

CHILDCARE AND CHILDREN'S INTELLECTUAL OUTCOMES

Key Points

- There is strong evidence that high quality early childhood education and care is beneficial for children when they start primary school. The effects are evident throughout primary school, and international evidence suggests that the benefits can persist into secondary school.
- Pre-school experience enhances all round development in children, and may particularly benefit disadvantaged children.
- Duration of attendance and an earlier start are related to better intellectual development.
- The effects of high quality provision remain evident throughout primary school. The home learning environment also has a strong influence.
- International evidence suggests that the benefits can persist into secondary education. Results of international assessments show that pupils who have attended pre-primary programmes tend to perform better than those who have not.

Background

The Children and Young People (Scotland) Act 2014 will see the childcare entitlement for 3 and 4 year olds rise from 475 hours a year to a minimum of 600 hours from August 2014. The same provision will be extended to 2 year olds who are 'looked after', under a Kinship Care Order, or with a parent appointed guardian; and, those who live in workless or job-seeking households. This will be further expanded in August 2015 to a wider group of two-year-olds based on current free school meal eligibility – representing around 27% of all 2 year olds.

Scotland's Future sets out plans to establish a universal system of high quality early learning and childcare for children from the age of one to when they start school. This has the potential to improve the outcomes and quality of life of children and families across Scotland, and would be among the most generous systems of childcare available in the EU. In the first budget after independence, the Scottish Government will further extend eligibility to 600 hours of childcare to nearly half of Scotland's two year olds. This will be funded from the savings and increased revenues laid out in *Scotland's Future*. By the end of the first Parliament, vulnerable 2 years olds and all 3 and 4 years olds will be entitled to enhanced provision of 1,140 hours of childcare a year, with a further investment of £600 million. In the longer term, the Scottish Government plans to provide 1,140 hours of childcare a year to all children from age one until they start school. Once fully operational, the Scottish Government estimates that around 240,000 children and 212,000 families will benefit.

Benefits to children of an expansion in childcare

There is a strong body of evidence which has shown the substantial benefits of early childhood education and childcare (ECEC). The benefits of formal¹ ECEC include cognitive, language and social development and improved confidence and peer relationships. Evidence suggests that it is children from disadvantaged backgrounds that are likely to gain the most from early years education and childcare.

This paper is focused on the benefits for children's intellectual outcomes which are usually understood in terms of vocabulary and problem solving. It summarises the benefits as demonstrated in large-scale surveys which provide robust evidence of the benefits to children over their life-course.

This paper is based on three key evidence sources and draws heavily from the referenced findings. The findings from these studies are also supported by other research studies. The studies which form the basis of this paper are:

- Growing Up in Scotland² (GUS): A large-scale longitudinal research project aimed at tracking the lives of several cohorts of Scottish children from the early years, through childhood and beyond. It gathers Scottish data about a range of outcomes for Scottish children including cognitive, social, emotional and behavioral development. GUS is currently following two cohorts of children across Scotland, Birth Cohort 1 has a sample of around 5000 children and Birth Cohort 2 has a sample of around 6000 children.
- The Effective Provision of Pre-school, Primary and Secondary Education³ (EPPE/EPPSE): A major study focused on the effectiveness of pre-school education. It considers the aspects of pre-school provision which have a positive impact on children's attainment, progress and development. EPPE is based on a sample of around 3000 children in England.
- The Programme for International Student Assessment (PISA): A three yearly international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students. It also gathers information on the students' backgrounds, schools and learning experiences and about the broader school system and learning environment. Around 510,000 students in 65 economies took part in PISA 2012, and around 470,000 students in 2009. The Scottish samples were around 3000 students in both 2009 and 2012.

The quality of childcare is found to be a critical factor in obtaining positive children's outcomes. There are a range of different dimensions to quality which include structural factors such as buildings and group size, and processes such as the quality of staff-child interactions, and staff education and training.⁴ Staff-child ratios

¹ The majority of the evidence on early childhood education and care relates to formal and group care. There is much less evidence available on individual and home based care.

² Growing Up in Scotland: <http://growingupinScotland.org.uk/> In addition to existing material a forthcoming GUS publication will focus on the characteristics of preschool provision and the relationship with child outcomes.

³ EPPSE: <http://www.ioe.ac.uk/research/153.html>

⁴ Quality in early provision is discussed in several research publications, Further information can be found in OECD (2012), Starting Strong III: A Quality Toolbox for Early Childhood Education and Care. OECD Publishing. <http://dx.doi.org/10.1787.9789264123564-en> and Campbell-Barr, V and Garnham

are considered a consistent predictor of high quality learning environments. Higher staff-child ratios tend to facilitate positive adult child interactions, and communications which support positive outcomes.

Benefits at the pre-school period

The EPPE study assessed children at ages 3 to 4, on entry to primary school and the end of years 1 and 2 of primary school. It also compared children who have attended pre-school with those with no pre-school attendance. Pre-school experience, compared to none, enhances all-round development in children. Children with no pre-school attendance had poorer cognitive attainment, sociability and concentration when they started primary school.

Duration of attendance (in months) is important and an earlier start (under age 3 years) is related to better intellectual development. However, full time attendance led to no better gains for children than part-time provision. Disadvantaged children benefit significantly from good quality pre-school experiences, especially where they are with a mixture of children from different social backgrounds. Overall, the EPPE study found that disadvantaged children tend to attend pre-school for shorter periods of time than those from more advantaged groups (around 4-6 months less).

GUS evidence shows that there a range of factors which are important in cognitive development, of which parental level of education was the most strongly associated with the change in cognitive ability between ages 3 and 5. In terms of problem solving ability, the experience of pre-school education itself had an impact. Those children who did not attend any pre-school were more likely to show a deterioration in problem solving ability. The EPPE study also emphasises the importance of the home learning environment and that what parents do with their children makes a real difference to young children's development.

Benefits in primary school

The EPPE study⁵ has found that the beneficial effects of pre-school remained evident throughout Years One and Two of primary school, although some outcomes were not as strong as they had been at school entry. High quality pre-school provision combined with longer duration had the strongest effect on development. The number of months a child attended pre-school continued to have an effect on their progress throughout the first two years of primary school. The benefits of an early pre-school start continued to be evident at the end of these two years for children aged six and seven.

Pre-school quality was significantly related to children's scores on standardised tests of reading and mathematics at age 6. At age 7 the relationship between quality and academic attainment was somewhat weaker but still evident.

(2010) Childcare: A review of what parents want. Equality and Human Rights Commission. http://www.equalityhumanrights.com/uploaded_files/research/childcare_what_parents_want.pdf

⁵ The effective provision of pre-school education (eppe) project: findings from pre-school to end of key stage 1 <http://eppe.ioe.ac.uk/eppe/eppepdfs/RBTec1223sept0412.pdf>

Individual pre-schools varied in their ‘effectiveness’ for influencing a child’s development. The advantages for a child’s development of attending a particularly ‘effective’ pre-school centre persists up to age 7. That is not to say that experiences at primary school have no impact on children’s lives – only that the individual pre-schools attended continued to have an influence. The EPPE 3-11 project continues the EPPE project to age 11⁶. It found a continuing positive effect of attending higher quality or more effective pre-school settings on children’s subsequent outcomes in reading and mathematics at age 10 (Year 5). This effect is evident once the influence of background factors has been taken into account. By year 5 there are no cognitive benefits from having attended a low-quality preschool.

It is important to note the continuing strong influence of the home learning environment. The effect of home learning activities during the pre-school period continues to be evident in children’s developmental profiles after two years of primary school. By age 10, even after 5 years in primary school, the early years home learning environment is found to be a powerful predictor of better cognitive attainment.

Benefits in secondary school

There is some international evidence available which suggests that the benefits of early education and childcare can persist into secondary school. Results from the OECD’s PISA assessment of students at age 15 show that, in most countries, pupils who have attended pre-primary education programmes tend to perform better than those who have not⁷. PISA research also suggests that longer duration of pre-primary education, smaller pupil-to-staff ratios and higher public expenditure per child all enhance the positive effects of pre-primary attendance.

The analysis of PISA results suggests that each of the factors considered: increasing spend; reducing ratios; increasing duration; and increasing enrolment are associated with increased PISA scores at age 15. The largest differences are associated with increased enrolment and increased duration. Increasing the duration of pre-primary education is associated with an average 10 point score increase on PISA. It should be noted, however, that many other factors will influence the performance of 15 year olds.

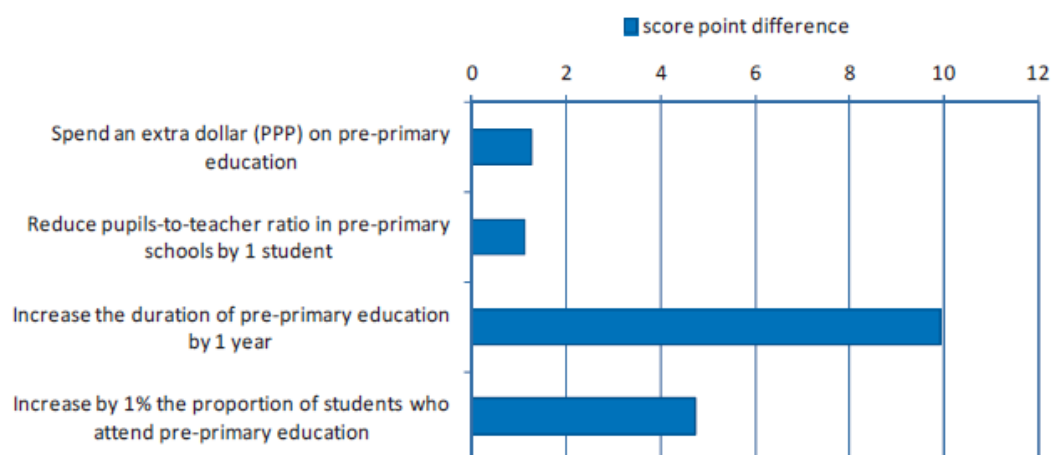
The figure below shows the impact of structural inputs into early childhood education and care on PISA scores.

⁶ Effective pre-school and primary education 3-11 project (EPPE 3-11) influences on children’s attainment and progress in key stage 2: Cognitive outcomes in Year 5
[http://www.ioe.ac.uk/Influences_on_childrens_attainment_and_progress_in_Key_Stage_2_\(2007\)_Cognitive_RB.pdf](http://www.ioe.ac.uk/Influences_on_childrens_attainment_and_progress_in_Key_Stage_2_(2007)_Cognitive_RB.pdf)

⁷ OECD (2012), “Access to early childhood education”, in *Education at a Glance 2012: Highlights*, OECD Publishing. http://dx.doi.org/10.1787/eag_highlights-2012-30-en

Figure 1: Structural ECEC inputs improve student performance at 15 years⁸

Based on PISA 2009 results
Average score point difference associated with attending pre-primary education in school systems that:



Note: The score point differences above are statistically significant.

Source: OECD, 2011 as cited in OECD (2012)

In addition to the structural inputs discussed above, results from PISA 2009 showed that fifteen-year-olds who had attended pre-school education perform better than those who did not, even after accounting for their socio-economic backgrounds. This was the case in practically every OECD country. The difference between students who had attended for more than one year and those who had not attended at all averaged 54 score points in the PISA reading assessment – which they estimate is more than one year of formal schooling. After taking account of background, the performance gap remains, with OECD students who had attended pre-school scoring an average of 33 points higher than those who had not. In Scotland this gap is 41 points. The 2012 PISA study⁹ focused on performance in mathematics. After taking account of background the OECD average difference between students who had attended pre-school for more than one year and those who had not attended at all was 31 points. In Scotland this difference was 35 points.

Summary

Expanding childcare has the potential to benefit children and families across Scotland. There is strong evidence that high quality early childhood education and care benefits children's intellectual development with the benefits persisting beyond their entry to school.

SCOTTISH GOVERNMENT: APRIL 2014

⁸ OECD (2012), Starting Strong III: A Quality Toolbox for Early Childhood Education and Care. OECD Publishing. <http://www.oecd.org/edu/school/startingstrongiii-aqualitytoolboxforearlychildhoodeducationandcare.htm>

⁹ OECD (2013), PISA 2012 Results: Excellence through Equity: Giving every student the chance to succeed (Volume II), PISA, OECD Publishing. <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-ii.pdf>