Why early learning and child well-being matter

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

The first five years of every child's life are a period of great opportunity, but also one of 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. While the quality of schooling also matters, strong early learning accelerates later development whereas a poor start inhibits it.

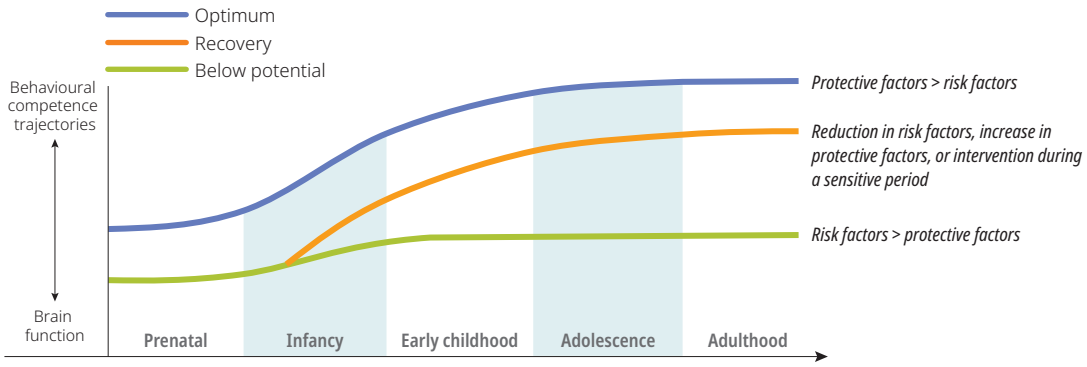
Early learning and children's well-being are inter-related and mutually reinforcing. Children thrive in caring families, where they feel safe and happy, and where they are supported as they learn about themselves and their social, cultural and physical environments. The day-to-day interactions and activities between young children and their parents and other family members foster their well-being and their emerging cognitive and social-emotional skills.

Children also learn in settings beyond their immediate home, including in their wider family network, their neighbourhood community, in early childhood education and care (ECEC) settings and in school. ECEC can be beneficial for all children. For children without strong home learning environments, however, ECEC and early schooling may be their only chance to develop the key skills they need. Children from even the most impoverished homes thrive when they have sustained access to high-quality and responsive learning environments. This early platform of learning enables them to develop the skills to succeed at school and in later life.

The window for positive early learning closes when children are around seven years old, due to a sharp decrease in brain malleability at this point (Stiles and Jernigan, 2010[1]). Protective factors that support children's development during this phase include regular, warm, stimulating interactions with their parents and other caregivers whereas risk factors that impede development include exposure to stresses, such as violence in the home and poor nutrition.

Children who experience supportive early learning environments develop rapidly, establishing a sound base for ongoing learning and achievement. Children who do not have a good start, however, can still be assisted through well-targeted investments that increase the balance of protective factors over risk factors. This enables timely development and shapes children's long-term ability to learn, as illustrated in Figure 1.1.

Figure 1.1 **Risk and protective factors affect development trajectories**



Source: Adapted from Walker et al. (2011[2])Early Childhood Stimulation Benefits Adult Competence and Reduces Violent Behavior, https://doi.org/10.1542/peds.2010-2231.

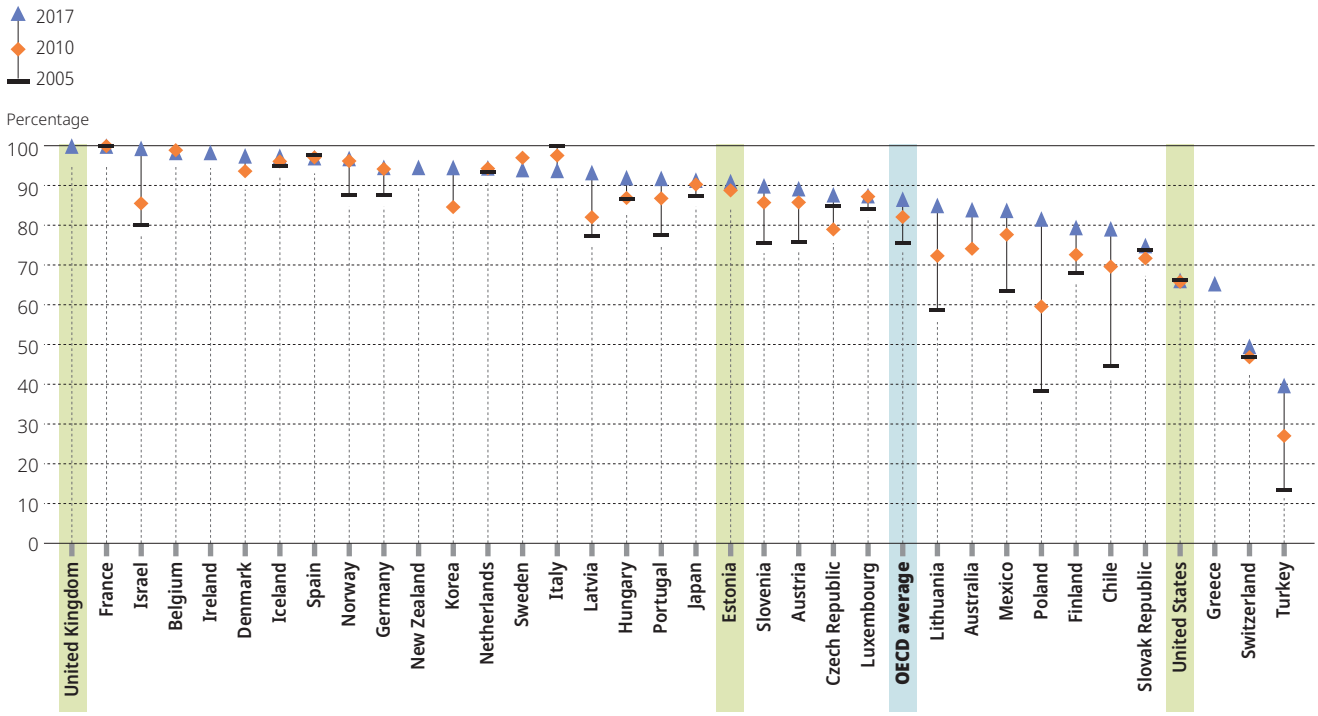
If children have not developed core foundation skills at seven years of age, they will struggle to progress well at school and are more likely to have social and behavioural difficulties in adolescence and in adulthood. Seeking to ameliorate a poor start at older ages is complex, challenging and costly, with limited success rates (Heckman, 2006[3]). At a system level, the proportion of children who have poor early development constrains the extent to which any education system can achieve success for these children and perform well as a whole.

Countries are increasingly focusing on early years policies, as a means of raising overall educational performance and mitigating disadvantage. Many countries have increased ECEC participation rates and increased their overall investments in early years policies, as shown in Figure 1.2 (OECD, 2019[4]). The expected benefits for children, however, are not always apparent. Despite this, early learning remains one of the most neglected areas of educational research, especially in an international context. As a consequence, there is little international evidence on how to improve early years policies and achieve better results for children.

There could be many reasons why the promise of early childhood education is not delivering for some children. These may include the quality and responsiveness of provision, whether the provision focuses on the skills children need to develop most in the early years, and the timeliness and continuity of provision. At a system level, there is much that countries could learn from each other about how to ensure effective provision for all children.

Figure 1.2 **Change in enrolment rates of children aged 3 to 5 years (2005, 2010 and 2017)**

Early childhood education (ISCED 0) and primary education



Source: OECD (2019[4]), Education at a Glance *OECD Indicators*, OECD Publishing, Paris, https://dx.doi.org/10.1787/f8d7880d-en.

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

The remainder of this chapter addresses:

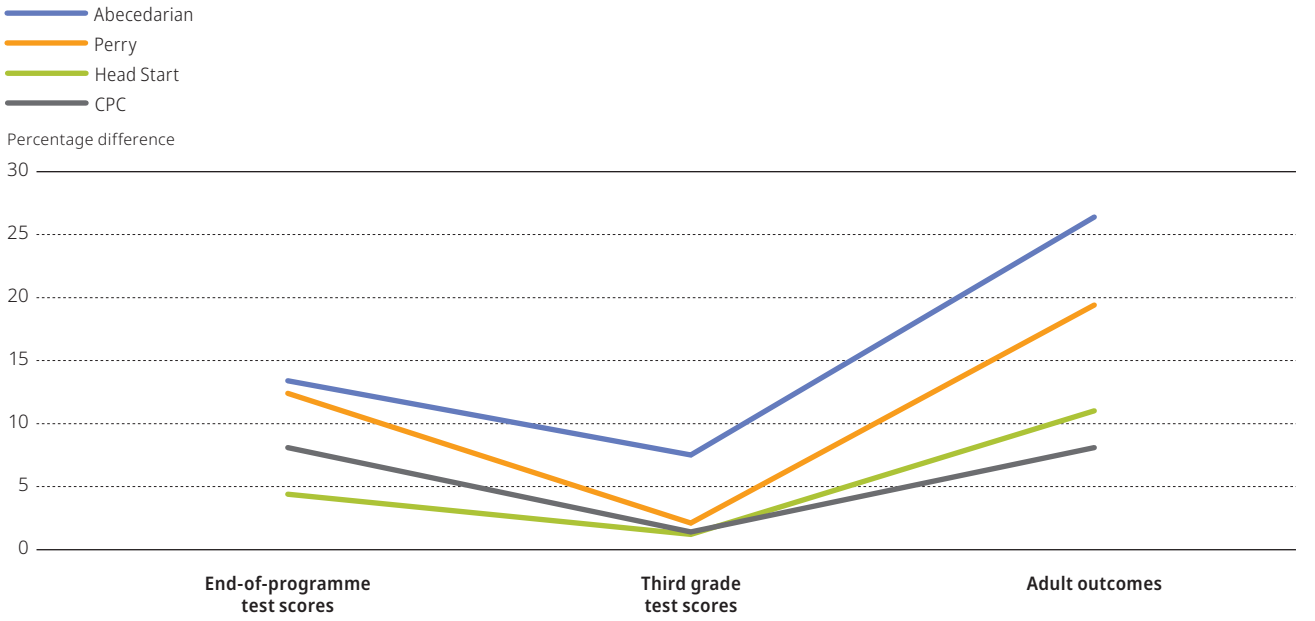
- the impacts of the early years on children's well-being, education and later outcomes
- the areas of learning that matter most for children
- the contexts in which children learn
- the benefits of giving all children a strong early start and the risks of not doing so
- how governments can assess their early years policies.

A STRONG PREDICTOR OF LATER OUTCOMES

Children's early learning and well-being have a direct and enduring impact on their later educational attainment, socio-economic status, health, well-being and civic engagement. An increasing body of longitudinal evidence[1] has tracked children from pre-school and through schooling into adulthood, consistently finding a significant relationship between their early experiences and later outcomes (Shuey and Kankaraš, 2018[5]). The benefits of strong early learning are clearly evident at school entry, at the end of compulsory schooling and later in adulthood. Children who do not develop critical early skills such as emergent literacy or self-regulation, however, face enormous challenges in achieving well at school and in having positive outcomes during adulthood.

An argument against early years investment has been that early skills fadeout in primary school. This is true, yet longitudinal studies demonstrate that the impact of positive early learning re-emerges later in schooling and continues into adulthood, as shown in Figure 1.3. In fact, children's test scores at the age of five better predict adult outcomes than those in primary school. Strong early learning appears to act as a foundation that, once consolidated during early schooling, then provides a protective and fertile base for greater skill development during the remaining school years and into adolescence and adulthood.

Figure 1.3 **Predicted percentage effects on adult earnings of early childhood programmes, based on test scores versus adult outcomes**



Note: Adult earnings effects are shown as predicted average percentage increase in earnings due to the programme, compared to expected earnings if the person had not participated in the programme. CPC refers to Chicago Child-Parent Center Program.

Source: Bartik (2014[6]), From Preschool to Prosperity: The Economic Payoff to Early Childhood Education, W.E. Upjohn Institute, http://dx.doi.org/10.17848/9780880994835.

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Children's early learning and well-being also affect a wide-range of interrelated outcomes in later life. For example, higher educational achievement and attainment are often linked with more positive employment and earnings, as well as with better mental and physical health (OECD, 2018).

The size of early learning effects on adult outcomes is significant. The four longitudinal studies in Figure 1.3 found effect sizes on adult incomes ranging from just under 10% to over 25%.

Early learning supports children's well-being and happiness

There is no trade-off between early learning and children's happiness or indeed from a child's perspective, between learning and play. Happy, healthy children are active and curious, and enjoy the natural processes of learning. These processes occur through interactions with family and other caregivers, and through different types of play. Through these experiences children learn about and actively explore their world, as they also develop their language and other cognitive skills, social-emotional skills, and physical skills (Shuey and Kankaraš, 2018[5]).

As well as developing emergent literacy skills, interactions with others help children learn to express their feelings and preferences, listen to others, share, self-regulate their emotions, solve problems, pay attention and concentrate. Children who develop this holistic set of skills are happier than children who do not have the opportunities to do so. These early skills influence how well children get along with others and how well they are able to make friends. Children's skills also influence the extent to which adults engage with them, further affecting their sense of connectedness and well-being, and their continuing skill development.

Better outcomes throughout schooling

Early academic skills such as emergent literacy and emergent numeracy are positively associated with later educational achievement. Self-regulation, visual-motor skills and agreeableness in early childhood all predict later educational attainment. These early skills are evident in the skills students demonstrate at the end of primary school and at the end of secondary school, including higher rates of school completion (Shuey and Kankaraš, 2018[5]).

Strong early learning translates into higher levels of skills at later ages because "skills beget skills" (Cunha and Heckman, 2009[7]). Early progress enables children to take greater advantage of further learning opportunities inside and outside school than children without such positive foundations. Children with strong early learning outcomes elicit additional learning opportunities from their parents, teachers and environment, by asking questions or taking the initiative to engage in new activities.

Strong early learning also reduces the need for special education support and remedial education during schooling (Sylva et al., 2004[8]; Siraj et al., 2017[9]).

Children with poor emergent literacy skills can appear to do well in the first year or two of school. However, these children understand fewer words per interaction, focus primarily on commands and tend to interact less with adults than children with better language skills. After two years of primary school, children with weaker early literacy skills increasingly struggle, particularly in reading, and often face a downward spiral from this point (Shuey and Kankaraš, 2018[5]).

Early self-regulation is also critical to later educational achievement, even after controlling for early literacy and numeracy skills (Duncan et al., 2007[10]). Aspects of self-regulation such as attentiveness and task persistence among children starting school are positively associated with achievement in reading and mathematics throughout primary school (Li-Grining et al., 2010[11]).

Early self-regulation relates positively to teachers' perceptions of children's abilities (Neuenschwander et al., 2012[12]) and thus their expectations of them. Self-regulation appears to be particularly important for boys (Washbrook, Propper and Sayal, 2013[13]) and for children from low-income or at-risk families in predicting later education outcomes.

Higher educational attainment following school

Early academic skills such as emergent literacy and numeracy are positively associated with educational attainment in adulthood. In addition, self-regulation, agreeableness, visual-motor skills, and prosocial behaviour in early childhood all predict adult educational attainment, such as completing a degree. Both self-regulation and early agreeableness have been found to be associated with higher academic attainment in adulthood, even after adjusting for earlier cognitive ability. Early self-regulation has also been found to be a stronger predictor of degree completion by the age of 25 than early reading or maths scores (McClelland et al., 2013[14]).

In addition to the attainment of degrees and other qualifications, early skills have been found to be predictive of adult literacy and numeracy skills, as indicated by test scores at different ages during adulthood. For example, children's persistence in completing a task as four-year-olds significantly predicted their reading and mathematics test scores at the age of 21 (McClelland et al., 2013[14]).

Stronger employment and socio-economic outcomes

Strong early cognitive skills, self-regulation skills and social well-being have clear positive associations with employment, income and socio-economic status in adulthood. For example, five-year-olds with stronger verbal skills are more likely as adults to be employed, earn a higher income and own their own home (Schoon et al., 2015[15]). Similar associations have been found for early numeracy and visual-motor skills.

Similarly, adults who succeeded in moving out of poverty they experienced as children generally displayed higher cognitive skills in their early years than those from similar circumstances who remained in poverty as adults (Blanden, 2006). Adults who achieved social mobility due to enhanced early learning have been found to pass similar benefits on to their own children (Heckman and Karapukula, 2019[16]).

Early cognitive skills are a stronger predictor of adult earnings for women than for men, although in a negative rather than positive direction. Women who had low early cognitive skills faced larger wage penalties in the labour market than men who had similarly low levels of early cognitive skills (Parsons et al., 2011[17]).

Early self-regulation has also been found to be linked to labour market outcomes. Better early self-regulation is related to a lower likelihood of unemployment, welfare dependence, including social housing, and higher income levels in adulthood (Moffitt et al., 2011[18]; Fergusson, Boden and Horwood, 2013[19]).

In addition, early social competence is associated with better work competence, as well as predicting entrepreneurial status, continuity of entrepreneurial activity and earnings.

Better mental and physical health

Early cognitive skills, self-regulation, emotional health and social skills are all associated with better mental health in adulthood. Children with better receptive language skills as five-year-olds were more likely to have positive mental health outcomes in adulthood, including a lower likelihood of depression, anxiety and psychological distress. Better self-regulation and visual-motor skills at age five are also associated with lower malaise in adulthood. Conversely, poor early self-regulation is associated with later psychological disorders, particularly for men (Schoon et al., 2015[15]).

Early cognitive abilities, self-regulation, visual-motor skills, agreeableness, and conscientiousness are all linked with adult physical health. This includes better self-reported health and better eating habits and lower likelihoods of obesity, smoking and substance abuse (Schoon et al., 2015[15]).

Better citizens

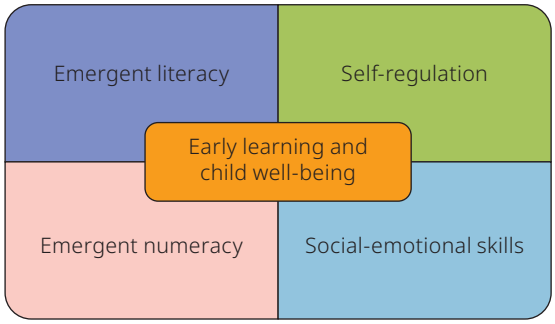
Strong language skills, self-regulation, trust and empathy in early childhood predict a lower likelihood of involvement in crime and delinquency in adulthood. Aspects of social well-being, particularly prosocial behaviours, are also important predictors of a lower likelihood of crime and delinquency later in life.

Conversely, children who demonstrate a lack of empathy and trust during their early years are more likely to demonstrate antisocial and delinquent behaviours later in adolescence, and also face greater risk of adult psychopathology (Fontaine et al., 2011[20]). In particular, poor early self-regulation and a lack of prosocial behaviours are related to violent offending in particular, and the likelihood and number of criminal offences in adulthood (Fergusson, Boden and Horwood, 2013[19]).

THE AREAS OF EARLY LEARNING THAT MATTER MOST FOR CHILDREN

Four areas of children's early learning are critical in predicting later outcomes in schooling and adulthood: emergent literacy, emergent numeracy, self-regulation and social-emotional skills. While these areas overlap, they each have an independent effect on later outcomes. And while other areas of children's development also matter, such as visual-motor and physical skills, the interrelated and overlapping nature of early learning means it is not necessary to measure every skill to have an accurate indication of how well a child is developing.

Figure 1.4 **Key areas of early learning and child well-being**



Children who are progressing well in the four areas in Figure 1.4 have a high likelihood of going on to do well at school, realise their aspirations, achieve economic independence and live happy, healthy lives.

Emergent literacy

In the early years, the most important components of emergent literacy are listening comprehension, vocabulary and phonological awareness. These are more predictive of children's later literacy skills than other literacy-related development, such as the level of reading and writing skills that children have developed at the age of five.

Listening comprehension incorporates a range of early literacy skills, such as understanding the explicit and implied meaning of spoken language, including standalone sentences. Vocabulary knowledge is fundamental for comprehension and for successfully communicating with others, which further develops emergent literacy as well as social connectedness. Phonological awareness is the ability to detect, manipulate and analyse the auditory aspects of spoken language.

Self-regulation

Self-regulation refers to the mental processes that enable individuals to plan, focus their attention, remember instructions and juggle multiple tasks successfully. The key elements of self-regulation that predict children's later outcomes are referred to as executive function. This includes working memory, inhibitory control and mental flexibility (Jones et al., 2016[21]). Working memory is the ability to store and manipulate or use information in order to complete a task. Inhibitory control (inhibition) represents the ability to overcome strong tendencies to react in a habitual manner, while mental flexibility reflects the capacity to shift between rules or adapt to changing circumstances.

The development of early self-regulation skills enables children to persist in achieving goals and to regulate their behaviour. The latter manifests itself through inhibiting impulsive behaviours and delaying gratification (Mischel, Shoda and Rodriguez, 1989[22]). As well as being better able to achieve tasks, children with self-regulation skills are more able to operate effectively in groups than those with poor behavioural regulation.

Emergent numeracy

Early numeracy skills reflect children's ability to reason and apply simple numerical concepts. Early numeracy comprises the ability to identify and understand numbers, to count, and to detect patterns and shapes. The early numeracy skills that are predictive of later positive outcomes for children are as much about the processes of mathematics as about content. Children at this stage are learning that things can be measured, such as through counting objects and through comparing lengths and weights. At the age of five, children are also developing organised ways of thinking about and dealing with mathematical issues to find solutions.

Social-emotional skills

During their early years, children begin to form close relationships and develop expectations about the behaviour of both themselves and others. They learn to control their emotions and actions, to take others' perspectives and to empathise. These skills represent the basic building blocks for the later development of more complex social-emotional skills. Of particular importance in the early years are children's empathy, trust in people familiar to them and prosocial behaviour, including the absence of disruptive behaviours.

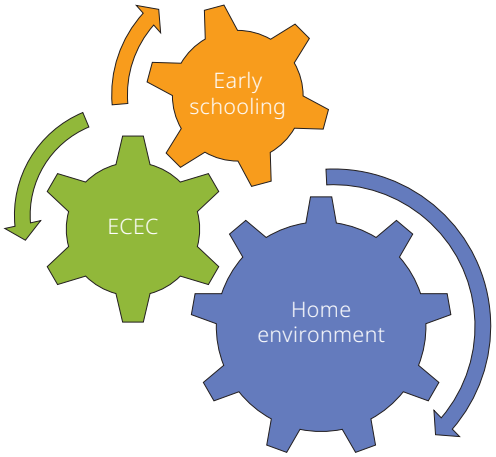
THE DRIVERS OF POSITIVE EARLY DEVELOPMENT

Human development is highly complex and cannot be distilled into simple dichotomies such as the classical "nature versus nurture" debate as individuals and contexts mutually influence one another (Overton, 2015[23]). In other words, children's individual characteristics (i.e. biological or inherited features) constantly interact with the characteristics of their surroundings (e.g. their home and other learning environments). Thus, while skills may be heritable to varying extents, the environments that children experience influence the ways in which they develop particular skills and also their potential for learning new skills (Kovas et al., 2007[24]).

Recent research in neuroscience and brain development (Stiles and Jernigan, 2010[1]) shows that the brain develops rapidly during children's early years. As they grow, these learning capacities slow down and the amount of effort it takes to learn new skills increases. High brain malleability early in life means that young children are especially sensitive to external stimuli, such as the types of interactions they have with their parents and other caregivers. Brain development is sequential and cumulative, so frequent and ongoing positive interactions lead to a virtuous cycle of skills acquisition.

The extraordinary plasticity of children's brains, however, cannot ensure that a sufficient rate of early development and learning actually occurs. Children's learning and continuing development depends on a nurturing and stimulating environment, particularly that provided by their families, which can be supported by early childhood education and care services, other early interventions, and early schooling, as set out in Figure 1.5.

Figure 1.5 **Drivers of children's early learning**



Strong home environments provide a great start for every child

Children's home environments are the strongest predictor of their early development. Their families' socio-economic status, their parents' education, parenting behaviours and parental well-being all contribute to the home environment children experience and thus to their early learning outcomes (Shuey and Kankaraš, 2018[5]).

Parents are children's first teachers. The activities they undertake with their children such as reading to them and engaging them in warm and responsive interactions, and the frequent use of complex adult language creates a home learning environment which supports children's development of cognitive skills, self-regulation, social-emotional skills, and their sense of well-being.

The Effective Pre-school and Primary Education Project (EPPE) found seven parental activities that parents undertake with their children that are significantly associated with later achievement in education. These are:

- frequency of reading from books
- going to the library
- playing with numbers
- painting and drawing
- teaching letters
- teaching numbers, and
- teaching songs, rhymes and poems.

EPPE found the combined effect of these activities on children's development was greater than the effects of parental education or family socio-economic status, although the prevalence of these activities correlated positively with both. Positive home learning environments were associated with stronger cognitive development, self-regulation and social-emotional skills. Thus, what parents do is more important than who they are (Sylva et al., 2004[8]).

Early childhood education and care can enhance early skill development, but it is not guaranteed

ECEC often serves multiple functions. In many countries, it is used as a tool to increase women's labour market participation, help families to reconcile work and family responsibilities, confront demographic challenges such as decreasing fertility rates and aging populations, and maintain high employment rates among the population.

More recently, however, governments have increasingly seen ECEC as a means to support children's early development and mitigate the effects of inequity. Policy makers are increasingly investing in early childhood programmes to build a strong foundation for cognitive and social-emotional skills, especially for children from disadvantaged or immigrant backgrounds to combat the linguistic and economic disadvantages that could otherwise hinder their development and integration. As such, ECEC is seen by many as a critical policy measure that can promote equity, support holistic and continuous development and improve children's well-being.

Results from the Programme for International Student Assessment (PISA) 2018, however, show highly variable effects from students' ECEC participation across countries. Even after taking into account differences in socio-economic background, the effects of participating in early childhood education on students' academic achievement at age 15 differ substantially across countries (Figure 1.6). Some education systems show very positive benefits among students who have attended ECEC whereas in others the impact appears to be neutral or even negative.

While more information is needed to understand these results, it is clear that ECEC does not guarantee better outcomes for students. In addition, the overall benefits of ECEC can diminish in systems where provision has expanded (Duncan and Magnuson, 2013). Thus, increasing provision without information about its quality or impact may not result in better outcomes for children. In fact, there is even evidence that some low-quality ECEC settings may damage children's outcomes and their subsequent prospects (Shuey and Kankaraš, 2018[5]).

Despite growing interest from policy makers on how to use ECEC for the benefit of children, there is little system-level information to help policy makers or education leaders to do so with any level of confidence. The relationship between children's development and structural aspects of ECEC provision, such as group size, has been found to be weak. Even factors such as teachers' qualifications do not always show a clear relationship with children's outcomes (Shuey and Kankaraš, 2018[5]). While process quality[2] is undoubtedly key, there is little evidence about what forms of participation, provision and pedagogical approaches work best for different groups of children.

In addition, in some countries, children from disadvantaged backgrounds have more limited access to ECEC than other children and they access lower-quality provision that is less responsive or tailored to their needs.

Figure 1.6 **Relationship between age of participation in early childhood education programmes and students' reading scores at age 15 across countries, controlling for socio-economic status, 2018**

Note: Impact of participation represents score-point difference in reading performance between students who reported having attended pre-school and those who did not. Differences in reading scores take into account students' socio-economic profiles.
Source: OECD (2018[26]) PISA 2018 Database, http://www.oecd.org/pisa/data/2018database/.
StatLink https://doi.org/10.1787/888934110239

CATCHING-UP DURING EARLY SCHOOLING IS POSSIBLE BUT IS CHALLENGING

High-quality early schooling can partly compensate for children's limited learning and development prior to school. While learning in the early years is more predictive of later outcomes than the first year or two in school, the initial years of schooling can still alter children's later learning trajectories.

Early schooling can be particularly effective in ameliorating poor mathematical skills on school entry. High-quality teaching in the first year or two of school can result in children making rapid progress. However, most children who have weak early numeracy skills do not entirely catch up with their peers who started school with strong early skills in numeracy (Sylva et al., 2008[27]).

High-quality early schooling can also accelerate children's literacy skills and their self-regulation, although not with the same success as in mathematics, and again, these children do not entirely catch up with their peers who started with strong early skills in literacy.

For children from disadvantaged backgrounds, high-quality early schooling is essential if they are to progress well in school - even if they have had a strong early start. Among advantaged children, having strong early skills when they start school provides a protective buffer against mediocre quality early schooling. This is not the case, however, for disadvantaged children. Disadvantaged children with strong early skills at school entry typically fall behind if they experience low-quality teaching in the first year or two of school. Positive outcomes in the earliest years do not entirely eliminate the vulnerability of disadvantage.

Paying attention to the early years reaps benefits for governments

Skills are more important than ever before, not only for individuals, but also for achieving cohesive families, communities and societies. As the value of skills increases across countries, the outlook for people with poor skills becomes a greater concern. Without the means for all citizens to develop the skills they need to fully participate in society, inequity and the by-products of inequity grow.

Inequality has increased across many countries over past decades and the economic recovery since the last financial crisis has exacerbated this. Top and middle-income groups have recovered much of the lost ground whereas those in the bottom income levels are still well below pre-crisis levels (OECD, 2016[28]).

The populations of OECD countries are becoming increasingly heterogeneous as a result of migration. For example, the share of the foreign-born population in OECD countries increased from 6% to 9% over the last two decades. Integrating young immigrant children into their new communities is of key importance for social and economic cohesion (OECD, 2017[29]).

The evidence is overwhelming. ***Starting behind means staying behind.*** When children's early learning is not strong before they start school and continues to be weak in the first two years of school, the outlook for these children is bleak. This group of children is likely to continue to attend school, at least until the end of primary school, but many will not develop the basic academic skills they need to achieve positive labour market outcomes. Some will struggle to participate fully in society or experience positive levels of well-being. This is a particular concern in countries or regions where rates of inequality and deprivation are already high and growing.

Governments can do much to promote early learning and child well-being in early childhood. Policies that support families with young children range from the provision of parental leave, to ensuring access to adequate housing in safe environments, to rules on migration and family reunification. The most direct policy levers available to governments for strengthening early learning are in the realm of ECEC as well as parenting programmes and other supports for families with young children.

Despite the potential for enhancing outcomes through early years policies, some governments know very little about the impact of their early years policies. Reliable, valid, comparable data on children's early learning outcomes and well-being are the only means to gauge how well children are faring and what is most needed to improve children's early experiences and outcomes.

Box 1.1 Children's rights to early learning and well-being

The United Nations Declaration on the Rights of the Child (UN, 1959[30]) states that every child should be enabled to develop and learn, to enjoy their early years and be positioned for later success and well-being across all dimensions of their lives. Principle 2 sets out that:

"The child shall … be given opportunities and facilities to enable him (her) to develop physically, mentally, morally, spiritually and socially in a healthy and normal manner … the best interests of the child shall be the paramount consideration."

Principle 6 of the Declaration refers to the importance of children having opportunities for love, understanding, care and security, while Principle 7 refers to opportunities for play and recreation, and an entitlement to education. The Declaration states that education will:

"… promote his (her) general culture and enable him (her), on a basis of equal opportunity, to develop his (her) abilities, his (her) individual judgement, and his (her) sense of moral and social responsibility, and to become a useful member of society."

With similar intent, the Sustainable Development Goals (SDGs) prioritise children's early development. Target 4.2 aspires "to ensure by 2030 that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education".

CONCLUSIONS

Children's well-being during childhood and as they grow into adulthood is significantly influenced by their experiences in the first few years of their lives. The development of children's early cognitive and social-emotional skills has long-lasting impacts on their later physical and mental health, life satisfaction, educational attainment, employment, income, and civic engagement. The benefits of strong early learning among children are clearly evident when they start school, at the end of compulsory education and later in adulthood. When children do not develop critical early skills, however, their well-being during childhood is undermined and they face enormous challenges in achieving positive outcomes as adults.

Countries will make faster progress on improving children's early learning experiences if they are able to learn from other countries and systems, rather than each working in isolation. There is a lack of reliable, valid and comparable international evidence that enables countries to do so. The International Early Learning and Child Well-being Study (IELS) addresses this gap.

References

Bartik, T. (2014), *From Preschool to Prosperity: The Economic Payoff to Early Childhood Education*, W.E. Upjohn Institute, http://dx.doi.org/10.17848/9780880994835. [6]

Cunha, F. and **J. Heckman** (2009), *The Economics and Psychology of Inequality and Human Development*, National Bureau of Economic Research, Cambridge, MA, http://dx.doi.org/10.3386/w14695. [7]

Duncan, G. et al. (2007), "School Readiness and Later Achievement", *Psychological Association*, Vol. 43/6, pp. 1428-1446, http://dx.doi.org/10.1037/[0012-1649.43.6.1428].supp. [10]

Fergusson, D., J. Boden and **L. Horwood** (2013), "Childhood self-control and adult outcomes: Results from a 30-year longitudinal study", *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 52/7, pp. 709-717.e1, http://dx.doi.org/10.1016/j.jaac.2013.04.008. [19]

Fontaine, N. et al. (2011), "Predictors and outcomes of joint trajectories of callous–unemotional traits and conduct problems in childhood.", *Journal of Abnormal Psychology*, Vol. 120/3, pp. 730-742, http://dx.doi.org/10.1037/a0022620. [20]

Heckman, J. (2006), *Skill formation and the economics of investing in disadvantaged children*, http://dx.doi.org/10.1126/science.1128898. [3]

Heckman, J. and **G. Karapukula** (2019), *Intergenerational and Intragenerational Externalities of the Perry Preschool Project*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3399272 (accessed on 25 February 2020). [16]

Jones, S. et al. (2016), *EXECUTIVE FUNCTION MAPPING PROJECT: Untangling the Terms and Skills Related to Executive Function and Self-Regulation in Early Childhood*, http://www.acf.hhs.gov/programs/opre/index.html. (accessed on 25 February 2020). [21]

Kovas, Y. et al. (2007), "The genetic and environmental origins of learning abilites and disabilities in the early school years", *Monographs of the Society for Research in Child Development*, Vol. 72/3, pp. 1-144, http://dx.doi.org/10.1111/j.1540-5834.2007.00439.x. [24]

Li-Grining, C. et al. (2010), "Children's Early Approaches to Learning and Academic Trajectories Through Fifth Grade", *Developmental Psychology*, Vol. 46/5, pp. 1062-1077, http://dx.doi.org/10.1037/a0020066. [11]

McClelland, M. et al. (2013), "Relations between preschool attention span-persistence and age 25 educational outcomes", *Early Childhood Research Quarterly*, Vol. 28/2, pp. 314-324, http://dx.doi.org/10.1016/j.ecresq.2012.07.008. [14]

Melhuish, E. et al. (2008), "Effects of the Home Learning Environment and Preschool Center Experience upon Literacy and Numeracy Development in Early Primary School", *Journal of Social Issues*, Vol. 64/1, pp. 95-114, http://dx.doi.org/10.1111/j.1540-4560.2008.00550.x. [25]

Mischel, W., Y. Shoda and **M. Rodriguez** (1989), "Delay of gratification in children", *Science*, Vol. 244/4907, pp. 933-938, http://dx.doi.org/10.1126/science.2658056. [22]

Moffitt, T. et al. (2011), "A gradient of childhood self-control predicts health, wealth, and public safety", *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 108/7, pp. 2693-2698, http://dx.doi.org/10.1073/pnas.1010076108. [18]

Neuenschwander, R. et al. (2012), "How do different aspects of self-regulation predict successful adaptation to school?", *Journal of Experimental Child Psychology*, Vol. 113/3, pp. 353-371, http://dx.doi.org/10.1016/j.jecp.2012.07.004. [12]

OECD (2019), *Education at a Glance 2019: OECD Indicators*, OECD Publishing, Paris, https://dx.doi.org/10.1787/f8d7880d-en. [4]

OECD (2018), *PISA 2018 Database*, http://www.oecd.org/pisa/data/2018database/ (accessed on 26 January 2020). [26]

OECD (2017), *Starting Strong 2017 Key Indicators on Early Childhood Education and Care*, https://dx.doi.org/10.1787/9789264276116-en (accessed on 25 February 2020). [29]

OECD (2020), *Income inequality update* (indicator), https://dx.doi.org/10.1787/459aa7f1-en (accessed on 25 February 2020). [28]

Overton, W. (2015), "Processes, Relations, and Relational-Developmental-Systems", in *Handbook of Child Psychology and Developmental Science*, John Wiley & Sons, Inc., http://dx.doi.org/10.1002/9781118963418.childpsy102. [23]

Parsons, S. et al. (2011), "Long-term outcomes for children with early language problems: Beating the odds", *Children and Society*, Vol. 25/3, pp. 202-214, http://dx.doi.org/10.1111/j.1099-0860.2009.00274.x. [17]

Schoon, I. et al. (2015), *The Impact of Early Life Skills on Later Outcomes*, http://discovery.ucl.ac.uk/10051902/1/Schoon_2015%20The%20Impact%20of%20Early%20Life%20Skills%20on%20Later%20Outcomes_%20Sept%20fin2015.pdf (accessed on 31 July 2019). [15]

Shuey, E. and **M. Kankaraš** (2018), "The Power and Promise of Early Learning", *OECD Education Working Papers*, No. 186, OECD Publishing, Paris, https://dx.doi.org/10.1787/f9b2e53f-en. [5]

Siraj, I. et al. (2017), *Fostering Effective Early Learning Study A review of the current international evidence considering quality in early childhood education and care programmes-in delivery, pedagogy and child outcomes*, NSW Government, http://www.dec.nsw.gov.au (accessed on 25 February 2020). [9]

Stiles, J. and **T. Jernigan** (2010), *The basics of brain development*, http://dx.doi.org/10.1007/s11065-010-9148-4. [1]

Sylva, K. et al. (2008), "Final report from the primary phase: Pre-school, school and family influences on children's development during Key Stage 2 (7-11)", *Faculty of Social Sciences - Papers*, https://ro.uow.edu.au/sspapers/1807 (accessed on 25 February 2020). [27]

Sylva, K. et al. (2004), *The Effective Provision of Pre-School Education (EPPE) Project: Findings from Pre-school to end of Key Stage1*, http://www.ioe.ac.uk/projects/eppe (accessed on 5 December 2019). [8]

UN (1959), Declaration of the Rights of the Child (1959), https://www.ohchr.org/EN/Issues/Education/Training/Compilation/Pages/1DeclarationoftheRightsoftheChild(1959).aspx, (accessed 4 March 2020). [30]

Walker, S. (2011), "Early childhood stimulation benefits adult competence and reduces violent behavior", *Pediatrics*, Vol. 127/5, pp. 849-857, http://dx.doi.org/10.1542/peds.2010-2231. [2]

Washbrook, E., C. Propper and **K. Sayal** (2013), "Pre-school hyperactivity/attention problems and educational outcomes in adolescence: Prospective longitudinal study", *British Journal of Psychiatry*, Vol. 203/4, pp. 265-271, http://dx.doi.org/10.1192/bjp.bp.112.123562. [13]

Notes

1. For a fuller description of relevant longitudinal studies refer to Shuey and Kankaraš (2018[5]).
2. Process quality refers to the quality of pedagogical interactions between ECEC staff and children, the quality of communications between staff and parents, and most importantly, the quality of interactions among children, as well as the quality of interaction of children with space and material (OECD, 2017[29]).