associated with an increase of 19 score points in emergent literacy, after accounting for the effects of all other variables in the model. The final model explains 30% of the variance in the emergent literacy scores of five-year-olds in the United States.

Table 3.6 **Results of the multiple regression model of emergent literacy, United States**

Variable	PE	SE	p
Age (months)	7.6	.86	**.000**
Learning difficulties	-34.8	7.50	**.000**
Social, emotional and behavioural difficulties	-26.0	8.43	**.002**
Parent speaks a language other than English	-33.6	6.79	**.000**
Socio-economic status (standardised)	18.6	3.01	**.000**
Books in the home (reference: 10 books or fewer)			
11 to 25	3.5	10.35	.735
26 to 50	31.3	8.54	**.000**
51 to 100	40.1	9.98	**.000**
More than 100	51.3	10.24	**.000**
Use of devices (reference: never or hardly ever)			
At least once a month, but not every week	36.9	15.53	**.017**
At least once a week, but not every day	24.2	12.08	**.045**
Every day	15.1	12.46	.225
Intercept*	444.2	13.57	

Note: p-values in **bold** indicate statistical significance. PE = parameter estimate. SE = standard error.
*The intercept is the estimated emergent literacy score of a child in the reference category of each categorical variable, aged 5 years 6 months, and with a mean value for socio-economic status.
StatLink https://doi.org/10.1787/888934103019

A range of individual characteristics and contextual factors significantly predict the emergent numeracy scores of children in the United States when examined in combination

Six explanatory variables were significant in the final model of emergent numeracy: age, learning difficulties, socio-economic status, ECEC attendance, parental involvement in school, and number of children's books in the home (Table 3.8). Each month of increasing age was associated with an average increase of 8 points in emergent numeracy. All else being equal, children identified by their parents as having learning difficulties had a mean emergent numeracy score that was 47 points lower than other children. Children who had 10 or fewer books at home had significantly lower mean emergent numeracy scores than those with more. The gap between the scores of children with fewer than 10 books and those with more than 100 books was equivalent to 61 points on the emergent numeracy scale. One standard deviation increase in SES was associated with an increase in emergent numeracy score of 28 points. Children whose teachers indicated that their parents were moderately or strongly involved in school activities had a mean emergent numeracy score that was 15 points higher than children whose parents were less involved, when all other variables in the model were held constant. Finally, holding everything else equal, children who had attended an ECEC programme (ISCED 01 or ISCED 02) had a significantly higher mean emergent numeracy score than those who had not, by a margin of 20 points. The final model explains 36% of the variance in children's emergent numeracy scores in the United States.[17]

Table 3.7 **Results of the multiple regression model of emergent numeracy, United States**

Variable	PE	SE	p
Age (months)	8.1	.66	**.000**
Learning difficulties	-47.3	7.74	**.000**
Socio-economic status	28.2	3.13	**.000**
Attended ECEC	20.1	7.32	**.006**
Parent moderately/strongly involved at school[a]	15.2	5.28	**.004**
Information on parental involvement missing	2.4	9.94	.811
Children's books in the home (reference: 10 books or fewer)			
11 to 25	23.2	10.77	**.031**
26 to 50	36.1	10.03	**.000**
51 to 100	59.0	11.21	**.000**
More than 100	61.4	12.19	**.000**
Intercept*	413.2	11.51	

Note: p-values in **bold** indicate statistical significance. PE = parameter estimate. SE = standard error.
*The intercept is the estimated emergent numeracy score of a child in the reference category of each categorical variable, aged 5 years 6 months, and with a mean value for socio-economic status. [a] Variable has a missing indicator to preserve cases in the dataset.
StatLink https://doi.org/10.1787/888934103038

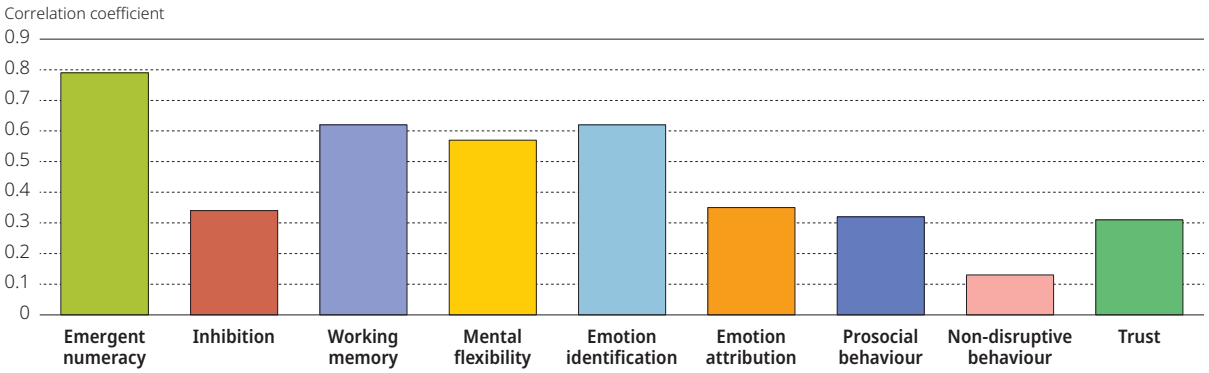
RELATIONS BETWEEN EARLY LITERACY AND NUMERACY SCORES AND SCORES IN OTHER LEARNING DOMAINS

Children's early language and numeracy skills develop at the same time that they are developing a host of other skills, including self-regulation and a range of social-emotional competencies. Skills development in each of these areas is theorised to be mutually reinforcing. Young children with better language skills, for example, may be able to engage more successfully with their peers in interactions that support their prosocial development. Better prosocial skills may lead to further opportunities to interact with others in ways that are support their vocabulary development and oral comprehension. As IELS assessed a broad range of children's early skills, it enables relations between these learning domains among five-year-olds to be examined.

Emergent literacy and emergent numeracy skills were strongly related to one another, and were also related to self-regulation and social-emotional scores

Figure 3.27 shows the correlations in the United States between five-year-olds' emergent literacy scores and scores in each of the other learning domains assessed in IELS. Emergent literacy and emergent numeracy were very strongly positively correlated (r = .8). Moderate to strong correlations were also present between emergent literacy and the self-regulation subdomains of working memory and mental flexibility. The correlations between emergent literacy and most of the social-emotional skills were weaker, although still statistically significant and positive. The exception was children's assessment scores for emotion identification, which were strongly correlated with emergent literacy scores.

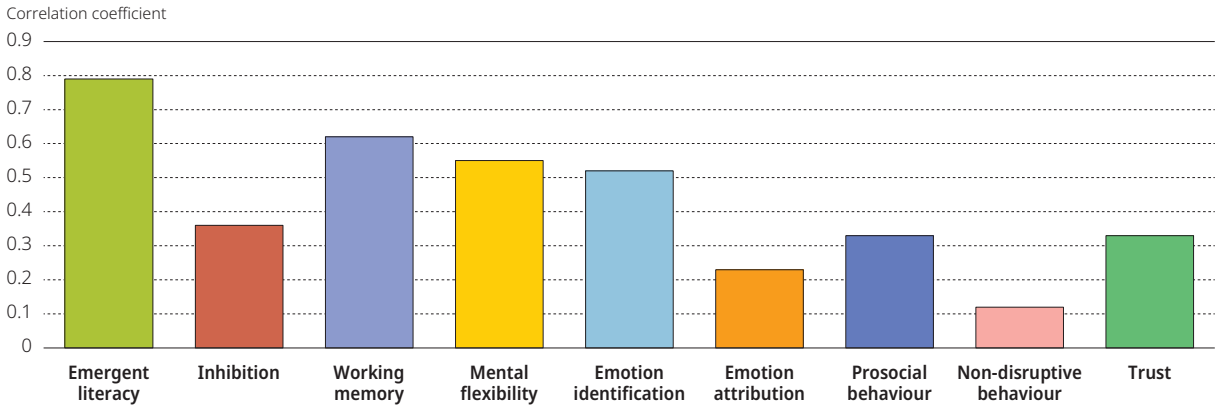
Figure 3.27 **Correlations between emergent literacy scores and other learning domains, United States**



Note: All correlations are statistically significant.
StatLink https://doi.org/10.1787/888934102240

Similarly, emergent numeracy scores correlated strongly with working memory, mental flexibility and emotion identification scores. Correlations between emergent numeracy and educators' assessments of prosocial behaviour, disruptive behaviour and trust, and the direct assessment of the self-regulation subdomain of inhibition, were weaker (Figure 3.28).

Figure 3.28 **Correlations between emergent numeracy scores and other learning domains, United States**



Note: All correlations are statistically significant.

StatLink https://doi.org/10.1787/888934102259

SUMMARY

Five-year-olds in the United States had lower average scores in the emergent literacy and emergent numeracy assessments than those in the two other countries participating in IELS, England and Estonia.

Very few children had parents who indicated that their language or numeracy development was below average for a five-year-old. Parents were considerably less likely than educators were to indicate that their child's development was below average, and parents' evaluations were less strongly associated with children's actual emergent literacy and emergent numeracy scores than educators'.

Five-year-old girls had a significantly higher mean emergent literacy score than boys in the United States. The gender gap was in the same direction and of similar size to gaps in England and Estonia. This finding is in line with assessments of reading achievement with older children in the United States and worldwide, where girls consistently outperform boys. Gender differences in affective factors relating to reading (such as reading attitudes, interest and motivation), as well as differences in reading behaviour (such as the nature and extent of leisure reading) have been implicated in the later gender reading gaps found consistently worldwide. The findings from IELS indicate that the roots of these gender gaps may be found before children are independently reading and that other factors may be involved in their formation.

In the United States, as in England and Estonia, five-year-old boys and girls had similar emergent numeracy scores. This stands in contrast to findings of assessments of mathematics undertaken with older students in the United States, where gender gaps in mathematics in favour of boys in the United States have been found in TIMSS (Grade 4), TIMSS Advanced and PISA, for example. The IELS findings suggest that gender gaps in mathematics may emerge later than age five, as children progress through school, perhaps due to the development over time of the socialised views about gender and mathematics ability that have been shown to affect girls' mathematics self-concepts. Despite the fact that boys and girls had similar emergent numeracy scores in the United States, parents were more likely to characterise girls' mathematics development as being above average.

Similar proportions of children in England, Estonia and the United States had experienced low birth weight or premature birth; learning difficulties; and social, emotional or behavioural difficulties. In the United States, boys were significantly more likely than girls to have had learning difficulties and twice as likely to have had social, emotional or behavioural difficulties, according to their parents. Children of lower socio-economic status were more likely to have experienced each of these issues, but there were no significant associations with race or ethnicity.

Socio-economic status was strongly associated with emergent literacy and emergent numeracy scores in the United States, with large gaps between the scores of children in the top and bottom SES quartiles. The gaps were considerably larger in the United States than in Estonia for both emergent literacy and emergent numeracy. The correlation between SES and emergent literacy scores was similar in magnitude in England and the United States, but the correlation with emergent numeracy scores was stronger in the United States.

Children in the United States from homes where at least one parent mainly spoke a language other than English had a lower mean emergent literacy score than other children, even after accounting for SES. These children also had a significantly lower mean emergent numeracy score than their peers, but the gap in mean scores was smaller. The assessments were, however, only offered in English and children were not screened for English proficiency. Thus, these findings may be due to the language demands of the assessment. Nevertheless, these findings point to a need for increased language support for children in the United States who have home languages that are not English. Differences in scores between children with and without an immigrant background appear primarily to be explainable by differences in socio-economic status and home language; when these variables were held constant there were no differences between the emergent literacy and emergent numeracy scores of five-year-olds with immigrant backgrounds and those without.

At the age of five, White children, Black children, Asian children and children of two or more races or ethnicities had similar average emergent literacy and emergent numeracy scores in the United States. After accounting for socio-economic status, there were also no significant differences in either domain between the mean scores of White and Hispanic children.

Several aspects of the home learning environment were associated with children's emergent literacy and emergent numeracy skills in the United States as assessed in IELS. Children whose parents read books and sang songs to them more frequently had significantly higher emergent literacy scores, on average, than children whose parents did so less frequently. Children with access to more children's books at home had higher mean scores in both domains. Additionally, children whose educators reported that the child's parents were moderately or strongly involved in their schooling had significantly higher mean emergent literacy and emergent numeracy scores than children whose parents were reportedly less involved.

How frequently children use digital devices at home was also related to children's scores. Children who never used these devices had a mean emergent literacy score that was significantly lower than that of children who used them with moderate frequency, but not significantly different from children who used them daily. There were no corresponding effects on emergent numeracy scores.

One in five children in the United States had not attended ECEC before starting kindergarten, and larger proportions of children in the top SES quartile attended than those in the bottom quartile. Children who had not attended had significantly lower mean scores in both emergent literacy and emergent numeracy than those who did attend ECEC, even after accounting for socio-economic status.

When looked at in combination, age; home language; SES; number of children's books in the home; whether the child had learning difficulties or social, emotional or behavioural difficulties; and the frequency of using digital devices all significantly predicted five-year-olds' emergent literacy scores in the United States. For emergent numeracy, age, whether the child had learning difficulties, number of children's books in the home, SES, the level of parental involvement in school, and ECEC attendance were all significant predictors of children's scores at the age of five.

Five-year-olds' emergent literacy and emergent numeracy scores in the United States were also positively related to their social-emotional scores and their self-regulation scores, in line with previous research that suggests that these skills are mutually reinforcing. Children's scores in these other learning domains are explored in Chapter 4 (self-regulation) and Chapter 5 (social-emotional learning).

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Notes

1. Scoring at or below Proficiency Level 1 in PISA Reading.
2. Scoring at or below Proficiency Level 1 in PIAAC Reading.
3. Beck, McKeown and Kucan (2013[14]) propose a three-tier model of vocabulary development, where Tier 1 words are common words used in everyday speech (e.g. table and blue), Tier 2 words are high-frequency words that occur across contexts and are more common in written than spoken language (e.g. compare and coincidence). Tier 3 words are low-frequency words used in domain-specific contexts (e.g. thesis and ecosystem).
4. For more information, see the IELS assessment framework (OECD, 2020).
5. While a small number of children in the sample were aged 5 years, 0 months or 6 years, 1 month at the time of the assessment, there were too few of these children to meet reporting standards and so the mean scores of these children are not considered in this section.
6. A birth weight lower than 5lbs, 8oz was defined as low.
7. Where educational attainment information was available for two parents, the higher of the two was used.
8. The Gini coefficient is a measure of income or wealth distribution, where 1 corresponds to maximal inequality and 0 represents perfect equality.
9. The IELS assessments cannot tell us anything about children's early literacy skills in these other languages.
10. Defined has having two parents who were born in a country or economy other than that in which the child participated in IELS (or one parent if information on only one parent was provided).
11. There were too few Pacific Islander and American Indian/Alaska Native children to reliably assess their abilities, and so their mean scores are not considered here.
12. Throughout this report, the term "effect" is used in a statistical sense only. The data collected do not permit causal attributions to be made.
13. Household income rather than the index of socioeconomic status in this case, because the SES index includes parental education levels.
14. Defined as a preschool, pre-kindergarten or transitional kindergarten in a public or private preschool, centre or place of worship, or childcare or day care in a centre with an educational component. Childcare or day care in the child's home or someone else's home are not categorised as ISCED settings.
15. A very small number of children started at the age of five, according to their parents. These children were too few to meet reporting standards and are not considered further here.
16. In order of descending p-value.
17. The variance explained by all the predictors in the model except the missing indicator for the parental involvement variable.

4

Results of the self-regulation assessments in the United States

This chapter presents findings on the self-regulation of five-year-olds in the United States. It describes how children's scores in inhibition, mental flexibility and working memory relate to individual characteristics, family backgrounds, home learning environments and early childhood education and care participation.

THE IMPORTANCE OF SELF-REGULATION DEVELOPMENT

Self-regulation describes the mental processes that allow individuals to focus their attention, remember instructions and handle multiple tasks successfully. These skills allow the brain to filter out distractions, prioritise tasks and control impulses. This ability to regulate and manage reactions and impulses is essential for personal and professional success (Diamond, 2013[1]; Eisenberg, Spinrad and Eggum, 2010[2]; McClelland et al., 2015[3]).

The brain functions that make up self-regulation include the capacity to use inhibition, mental flexibility and working memory – among other skills – to manage thoughts and actions (Zelazo, Blair and Willoughby, 2016[4]). Together, these three components of self-regulation are referred to as executive function. They describe the ability to direct and sustain short-term attention, inhibit impulse responses, revise initial plans and retrieve rules from memory.

Self-regulation skills are strong predictors of later health, education and labour-market outcomes

The development of self-regulation skills in early childhood is associated with a wide range of outcomes later in life. These include facilitating the transition into – and success in – school (Blair and Raver, 2015[5]; McClelland et al., 2007[6]; Morrison, Cameron and McClelland, 2010[7]), higher academic achievement in adolescence, better labour-market outcomes as adults – including in employment and earnings – and better health outcomes (Duckworth, Quinn and Tsukayama, 2012[8]; Tangney, Baumeister and Boone, 2004[9]).

Self-regulation skills are important for a child's transition to and participation in school (Blair and Peters Razza, 2007[10]; Neuenschwander et al., 2012[11]). Starting school is often a time of major change in the physical surroundings and people – including both other children and teachers/staff – that children are accustomed to. It also presents a new set of learning expectations and routines to follow (Dockett and Perry, 2001[12]). Children must manage competing stimuli to navigate classroom activities. Self-regulation skills facilitate the learning of new concepts and allow children to engage successfully in classroom activities. These skills also allow them to interact productively with their teachers and peers while managing their own responses (Garon, Bryson and Smith, 2008[13]).

A child's ability to self-regulate is associated with the development of social-emotional, literacy and numeracy skills (Blair and Peters Razza, 2007[10]). For example, working memory (Raghubar, Barnes and Hecht, 2010[14]), mental flexibility and inhibition (Clark, Pritchard and Woodward, 2010[15]) are associated with the development of pre-arithmetic, simple and more complex mathematical skills. These skills allow children to better integrate information they receive in the classroom. They play an important role in academic achievement through late childhood and adolescence (Best, Miller and Naglieri, 2011[16]; Duncan et al., 2007[17]).

Children with more developed self-regulation skills in childhood are more likely to have better long-term health outcomes (Caspi et al., 1998[18]; Daly et al., 2015[19]; Moffitt et al., 2011[20]), including lower rates of obesity in adolescence (Evans, Fuller-Rowell and Doan, 2012[21]) and lower levels of anxiety and depression (Blair and Peters Razza, 2007[10]; Buckner, Mezzacappa and Beardslee, 2009[22]). Children and adolescents with more developed self-regulation skills are also less likely to use drugs or receive a criminal conviction (Ayduk et al., 2000[23]; Caspi et al., 1998[18]; Duckworth, Tsukayama and May, 2010[24]; Moffitt et al., 2011[20]).

Children's environments influence their development of self-regulation skills

A combination of genetic and environmental factors shape self-regulation skills (Bridgett et al., 2015[25]; McClelland et al., 2015[3]). Children exposed to poverty, low economic status, abuse or neglect in their home environment are more likely to display deficits in their self-regulation skills than children living in more enabling environments (Noble, Norman and Farah, 2005[26]; Raver, Blair and Willoughby, 2013[27]).

Adverse childhood experiences and toxic stress can significantly impair the self-regulation development of children. Exposure to adverse home environments can limit their opportunities to develop their self-regulation skills. Negative early experiences, including multiple and chronic environmental stressors, can cause structural changes in the neural connections of the areas of the brain that control self-regulation (Nelson et al., 2007[28]; McEwen, Nasca and Gray, 2016[29]). Children exposed to cumulative risks are also more likely to have parents who do not provide them with opportunities to practise their self-regulation skills (Wachs, Gurkas and Kontos, 2004[30]; Fuller et al., 2010[31]) .

Disparities in socio-economic background are associated with differences in the physical structure and functioning of the parts of the brain that control self-regulation (Hackman and Farah, 2009[32]). The functioning of the prefrontal cortex in children from low socio-economic status backgrounds who are exposed to chronic environmental stressors, for example, is similar to that of individuals with damage to the prefrontal cortex (Kishiyama et al., 2009[33]).

The impact of confounding factors – such as housing instability – on self-regulation is also more pronounced for young children from low socio-economic backgrounds (Ziol-Guest and McKenna, 2014[34]). The number of times a child changes homes, for example, is associated with lower scores on assessments of inhibition as well as numeracy and letter identification (Schmitt, Finders and McClelland, 2015[35]).

Emotionally positive parenting, an encouraging home environment and high-quality early childhood education and care experiences enable the development of self-regulation skills

Self-regulation skills are malleable. Adverse childhood experiences and toxic stress impede the development of self-regulation skills. Similarly, positive home environments and early childhood education and care (ECEC) experiences promote these skills.

Emotionally positive parent-child relationships contribute to self-regulation skills across the early years. Parenting styles that include clear and consistent rules and expectations encourage the positive development of self-regulation skills (Blair and Raver, 2012[36]). For example, parenting styles that focus on children's autonomy within set limits predict stronger self-regulation in children than parenting styles focused on compliance (Bernier, Carlson and Whipple, 2010[37]).

Organised and predictable home environments provide children with a context where they can develop their self-regulation skills (McClelland et al., 2018[38]). Interactions between children and their parents and caregivers facilitate the regulation of emotions and behaviour. These interactions help children understand their emotions and express them more productively. This, in turn, allows children to regulate their responses to distracting stimuli in their environment (Heatherton and Wagner, 2011[39]).

As with the home environment, structured and predictable environments in ECEC programmes are important for children's self-regulation, engagement and academic scores (Ponitz et al., 2009[40]). Stimulating learning environments and positive interactions with teachers and peers enable children to develop self-regulation skills.

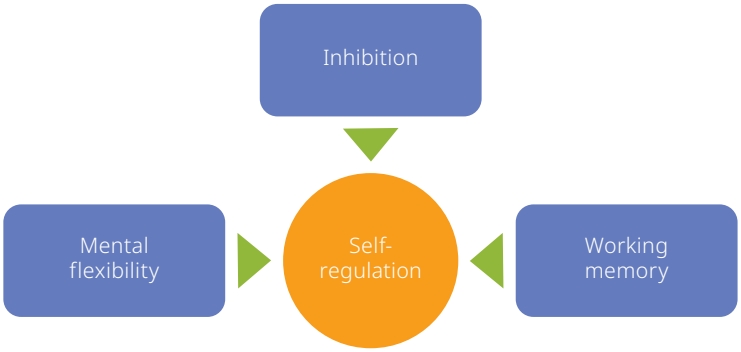
The International Early Learning and Child Well-being Study (IELS) directly assessed the self-regulation skills of inhibition, mental flexibility and working memory

Although the precise definition of which skills and processes make up self-regulation varies across studies and disciplines (Booth, Hennessy and Doyle, 2018[41]), self-regulation skills are highly integrated and bidirectional (Anderson and Reidy, 2012[42]). Completing everyday tasks requires adequate development in all of the interdependent parts.

A large body of literature has emphasised a number of key self-regulation skills (Diamond and Lee, 2011[43]; Garon, Bryson and Smith, 2008[13]). These have mostly centred on the influence of inhibition, mental flexibility and working memory skills on later outcomes (McClelland et al., 2010[44]). These three skills together are often referred to as executive function. Executive function skills make up the cognitive component of self-regulation. Chapter 5 of this report will cover children's social-emotional development.

Accordingly, IELS directly assessed the cognitive aspects of self-regulation and defines self-regulation in the direct assessment as: 1) inhibition – the ability to control impulses and reactions; 2) mental flexibility – the ability to shift between rules according to changing circumstances; and 3) working memory – the ability to retain and process information (Figure 4.1).

Figure 4.1 **The three key components of self-regulation in IELS**



IELS directly measured self-regulation skills in children through developmentally appropriate and engaging activities

IELS explored how children's early learning experiences – including their individual characteristics, home learning environments, ECEC participation and their families' socio-economic contexts – relate to their development of self-regulation. Each of the skills that make up self-regulation in IELS was measured using a single task, consisting of a number of different items. There was, therefore, a separate task to measure inhibition, mental flexibility and working memory (Table 4.1). Audio and engaging illustrations guided the children through these three activities on a tablet under the supervision of a study administrator.

Table 4.1 **The three skills assessed in the self-regulation domain**

Content component	Description	Assessment task
Inhibition	Ability to resist impulsive responses based on new information	Stop/go task
Mental flexibility	Ability to shift between rules according to changing circumstances or to apply different rules in different settings	Switching task
Working memory	Ability to store information and manipulate it to complete a given task	Odd-one-out task

Inhibition

The inhibition activity assessed a child's ability to inhibit a learned response in favour of an alternative response. The assessment introduced the child to an image and asked them to touch a button on the screen whenever this image appeared. The assessment then introduced the child to a visually similar image and asked them to touch a different button whenever the new image appeared. In sum, the task required the child to respond differently to each of two very similar images, presented one after another in a pre-determined but unpredictable sequence. Their ability to touch the different button whenever the new image appeared reflected their ability to inhibit their learned response.

Mental flexibility

The mental flexibility activity assessed a child's ability to respond to changing rules during the activity. The assessment introduced the child to two distinct animals and asked them to touch a shape on the screen depending on which animal appeared. The assessment then introduced a new rule where the child was asked to touch the alternative shape when each animal appeared. Their ability to adapt to the new rule and not persist in applying the original rule indicated their mental flexibility.

Working memory

The working memory activity assessed a child's ability to recall short visual sequences. The child was introduced to a visually distinct zebra placed in one of three rows on a bus. The other two rows on the bus were occupied by elephants. The child was then asked to remember in which of the three rows the zebra was seated and touch the corresponding row in a following image.

The assessment was divided into several sections of increasing levels of difficulty involving more rows to remember. If the child did not complete the higher difficulty tasks, the assessment automatically proceeded to the next section.

IELS assessed how children's self-regulation relates to their individual and family characteristics and their upbringing and early experiences

This chapter presents the scores of the IELS direct assessments of the inhibition, mental flexibility and working memory of children in the United States. The chapter details how children's self-regulation skills relate to their individual characteristics, family backgrounds, home learning environments and ECEC experiences.

Children's self-regulation abilities were measured directly through the assessments. Indirect information on their self-regulation development was also collected through questionnaires administered to the children's parents and educators. Parents and educators were asked to assess each child's self-regulation development, defined as whether the child is attentive, organised and in control of their actions.

This chapter presents the results of both the direct assessment of children's self-regulation and how parents and educators perceived children's overall self-regulation development. It highlights the similarities and differences between the US scores and those in England and Estonia throughout.

SELF-REGULATION SKILLS OF FIVE-YEAR-OLDS IN THE UNITED STATES

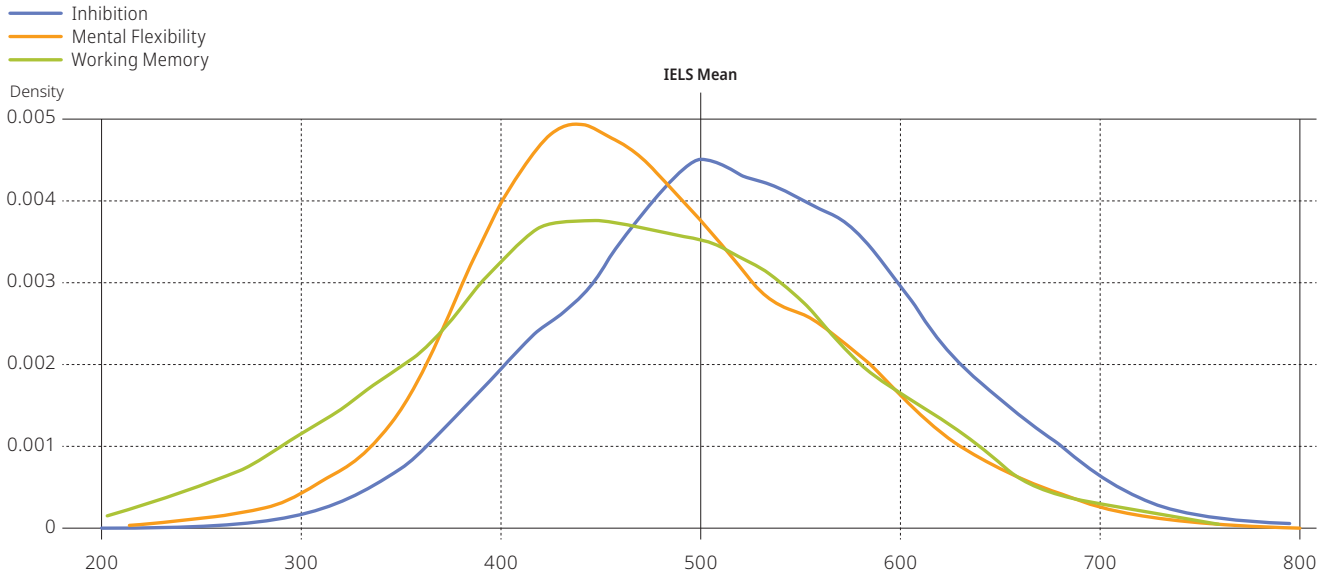
On average, five-year-olds in the United States score relatively highly for inhibition but less so for mental flexibility and working memory

On average, five-year olds in the United States were 21 points above the overall mean of participating countries (500 points) on inhibition (521). They were 23 points below the overall mean on mental flexibility (477) and 36 points below the mean on working memory (464).

The average inhibition scores in the United States were higher than those in England and similar to those in Estonia. Average mental flexibility and working memory scores in the United States were lower than those in England and Estonia. There was, on average, about a 36-point difference between the mental flexibility scores of children in England and those in the United States. Similarly, there was a 52-point difference between the working memory scores of children in England and children in the United States. The difference in the mental flexibility scores of children in the United States and those in Estonia was 34 points. The difference in the working memory scores of children in the United States and children in Estonia was 57 points.

The spread between the average scores of the bottom quartile and the top quartile in the United States was greater for working memory (141 points) than it was for inhibition (121 points) or mental flexibility (114 points). The spread in inhibition scores was about the same across the three countries. The spread in mental flexibility scores in the United States was smaller than in England or Estonia, meaning that the differences in scores between the top and bottom quartiles in the United States is smaller than in the other two countries. The spread of working memory scores between the bottom quartile and the top quartile in the United States was similar to the spread in Estonia but larger than the spread in England (Figure 4.2).

Figure 4.2 **Distribution of self-regulation scores, United States**



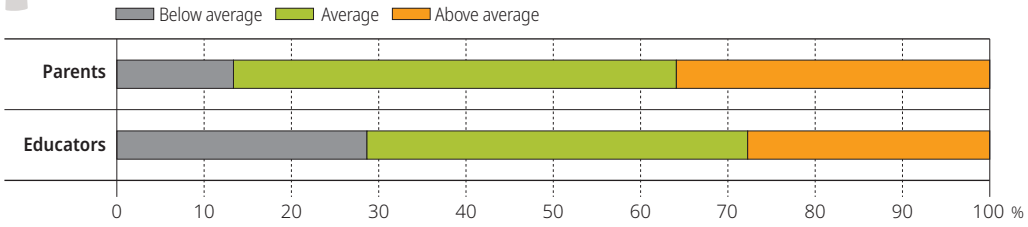
Note: Graph produced using the first plausible values. For more information on the use of plausible values in the study, please consult the IELS Technical Report.

The distribution of inhibition scores in the United States was generally to the right of the overall mean of participating countries, reflecting the United States' higher average scores on inhibition. The mental flexibility scores of most US five-year-olds were to the left of the overall mean. There was a wider distribution in the working memory scores of five-year-olds, although this was close to bell-shaped with a centre to the left of the overall mean of 500.

Parents in the United States were more likely than educators to report their child as developing above-average self-regulation skills

When asked to rate their five-year-olds' level of self-regulation development, parents were more likely than educators to report their children's development as above average and less likely to report it as below average (Figure 4.3). Parents and educators may have assessed children's self-regulation development differently partly because children behave differently in a home environment than in a classroom environment. Educators may also have more experience assessing the relative level of children's development given that, among other factors, they have more children to compare them to.

Figure 4.3 **Self-regulation development as reported by parents and educators, United States**



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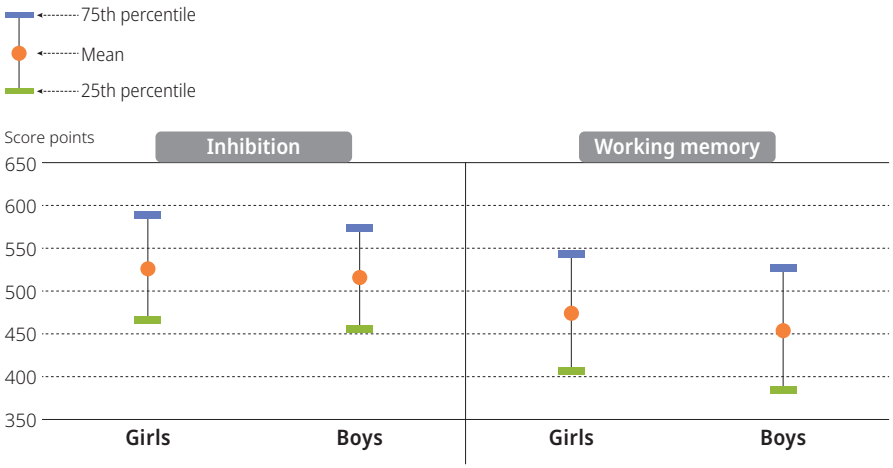
INDIVIDUAL CHARACTERISTICS AND SELF-REGULATION SCORES

The inhibition and working memory scores of girls are higher than those of boys, but there are no significant differences in mental flexibility scores between boys and girls

Children's individual characteristics influence their early learning outcomes. In the United States, the gender gap in IELS scores was statistically significant for inhibition (10 points) and working memory (20 points), with girls scoring higher than boys for both skills (Figure 4.4). The difference between boys' and girls' mental flexibility scores was not statistically significant, implying that the development of mental flexibility skills is at about the same level for both at the age of five. The gender difference in inhibition and working memory scores in the United States was consistent with the pattern observed for emergent literacy. It was also consistent with the perceptions of parents and educators.

Similar gender gaps were observed in Estonia, where the mental flexibility scores of girls were also higher than those of boys. In England, the gender gap on inhibition scores was reversed, with boys in England scoring higher than girls. There were no differences in the scores of boys and girls on mental flexibility or working memory in England.

Figure 4.4 **Inhibition and working memory scores by gender, United States**



Note: The gender differences in the mean scores are statistically significant. The gender difference in inhibition scores at the 75th percentile is statistically significant. The gender difference in working memory scores at the 25th percentile is statistically significant.

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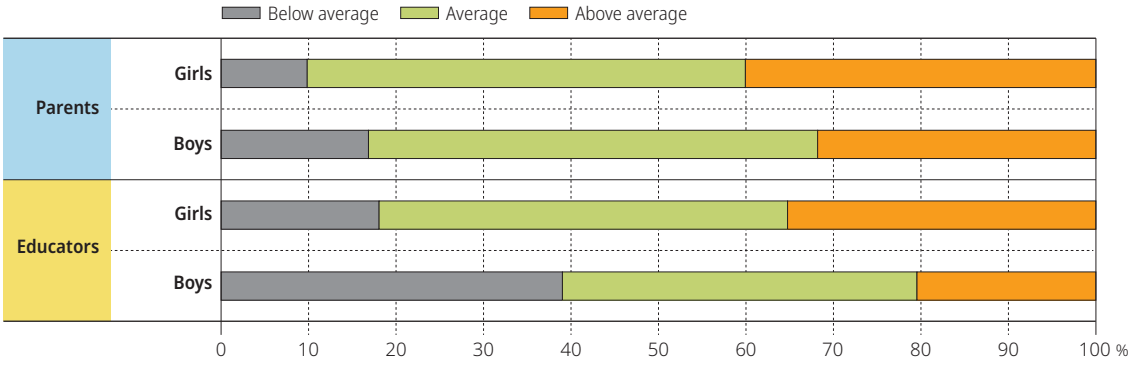
Parents and educators tend to rate the self-regulation skills development of girls more highly than those of boys

When asked to report on their perception of children's self-regulation development, both parents and educators in the United States were more likely to report that girls had developed above-average self-regulation than boys. Parents were also more likely than educators to report that their children's general self-regulation as above average and less likely to report it as below average, irrespective of the gender of the child (Figure 4.5).

Both parents and educators were more likely to perceive boys as having below-average self-regulation skills than girls, with educators significantly more likely to do so. Educators perceived about 40% of boys as developing below average compared to

about 20% of girls. Girls scored higher than boys in the IELS direct assessments of inhibition and working memory, although there were no significant differences in their scores on mental flexibility.

Figure 4.5 **Self-regulation development as reported by parents and educators, by gender, United States**



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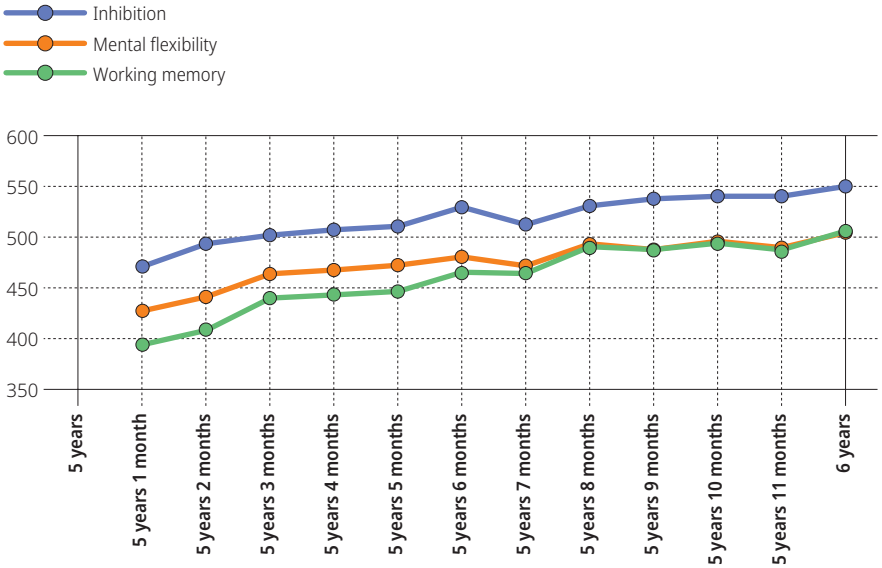
Children's self-regulation scores are related to their age in the United States

Children's self-regulation skills tend to improve as they grow older. Children aged five years and one month in the United States had significantly lower mean self-regulation scores than those aged six years, with gaps of 79 points for inhibition, 77 points for mental flexibility and 112 points for working memory (Figure 4.6).[1]

The average difference in the inhibition and mental flexibility outcomes of children between the ages of five years one month and six years were similar across the three countries participating in IELS. The average difference in working memory outcomes between the oldest and youngest children was similar in both England and the United States, but smaller in Estonia.

Figure 4.6 **Self-regulation scores by age of child in months, United States**



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Five-year-olds who experienced difficulties in earlier life have lower average self-regulation scores

IELS asked parents to indicate whether their child had ever experienced a number of difficulties that might affect their early learning. These difficulties included low birth weight or premature birth, learning difficulties (such as speech or language delay or intellectual disabilities) and social, emotional or behavioural difficulties.

The results indicate that experiencing learning difficulties earlier in life was significantly related to the self-regulation scores of five-year-olds in the United States, across all three domains (Figure 4.7). The scores of children who had experienced learning

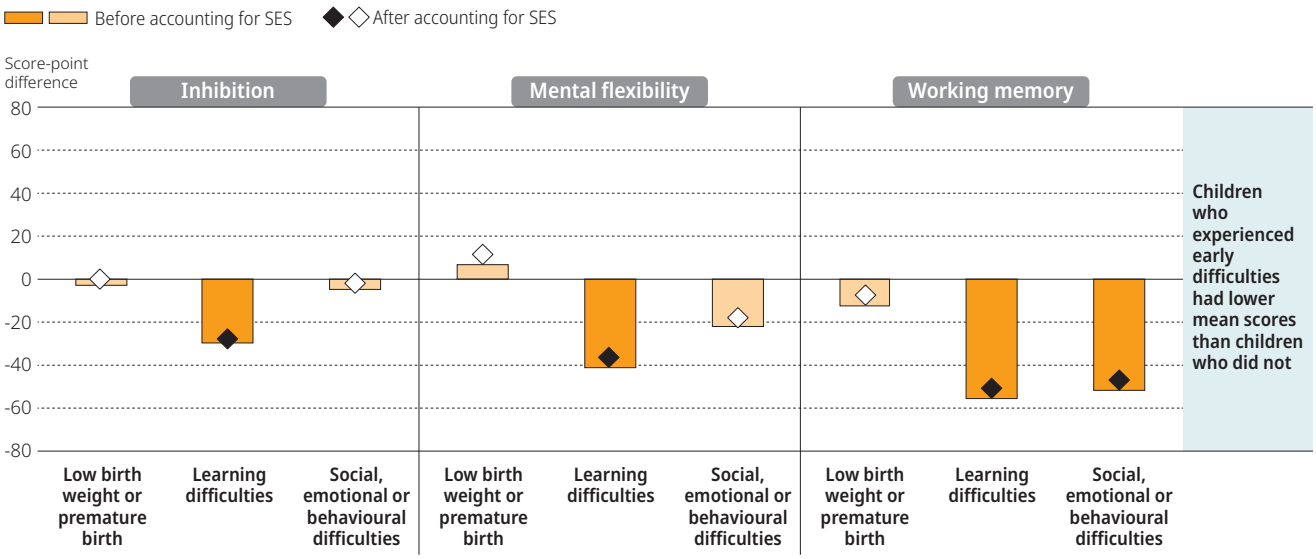
difficulties were 28 points lower on inhibition, 37 points lower on mental flexibility and 52 points lower on working memory on average than children who had not experienced learning difficulties after accounting for the effects of other early difficulties and socio-economic status.

Experiencing social, emotional or behavioural difficulties early in life also had a negative relationship to children's working memory scores at five years old. The working memory scores of children who had experienced social, emotional or behavioural difficulties were 48 points lower than those who had not after accounting for the effects of other early difficulties and socio-economic status. Having low birth weight or prematurity was not related to the assessed self-regulation skills of five-year-olds in the United States.

The relationship between having experienced learning difficulties and self-regulation scores was different for boys and girls. The inhibition and working memory scores of boys who had experienced learning difficulties were significantly lower than those of boys who had not after accounting for the effects of other early difficulties and socio-economic status. Scores did not differ for girls. Similarly, the relationship between having experienced social, emotional or behavioural difficulties and self-regulation scores was different for boys and girls. The mental flexibility and working memory scores of girls who had experienced difficulties were significantly lower than those of girls who had not. Scores did not differ for boys.

Figure 4.7 **Self-regulation scores by experience of early difficulties, United States**

Score-point differences between children who have and have not experienced an early difficulty, after accounting for the effects of other early difficulties, and before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

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HOME AND FAMILY BACKGROUNDS AND SELF-REGULATION SCORES

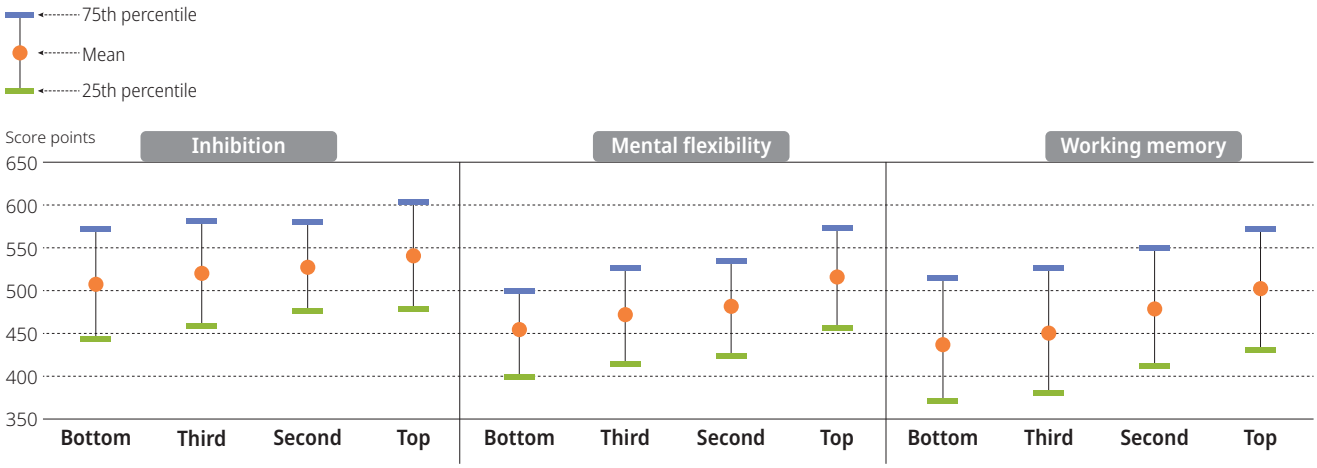
A child's parents and primary caregivers play an important role in all aspects of their upbringing, from determining the context of their home environment to their activities outside the home. The home and family environments that children grow up in shape their early learning opportunities and experiences.

Family background and socio-economic status were associated with children's self-regulation scores in IELS. The children of parents with higher levels of education had higher mean scores on the IELS inhibition, mental flexibility and working memory assessments. Similarly, the self-regulation scores of children in the second and top socio-economic quartiles were significantly higher than those of children in the bottom quartile in the United States.

Children's self-regulation scores increase with the socio-economic status of their family

The differences in the scores of children from families in the lowest socio-economic quartile and those in the top quartile were 33 points, on average, for inhibition, 61 points on average for mental flexibility and 66 points for working memory (Figure 4.8). There was no difference, however, in the inhibition and working memory scores between the bottom and third socio-economic quartiles (Figure 4.8). The relation of socio-economic status to self-regulation scores in the United States was similar for boys and girls.

Figure 4.8 **Self-regulation scores by socio-economic quartile, United States**



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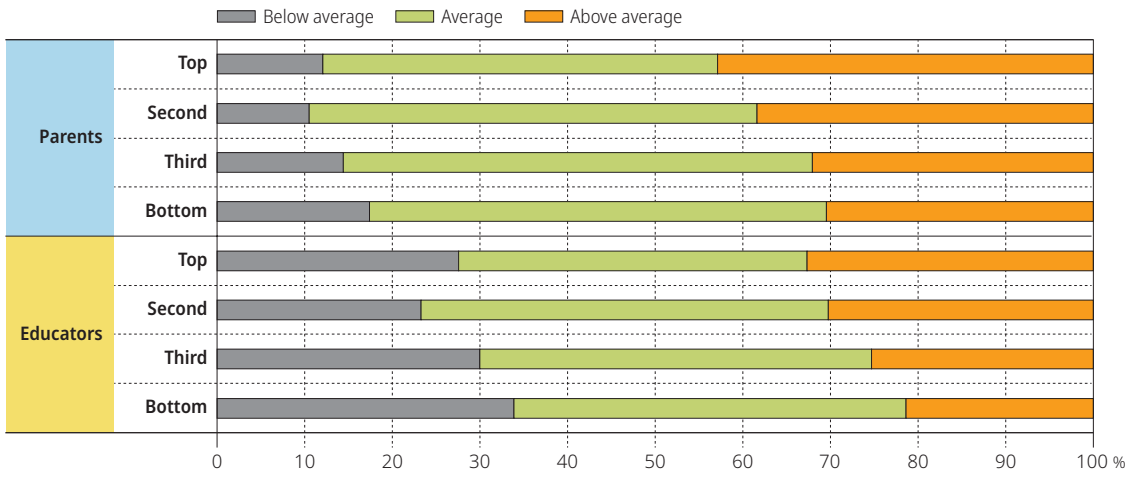
Parents and educators are more likely to report a child as developing above-average self-regulation skills if s/he is from a higher socio-economic family

Both parents and educators were more likely to perceive children's self-regulation development as above average if they were from families with a higher socio-economic status (Figure 4.9). Children from a family in the bottom socio-economic quartile were more likely to be considered below average for self-regulation skills by their parents and educators.

There were no differences in the perception of the self-regulation development of children in the top and second quartiles of socio-economic status by their parents and educators. Children in those quartiles were equally likely to be perceived as developing above-average self-regulation skills. Children from families in the second quartile were also less likely to be perceived as developing below-average self-regulation skills by their parents and educators than children in the top quartile.

Figure 4.9 **Self-regulation development as reported by parents and educators, by socio-economic quartile, United States**



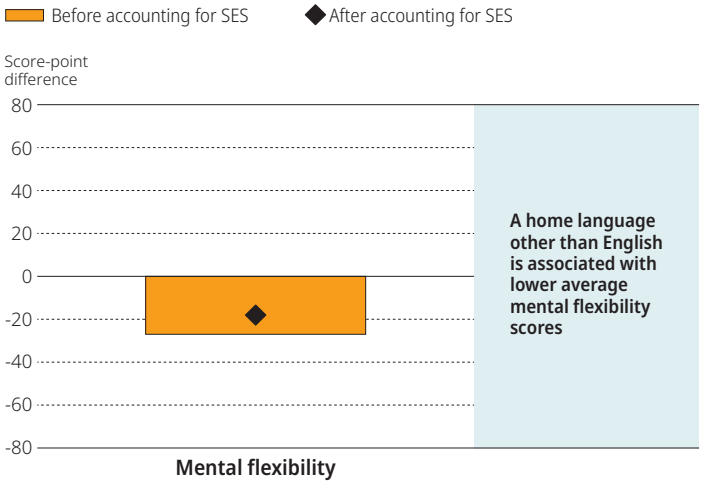
StatLink https://doi.org/10.1787/888934102392

Children with a home language other than English score lower in mental flexibility

The mental flexibility scores of children from homes where at least one parent mainly spoke a language other than English were lower than those of children in homes where both parents (or the sole parent) primarily spoke English, after accounting for socio-economic status (Figure 4.10). The scores of children whose parent or parents primarily spoke English were 17 points higher than their counterparts, after accounting for socio-economic status.[2] The relationship between home language and mental flexibility outcomes was similar for boys and girls.

Figure 4.10 **Mental flexibility scores by home language, United States**

Score-point differences between children with a language other than English as a home language and those with English as a home language, before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

StatLink https://doi.org/10.1787/888934102411

There are no differences in the self-regulation skills of five-year-olds of different racial/ethnic backgrounds after accounting for socio-economic status and home language

The self-regulation scores of children in the United States showed limited variation across different racial/ethnic backgrounds. No significant differences existed between the self-regulation scores of White, Black and Asian children and children of two or more races after accounting for socio-economic differences.

After accounting for the primary language of their parents, there were no significant differences between the mental flexibility scores of Hispanic and White children.

Parents of different racial/ethnic backgrounds perceive differences in their child's self-regulation skills

Educators, on average, perceived only slight differences in the level of children's self-regulation skills based on their racial/ethnic backgrounds (Figure 4.11). Educators were equally likely to perceive children of different racial/ethnic backgrounds as having below average or above average self-regulation

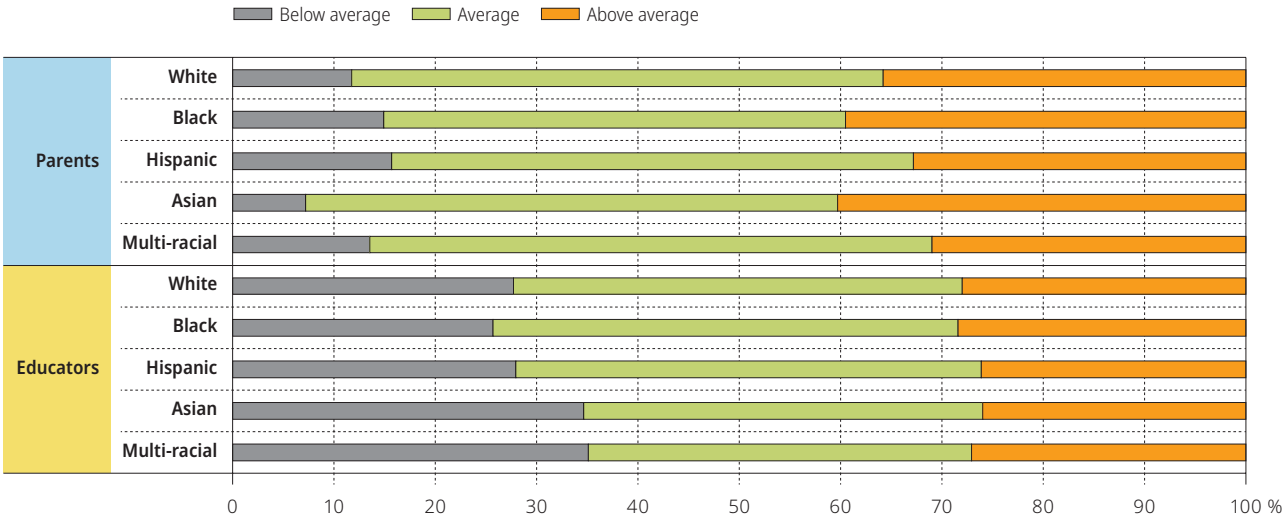
There were larger differences among parents than among educators in this area (Figure 4.11). While the parents of White and Hispanic children were more likely than educators to perceive their children as having above-average self-regulation skills, the gap was smaller than among other ethnicities and races. Over 40% of the parents of Asian children and about 40% of the parents of Black children perceived their child to have above-average self-regulation skills. Similarly, less than 10% of Asian children were perceived by their parents as having below average self-regulation skills.

Children's immigration backgrounds are not associated with differences in self-regulation scores after accounting for socio-economic status and home language

As with home language, the mental flexibility scores of children from immigrant backgrounds[3] differed from those of the children of parents born in the United States. While this may be explained by cultural factors, a combination of differences in primary language, the need to adapt to a new education system and socio-economic differences – among other factors – may play a more decisive role.

Mental flexibility scores were lower for children from immigrant backgrounds than they were for the children of parents who were born in the United States. There was a 26-point gap between children with an immigrant background and those without. There was no significant difference in the development of inhibition and working memory skills between both groups of children.

Figure 4.11 **Self-regulation development as reported by parents and educators by race/ethnicity, United States**



StatLink https://doi.org/10.1787/888934102430

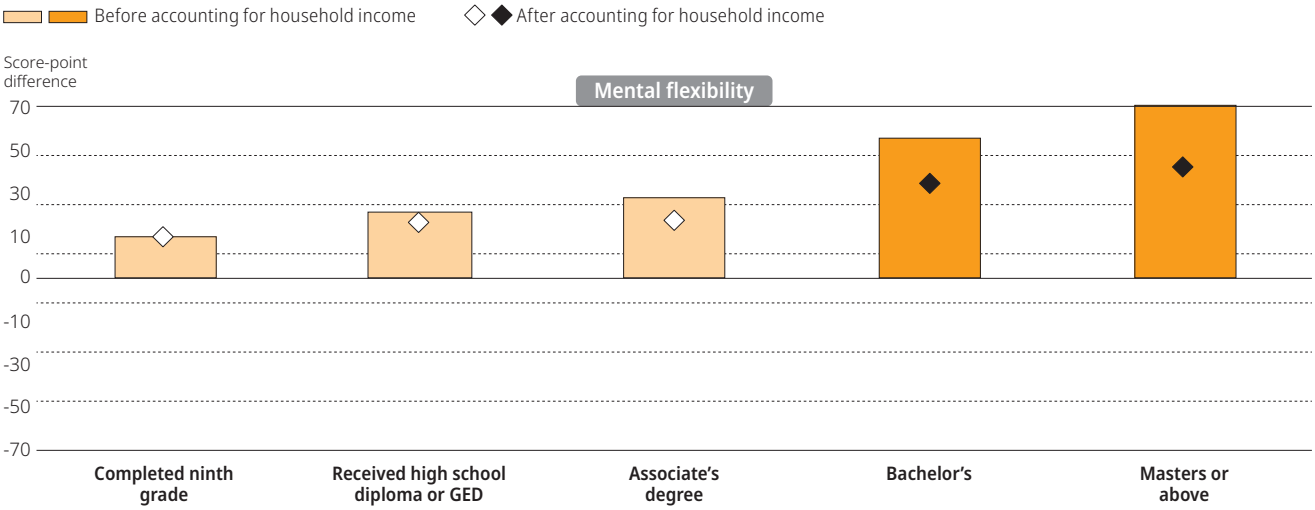
After accounting for both socio-economic status and home language, there was no significant difference the mental flexibility scores of children with and without an immigrant background. This result suggests that the combination of socio-economic status and home language explain the observed differences between the two groups.

Mental flexibility scores are higher among the children of mothers who have completed at least a bachelor's degree

In the United States, the children of mothers with at least a bachelor's degree had significantly higher mental flexibility scores even after accounting for household income. For example, the gap in mental flexibility scores between the children of mothers who held least a master's degree and those who only had a lower secondary education was 28 points (Figure 4.12).

Figure 4.12 **Mental flexibility scores by mother's educational attainment, United States**

Score-point differences between children whose mothers have completed various education levels higher than ninth grade and those of mothers who have completed up to ninth grade, before and after accounting for household income



Note: Statistically significant differences are shown in a darker tone.

StatLink https://doi.org/10.1787/888934102449

Maternal education at any level below a bachelor's degree, however, was not related to mental flexibility scores after accounting for income. Similarly, maternal education was not related to children's inhibition or working memory scores in the United States.

The association between a mother's educational attainment and her child's self-regulation scores was most pronounced in England. Any level of maternal education above lower secondary predicted higher mental flexibility and working memory scores among five-year-olds in England after accounting for household income. In Estonia, the working memory outcomes of the children of mothers with at least a bachelor's degree were higher than those of the children whose mothers did not have a bachelor's degree or higher. The relation between a mother's educational attainment and her child's mental flexibility scores did not vary between boys and girls.

Children in single-parent households have similar self-regulation scores to children in two-parent households after accounting for socio-economic status

Before accounting for the socio-economic status of a child's family, the gap in self-regulation scores between two-parent households and single-parent households was 31 points for mental flexibility and 35 points for working memory. After accounting for socio-economic status, there was no significant difference in the self-regulation scores of children from one-parent and two-parent households. This finding underlines the relation between socio-economic status and the self-regulation scores of five-year-olds in the United States.

Children with up to two siblings have higher working memory scores than children with no siblings after controlling for socio-economic status

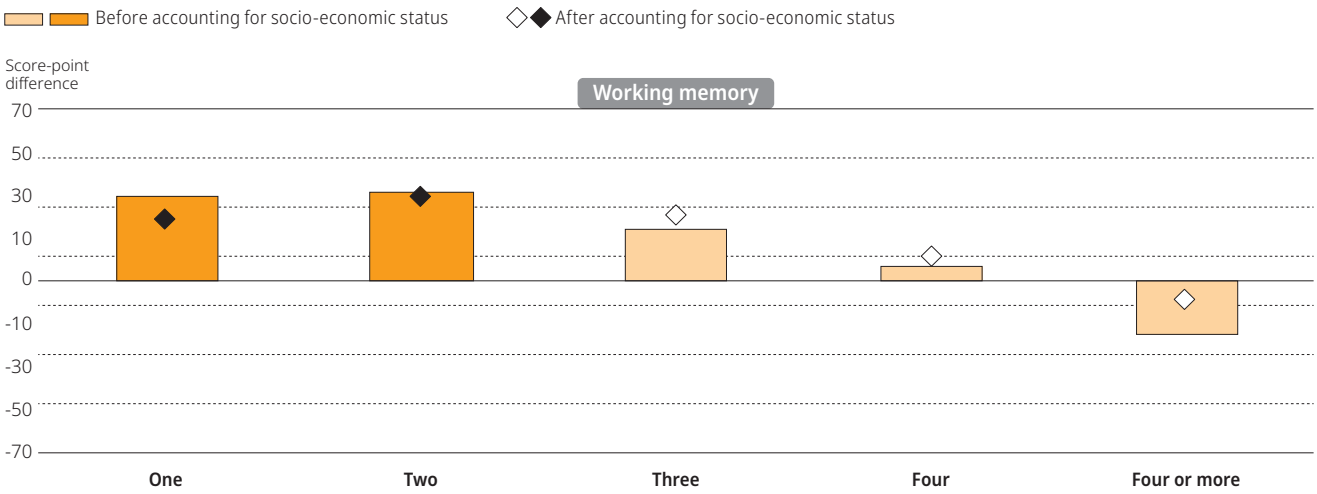
On average, the number of siblings a child had was related to their working memory scores in IELS in the United States. The working memory scores of children with one sibling were 25 points higher than for those with no siblings after accounting for socio-economic status, while those with two siblings scored 34 points more than only children (Figure 4.13).

The relationship between number of siblings and self-regulation scores was different for boys and girls. Boys with siblings had similar scores to boys without siblings across all three subdomains. The working memory scores of girls with two siblings were significantly higher than those of girls with no siblings after accounting for socio-economic status.

The relationship between number of siblings and self-regulation scores was also different for the three countries participating in IELS. The number of siblings was not related to the self-regulation skills of children in England. In Estonia, the inhibition scores of children with one or two siblings were significantly higher than those of children with no siblings after accounting for socio-economic status. Similarly, the working memory outcomes of children with one sibling were significantly higher than for those with no siblings in Estonia.

Figure 4.13 **Working memory scores by number of siblings, United States**

Score-point differences between children with one or more siblings and those with no siblings, before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

StatLink https://doi.org/10.1787/888934102468

HOME LEARNING ENVIRONMENT AND SELF-REGULATION SCORES

Children's homes are their first opportunity to learn, develop and grow. Their home learning environments and the quality of their interactions with their parents are important factors in their self-regulation development. This report considers a number of elements of the home environment: the number of children's books in the home; how often children are read to and take part in special activities outside the home; and the level of parental involvement in activities taking place at the school. Additionally, parents were asked whether their child used a digital device and, if so, the frequency of that usage.

The number of children's books in the home is predictive of a child's working memory scores

The number of children's books that children had access to in their homes – including those from a public or school library – predicted their inhibition and working memory scores in the United States. The inhibition scores of children with access to 51-100 children's books in their home were higher than those of children with 10 or fewer after accounting for socio-economic status. The inhibition scores of children with any number of books above or below that range, however, did not differ from those of children with fewer than 10 books. Similarly, the number of books that children had access to in their homes was not related to their mental flexibility scores.

Children with access to 26-100 children's books in their home had higher working memory scores than those with 10 books or fewer after accounting for socio-economic status (Figure 4.14). The working memory scores of children with fewer than 26 books, however, did not differ from those of children with fewer than 10 books.

The relationship between the number of books in the home and children's inhibition and working memory outcomes was different for girls and boys. The inhibition and working memory scores of boys with more than 10 books were not significantly different from those of boys with fewer books after accounting for socio-economic status. The scores of girls, however, were related to the number of books they had access to in the home.

The self-regulation scores of children who are read to at least once a week are not significantly different from those of children who are read to less often

How often a child is read to from a book or e-book did not predict their self-regulation scores in the United States after accounting for socio-economic status. These results did not differ by the gender of the child.

Figure 4.14 **Working memory scores by number of children's books in the home, United States**

Score-point differences between children with access to more than 10 children's books in the home and those with access to 10 or fewer, before and after accounting for socio-economic status

Note: Statistically significant differences are shown in a darker tone.

StatLink https://doi.org/10.1787/888934102487

While the act of being read to is related to the development of a child's emergent literacy skills, the quality of the reading experience may be more important for self-regulation development. Direct interactions between a child and the reading material – either in the interactivity of the reading material or the reading experience with their caregiver – may be more important for self-regulation scores than the act of being read to.

Neither special or paid activities outside the home nor parental involvement in school activities predict the self-regulation outcomes of children in the United States

How frequently children attended a special or paid activity outside of the home – such as a sports club or dance, swimming and language lessons – did not predict their self-regulation scores in the United States after accounting for socio-economic status. Similarly, the self-regulation scores of children whose parents were considered by educators to be only slightly involved in school activities or not involved at all were not significantly different from those of the children whose parents were strongly or moderately involved. These results did not differ by the gender of the child.

Five-year-olds who use a digital device at least once a week have higher mental flexibility scores than those who hardly ever do

The frequency with which children used digital devices – including a desktop or laptop computer, tablet device or smartphone – was significantly related to their mental flexibility scores in IELS after accounting for socio-economic status.

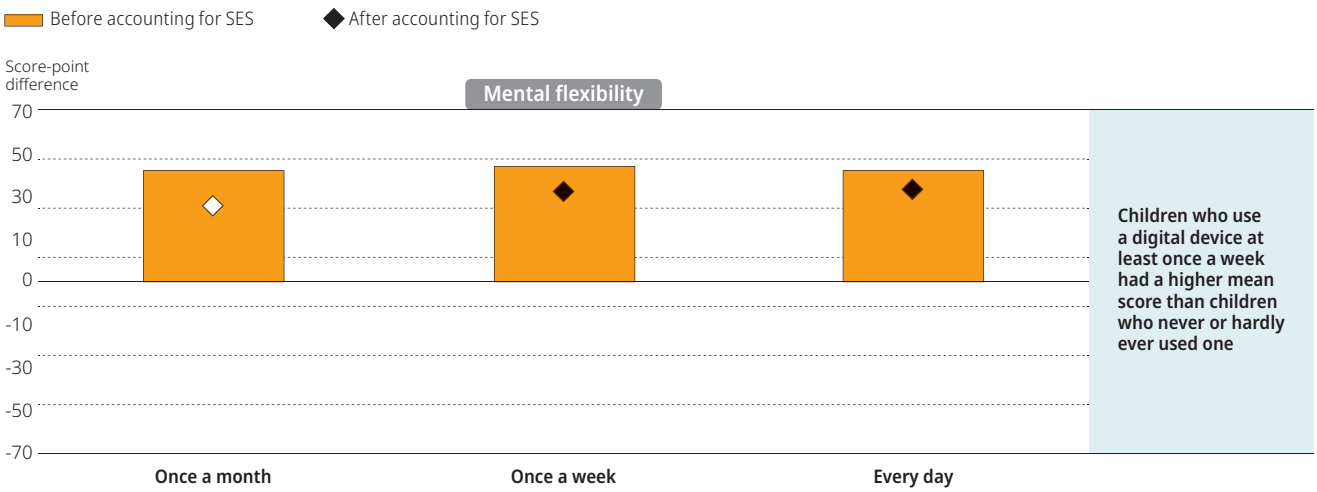
Children who used such devices at least once a week but not every day scored 36 points more for mental flexibility than children who never or hardly ever used them after accounting for socio-economic status (Figure 4.15). Children who used a device every day scored 37 points higher than those who hardly or never used one. However, there was no significant difference in the scores of children who used devices less frequently than once a week. The use of digital devices was also not significantly related to their inhibition or working memory scores.

The use of digital devices related to the mental flexibility scores of girls and boys differently. There was no difference in the mean mental flexibility scores of boys who used a digital device and those who did not, regardless of how often they used them. Girls who used a device at least once a week scored higher, on average, than those who do not. These sorts of differences may be driven by the different activities that boys and girls engage in when using a device and their relation to self-regulation skills.

The observed difference in outcomes based on digital device use may be partly attributable to the assessment of a child's self-regulation skills through a tablet-based direct assessment. However, the frequency of use that predicted different self-regulation outcomes differed by participating countries. Using a device every day predicted higher inhibition and mental flexibility outcomes in Estonia, after accounting for socio-economic status. In the England, using a device once a week but not daily predicted higher working memory scores. The inconsistency with which digital device use predicted self-regulation outcomes implies that differences are more likely to be specific to a child within a given country, rather than to a tablet-based direct assessment. While the use of a digital device in and of itself may not influence children's scores, the type of activities that children used them for might have enabled them to develop their mental flexibility skills.

Figure 4.15 **Mental flexibility scores by use of digital devices, United States**

Score-point differences between children who use a digital device once a month or more frequently and those who never use a device, before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

StatLink https://doi.org/10.1787/888934102506

ATTENDING EARLY CHILDHOOD EDUCATION OR CARE AND SELF-REGULATION SCORES

In the United States, 80% of the five-year-olds in IELS had attended an ECEC setting (ISCED 01 or 02)[4] before starting school. Attendance varied significantly by the socio-economic status of a child's household, with 73% of children in the lowest quartile having attended compared to 91% of children in the top quartile. Attendance did not vary significantly by racial or ethnic group and boys and girls were equally likely to have attended.

Children who do and do not attend ECEC do not differ in their self-regulation, but age and intensity of attendance are related to self-regulation scores

As outlined in Chapter 3, the mean emergent literacy and emergent numeracy scores of children in the United States who attended an ECEC setting were significantly higher than those who did not. Average self-regulation scores, however, did not significantly differ between five-year-olds who had attended any ECEC setting and those who had not.

This result held for both boys and girls as well as for children within individual socio-economic quartiles. This implies that, even for children from families in the bottom or top socio-economic quartile, there was no relationship between attending an ECEC setting and self-regulation scores at the age of five.

While overall attendance was not significantly related to self-regulation scores, the number of hours per week that children attended an ECEC setting was related to their self-regulation scores as five-year-olds, after accounting for socio-economic status. For example, five-year-olds who had attended ECEC for more than 20 hours a week at the age of one had working memory scores that were 25 points higher than children who did not attend at that age. Children who attended a setting for less than 20 hours at the age of four scored 16 points more for mental flexibility than children who did not attend as four-year-olds.

Several factors may contribute to the lack of an observed relationship between overall ECEC attendance and self-regulation outcomes. Attending an ECEC setting on its own may not influence a child's self-regulation scores. The quality of activities that children engage in at the setting and the quality of their interactions with their early learning educators may be related their early development. IELS did not collect information on the quality of children's ECEC settings.

ASSESSING THE COMBINED EFFECTS OF CHILD, FAMILY AND ECEC CHARACTERISTICS ON SELF-REGULATION SCORES

Analysing how the variables that predict self-regulation outcomes presented in this chapter also relate to one another through a regression model gives insight into which factors contribute most to the observed outcomes. Such results do not provide a causal explanation of which policy levers lead to changes in a child's self-regulation outcomes; however, they do provide a better understanding of which variables independently predict self-regulation outcomes.

Variables that were significantly related to self-regulation scores were included in regression models to assess how well they explained variation in the scores. Variables that were not significant in the models were removed one at a time[5] until all remaining variables were significantly related to the outcome.

Inhibition scores are related to children's gender, the socioeconomic status of their family and their ECEC attendance

A child's gender significantly predicts their inhibition scores in the United States. When accounting for all other factors in the regression model, boys' scores were about 11 points below those of girls (Table 4.2).

Early learning difficulties (e.g., speech or language delay, intellectual disability, etc.) predict children's inhibition scores. Five-year-olds who experienced learning difficulties earlier in life scored over 23 points below children who had not experienced these difficulties.

The socioeconomic status of a child's family was also a significant independent predictor of their inhibition scores at age five. The average difference in inhibition scores between a child in the top socioeconomic quartile and that of a child in the bottom quartile was about 27 points.

Attending an ECEC setting before the age of one was a significant predictor of children's inhibition scores at five years old. The average inhibition score among children who attended an ECEC setting before the age of one was about 11 points higher than those who did not attend.

Table 4.2 **Results of the multiple regression model of inhibition, United States**

Variable	PE	SE	*p*
Child is a boy	-11.0	5.00	**0.03**
Age (months)	6.2	0.76	**0.00**
Learning difficulties	-23.4	9.79	**0.02**
Socio-economic status quartile (Reference: bottom quartile)			
3rd	11.7	7.39	0.113
2nd	17.7	9.05	0.05
Top	27.4	8.91	**0.00**
Attendance of ECEC before the age of 1	11.3	2.85	**0.00**
Intercept.	511.3	6.40	

Note: p-values in **bold** indicate statistical significance. PE = parameter estimate. SE = standard error.
*The intercept is the estimated inhibition score of a child in the reference category of each categorical variable, aged 5 years 6 months, and with a mean value for socio-economic status.
StatLink https://doi.org/10.1787/888934103057

Mental flexibility scores are related to children's early learning difficulties and the socio-economic status of their family

Early learning difficulties (e.g., speech or language delay, intellectual disability, etc.) predict children's mental flexibility scores. Five-year-olds who experienced learning difficulties earlier in life scored over 39 points below children who had not experienced these difficulties (Table 4.3).

The socio-economic status of a child's family was a significant predictor of mental flexibility scores at the age of five. Children in the bottom quartile were, on average, over 58 points below those in the top quartile.

Table 4.3 **Results of the multiple regression model of mental flexibility, United States**

Variable	PE	SE	*p*
Age (months)	5.3	0.84	**0.00**
Learning difficulties	-38.6	9.28	**0.00**
Socio-economic status quartile (Reference: bottom quartile)			
Third quartile	15.9	8.31	0.06
Second quartile	25.6	9.11	**0.01**
Top quartile	58.3	8.28	**0.00**
Intercept	457.3	6.59	

Note: p-values in **bold** indicate statistical significance. PE = parameter estimate. SE = standard error.
*The intercept is the estimated mental flexibility score of a child in the reference category of each categorical variable, aged 5 years 6 months, and with a mean value for socio-economic status.
StatLink https://doi.org/10.1787/888934103076

Working memory scores are related to children's gender, early experience of difficulties, socio-economic status and ECEC attendance

A child's gender significantly predicts their inhibition scores in the United States. When accounting for all other factors in the regression model, boys' scores were about 16 points below those of girls (Table 4.4).

Experiencing early difficulties before the age of five was a significant independent predictor of five-year-olds' working memory scores. Children whose parents reported they had experienced early learning difficulties scored about 46 points lower for working memory than those whose parents did not after accounting for all other factors in the analysis. Similarly, children who were reported to have experienced social, emotional or behavioural difficulties scored about 45 points lower than those who had not.

The socioeconomic status of a child's family was also a significant predictor of their working memory scores at age five. For example, the average difference in working memory scores between a child in the top socioeconomic quartile and that of a child in the bottom quartile was over 55 points.

Attending an ECEC setting before the age of one was a significant predictor of children's working memory scores at five years old. The working memory score among children who attended an ECEC setting before the age of one was about 13 points higher than those who did not attend.

Table 4.4 **Results of the multiple regression model of working memory, United States**

Variable	PE	SE	*p*
Child is a boy	-15.4	7.21	**0.03**
Age (months)	9.4	1.20	**0.00**
Learning difficulties	-46.3	10.68	**0.00**
Social, emotional or behavioural difficulties	-45.1	13.55	**0.00**
Socio-economic status quartile (Reference: bottom quartile)			
3rd	10.8	9.16	0.24
2nd	37.0	10.70	**0.00**
Top	53.8	10.46	**0.00**
Attendance of ECEC before the age of 1	12.9	5.33	**0.02**
Intercept	450.4	8.36	

Note: p-values in **bold** indicate statistical significance. PE = parameter estimate. SE = standard error.
*The intercept is the estimated working memory score of a child in the reference category of each categorical variable, aged 5 years 6 months, and with a mean value for socio-economic status.
StatLink https://doi.org/10.1787/888934103095

SUMMARY

The self-regulation skills of inhibition, mental flexibility and working memory may be predictive of children's future well-being, including how well they do at school and in non-academic activities where concentration and persistence correlate with success. Overall, five-year-olds in the United States scored higher than the IELS mean on inhibition, with similar scores to children in Estonia and higher scores than those in England. The mental flexibility and working memory scores of children in the United States were lower than the scores in England and Estonia.

These results suggest that children in the United States are more likely than those in the other two countries to successfully inhibit their responses when presented with a new set of information. US children, however, are less likely to successfully switch between rules or recall short visual sequences.

Experiencing difficulties earlier in life is related to children's scores at the age of five. While, low birth weight or premature birth, was not related to the self-regulation skills of five-year-olds in the United States, experiencing learning difficulties earlier in life was significantly related to the self-regulation scores of five-year-olds in the United States across all three self-regulation domains. The self-regulation scores of children who had experienced such difficulties before the age of five were significantly lower than those of children who had not. Experiencing social, emotional or behavioural difficulties before the age of five was also a significant predictor of the working memory scores of five-year-olds in the United States, even after accounting for all factors in the overall regression model.

Five-year-olds from households in higher socio-economic brackets in the United States scored higher than children from low socio-economic backgrounds across the three self-regulation subdomains. The results of the regression analysis at the end of the chapter also suggest that children's socio-economic background was a significant predictor of their inhibition, mental flexibility, and working memory scores. This implies that children from households with a lower socio-economic status are less likely to successfully resist impulsive responses, switch between rules and recall sequences from memory than children from households with a higher one.

Children's socio-economic background was a significant predictor of self-regulation outcomes in all participating countries – particularly in relation to mental flexibility and working memory – although the impacts varied by country. Estonia had the smallest differences in children's skills based on socio-economic status compared to England and the United States. By understanding

which policies may help mitigate disadvantage, policy makers and education leaders may be able to achieve outcomes that are more equitable for children.

The number of children's books that a child has access to in their home – including those from a public or school library – was a significant predictor of their working memory scores in the United States. This also emphasises the importance of reading materials for children's self-regulation development. The use of electronic devices was also found to be significantly related to their mental flexibility scores in the United States.

The United States is ethnically and racially diverse. In the United States, 52% of children were White, 25% were Hispanic, 11% were Black, 7% were Asian, 4% were two or more races and less than 1% were of another ethnicity. The self-regulation scores of children in the United States showed limited variation by different races and ethnic groups, with no significant differences for children who were White, Black, Hispanic, Asian or two or more races. The study found no relationship between having a parent of an immigrant background and children's self-regulation outcomes.

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Notes

1. While a small number of children in the sample were aged 5 years, 0 months or 6 years, 1 month at the time of the assessment, there were too few of these children to meet reporting standards and so the mean scores of these children are not considered in this section.
2. The direct assessment of children was available only in English, and children were not screened for English proficiency.
3. Children with a two parents who were born in a country other than the one in which the child participated in IELS, or one parent in single-parent families.
4. Defined as a preschool, pre-kindergarten child care or day care in a centre or transitional kindergarten in a public or private preschool, centre or place of worship. Childcare or day care in the child's home or someone else's home are not categorised as ISCED settings.
5. In order of descending p-value.

5

Results of the social-emotional skills assessment in the United States

This chapter presents findings on the social-emotional skills of five-year-olds in the United States. It shows the differences in social-emotional scores across multiple subgroups of children, considering their individual and family characteristics, as well as their home learning environments. This is based on a direct assessment of children's skills and reports from the children's parents and educators.

THE IMPORTANCE OF SOCIAL-EMOTIONAL SKILLS

Children develop their capacity to experience and express emotions starting in early infancy, at the same time as they grow physically and cognitively in developing their language and problem-solving skills (Thompson, 2001[1]). Recent developments in neuroscience have shown that the same neural circuits involved in the regulation of emotions overlap with those associated with cognitive processing (Bush, Luu and Posner, 2000[2]; Davidson et al., 2002[3]; Posner and Rothbart, 2000[4]).

Emotions can support cognitive development when they are well-regulated, but interfere when they are not. For instance, children who do not feel in control of their emotions are more prone to outbursts, inattention and rapid retreats from stressful situations, (Garber and Dodge, 1991[5]). Children's beliefs and their neural mechanisms of attention are interrelated components during childhood development (Schroder et al., 2017[6]).

Early social-emotional skills are strong predictors of later health, educational, social and labour-market outcomes

The ability to understand emotions is a unique, concurrent predictor of academic competence (Leerkes et al., 2008[7]). Early prosocial behaviour at age eight is shown to be as important as early cognitive ability in predicting educational attainment at age 30 (Schoon et al., 2015[8]), as well as in shaping attainment in adolescence and adulthood (Caprara et al., 2000[9]). Social-emotional skills developed during childhood are linked to educational achievement, even after controlling for early literacy and numeracy skills (Duncan et al., 2007[10]). For example, children's early skills in identifying and responding empathetically to others' emotions have been found to predict concept knowledge and language competence, even after controlling for age, gender and parental income level (Rhoades et al., 2011[11]; Garner and Waajid, 2008[12]).

Underdeveloped skills in identifying others' emotions in early adolescence predict increases in fear, decreases in positive emotions and decreases in the quality and quantity of social support. Amongst boys, low emotion identification skills also predict increases in sadness (Ciarrochi, Heaven and Supavadeeprasit, 2008[13]).

Early empathy, trust and prosocial behaviours are associated with social justice beliefs and a lower likelihood of involvement in crime and delinquency in adulthood (Schoon et al., 2015[8]). Low empathy is associated with antisocial and delinquent behaviours, and increased risk of psychopathology as adults (Fontaine et al., 2011[14]). Sympathy and moral reasoning among 6- to 9-year-olds are associated with social justice values at age 12 (Daniel et al., 2014[15]).

Children's emotional health is the strongest predictor of adult life satisfaction at all ages, even more than family economic resources, family psychosocial resources and children's cognitive ability (Flèche, Lekfuangfu and Clark, 2019[16]). Early emotional well-being is linked with mental health in later life, and emotional difficulties at age five are predictors of midlife psychological disorders, such as anxiety and depression (Buchanan, Flouri and Brinke, 2002[17]; Rutter, Kim-Cohen and Maughan, 2006[18]).

IELS included a direct measure of children's emotion identification and attribution, and indirect measures of children's prosocial behaviour, trust in familiar people and non-disruptive behaviour

The International Early Learning and Child Well-being Study (IELS) provides a direct and indirect assessment of social-emotional skills (Box 5.1). Parents and educators responded to survey questions about the child's prosocial behaviour, trust and disruptive behaviours. Children in the study participated in an interactive tablet-based assessment of their empathy skills in a one-on-one setting with a trained study administrator. Reports from educators and parents helped to create a more accurate picture of their children's early social-emotional skills in both home and early childhood education and care (ECEC) environments than could be ascertained from the direct assessment alone.

Measuring empathy in IELS entails the assessment of two skills: emotion identification and emotion attribution in response to a story about a set of characters. Children who participated in the IELS direct assessment responded to hypothetical (story) scenarios designed to measure their empathy skills. Narrated stimulus stories (narrated) presented cartoon-like children in brief vignettes presented on electronic tablets. The empathy measure required the child to identify an emotion using emoticons representing happy, sad, afraid, angry and surprised. The emotion identification scores reflected children's ability to recognise the emotions of others (i.e. how did the story character feel?). The emotion attribution scores reflected the interaction of concordant emotional response (i.e. when child's responses matched the emotion of the story character) and his or her own emotion attribution (i.e. how the child felt and why s/he felt that way in response to the story).

IELS also measured prosocial, trust and non-disruptive behaviours indirectly through reports from parents and educators, with parents and educators rating the same children on the same set of behaviours. The items for assessing prosocial behaviour and non-disruptive behaviour were based on the Adaptive Social Behaviour Inventory (Hogan, Scott and Bauer, 1992[19]), while those for trust were developed based on previous research (Baumrind, 1968[20]; Roberts, Strayer and Denham, 2014[21]). The prosocial

behaviour measure is composed of items such as the child "understands others' feelings, such as when they are happy, sad or angry". The non-disruptive behaviour measure was composed of items such as the child "fights with other children", which was positively inverted for easier interpretation (i.e. the higher the scores the less disruptive). Lastly, the trust measure is composed of items such as the child "approaches familiar adults for comfort when upset".

This chapter compares educators' and parents' ratings of children's behaviours related to their social-emotional skills. Parents undoubtedly have a better knowledge of their child in a wider set of situations, while educators have a larger reference group for comparison, but children may also behave differently in different environments.

Educators' ratings of children's behaviours were more closely related to the direct assessment of social-emotional skills and their scores were aggregated into a single score for prosocial behaviour, trust and non-disruptive behaviour, and scaled together with the rest of the study's outcomes. Educators' indirect assessments are, therefore, internationally standardised with a mean of 500 and a standard deviation of 100, and comparable with the scores from other subdomains of the children's direct assessment.

Box 5.1 **Defining social-emotional learning**

Social-emotional learning is the process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions; set and achieve positive goals; feel and show empathy for and towards others; establish and maintain positive relationships; and make responsible decisions (CASEL, 2015[22]; Wessberg et al., 2015[23]).

Social-emotional development is the continuous process of learning social-emotional skills. Similar to other skills, such as mathematics, reading or science, developing these skills early on and continuing throughout adulthood is important for their effect on personal, academic and life outcomes over time.

Social-emotional skills are individual characteristics that 1) link biological predispositions and environmental factors; 2) are expressed through consistent patterns of thoughts, feelings and behaviours; 3) develop through formal and informal learning experiences; and 4) influence important socio-economic outcomes throughout life (De Fruyt and Wille, 2015[24]). The term is increasingly prevalent in policy discussions that emphasise improving these skills through learning. Other terms such as "21st century skills", "non-cognitive skills", "employability skills" and "personality characteristics" often refer to the same concept. For further discussion about their overlaps and differences, see Abrahams et al. (2019[25]) and Kankaraš and Suarez-Alvarez (2019[26]).

IELS measures of social-emotional skills are interrelated

An important component of prosocial behaviour and getting along with others is being able to recognise and understand the emotions of others (Strayer, 1987[27]; Strayer, 1993[28]). Both emotion identification and emotion attribution act, therefore, as precursors to engaging in prosocial behaviour in response to another person's emotional state (Hinnant and O'Brien, 2007[29]). At the same time, it is important to note that prosocial behaviour goes one-step further as it also includes the expression of positive social behaviours, for example, the child "tries to comfort others when they are upset".

The central aspect of trust in IELS is the child's expectations that others will be supportive, responsive and kind (Bowlby, 1983[30]). Children develop their first relationships with adults, peers and friends in early childhood. When these first relationships become consistent, predictable and responsive to their needs, children are more likely to develop secure attachments that help them to acquire and reinforce their trust in known people and themselves (Bowlby, 1983[30]). It is important to clarify that trust does not mean that children are indiscriminately developing secure attachments with anybody without judgement, but that they develop trust because of frequent and repetitive patterns with close adults. Reassuring expressions from caregivers (which nurture a child's secure attachment) can support children to continue to play comfortably, while anxious expressions (which nurture a child's insecure attachments) might interfere in children's trust and playful interactions and, ultimately, hamper their development (Baldwin and Moses, 1996[31]). Mistrustful children might be overly wary or fearful of peers or adults; a child might be reluctant to engage with others, or be needy and dependent since s/he does not trust others to be responsive and supportive. As shown in this chapter, children's trust isassociated with adaptive social behaviour, such as the expression of prosocial and non-disruptive behaviour.

SOCIAL-EMOTIONAL SKILLS OF FIVE-YEAR-OLDS IN THE UNITED STATES

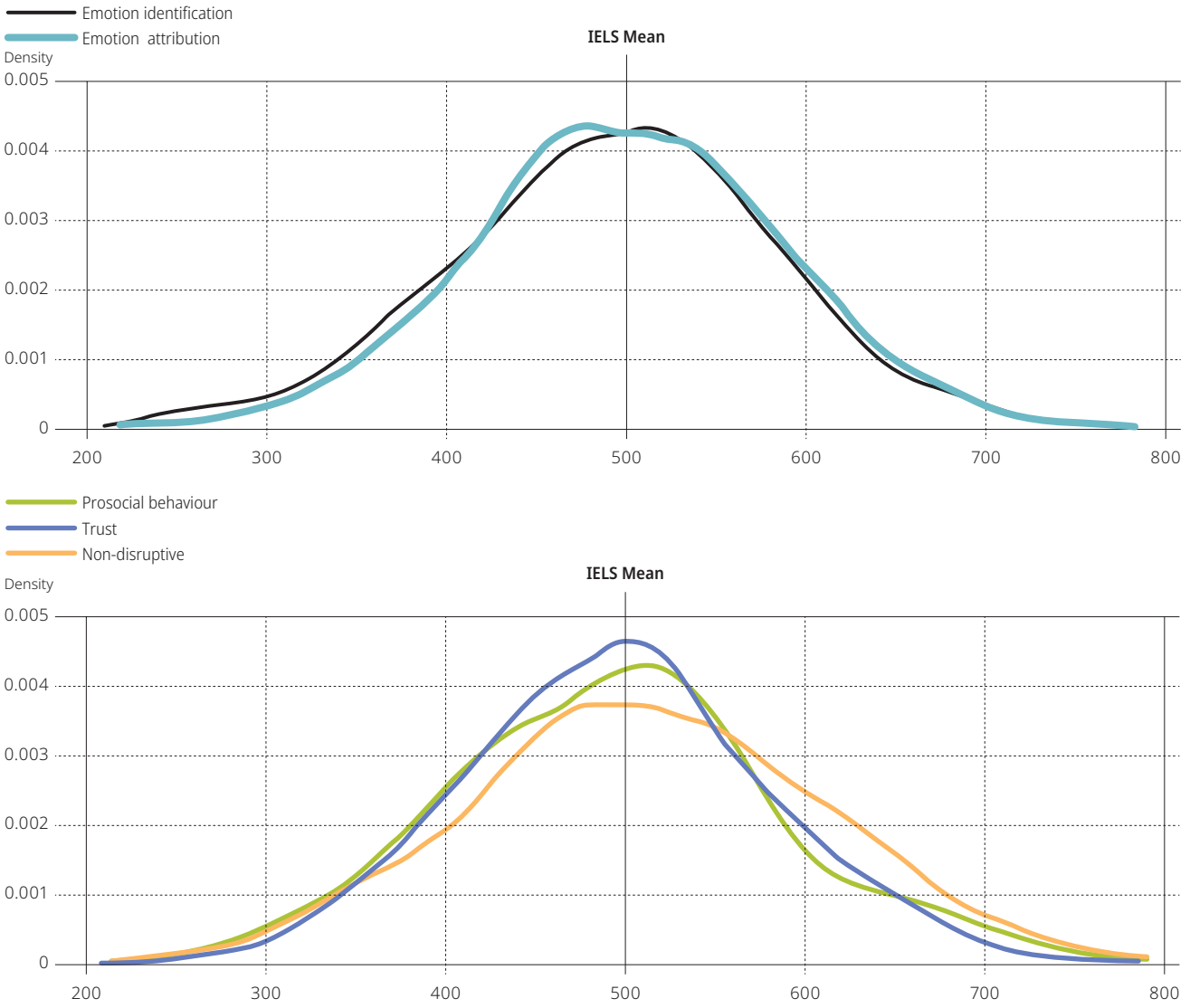
The average five-year-old child in the United States is less able to recognise emotions than children in Estonia

When presented with a range of stories and situations, children in the United States were less able to accurately identify the feelings of the characters in these stories than children in Estonia but had similar abilities to children in England. However, children in the United States appear to have similar skills in emotion attribution as children in England and Estonia. The mean score among five-year-olds in the United States for emotion identification was 493 points, which is similar to England (497) and significantly lower than Estonia (511). In emotion attribution, where the score reflects children's own emotions, children in the United States scored similarly to children in England and Estonia.

According to their educators, children in the United States had similar ratings for prosocial behaviour as children in England (494 compared to 495 in England), but significantly lower than children in Estonia (511). However, educators in the United States rated children as significantly less disruptive than in Estonia (515 compared to 470) and similar to children in England (514). Educators in the three countries participating in the study all rated children's levels of trust similarly.

The distributions of social-emotional scores in the United States are shown in Figure 5.1.

Figure 5.1 **Distribution of social-emotional learning scores, United States**



Note: Graphs produced using the first plausible values. For more information on the use of plausible values in the study, please consult the IELS Technical Report.

Social-emotional learning scores are interrelated for both direct and indirect assessments

Table 5.1 shows the correlation coefficients between the social-emotional skills measured as part of IELS for the United States. For the direct assessment, the scores for emotion identification and emotion attribution were strongly correlated (r = .59). For the indirect assessment (educators and parents), the association between trust and non-disruptive behaviour was moderately strong, as was the association between prosocial behaviour and non-disruptive behaviour. The strongest association was between educators' ratings of prosocial behaviour and trust. As expected, these results are similar to the overall correlations across participating countries in IELS.

The association between the direct assessment of children and educators' indirect assessment is moderately strong. The direct assessment provides children's emotion identification and emotion attribution, while the indirect assessment provided educators' ratings on children's prosocial behaviour, trust, and non-disruptive behaviour. Examples of prosocial behaviour include "the child understands other's feelings" and "the child tries to comfort others when they are upset". While the first statement is closely associated with the tasks in the direct assessment, the second statement includes a positive behaviour. Examples of trust include the child "approaches familiar adults for comfort when upset" and disruptive behaviour the child "fights with other children". Although such behaviour still relates to the tasks presented in the direct assessment, they are slightly more distal behaviours from emotion identification and emotion attribution than prosocial behaviour.

On the other hand, the association between educators and parents' indirect assessments is moderate while the association between parents' ratings and the direct assessment of children's social and emotional is weak. As previously mentioned, it is important to highlight that these domains are conceptually overlapping, but not exactly the same.

Table 5.1 **Correlations between the social-emotional skills in each type of assessment, United States**

		Direct assessment		Indirect assessment (educators)			Indirect assessment (parents)	
		Emotion identification	Emotion attribution	Prosocial behaviour	Trust	Non-disruptive	Prosocial behaviour	Trust
Direct assessment	Emotion attribution	.59 (.57)						
Indirect assessment (educators)	Prosocial behaviour	.24 (.25)	.19 (.18)					
	Trust	.13 (.17)	.17 (.13)	.78 (.72)				
	Non-disruptive	.18 (.12)	.09 (.09)	.49 (.49)	.25 (.21)			
Indirect assessment (parents)	Prosocial behaviour	.14 (0.14)	.10 (0.10)	.20 (.23)	.18 (.20)	.08 (.12)		
	Trust	.10 (0.10)	.07 (0.07)	.11 (.13)	.23 (.27)	-0.06 (-0.04)	.81 (.80)	
	Non-disruptive	.10 (0.06)	0.11 (0.11)	.19 (.22)	.07 (.06)	.30 (.35)	.47 (.47)	.39 (.37)

Note: This table shows the correlation coefficients between the social-emotional skills in the United States (using child weights). The values in parentheses are the overall values across participating countries in IELS (senate weighted).

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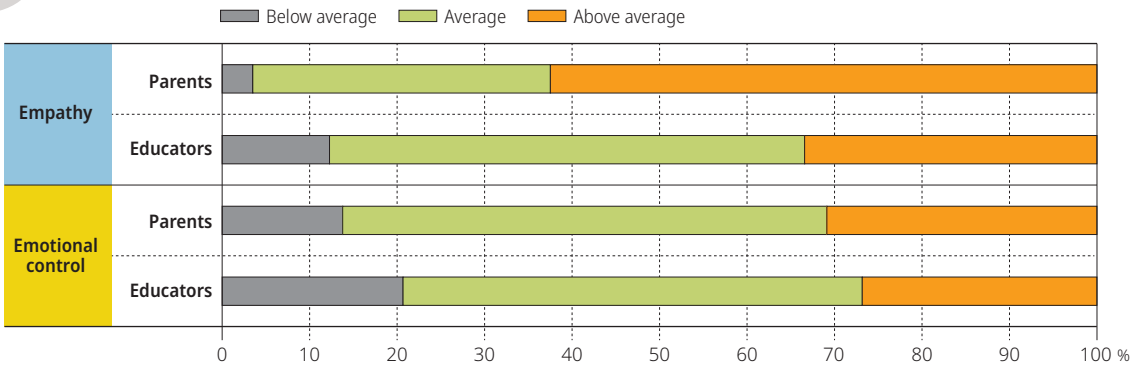
Parents give more positive ratings of their children's empathy skills than educators but both rate children's emotional control similarly

In addition to the direct assessment of emotion identification and emotion attribution, parents and educators also rated children's development in empathy (e.g. the child is considerate, helpful, caring) and emotional control (e.g. the child controls emotions, waits patiently for something he or she wants). Parents were more likely to rate children's empathy skills as more developed than educators (Figure 5.2). However, both parents and educators rated children's emotional control similarly. Parents in England and Estonia also rated children's empathy skills as more developed than educators.

Figure 5.2 **Social-emotional development as reported by parents and educators, United States**



Note: The figure compares the same children as rated by their educators and parents.
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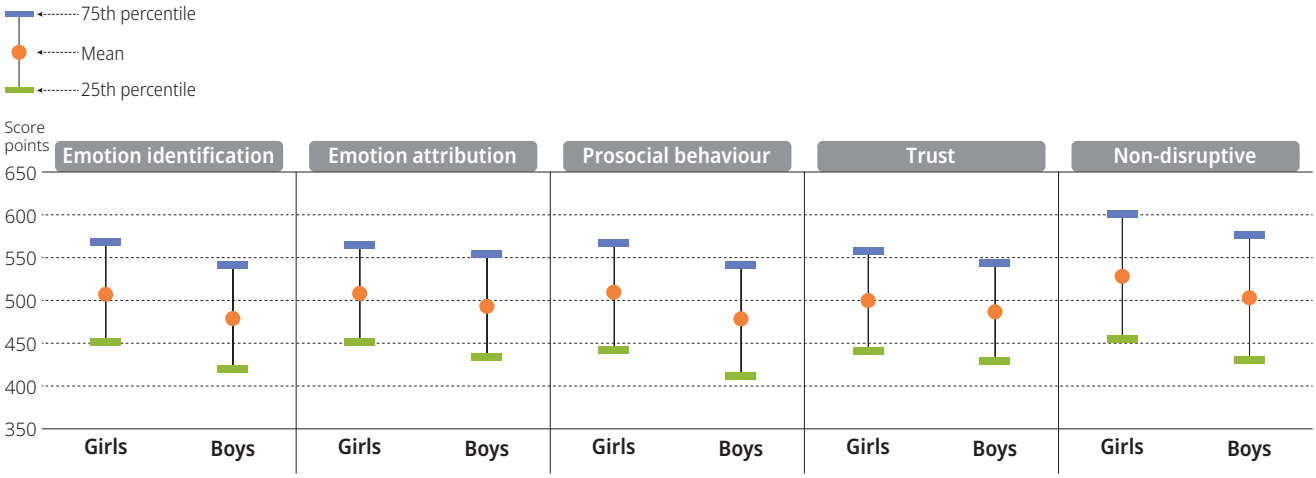
INDIVIDUAL CHARACTERISTICS AND EARLY SOCIAL-EMOTIONAL SKILLS

While girls typically have better social-emotional scores than boys, the gender gaps are narrower in the United States than in Estonia or England

Figure 5.3 shows that, on average, girls had higher social-emotional scores than boys for emotion identification, emotion attribution, prosocial behaviour, trust and non-disruptive behaviour. Educators reported larger gender differences in prosocial behaviour and non-disruptive behaviour than those found in the direct assessment. The differences in scores between boys and girls were statistically significant for both the direct and indirect assessment. The gender gap in the United States is significantly smaller than in Estonia in prosocial behaviour and trust, and significantly smaller than in England in emotion attribution. However, the gender gap in the United States is not significantly smaller than in Estonia in emotion identification, emotion attribution, and non-disruptive behaviour and in emotion attribution, prosocial behaviour, trust, or than in non-disruptive behaviour in England.

Figure 5.3 **Social-emotional scores by gender, United States**



Note: The gender differences in mean scores are statistically significant.
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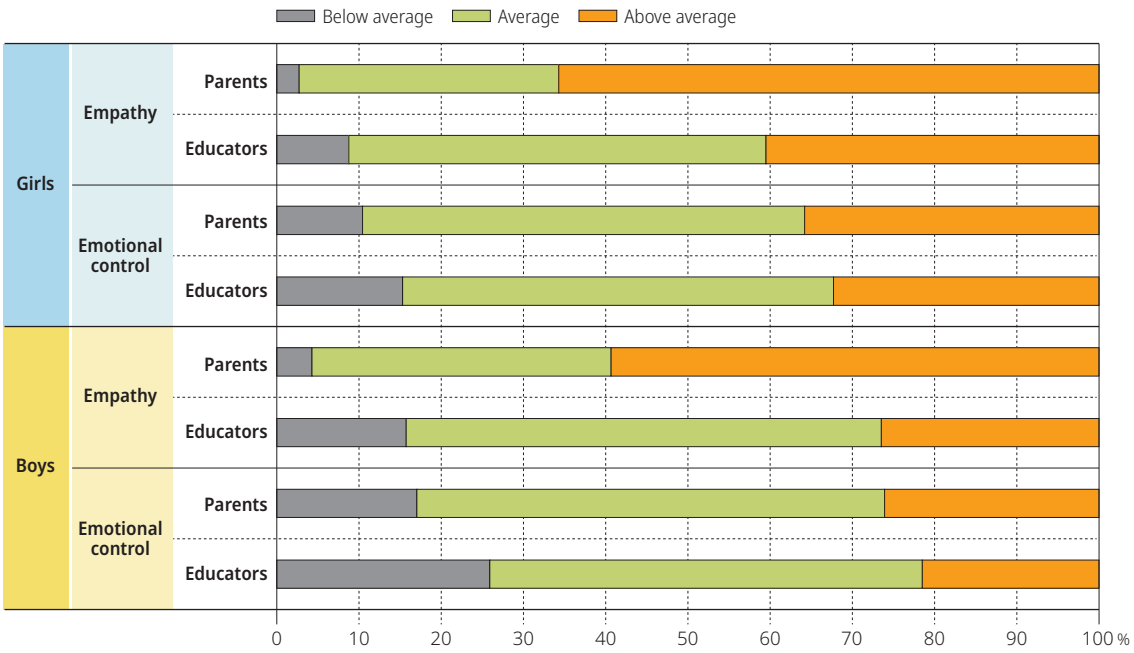
Both parents and educators reported girls as having more developed empathy and emotional control than boys (Figure 5.4). This difference also existed in Estonia and England. Parents were also more likely than educators to rate children's empathy skills as better developed regardless of their gender.

Figure 5.4 **Social-emotional development as reported by parents and educators by gender, United States**



Note: The figure is comparing the same children rated by their educators and parents.

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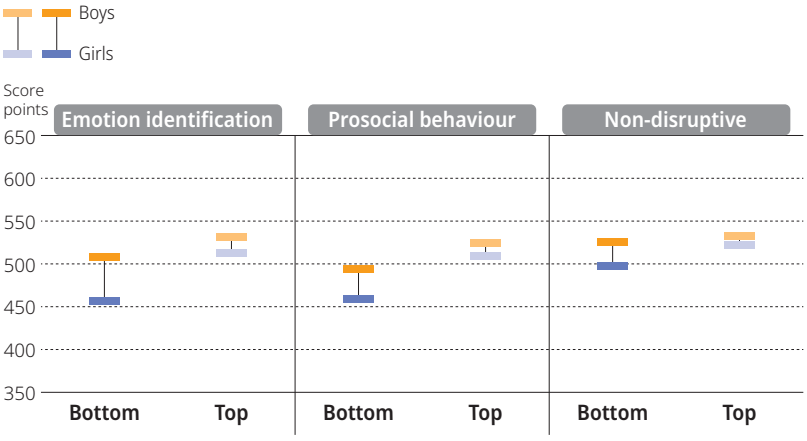
The gender gap is larger among children in the bottom socio-economic quartile of socio-economic background than those in the top quartile

Figure 5.5 shows the differences between girls' and boys' scores by their families' socio-economic status (SES)[1], comparing the top and bottom SES quartiles. On average, girls still had better social-emotional learning scores than boys across both quartiles, but the gender gap was larger for children in the bottom quartile for emotion identification, prosocial behaviour and non-disruptive behaviour. For example, the gender gap in emotion identification skills was 52 points in the bottom quartile but was not statistically significant in the top quartile. Likewise, for prosocial behaviour, there was a gender gap of 35 points in the bottom quartile while in the top quartile the gap was not statistically significant.

Figure 5.5 **Social-emotional scores by socio-economic quartile and gender, United States**



Note: Bottom refers to the bottom quartile of socioeconomic-status and top to the top quartile of socioeconomic status. Statistically significant differences are shown in a darker tone. The figure only includes scores when at least one of the comparisons was statistically significant.

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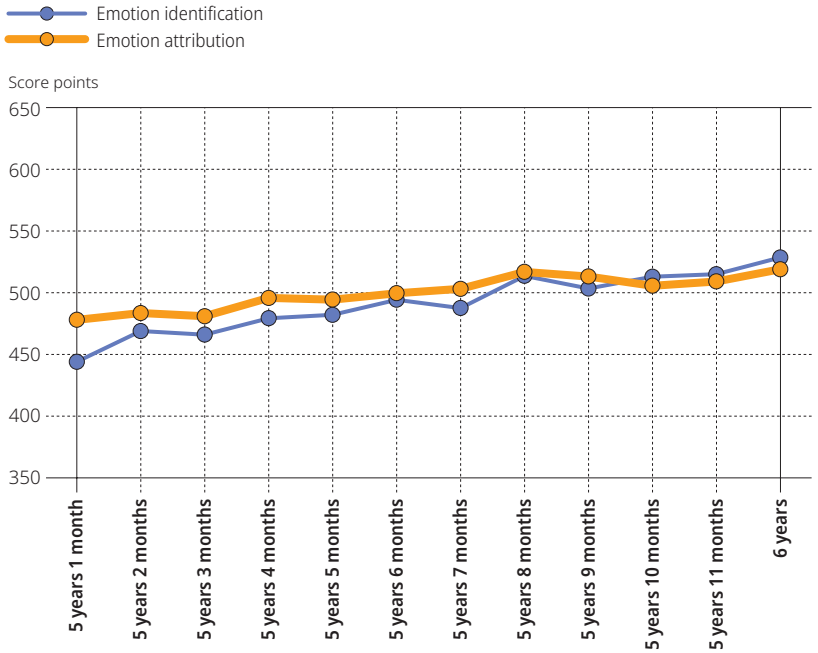
The direct assessment also showed significant gender gaps in the second SES quartile, while there were significant gender gaps in the second and third SES quartiles for educators' assessment of prosocial behaviour, and in the third SES quartile for assessments of trust and non-disruptive behaviour.

Children's social-emotional skills scores increase slightly with age

Figure 5.8 shows children's social-emotional learning scores by their age in months at the time of the assessment. In the United States, the average difference between the oldest and youngest children was 92 points for emotion identification and 55 points for emotion attribution. This means, for every additional month in age, children's emotion identification scores increased by 6 points on average and their emotion attribution scores by 4 points. The data indicate a small but significant positive correlation between children's ages and their scores on the direct assessment of their social-emotional learning. In the United States, the correlation was 0.22 for emotion identification and 0.13 for emotion attribution. Differences by age were smaller in educator indirect assessment ratings: the correlation was significant for prosocial behaviour and not statistically significant for trust and a non-disruptive behaviour. The data show similar correlations between age and social-emotional learning outcomes for boys and girls.

Figure 5.6 **Social-emotional scores by age of child in months, United States**



StatLink https://doi.org/10.1787/888934102601

Social, emotional or behavioural difficulties are more strongly associated with lower social-emotional learning outcomes, especially more disruptive behaviour, than low birth weight or premature birth and learning difficulties

IELS asked parents whether their children had a low birth weight or premature birth; learning difficulties; or social, emotional or behavioural difficulties.

The primary cause of low birth weight is often premature birth (i.e. born before 37 weeks gestation) and it can be, though is not always, associated with early learning difficulties. In the United States, parents reported 10% of children as having had a low birth weight or premature birth (<5lbs, 8oz), similar to the share in England (11%) and Estonia (8%). Learning difficulties (e.g. speech or language delay, or intellectual disability) affected 13% of children whose parents provided data, 3 percentage points higher than in the other two participating countries. Social, emotional or behavioural difficulties affected 12% of children whose parents provided data in the United States, compared to 10% in Estonia and 8% in England.

In the United States, boys were more likely to be identified by their parents as having learning difficulties (17% of boys and 10% of girls) or social, emotional or behavioural difficulties (16% of boys and 8% of girls). However, the data showed no significant

gender differences in social-emotional learning scores between children with and without these difficulties, after accounting for socio-economic status.

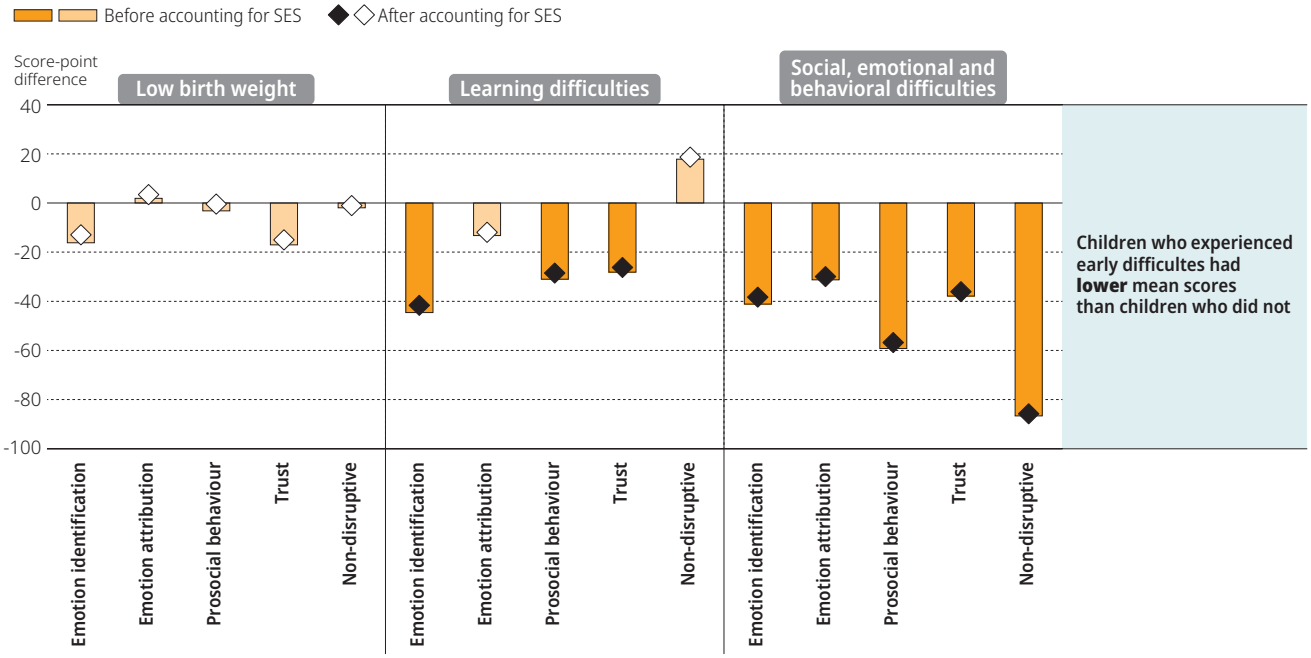
Overall in the United States, 27% of five-year-olds for whom information was available had experienced at least one of these challenges or difficulties, with 20% having experienced just one, 6% having experienced two and 1% having experienced all three.

Children who had experienced learning difficulties had a lower mean emotion identification score and were rated as having lower prosocial behaviour and trust by their educators than children who had not (Figure 5.7). Children with social, emotional or behavioural difficulties had lower social-emotional learning scores on both the direct and the indirect assessment, and lower scores than children with learning difficulties. When all of these challenges are analysed together, social, emotional and behavioural difficulties were more highly associated with poor social-emotional learning outcomes than low birth weight/premature birth or learning difficulties. As might be expected – since these difficulties include behavioural difficulties – this was particularly the case for disruptive behaviour. These associations were significant after controlling for socio-economic status. In contrast, children with learning difficulties were assessed as no more disruptive than children without learning difficulties.

When analysed alone, children with a low birth weight or who had been born prematurely had lower emotion identification skills and lower trust as reported by educators than other children. However, these differences disappeared when controlling for learning and social-emotional difficulties.

Figure 5.7 **Relative associations between early difficulties and social-emotional scores, United States**

Score-point differences between children who have and have not experienced an early difficulty, after accounting for the effects of other early difficulties, and before and after accounting for socio-economic status



Note: Statistically significant differences are shown in a darker tone.

StatLink https://doi.org/10.1787/888934102620

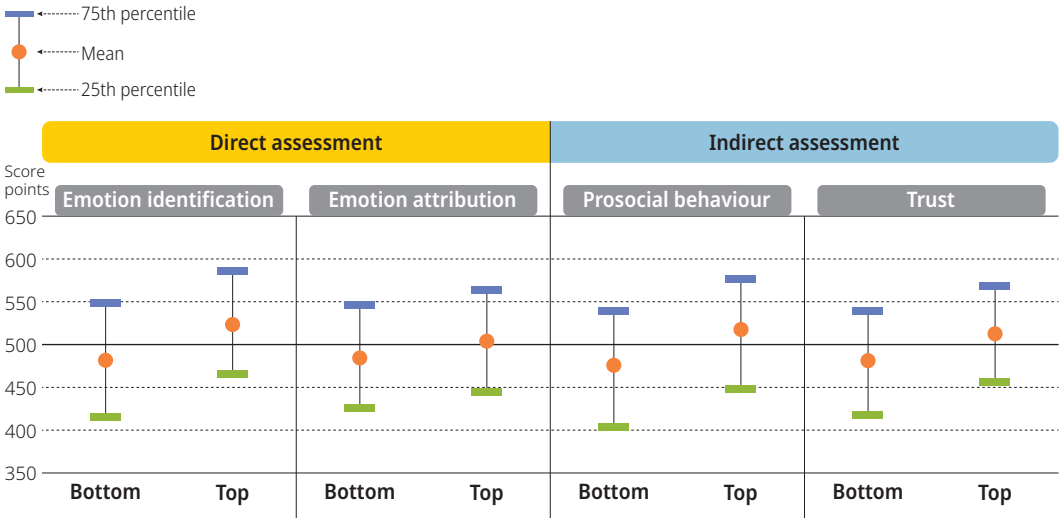
HOME AND FAMILY CHARACTERISTICS AND EARLY SOCIAL-EMOTIONAL SKILLS

Children from advantaged backgrounds have higher social-emotional scores than those from less advantaged backgrounds

Figure 5.8 shows the difference in social-emotional learning scores between children from the top and bottom quartiles of the national socio-economic status (SES) index. IELS defines children from an advantaged socio-economic background as those who are located in the top quartile of the index, while children from a disadvantaged background are defined as those belonging to the bottom quartile. The results show that children from advantaged backgrounds had higher social-emotional scores than children from disadvantaged backgrounds in both the direct and the indirect assessments.

Nevertheless, the strength of the relationship varied depending on the skill examined. The direct assessment found that socio-economic status had a significant relationship with emotion identification and emotion attribution. According to educators' assessments, children from advantaged backgrounds also had higher prosocial behaviour and trust than those from less advantaged backgrounds. However, socio-economic status had no relationship with children's disruptive behaviour.

Figure 5.8 **Social-emotional scores by socio-economic background, United States**



Note: The differences in the mean scores of children in the bottom and top quartiles of socio-economic status are statistically significant.
StatLink https://doi.org/10.1787/888934102639

There are no statistically significant differences in social-emotional learning scores along racial and ethnic lines

In the United States, the children were reported as White (52%), Black (11%), Hispanic (25%), Asian (7%), American Indian or Alaska Native (1%), Native Hawaiian or Pacific Islander (<1%) and those of two or more races (4%). The IELS results found no statistically significant differences between children from different racial and ethnic backgrounds and nor did these results differ between boys and girls, or after controlling for socio-economic status.

Educators report less disruptive behaviour among children with parents who primarily speak a language other than English at home

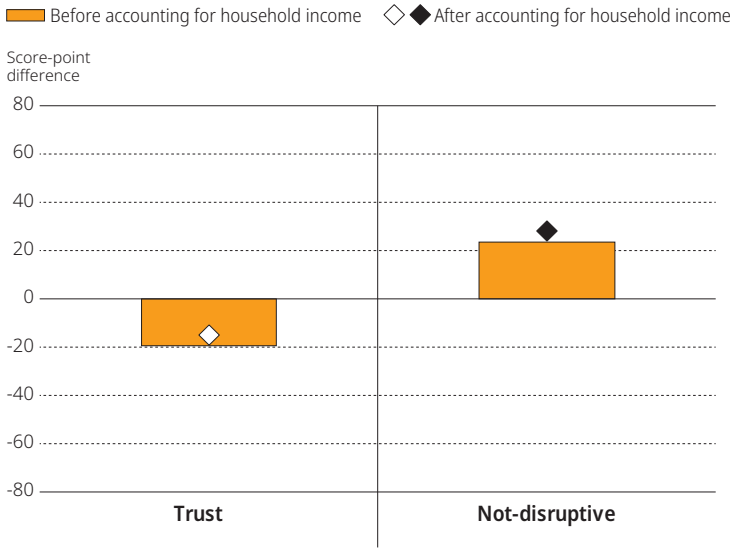
IELS asked parents whether English was the language most often spoken at home. In the United States, around 20% of the children for whom information was provided had at least one parent who primarily spoke a language other than English at home; this was 4% higher than in England and 14% higher than the share of children in Estonia whose parents did not speak Estonian or Russian at home. Figure 5.9 shows the score-point difference in social-emotional scores between children with parents who most often speak a different language at home and those who do not. Educators reported less disruptive behaviour in children with parents who primarily spoke another language at home, and the difference was statistically significant after controlling for socio-economic status. Educators also reported lower trust in those children but the differences become non-significant after controlling for socio-economic status. The direct assessment showed no significant differences for this group of children.

Children's immigration background is not associated with different social-emotional learning scores after controlling for home language

In the United States, 18% of the children for whom information was provided had an immigrant background; this is the same as in England and much higher than in Estonia (2%). IELS defines an immigrant background as having both parents – or the sole parent if a single parent – born in another country or economy than where the study took place. Educators in the United States reported lower trust and less disruptive behaviour among children with an immigrant background after accounting for socio-economic status, but the differences disappeared when the results were also controlled for home language. These results suggest that children's immigration background was not related to their social-emotional learning scores.

Figure 5.9 **Social-emotional scores by home language before and after accounting for socio-economic status, United States**

Score-point differences between children with at least one parent who speaks a language other than English at home and children with parent(s) who mainly speak English at home



Note: Statistically significant differences are shown in a darker tone.

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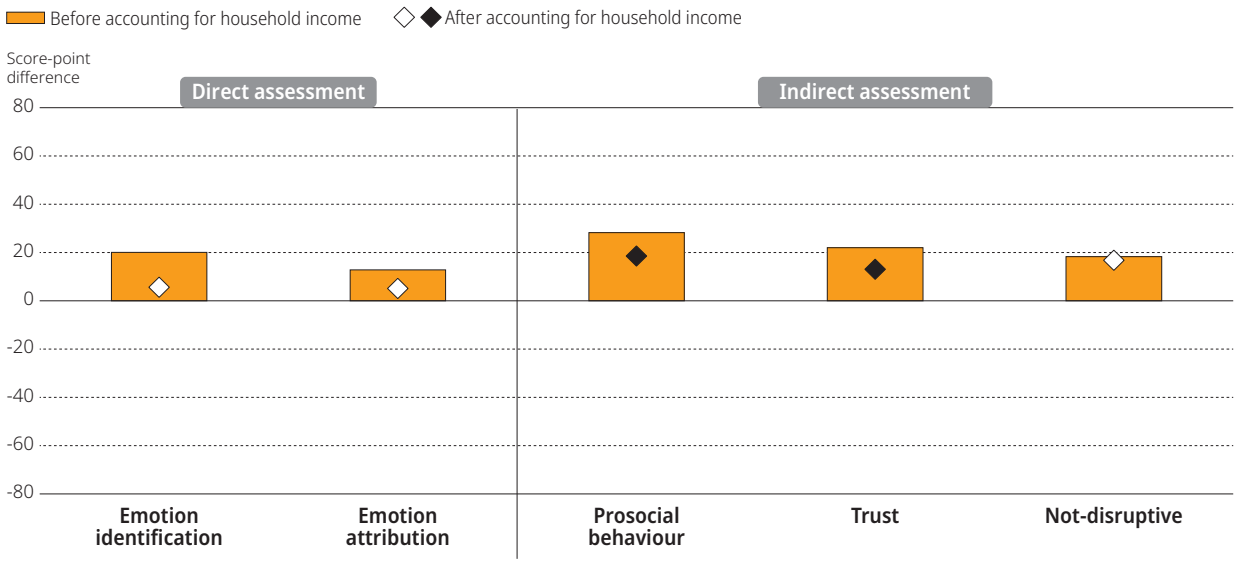
Children whose mothers have completed higher education have higher social-emotional scores

In the United States, 39% of the five-year-olds in the study had mothers who had completed higher education (i.e. a bachelor's degree, master's degree, professional degree or doctorate), which was similar to the share in England (40%) but lower than in Estonia (53%). Figure 5.10 shows the score-point difference in social-emotional learning scores between children whose mothers had completed higher education and those who had not. Children whose mothers had completed higher education were rated as displaying more prosocial behaviour and trust and less disruptive behaviour as well as higher emotion identification and emotion attribution than children whose mothers had not completed higher education. However, these differences only remained significant with respect to prosocial behaviour and trust after accounting for household income.

Figure 5.10 **Social-emotional scores by mother's educational attainment, United States**

Score-point differences between children whose mothers hold a bachelor's or higher degree and those whose mothers do not, before and after for accounting for household income



Note: Statistically significant differences are shown in a darker tone.

StatLink https://doi.org/10.1787/888934102677

Children in single-parent households generally have similar social-emotional skills to those in two-parent households

In the United States, 15% of the children for whom the information was provided were in single-parent households, the same share as in England and a larger share than in Estonia (12%). Children's social-emotional skills in single-parent households were not significantly different to children in two-parent households after accounting for socio-economic background. However, children in single-parent households had more disruptive behavior (21 points) according to their educators than children in two-parent households after accounting for socio-economic background.

The results relating to the number of siblings a child has are equivocal

In the United States, 14% of the children had no siblings, 39% had one sibling, 26% had two, 11% had three, 5% had four and around 5% had more than four siblings. The most common number of siblings among the participating countries was one. Children in the United States had more siblings on average than in the other two countries; 20% of children had three or more siblings compared to only 12% in England and 8% in Estonia. Children with one sibling scored significantly higher (18 points) for emotion attribution than children with two siblings, after accounting for socio-economic status. However, the results for the other social-emotional sub-domains were not conclusive.

There were clearer patterns in England and Estonia. For example, children without siblings were reported by educators as having higher disruptive behaviour than children with one or more siblings. This result was not found in the United States, after controlling for socio-economic status.

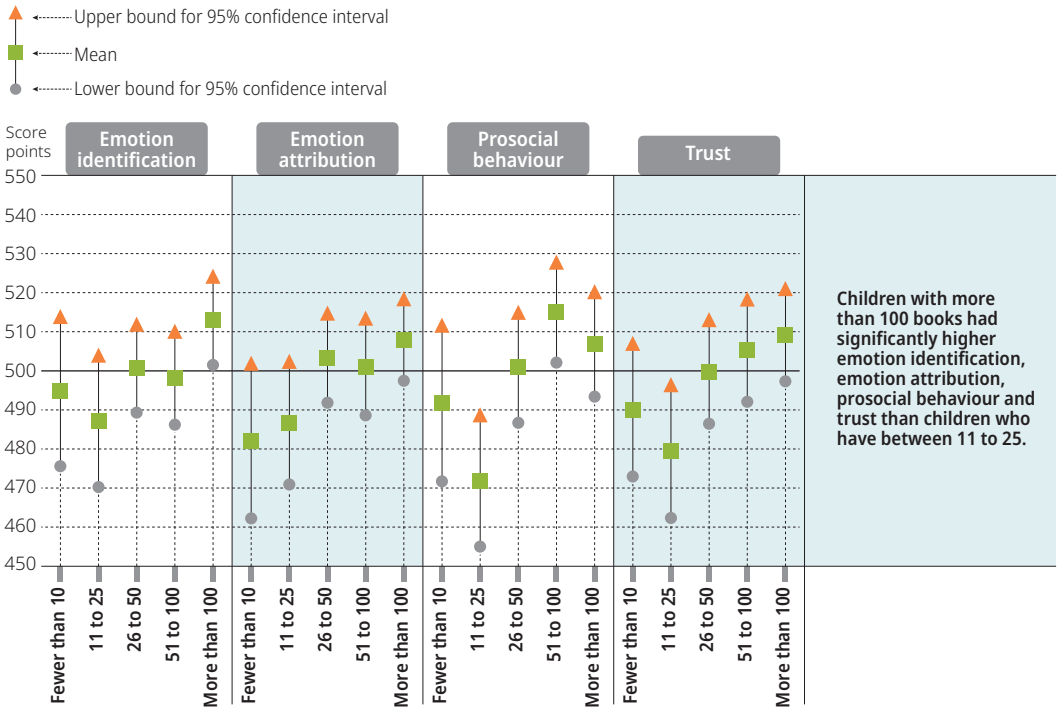
HOME LEARNING ENVIRONMENT AND EARLY SOCIAL-EMOTIONAL SKILLS

The number of books children have access to at home is positively related to their social-emotional skills

In the United States, 12% of children lived in households with access to 10 or fewer children's books – including those from a school or public library – 17% in homes with 11-25 books, 23% in homes with 26-50 books, 22% in homes with 51-100 books and 26% in homes with more than 100 children's books. On average, children in the United States had access to a greater number of children's books than in Estonia (where the most common number was 26-50 books) and a little lower than in England. Children from homes with more books had, on average, higher social-emotional learning scores on the direct assessment. The difference in children's emotion identification and emotion attribution scores between those with more than 100 children's books at home and those with 11-25 was significant, after controlling for socio-economic status (Figure 5.11).

Figure 5.11 **Social-emotional scores by number of books in the home, United States**

After accounting for socio-economic status



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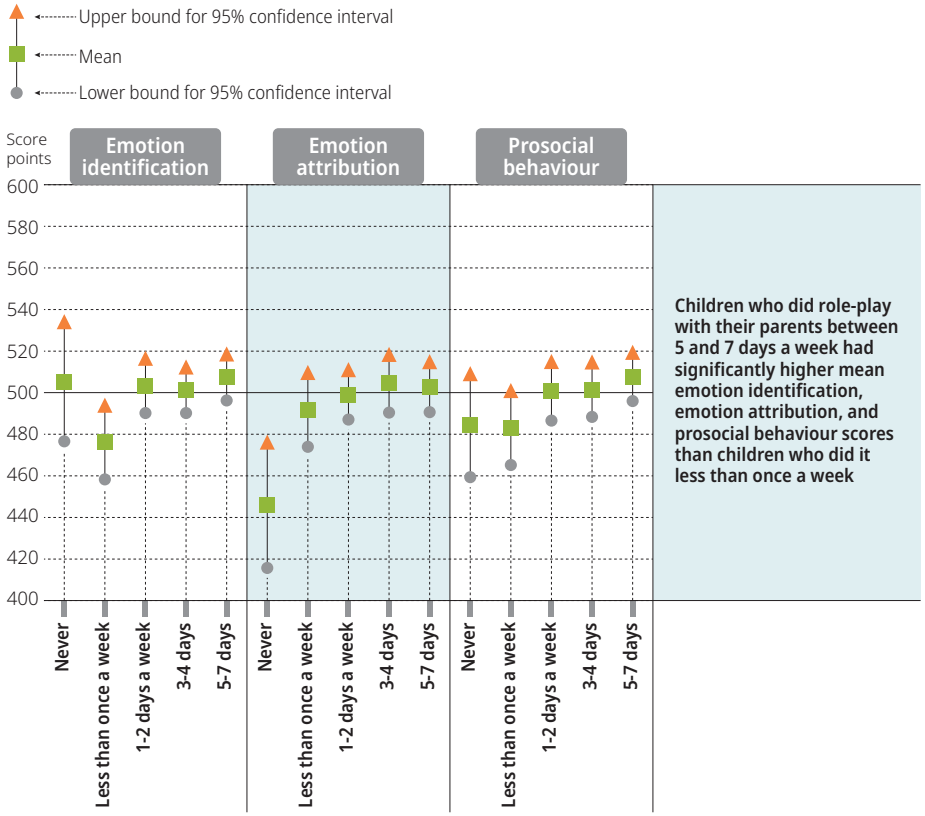
The indirect assessment yielded similar findings. Educators reported significantly higher prosocial behaviour and trust among children from homes with more than 100 books than those from homes with 11-25 books after accounting for SES. The positive association of having a greater number of books at home did not significantly differ by gender in the direct assessment and the data did not show a consistent gap.

Children who regularly role-play with their parents are more empathetic and have more prosocial behaviours than children who do it less than once a week

In the United States, 4% of the parents participating in IELS reported never role-playing with their children (defined as imaginative or pretend play such as playing the role of a chef or a shopkeeper), 12% did it less than once a week, 26% one or two days a week, 28% 3-4 days a week and 30% 5-7 days a week. The percentage of parents in the United States who frequently engaged in role-play with their children was higher than in Estonia and England (around 60% role-played at least 3 days a week in the United States, compared with 50% in England and 30% in Estonia). Children who role-played regularly with their parents were more empathetic and had more developed prosocial behaviours according to educators than those who did it less than once a week (Figure 5.12). These results remained significant after controlling for socio-economic status. The positive association for role-playing with parents did not significantly differ by gender after accounting for SES.

Figure 5.12 **Social-emotional scores by frequency of role-play with parents, United States**

After accounting for socio-economic status



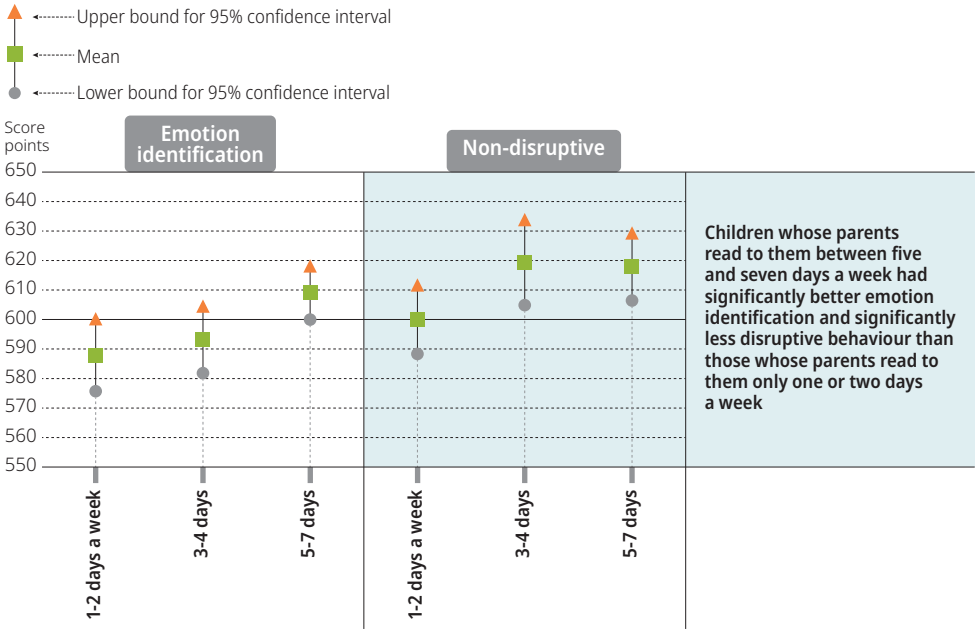
StatLink https://doi.org/10.1787/888934102715

Children whose parents read to them frequently are better able to recognise emotions and are less disruptive

In the United States, 7% of the parents reported reading books to their child less than once a week, 20% one or two days a week, 32% on 3-4 days a week, and 43% on 5-7 days a week. The percentage of parents who read to their child 5-7 times a week was around 5 percentage points lower in Estonia but 17 percentage points higher in England. The direct assessment found that children in the United States whose parents read to them most often were better able to recognise and understand emotions (Figure 5.13).

Figure 5.13 **Social-emotional scores by frequency of being read to by parents, United States**

After accounting for socio-economic status



StatLink https://doi.org/10.1787/888934102734

Children who regularly attend activities outside the home have stronger prosocial behaviour and trust and are less disruptive than other children

In the United States, 27% of parents reported that their children never attended special or paid for activities outside the home, 20% reported their child attended less than once a week, 36% one or two days a week, 14% 3-4 days a week, and 4% 5-7 days a week. Examples of special activities included sports clubs, and dance, swimming and language lessons. The share of children who attended such activities once or twice a week was around 4 percentage points higher in Estonia and 11 percentage points higher in England. In the United States, educators reported that children who attended such activities one or two days a week showed stronger prosocial behaviour and trust and were less disruptive according than children who never attended such activies, after accounting for socio-economic status (Figure 5.14). At the same time, children who attended such activities one or two days a week had higher emotion identification and less disruptive behaviour than those who did so between 5 and 7 days a week.

Children who regularly have back-and-forth conversations about how they feel are more empathetic

In the United States, less than 2% of parents reported never having back-and-forth conversations with their children about how they feel, 4% reported doing so less than once a week, 13% one or two days a week, 23% 3-4 days a week and 59% 5-7 days a week. These percentages were similar in England and Estonia. The data found that children who had the most frequent back-and-forth conversations about how they felt scored higher for both emotion identification and emotion attribution than those who did so less often, after accounting for socio-economic status (Figure 5.15).

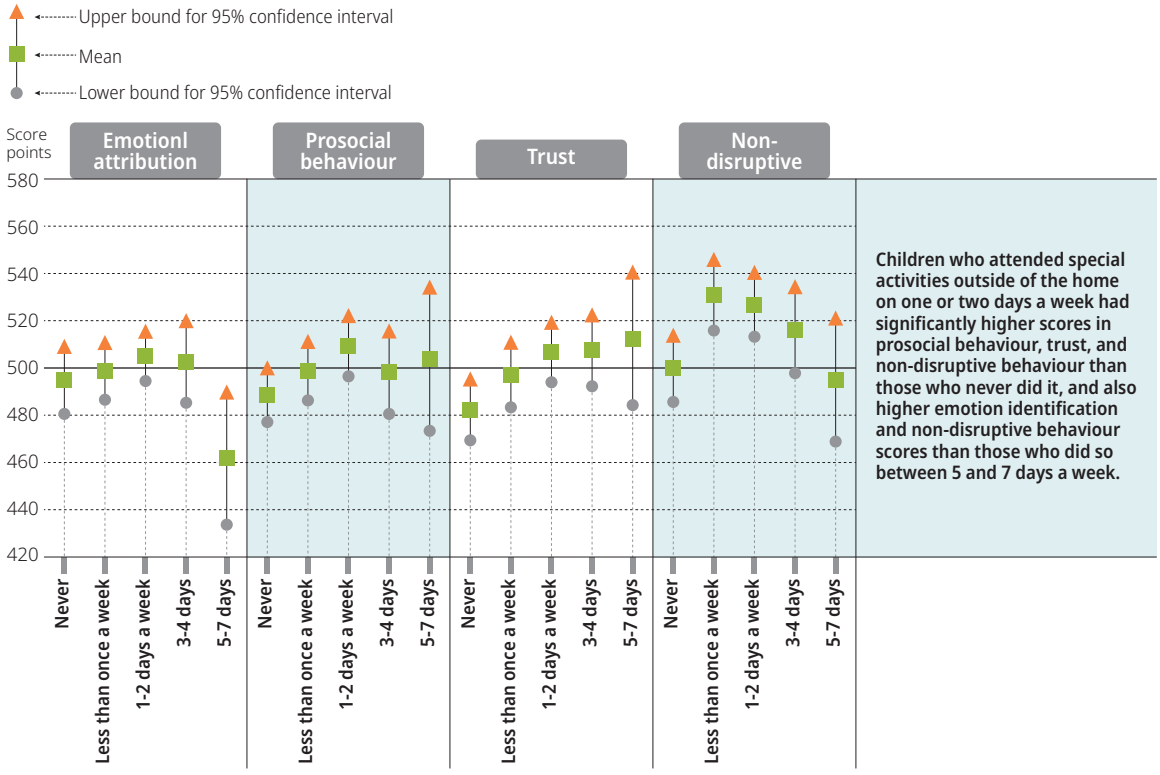
Children whose parents are moderately or strongly involved in their schooling, have higher average social-emotional learning scores

In the United States, 65% of children had parents who were moderately or strongly involved in school activities, according to their teachers, which was lower than in England (69%) and Estonia (80%). Examples of activities included class parties, school concerts or plays, parents' evenings and parental workshops. Figure 5.16 shows the difference in social-emotional learning scores between children whose parents were more and less involved. Children whose parents were moderately or strongly involved in school were rated as having better social-emotional skills, even after accounting for socio-economic status. However, these differences were not statistically significant for children's direct assessment scores.

The positive relationship between parental involvement and children's social-emotional scores did not significantly differ by gender.

Figure 5.14 Social-emotional scores by engagement in special or paid activities outside the home, United States

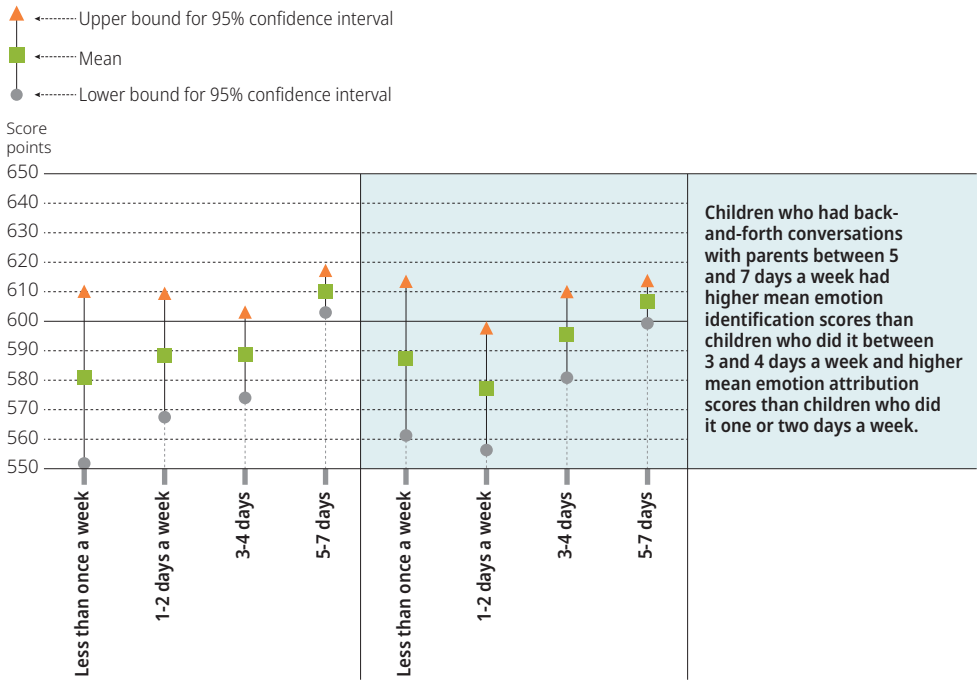
After accounting for socio-economic status



StatLink https://doi.org/10.1787/888934102753

Figure 5.15 Social-emotional scores by frequency of back-and-forth conversations about feelings with parents, United States

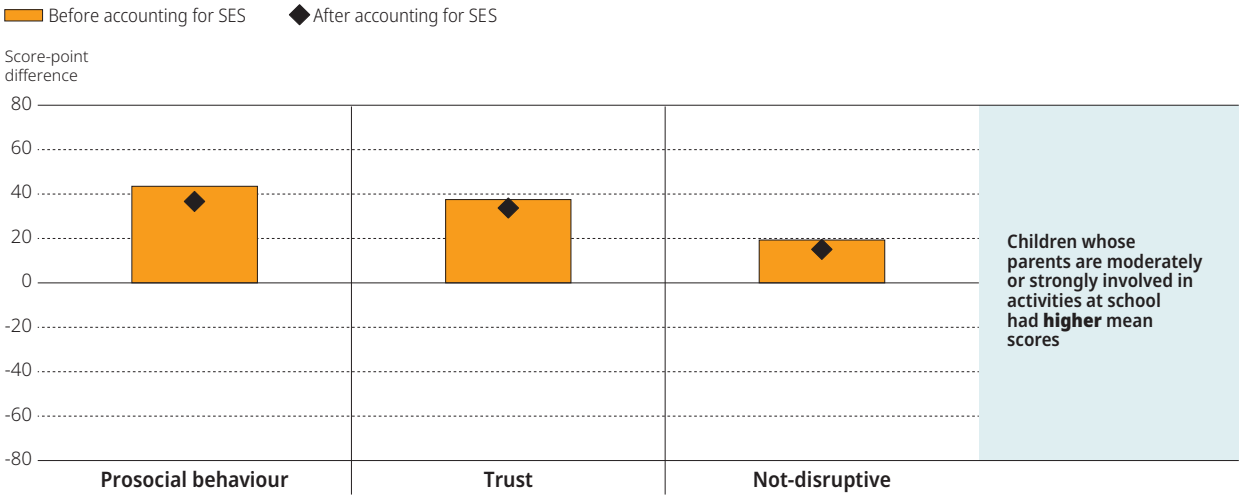
After accounting for socio-economic status



StatLink https://doi.org/10.1787/888934102772

Figure 5.16 Social-emotional scores by parental involvement in school activities, United States

Score-point differences between children whose parents are moderately or strongly involved in activities at school and those whose parents are slightly or not involved, according to their teachers, before and after accounting for socio-economic status



Note: The differences are statistically significant.

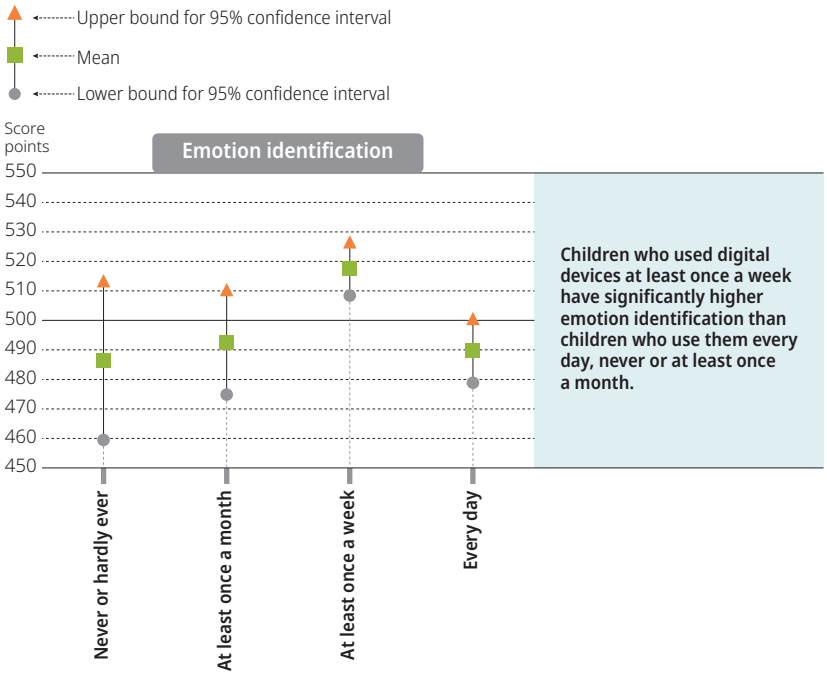
StatLink https://doi.org/10.1787/888934102791

Children who use digital devices weekly but not daily are better able to recognise emotions than those who use them more frequently

In the United States, 5% of the children never or hardly ever used a desktop or laptop computer, tablet device or a smartphone, 7% used them at least once a month (but not every week), 40% used them at least once a week, and 49% used them every day. In England and Estonia, the share of children who used these digital devices every day was around 10% lower. Children who used such devices weekly but not daily were better able to recognise emotions than those who used them every day, never or at least once a month (Figure 5.17). There were no differences in the effects of technology use between boys and girls, or between those using them every day and those using them monthly or never.[2]

Figure 5.17 Social-emotional scores by use of digital devices, United States

After accounting for socio-economic status



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EARLY CHILDHOOD EDUCATION AND CARE AND EARLY SOCIAL-EMOTIONAL SKILLS

Overall, attending early childhood education and care before the age of five has no significant relation to children's early social-emotional learning scores

In the United States, 80% of the children had attended early childhood education and care (ISCED 01 or ISCED 02) before the age of five, a smaller share than in England and Estonia. As discussed in the previous chapters, attendance varied significantly by socio-economic status, but did not vary significantly by gender or racial or ethnic group.

At an aggregate level, there were no clear relationships between participation in ECEC and children's social-emotional scores. This was regardless of whether children attended part-time or full-time. However, there were some negative relationships with social-emotional skills when comparing children who did not attend ECEC before the age of five and those who first attended before the age of three.

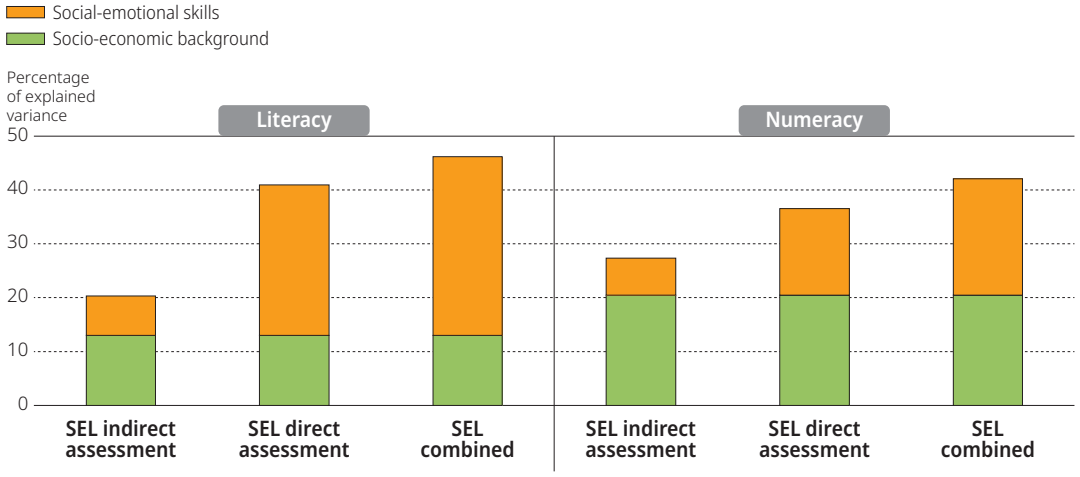
EARLY SOCIAL-EMOTIONAL SKILLS AND EMERGENT COGNITIVE DEVELOPMENT

Children's social-emotional skills are associated with their emergent literacy and numeracy skills after accounting for socio-economic status.

Many studies have shown that social-emotional skills are significant predictors of students' academic performance in areas such as maths and reading, after accounting for socio-economic status (Suárez-Álvarez, Fernández-Alonso and Muñiz, 2014[32]; Chamorro-Premuzic and Furnham, 2008[33]). Although previous research has typically looked at students attending primary, secondary and higher education, recent evidence from neuroscience suggests emotion and cognition are interrelated during early infancy (Bush, Luu and Posner, 2000[2]; Davidson et al., 2002[3]; Posner and Rothbart, 2000[4]).

Figure 5.18 shows the variation in IELS emergent literacy and emergent numeracy scores explained by social-emotional scores, after accounting for socio-economic status. The first bar presents the percentage of variation in numeracy explained by educators' indirect assessment of children's social-emotional skills (prosocial behaviour, trust and non-disruptive behaviour) after accounting for socio-economic background. The second shows the association with the direct assessment of children social-emotional skills (emotion identification and emotion attribution). The third shows the combined effect of the direct and indirect assessments together. While the measurement of the domains in the second column shared the same assessment method – tablet-based stories and games – the first bar used educator assessments as an independent method. Therefore, the percentages in the first and third bars serve as a proxy of the minimum and maximum variation associated with social-emotional skills regardless of the assessment method.

Figure 5.18 **Percentage of the variation in emergent literacy and numeracy scores explained by social-emotional skills and socio-economic status, United States**



Note: SEL = social-emotional learning. The green bar shows the percentage of variation in each IELS outcome explained by socio-economic status. The orange bars show the additional variance explained when social-emotional skills (indirectly assessed, directly assessed or both combined) are introduced to a regression model already containing socio-economic status.

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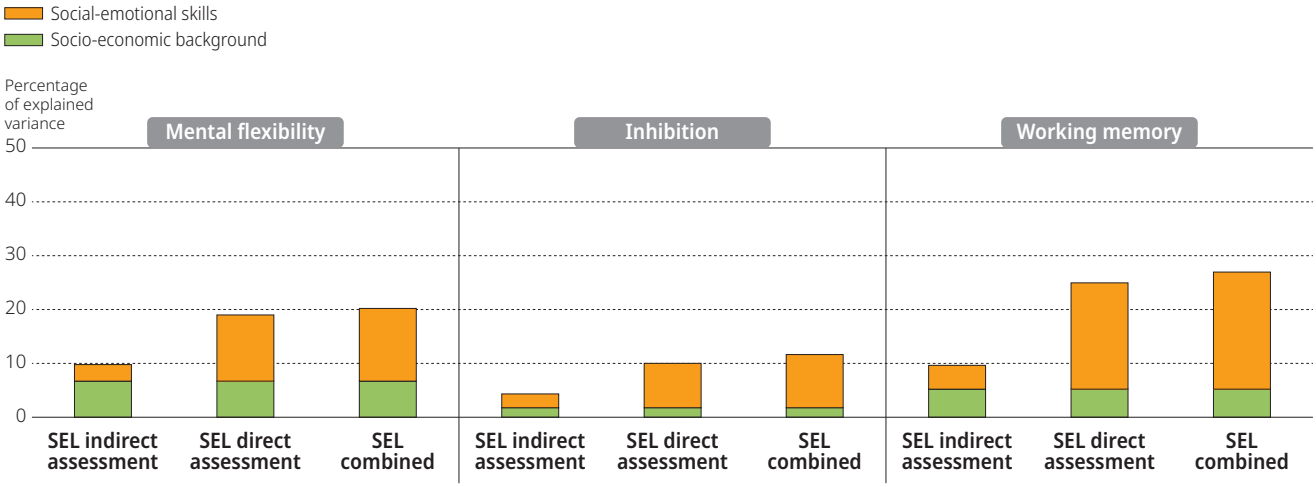
The data shows that social-emotional scores were associated with emergent literacy, numeracy scores, and self-regulation scores. Children's social-emotional scores, together with their socio-economic status, explained between 20% and 46% of the variation in the emergent literacy scores in the United States. More importantly, social-emotional skills explained between 7% and 33% of emergent literacy scores after accounting for socio-economic status.

Figure 5.19 shows the percentage of variation in self-regulation scores (for mental flexibility, inhibition and working memory) explained by social-emotional scores after accounting for socio-economic status. As in the previous figure, the bars represent the different measures of social-emotional skills based on indirect assessment from educators' reports, the direct assessment and the combined effect of both. Children's social-emotional scores together with socio-economic status explained between 10% and 27% of the variation in working memory scores in the United States and between 5% and 22% of the emergent working memory scores after accounting for socio-economic status. Despite sharing the same assessment method, the association between inhibition and empathy skills is negligible. Importantly, educators also support the relation between emotion and cognition in the indirect assessment of social-emotional skills through an independent method. Indeed, educators' indirect assessment still explained a significant amount of the variation in self-regulation scores after accounting for socio-economic status.

In short, children rated by their educators as having higher levels of prosocial behaviour, trust, and non-disruptive behaviour had significantly higher emergent literacy, numeracy and working memory scores. Children who scored higher in the direct assessment of their empathy skills also had significantly higher scores in those domains.

Figure 5.19 **Percentage of the variation in self-regulation scores explained by social-emotional skills and socio-economic status, United States**



Note: SEL = social-emotional learning. The green bar shows the percentage of variation in each IELS outcome explained by socio-economic status. The orange bars show the additional variance explained when social-emotional skills (indirectly assessed, directly assessed or both combined) are introduced to a regression model already containing socio-economic status.

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SUMMARY

The average five-year-old child in the United States was less able to accurately identify the feelings of characters in stories than children in Estonia, but performed similarly to children in England.

Children's ability to recognise emotions is a precursor of their ability to empathise with others. Emotion attribution scores in IELS reflected their ability to recognise both emotions in others and their own emotions. Children in the United States scored similarly to children in England and Estonia on this measure.

Based on reports from their educators, children in the United States displayed significantly lower levels of prosocial behaviour than children in Estonia and similar levels to children in England. However, educators in the United States rated the children as significantly less disruptive than those in Estonia and about the same as in England. Educators in all three countries participating in the study rated children's average levels of trust similarly.

Children's social-emotional scores, for both the direct and indirect assessment, were predictors of their scores in the other aspects of the assessment even after accounting for socio-economic status. In the United States, children's social-emotional scores accounted for 7% to 33% of their emergent literacy scores (compared to between 13% and 33% in England and between 5% and 27% in Estonia), between 7% and 22% of their numeracy scores (compared to between 12% and 28% in England and between 6% and 26% in Estonia), and between 5% and 22% of their working memory scores (compared to between 7% and 18% in England and between 4% and 11% in Estonia), after accounting for socio-economic status.

The development of early skills are interrelated. Cognitive skills are a necessary, but not sufficient, condition to foster early social-emotional learning. For example, children need a minimum level of literacy skills to be able to adequately navigate socially; have rich interactions with peers, friends, and parents; and, ultimately, to open the door to social-emotional learning. However, having high levels of literacy does not always imply high social-emotional skills, and vice versa.

At the aggregate level, ECEC attendance before the age of five had no conclusive results for children's early social-emotional learning scores. There were no clear relationships either between ECEC intensity – i.e. whether the child attended part time or full time – and social-emotional development. These equivocal findings may mean that children's social and emotional skills develop more in the home than in education settings and/or that their development is dependent on the quality and approach of the ECEC setting, rather than children's participation in itself.

Socio-economic background had a significant relationship with children's social-emotional development in the United States. This relationship was even more pronounced in boys than in girls, increasing the gender differences in children from lower socio-economic backgrounds and with learning difficulties. However, children's ethnic or racial background was not significantly associated with their social-emotional skills. Nor was a child's immigration background if their parents spoke English at home. These results suggest that whether English was the primary language at home was more important than having an immigrant background.

After accounting for socio-economic background, children's home and family learning environments remained a powerful predictor of their social-emotional scores. The following factors tended to be positively related to the social-emotional scores of five-year-olds in the United States: having a mother who completed higher education, having a large number of children's books at home, moderate use of digital devices, regularly role-playing with their parents, parents who regularly read to them, regular back-and-forth conversations with parents about how they feel, attending special activities outside the home, as well as a high parental involvement in school activities.

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Notes

1. The index of socioeconomic status in IELS comprises household income, parents' educational attainment and parent occupation.
2. Throughout this report, the term "effect" is used in a statistical sense only. The data collected do not permit causal attributions to be made.

6

Summary and conclusions

This chapter summarises the main findings for the United States and discusses them in relation to themes such as gender, socio-economic status, home learning environment and early childhood education and care.

EARLY LEARNING IN THE UNITED STATES

In early childhood, children learn and develop faster than at any other time in their lives. The experiences they have in their earliest years can set the trajectories for their future well-being and success. Societies interested in improving the equity of children's outcomes should focus on what happens in these earliest years. The International Early Learning and Well-being Study (IELS) was designed to provide valid, reliable and comparable information to participating countries about children's early learning in a range of different domains, and on how this learning relates to a host of individual characteristics and contextual factors. This chapter summarises the main IELS findings for the United States.

There is room for improvement in the early learning of young children in the United States, particularly in the cognitive subdomains

In IELS, five-year-olds in the United States had significantly lower emergent literacy and emergent numeracy scores than five-year-olds in Estonia and in England. Mean scores of US five-year-olds in the self-regulation subdomains of working memory and mental flexibility were also significantly below the averages of each of the other participating countries. In the subdomain of inhibition, however, the mean score was one-quarter of a standard deviation higher than the overall mean, similar to the mean score in Estonia and significantly higher than that of England. In terms of social-emotional skills, the picture was more mixed. Specifically, five-year-olds in the United States had similar mean scores on emotion attribution and trust as children in England and Estonia. Overall, children in the United States were less able than children in Estonia to accurately identify the feelings of characters in stories and about as accurate as children in England. Children in the United States were rated by their educators as having lower prosocial skills but also less disruptive behaviour than on average in IELS, although the deviations from the overall IELS means were modest in both cases.

Children's skills in each of the learning domains assessed in IELS were interrelated in the United States. Emergent literacy and numeracy scores were strongly positively correlated with one another, and each was moderately to strongly positively correlated with working memory, mental flexibility and emotion identification. Correlations were weaker between each of emergent literacy and emergent numeracy and scores in inhibition (directly assessed), trust and prosocial behaviour (educator-rated). The correlations between emergent literacy and disruptive behaviour, and between emergent numeracy and disruptive behaviour, were negligible.

Conclusion 1: There is room for improvement in terms of the early learning skills of young children in the United States assessed in IELS, and in particular in the areas of emergent literacy, emergent numeracy, working memory and mental flexibility. These early cognitive skills have been shown in previous research to be among the strongest predictors of later cognitive competence (Duncan et al., 2007[1]), and to be strongly associated with a range of educational, social, health and economic outcomes throughout the life course (Kautz et al., 2014[2]).

Girls display higher levels of emergent literacy and social-emotional skills than boys, but there are no gender differences in emergent numeracy or self-regulation

In the United States, five-year-old girls had a higher mean emergent literacy score than five-year-old boys. Although significant, the gap was modest, and was similar in size and direction to the gender gaps in Estonia and England. The finding was in line with findings of many national and international assessments that show girls consistently outperforming boys in literacy or reading achievement (National Assessment of Educational Progress [NAEP], Progress in International Reading Literacy Study [PIRLS], Programme for International Student Assessment [PISA], Early Childhood Longitudinal Study [ECLS-K]). Gender differences in affective factors such as reading motivation, reading interest and reading self-concept, as well as in reading behaviour, such as the nature and extent of leisure reading, have been implicated in the gender gaps in literacy found in programmes of assessment worldwide. Results from IELS show that gender gaps in the early language skills that predict later reading competence (listening comprehension, vocabulary knowledge and phonological awareness) have already started to emerge at the time children start school, before most children would be expected to be reading independently. These gaps do not seem fully attributable to differences in parent practices with girls and boys at home. In the United States, boys and girls were equally likely to be read to frequently by their parents, to have access to children's books at home, to attend ECEC, and to have parents who were involved at school. However, parents did report that they more likely to sing songs and nursery rhymes to girls on multiple days each week than to boys, an activity that was significantly associated with emergent literacy scores after accounting for socio-economic status and gender. It is likely that factors other than those measured in IELS contribute to the gender gap in emergent literacy skills at age five.

There was no significant difference in the mean scores of boys and girls on the IELS assessment of emergent numeracy. Nonetheless, girls were more likely than boys to be rated as having above-average mathematics development by their parents and teachers, and less likely to be rated as below average. It is possible that societal beliefs about girls having lower mathematics

ability may have meant that girls who showed any numerical aptitude were more likely to be rated above average by parents and educators than boys with similar ability. Gender differences in favour of boys have been found in a number of large-scale assessments of mathematics achievement with older US children, including in NAEP, PISA and the Trends in Mathematics and Science Study (TIMSS). Given that IELS showed no gender differences at the age of five, it is possible that these differences emerge later in childhood, perhaps as a result of practices at school or of cultural beliefs about gender and mathematical ability transmitted to children by peers, parents, teachers or wider society. Given the cross-sectional designs of these large-scale assessments, it is not possible to conclude this with certainty.

At five years of age, girls in the United States had significantly higher mean scores on all measures of social-emotional skills administered in IELS. They displayed greater ability to identify emotions and take others' perspectives, skills that were directly assessed in IELS. Girls were also more trusting and displayed more prosocial and less disruptive behaviour than boys did, as indirectly assessed by their educators. The gender gaps in mean social-emotional learning scores were somewhat smaller in the United States than in either England or Estonia.

In the United States, boys were significantly more likely than girls were to have experienced learning difficulties or to have experienced social, emotional or behavioural difficulties, according to their parents, replicating the patterns found in Estonia and England. Boys from lower socio-economic backgrounds were particularly likely to have experienced these challenges and represent a group that may be at risk for later educational and social difficulties.

Conclusion 2: Particular attention may need to be paid to the literacy development and the social- emotional learning of boys in order to bring their early outcomes in line with those of girls and/or to prevent further widening of gaps.

Conclusion 3: Around the time of school entry, girls in the United States have similar early numeracy skills to boys. Action may be needed in order to avoid gender gaps emerging in favour of boys as children progress through school.

Children's IELS scores vary considerably by socio-economic background, but the United States is faring better at achieving equity along racial and ethnic lines

Across all three countries that participated in IELS, socio-economic status was significantly positively correlated with children's early skills. In the United States, children from higher socio-economic status (SES) backgrounds had higher scores, on average, than children from lower backgrounds in emergent literacy, emergent numeracy, working memory, mental flexibility and inhibition. They also had higher mean scores on the social-emotional subdomains of emotion identification, prosocial behaviour and trust. The exceptions to this trend related to disruptive behaviour and emotion attribution. Low-SES and high-SES children displayed similar average levels of disruptive behaviour at school and did not differ significantly in their average emotion attribution scores. The relationships between children's socio-economic background and many of the early skills assessed by IELS were stronger in the United States than in either of the other two countries that participated in IELS. For example, the gap in mean scores in emergent literacy between children in the top quartile and the bottom quartile of SES in the United States was approximately 60% greater than the corresponding gap in Estonia. There were significant associations between SES and children having experienced low birth weight or premature birth, learning difficulties, and social, emotional or behavioural difficulties in the United States, with children from lower SES backgrounds more likely to have experienced each of these challenges.

There were no significant differences in the United States between the mean IELS scores of White, Black and Asian children or those of two or more races on the assessments of emergent literacy, emergent numeracy, any of the three self-regulation subdomains, nor on the direct and indirect assessments of social-emotional skills.[1] After accounting for socio-economic background or home language, the mean emergent literacy, emergent numeracy and mental flexibility scores of Hispanic children were not significantly different from those of White children. There were also no significant associations between children's racial or ethnic background and whether their language (receptive or expressive) development or numeracy development were rated as above average, below average or average by their teachers or by their parents. As described in Chapter 2 of this report, assessments of the educational progress of older children in the United States (such as NAEP) have consistently shown gaps in student achievement in reading and mathematics between White and Black children and between White and Hispanic children, although the size of these gaps has been closing over time. In IELS, there were also no significant associations between children's racial or ethnic background and their having experienced low birth weight or premature birth, learning difficulties, or social and emotional difficulties.

Conclusion 4: Around the time of school entry, there are already substantial gaps in scores in cognitive and social-emotional domains between children from low- and high-SES backgrounds in the United States.

Conclusion 5: There are very few gaps in early skills along racial or ethnic lines among five-year-olds in the United States, suggesting that these gaps emerge as children progress through school.

Five-year-olds in the United States come from linguistically diverse homes and have different linguistic repertoires

In the United States, one in five children for whom information on home language was available had at least one parent who mainly spoke a language other than English at home. These children had significantly lower emergent literacy scores, on average, than children whose parents – or their sole parent – mainly spoke English at home. When interpreting this finding, it is important to note that the IELS assessment of early literacy in the United States was only administered in English, and was not translated into any of the other languages that children might use or be exposed to in their homes or neighbourhoods. While scoring lower, on average, on what was an assessment of *English* vocabulary, oral comprehension of *English*, and knowledge of *English* phonemes, it is important to recognise that children with other languages at home have linguistic repertoires that are spread across more than one language. These children are likely to have proficiency in two (or more) named languages, and may also use code-mixing/code-switching or translanguaging in their interactions at home or the community. The IELS assessment of emergent literacy did not provide these children any opportunity to demonstrate these linguistic proficiencies and that should be borne in mind when interpreting these findings. Bilingual or plurilingual children's performance in an assessment of early literacy skills in one language should not be taken as evidence that they are linguistically deficient. The best available evidence suggests that children's home languages should be given overt support in their early childhood education and care (ECEC) settings or schools, as well as at home, if they differ from the language of instruction. Developing children's full linguistic repertoires is likely to lead to the best outcomes for children.

Children with a home language other than English also had a significantly lower score on the emergent numeracy and mental flexibility assessments after accounting for SES, but by a smaller margin than in emergent literacy. This finding was in line with findings from NAEP, which also found smaller gaps between English-language learner (ELL) students and others in mathematics than in reading (see Chapter 2). There were no significant differences in ether working memory or inhibition scores between children whose home language was English and other children. There were also no significant differences in mean scores on emotion identification, emotion attribution or prosocial behaviour. However, children with a home language other than English had significantly lower levels of reported disruptive behaviour than children whose main home language was English.

Children from immigrant backgrounds, defined here as having both parents born outside the United States (or one parent, where only information on one parent was provided), comprised 18% of children in the study for whom information on parents' country of origin was available. Of these, 63% had a parent who mainly spoke a language other than English at home (compared to 4% of children with a non-immigrant background). After accounting for SES and home language, there were no significant differences in the emergent literacy and emergent numeracy scores of children with and without an immigrant background. Similarly, after accounting for SES and home language, there were no differences between the mean scores of children with and without an immigrant background in any of the self-regulation subdomains. In terms of social-emotional skills, children with and without an immigrant background did not differ significantly in their mean scores on emotion identification, emotion attribution or prosocial behaviour. However, five-year-olds with an immigrant background scored significantly lower on trust than children without an immigrant background and also engaged in less disruptive behaviour than children without an immigrant background, according to their teachers, after accounting for SES. The differences were not significant after accounting for home language in addition to SES, suggesting that whether the parents mainly spoke the language of the school explained more of the variation in children's early learning outcomes than whether or not they have an immigrant background.

Conclusion 6: Children from linguistically diverse backgrounds in the United States have unique learning strengths and challenges, both of which should be supported in their ECEC settings and early schooling.

Conclusion 7: Children with a language other than English at home and children with immigrant backgrounds do not differ significantly from other children in social-emotional skills such as emotion identification, emotion attribution and prosocial behaviour. Children with a language other than English at home, however, do display lower levels of disruptive behaviour at school than their peers.

Parents are important sources of information about their children's learning and their activities at home are associated with their children's early skills

Parents are important sources of information about their children. In IELS, parents were asked to evaluate their children's development in a number of areas, relative to other five-year-olds. Very low proportions of children in the United States had parents who indicated that they were below average with respective to their receptive and expressive language development, numeracy development, self-regulation development, and social-emotional development, with over 90% of children having parents who indicated that their development as average or above average. Children's parents were substantially less likely to describe them as below average in each of these areas than their educators were. This may reflect educators' greater experience with children in the target age group, leading them to have a more accurate understanding of the average development of five-year-olds. Alternatively, it may reflect differences in how children display early skills in the school environment and how they

do so at home, with the people who know them best. It is possible that the lack of alignment between parents' and educators' perceptions of children's development may have implications for the levels of support for that learning domain given at home or at school. There may therefore be a role for increased communication between educators and parents, who are potentially important sources of information for each other on children's learning and development.

IELS found a number of parental practices that are positively associated with children's learning. For example, regardless of socio-economic background, five-year-olds in the United States who were read to most often by their parents had significantly higher mean scores for emergent literacy and emotion identification than children who were read to less frequently. Having access to more children's books at home was associated with higher scores across a range of cognitive and social-emotional subdomains. Children whose parents frequently sang songs or nursery rhymes to them had better average scores on the emergent literacy assessment than children whose parents did so less often. For other activities, moderate frequency was associated with higher IELS scores than lower or higher frequency. For example, children whose parents took them to special activities (such as sport, dance or scouts) on one or two days a week had higher mean literacy scores than both those who never attended such activities and those who attended them most days.

In addition to involvement in home-based activities, parental involvement at school was positively associated with children's scores in a range of learning domains. Children whose parents were described by teachers as being moderately or strongly involved in activities at the school had significantly higher mean scores on the assessments of emergent literacy, emergent numeracy, prosocial behaviour, trust and non-disruptive behaviour than children whose parents were not or only slightly involved, once socio-economic status was accounted for.

Children who used digital devices with moderate frequency, whether for educational activities or otherwise, had higher mean literacy scores than children who never or hardly every used them and those who used them every day, after accounting for socio-economic status. In the United States, almost half of five-year-olds used these devices every day, a higher proportion than in either England (39%) or Estonia (39%).

Conclusion 8: There is some misalignment between teachers' and parents' ratings of children's development, across a range of learning domains in IELS. Increased communication between the home and the school about children's progress is likely to be beneficial for all parties.

Conclusion 9: A range of parental practices are positively associated with children's early learning scores in IELS. This suggests a number of ways parents might be usefully advised to support their children's early learning and development at home.

Conclusion 10: The findings suggest that for some home activities, more is better (such as reading to a child, or singing songs and nursery rhymes), while for others, the highest mean scores are associated with moderate levels of engagement (e.g. extracurricular activities, use of digital devices).

ECEC attendance is associated with higher emergent literacy and numeracy scores, regardless of socio-economic status, but disadvantaged children are less likely to attend

In the United States, there was a statistically significant association between ECEC attendance and socio-economic status, with over 90% of five-year-olds in the top SES quartile having attended before the age of five, compared to 73% in the lowest SES quartile. There was no significant association between ECEC attendance and children's race/ethnicity, and girls and boys were equally likely to have attended. Children in the United States who had ever attended ECEC had significantly higher mean emergent literacy and emergent numeracy scores than children who never attended, even after accounting for SES. Age of first entry to ECEC was not significantly related to scores in any of the learning outcomes assessed in IELS. ECEC participation rates were lower in the United States than in England and Estonia, where there is near-universal participation.

Conclusion 11: Regardless of socio-economic background, children in the United States who had attended ECEC have better emergent literacy and numeracy skills as assessed in IELS than those who did not. US children from higher SES households attended ECEC earlier and for longer than children from lower socio-economic backgrounds.

Conclusion 12: Expanding access to high-quality ECEC in the United States may be a means of improving early learning outcomes.

Findings from IELS in the United States show that disparities in children's early skills related to their gender, socio-economic status and home language are already present shortly after school entry. These gaps are observable across a range of early learning domains. That some groups of children are already falling far behind others at the age of five should be cause for concern. There are groups of children in the United States who are likely to need intensive and tailored support throughout their early schooling in order to stop these gaps from widening or, more hopefully, to help them to close. Providing this support before the critical window for positive early learning closes is likely to offer the best chance of success.

References

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Note

1. There were too few Pacific Islander/Native Hawaiian and too few American Indian/Alaska Native children in the sample to accurately estimate the skills of these children in IELS.

ANNEX A

Technical note

This technical note provides additional background information on technical aspects relating to the International Early Learning the Child Well-being Study (IELS). It sets out the rationale for the types of assessment used in the study, response rates and other factors influencing the robustness, reliability and comparability of the data. More information on the conceptual and technical aspects of the study can be found in the Assessment Framework and Technical Standards for the study.

Assessment methods

The study used two types of assessment: direct assessment of children's skills through developmentally-appropriate, interactive stories and games delivered on a tablet device and indirect assessment through reports on children's skills from parents and educators. The key benefit of direct assessment is that it provides countries with a common basis for comparing children's early learning. Through careful development, testing and analysis[1], any cultural or other biases are minimised so that countries can have confidence that the results are comparable across countries. Furthermore, delivery of the assessment through a tablet device enhances the reliability of the results through the avoidance of transcription and coding errors.

The indirect assessment provides benefits in triangulating the results from the direct assessment and in providing a fuller picture of children's development and skills. Parents have knowledge of their child over time and in a range of settings, whereas teachers have a comparative group of children at the same age on which to base their assessments. Thus, gaining information from parents as well as from teachers provides greater breadth and depth on children's early learning and development while the direct assessment provides a stronger basis for comparability across countries.

Participation rates

A critical factor influencing the reliability of the results from any survey is the response rates, particularly for any form of direct assessment. The quality standard for child participation rates for IELS was set at 75%, meaning this level of participation rate provides confidence that the sample is representative of children at that age in that country. Each participating country exceeded this standard. Teacher response rates were also very high, 90% or higher in each country. While parent response rates were somewhat lower, these were still higher than is generally expected.

Table A.1 **Response rates for IELS, by informant and country**

Participation rates	England (%)	Estonia (%)	United States (%)
Child	94.9	84.1	92.7
Parent	67.5	86.0	71.2
Educator	89.7	94.1	96.4

Note: The participation rates are weighted and based on participating centre/schools and children.

Quality assurance

Standards for administration and assessment procedures, to achieve standardised implementation procedures, were set out in comprehensive manuals, applicable to each participating country. Precise instructions were provided for centre and school co-ordinators and scripts were provided to study administrators, in addition to the provision of mandatory training.

National and International Quality Assurance Monitors (IQAMs) were appointed to attest that the implementation in each country complied with the standards for the study. These Quality Monitors were independent and observed the administration of the assessments in each participating country in order to attest that the required standards were met. Across all quality assurance activities, the observations showed that all three participating countries generally followed the standardized procedures as outlined in the IELS Technical Standards.

Note

1. The types of analysis used for this study included differential item functioning by gender, country, and language, item-level analysis, latent trait-level analysis, and convergent and predictive validity analysis.

Early Learning and Child Well-being in the United States

The first five years of a child's life is a period of great opportunity, and risk. The cognitive and social-emotional skills that children develop in these early years have long-lasting impacts on their later outcomes throughout schooling and adulthood.

This report sets out the findings from the International Early Learning and Child Well-being Study in the United States. The study assesses children's skills across both cognitive and social-emotional development, and how these relate to children's early learning experiences at home and in early childhood education and care. It is enriched by contextual and assessment information from the children's parents and educators. It provides comparative data on children's early skills with children from England and Estonia, who also participated in the study, to better identify factors that promote or hinder children's early learning.

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