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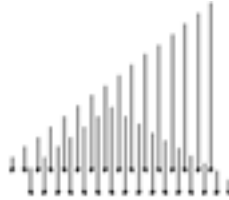
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USING FOUNDATION STAGE PROFILE ASSESSMENTS TO ASSESS OUTCOMES FROM EARLY YEARS EDUCATION

Rebecca Hopkin, Lucy Stokes and David Wilkinson*

In the past decade early years education has expanded throughout England with progressive extensions in entitlement to some hours of free provision. Furthermore, there is consistent evidence that shows that early years education leads to improvement in cognitive and social development for children. This paper uses the latest data from the Millennium Cohort Study to consider whether, in an era of near universal provision, receipt of early years education still leads to better outcomes for children than for those who did not receive early years education and whether different characteristics of provision produce better outcomes. The outcome measures we consider are the Foundation Stage Profile Assessments that apply to all children in England.

Keywords: Early years education; child outcomes

JEL Classification: J13

Introduction

Several studies have explored the relationship between pre-school care and education and child development, both in terms of cognitive outcomes as well as social and behavioural skills; see Melhuish (2004) for a review. Research focusing on children aged three to five years, consistently demonstrated a positive relationship between early years education and care and both intellectual and social/behavioural development.

The findings of the Effective Provision of Pre-School Education (EPPE) project in the UK are widely cited, reporting a significant impact of pre-school education in terms of both cognitive and social function (Sylva *et al.*, 2004), still observable through to the end of Key Stage 1 at age seven. More recent evidence (Sammons *et al.*, 2007; Sylva *et al.*, 2008) shows that pre-school provision still impacts upon cognitive outcomes in years 5 and 6 of primary schooling, at age ten and eleven. However, the impact depends on the quality and effectiveness of this provision.

Similarly in the US, Magnuson *et al.* (2007) found a positive effect of prekindergarten on children's readiness for school, in terms of academic skills, using a sample of children attending kindergarten in 1998. However, they found negative effects on behaviour. Attending prekindergarten located in the same public school as kindergarten, however, did not result in negative consequences for behaviour, while the positive cognitive benefits were still observed.

Another major US study is the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care, which is following a sample of approximately 1300 children from birth (starting in 1991). The NICHD Early Childcare Research Network (2000), in an analysis of this study when the children were approximately three years old, found a positive relationship between high quality childcare and cognitive and language skills.

Heckman and Lochner (2000) find that the greatest return to investments in children's development comes from investment in early childhood and there is a body of evidence that shows disadvantaged children are especially likely to benefit from attending better quality pre-school provision (e.g. Currie, 2001; Stephen, 2006; Sylva *et al.*, 2004, 2008).

In the UK, the past decade has seen a large increase in government spending on early years services, from around £1bn in 1997/8 to roughly £4bn in 2007/8 (Department for Children, Schools and Families, 2008). From 2004, all three and four year-old children in England were guaranteed a free early education place which currently consists of five two and a half hour sessions per week, for 38 weeks per year.¹

Take-up of the free entitlement has been high. La Valle and Smith (2009) report figures from *www* Childcare and

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Early Years Survey for attendance at an early years setting of 89 and 97 per cent for three and four year-olds respectively. This is a notable expansion, especially for three year-olds, compared with figures of 64 per cent and 90 per cent in 2001.

Given this expansion of provision, it is important to assess whether this investment continues to yield positive impacts for children. The research presented here was conducted as part of the Quality Measurement Framework (QMF) project, funded by HM Treasury's Invest to Save Budget. The QMF project is led by the UK Centre for the Measurement of Government Activity (UKCeMGA) at the Office for National Statistics (ONS) and aims to develop effective but easily useable methodologies for measuring and assessing the quality and value of public services.

There is growing interest in assessing performance both within the UK and internationally. In the UK the Atkinson Review into the measurement of government output and productivity for the National Accounts' (Office for National Statistics, 2005) stated that "the output of the government sector should in principle be measured in a way that is adjusted for quality, taking account of the attributable incremental contribution of the service to the outcome". Waldfogel (2006) identifies the need to examine ways in which quality and effectiveness can be routinely evaluated, in order to increase accountability at local level. She suggests that this may entail monitoring of outcomes in addition to processes and notes that in the US there is already significant interest in using information on outcomes for this purpose.

This work is undertaken very much with that goal in mind. This part of the work focuses on the impact of early years' provision on outcomes for children. The aims of this paper are to assess whether attendance at early years education improves child outcomes and whether different characteristics of provision lead to better outcomes.

Evidence on whether the average number of hours per week that a child spends in education has an impact on child outcome measures is mixed. Sylva *et al.* (2004), using the EPPE study, found that attending on a full-time basis led to no greater improvement in outcomes than attending part-time. Loeb *et al.* (2007), in an analysis of the Early Childhood Longitudinal Study in the US, found that children's cognitive development appeared to benefit from a greater number of hours, while the reverse applied for behavioural development. With free

provision only covering part-time attendance, it will be important to consider whether outcomes vary by the number of hours spent in education.

The type of setting has also been found to be important in determining the impact of provision. Sylva *et al.* (2004), from the EPPE study, note that whilst there are significant differences between individual pre-school settings in their impact on children, some settings are more effective than others in promoting positive child outcomes. Children tend to do better in fully integrated centres and nursery schools. Similarly, Mathers *et al.* (2007), using MCS data for children at age three, report that maintained settings were providing the highest quality provision overall, particularly with regard to the 'learning' aspects of provision. However, comparing the MCS and EPPE data shows that, whilst all sectors have made improvements since the late 1990s, the largest gains have been seen in the voluntary sector. Given this, it will be important to see whether differences remain according to the nature of the provider.

A number of studies have also suggested that the age at which children start early years education may be important in determining the impact of the provision. According to EPPE, the number of months at pre-school was found to be positively related to outcomes, particularly for cognitive development (Sylva *et al.*, 2004). Starting at preschool between ages two and three was also found to be beneficial for children's cognitive development with better outcomes at entry to school and at age seven although there were no additional benefits from starting before two years. In the US, Loeb *et al.* (2007), find that cognitive gains are maximised for children who start pre-school at age two to three years. Longer duration in pre-school (starting at an earlier age) is associated with a negative effect on behavioural outcomes.

We will consider all the issues discussed above: whether children attended any early years education or not; whether attendance was full-time or part-time; the type of provider attended and the age at which the child started attending provision. The outcomes we consider are those from the Foundation Stage Profile Assessment (FSPA) conducted for all children in England.

Foundation Stage Profile Assessments

The foundation stage encompassed education for pupils aged three to five, most commonly the first year being in a nursery setting and the second being in a reception

class at school. The FSPA comprises a set of assessments for children in England that are completed by the end of their final foundation stage year. They are cumulative and teacher-directed. Throughout the foundation stage, children attending government-funded settings are assessed in relation to the 'stepping stones' and 'early learning goals' that comprise six areas of learning within the 'Curriculum Guidance for the Foundation Stage', which from September 2008 was replaced by the Early Years Foundation Stage (EYFS), encompassing education from age nought to five. They are based on thirteen nine-point scales within six areas of learning:²

- personal, social and emotional development (PSE);
- mathematical development (MD);
- communication, language and literacy (CLL);
- creative development (CD);
- knowledge and understanding of the world (KUW); and
- physical development (PD).

There are two Local Authority National Indicators which relate to these assessments. NI 72 is related to the achievement targets of at least 78 points across the thirteen scales of the FSPA and at least six points in each of the personal, social and emotional development and communication, language and literacy scales. NI 92 is related to the narrowing of the gap between the lowest achieving 20 per cent in the FSPA and the rest. The full set of national indicators is the basis of assessment of Local Authority performance.

The first three points of each scale describe a child who is still progressing towards the achievements described in the early learning goals, and are based mainly on the stepping stones in the curriculum guidance. Most children will achieve all of these three points before they achieve any of the early learning goals, but there may be some exceptions to this pattern.

The next five points are drawn from the early learning goals themselves. These are presented in approximate order of difficulty, according to evidence from trials. The points are not necessarily hierarchical and a child may achieve a later point without having achieved some or all of the earlier points.

The final point in each scale describes a child who has achieved all the points from 1–8 on that scale, has developed further both in breadth and depth, and is working consistently beyond the level of the early learning goals.

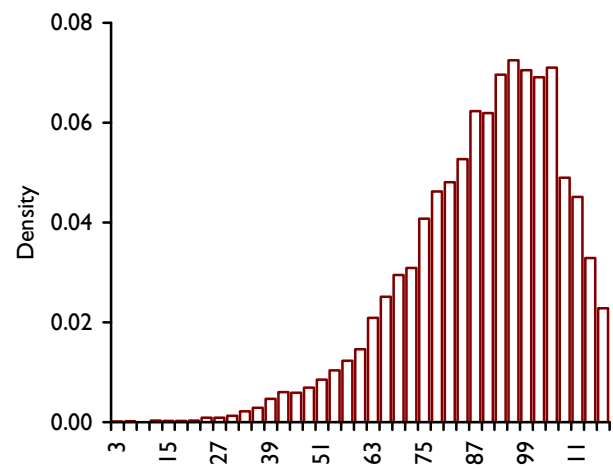
While the assessment process is primarily teacher-directed, other contributors will be involved: the child's parents or guardians, the child him or herself, records from previous settings, and other practitioners (e.g. learning assistants).

The majority of the assessments can be made in another language for non-English speakers. However, points 4–9 of the communication, language and literacy scales must be assessed in English.

A scale score of 1–3 indicates working towards the early learning goals, a scale score of 4–7 indicates working within the early learning goals, a scale score of 6 or more in all scales indicates a good level of development within the early learning goals, a scale score of 8 indicates completion of the early learning goals and a scale score of 9 indicates working beyond the early learning goals.

For the purpose of our analysis we consider two different outcome measures. Most of the analysis focuses on total scores from all thirteen scales. We also consider scores for each separate area of learning. Here we split the score into four categories. The lowest category is equivalent to a score of 1–3 on that scale. The second category is equivalent to a score of 4 or 5, the third category equivalent to a score of 6 or 7, and the highest category is equivalent to a score of 8 or 9. Where the area of learning consists of more than one scale, the cut-off points for the categories are the same as for one scale multiplied by the number of scales that constitute the

Figure 1. Distribution of total FSPA scores



particular area of learning. So for personal, social and emotional development, which is comprised of three scales, the lowest category is a combined score of less than or equal to 9, and the other three categories correspond to scores of 10–15, 16–21 and 22–27.

A distribution of the overall scores is shown in figure 1. Roughly three quarters of children score 78 or more (an average score of 6 or more across the thirteen scales) and fewer than 2 per cent of children score below 39 (an average score of below 3 on the thirteen scales).

The data were collected by the Department for Children, Schools and Families (then known as the Department for Education and Skills) and have been matched into detailed survey data from the Millennium Cohort Study (MCS), further details of which are provided below. Thus the FSPA provides a convenient measure of child attainment to use in analysis of the impact of early years education on child development. It is one of a range of outcome measures that could be considered. Other measures of cognitive and social development were collected in the MCS survey, but the main advantages of the FSPA data are that it is collected nationally, and it covers a range of aspects of development, and as we noted above, it is the basis for two National Indicators.

The Millennium Cohort Study (MCS)

The MCS follows the lives of almost 19,000 babies, born between September 2000 and August 2001 in England and Wales, and between November 2000 and January 2002 in Scotland and Northern Ireland. Given that the FSPA only applied in England we focus on babies born in England.

We use data from the first three sweeps of data collection. The survey for the first sweep took place when the children were aged about nine months. Data were collected from parents or guardians about themselves and their babies. Some detail about childcare provision is included. The second sweep was carried out when the children were around three years old, and the third sweep in 2006 when the children were around five years old and were entering primary school. For further details about the survey see Hansen (2008).

The MCS collects very detailed information on a wide range of topics. These have included child's health and development, early education, schooling and childcare, parenting activities, grandparents' and friends' involvement with the children, details of siblings,

parental health, employment, education and earnings, housing, local area and household demographics and family context. Some parts of the interview are completed via self-completion modules; these have included questions about the child's behaviour, the respondent's relationship with their partner, mental health and attitudes to parenting.

The MCS sample is clustered geographically and disproportionately stratified to over-represent areas with higher proportions of ethnic minorities in England; areas of high child poverty; and the three smaller countries of the UK. The sample design and non-response at the first two sweeps of the survey are taken into account in all the analysis in the paper. All of our analysis is for England and hence should be representative of births in England during the sample period. The analysis includes just one child per household, so excludes roughly 200 twins and triplets in the data.

The paper focuses on early years' education and outcomes for children. The survey included cognitive and behavioural assessments at ages three and five, plus in each wave questions are asked about early years services for the child. FSPA data has been merged in to the survey data for children in England. This was possible for 95 per cent of children (Johnson, 2008). We only include children where complete FSPA data is available. In addition we include only children who have both cognitive and social development assessment data from sweep 3 of the survey. This leaves a sample of 7939 children.

We have compared our analysis sample with the sample of all MCS children living in England at the time of sweep 3 using a number of key characteristics and we find no substantial differences between the two samples.

Attendance at early years' education

Information on attendance at childcare has been collected at all three sweeps of the MCS. Here we focus mainly on the information from the third sweep where respondents were asked whether their child had *ever* attended any of the following types of provider: nursery school or class, playgroup, pre-school, childminder or day nursery.³ Information on start and finish dates was collected for each provider type attended and, depending on type, whether attendance had been full or part-time, or average hours.

If children attended nursery school or class, playgroup or pre-school, the survey asked whether they had attended full-time or part-time. Here part-time attendance was defined as either a morning or afternoon session 4–5 days a week or a full day on 1–3 days a week. However, if they had attended a childminder or day nursery, the survey asked “about how many hours per week the child attended”. This makes it difficult to create a consistent part-time/full-time indicator for provision. We do so by categorising children as having attended a childminder or day nursery part-time if they attended for less than 30 hours per week. This indicator is then combined with the self reporting of full or part-time attendance for the other types of provision.

Using the dates for the beginning of spells of early years education, we can identify the age of children when they started provision and thus we create the early years measures needed for our analysis.

Ideally we want to use data from earlier sweeps of the survey to give us a full early years history, but inconsistencies in questions asked and in reporting of spells of provision mean that we are limited to sweep 3 data to give us consistent data. The MCS questions for sweep 3 were designed partly with the intention of gathering data on previous attendance, as information collected at the first two sweeps was felt not to have sufficiently captured this (Jones, 2008).

Most children (93 per cent) had attended some form of early years education by the time of the interview at sweep 3, with just 7 per cent never having attended any of the five specified provider types (table 1). The most common form of provider used was a nursery school or class, with just over half (56 per cent) of children having attended this type of setting. Just under a third (31 per cent) of children had attended a playgroup, while a similar proportion (28 per cent) had attended a pre-school. Day nurseries had been used by 16 per cent of

Table 1. Percentage of children ever attending early years education by type of provider

Nursery school/class	56
Playgroup	31
Pre-school	28
Childminder	14
Day nursery	16
Never attended any of these providers	7
Total no. of children	7939

parents, and childminders by 14 per cent. While around half (52 per cent) of children had attended one type of provider only, around one third (32 per cent) had attended two types of provider and almost one in ten (9 per cent) had attended three or more.

Ideally we would like to identify the hours of free provision, but as discussed above we only have hours of attendance for the two least frequently attended types of provider: childminders and day nurseries. It is difficult to categorise part-time provision, particularly when children often attended more than one provider for part-time hours at the same time. For example, for nursery school, nursery class, play group or pre-school provision we don't know whether two spells of part-time attendance were two spells of one full day a week, which would in total still be part-time provision, or whether the two spells of part-time provision were three full days and two full days thus constituting full-time provision.

Thus to extend our categorisation beyond a simple full-time/part-time split we consider a three way classification covering full-time provision, part-time provision with one provider and part-time provision with more than one provider. Table 2 shows that 18 per cent of children attended some provision that was usually full-time whilst 42 per cent attended part-time with just one provider. The remaining 32 per cent of

Table 2. Percentage of children attending early years education by whether full-time or part-time

Attended full-time	18
Attended part-time with one provider	42
Attended part-time with more than one provider	32
Never attended any providers	7
Total no. of children	7939

Table 3. Percentage of children attending early years education by age started to attend

Less than 12 months	18
12–24 months	12
24–36 months	31
36–48 months	27
More than 48 months	3
Age started unknown	2
Never attended any providers	7
Total no. of children	7939

children attended part-time with more than one provider.

Our third measure of early years education relates to the age children started. Once started, most children remain in early years education until they start full-time schooling. Therefore, in most cases the difference between the age the child started full-time schooling and the age starting early years education gives the duration of early years education. This is useful to bear in mind when interpreting the impact of the age children started early years education.

Table 3 shows that most children started early years education between the ages of two and four years old. Thirty-one per cent started when they were two and 27 per cent when they were three. A further 30 per cent started before they were aged two and just 3 per cent started after they became four years old.

Differences in FSPA scores by attendance at early years education

Figure 2 below shows the average total FSPA score by characteristics of early years education. Overall, the average score is 88. The average score is higher for children that attended early years education (88) than for children who did not (85) – a difference that is statistically significant. This is in line with earlier evidence indicating a positive relationship between

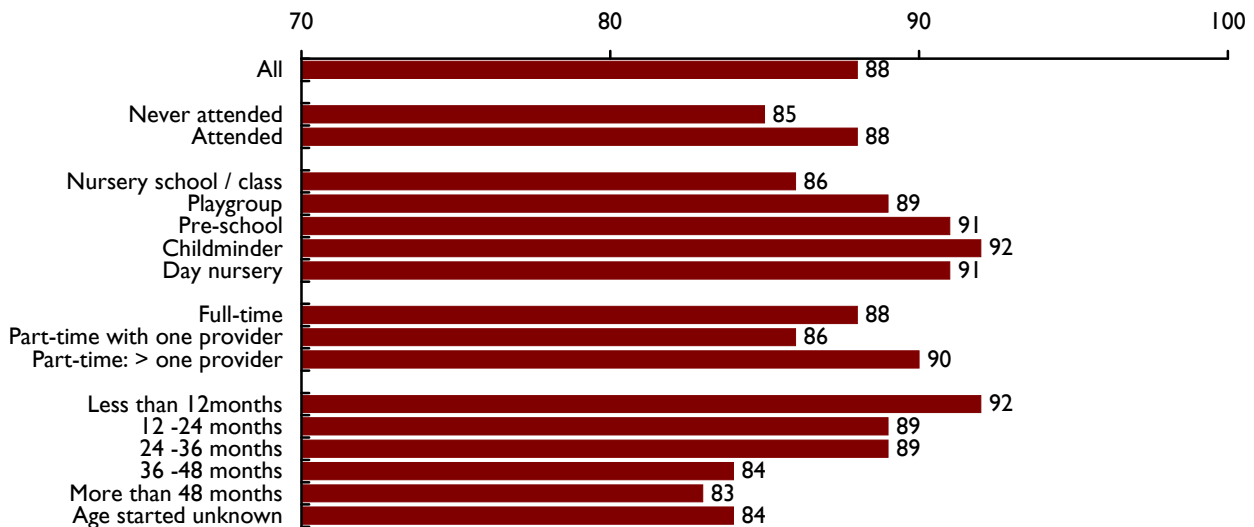
attendance at early years education and child outcomes.

Differences by type of provider show that the lowest average scores were for children who attended a nursery school or class (86). This was significantly lower than all the other average scores. This is opposite to what we might have expected where evidence from EPPE indicated that children who attended nursery schools generally had better outcomes. Differences between the other types of provision are less striking.

The next set of bars considers our measures of full and part-time attendance. Children who attended early years education part-time at more than one provider came out with the highest average scores (90), followed by children who attended some full-time early years education (88), and the lowest average scores were for children who attended one provider part-time.

Differences by age started attending early years education are also evident. The lowest average scores were for children who started early years education after their third birthday (or when age started was unknown) and highest for children who started provision before their first birthday. The differences observed here are the largest. Children who started education before their first birthday had an average score of 92 compared with just 83 for children who started after their fourth birthday and 84 for children who started education when they were three.

Figure 2. Average total FSPA scores by type of early years education



Methodology

The above descriptive statistics give some indication of how attendance at early years education may influence child outcomes. However, the differences shown above may simply reflect other differences among the children in different categories of provision. In order to explore whether Foundation Stage Profile Assessment scores vary with early years education attendance, we need to control for a range of other variables that may be affecting children's performance in their FSPA.

Included in our models are our selection of early years variables described above and a wide range of other characteristics. These can be split into child characteristics, family and parent characteristics and the early years characteristics already mentioned.

The child characteristics include gender, ethnicity, whether birth weight was low, whether any development delays were recorded at age nine months, whether the child has a long-term illness, cognitive and social development scores at age three, age started full-time school and age in July 2006, when all children should have completed the FSPA.

The family characteristics include mother's qualifications, mother's and father's age, family socio-economic status, parental marital status, and whether the child has siblings. The home learning environment, which Ermisch (2008) has shown to be important in determining child outcomes, is also captured through whether the child had help with reading, writing and numbers at home.

The type of model we estimate is determined by the outcome variables we are considering. Our analysis is at two levels, the first focuses on the total FSPA score, which approximates to a continuous variable allowing us to estimate ordinary least squares models to assess the impact of independent variables on these scores. We would, in addition, want to control for parents' selection into whether their children attend early years education and which type of provider they choose, but valid instruments for this selection are not obvious. La Valle and Smith (2009) report that non-attendance at early years education is partly due to parents' preferences and attitudes, with some parents preferring to look after their child at home. However, other reasons for non-attendance relate to difficulties in accessing provision such as lack of places and costs. Unfortunately the survey does not allow any measure of parental attitude or availability of places.

A second level of analysis focuses on the six early learning goals. Here there is much less variation in the scores, in some cases the measure comes from a single nine point scale, so for these outcome variables we estimate ordered probit models, with four categories of score outlined previously.

Statistical analysis

The results from the estimation are presented in tables 4, 5 and 6. Table 4 reports estimates for the impact of early years education on the overall FSPA score and tables 5 and 6 focus on each of the six areas of learning. We only

Table 4. The impact of early years education on FSPA scores

	(1)	(2)	(3)	(4)	(5)
Attended some early years education	0.86 (0.65)				
Attended full-time		1.50** (0.74)			
Attended part-time with one provider		0.35 (0.66)			
Attended part-time with more than one provider		1.11 (0.76)			
Started age less than 12 months			1.42** (0.72)		
Started age 12–24 months			0.88 (0.86)		
Started age 24–36 months			1.57** (0.75)		
Started age less than 36 months					1.48** (0.74)
Started age 36–48 months			0.29 (0.68)		0.52 (0.677)
Started age more than 48 months			-3.31*** (1.14)		-3.06*** (1.07)
Attended nursery school/class				0.14 (0.52)	-0.16 (0.57)
Attended playgroup				0.65 (0.43)	0.14 (0.44)
Attended pre-school				1.42*** (0.50)	0.99* (0.51)
Attended childminder				0.55 (0.47)	0.29 (0.48)
Attended day nursery				0.16 (0.54)	-0.33 (0.56)
Number of observations	7939	7939	7939	7939	7939
R-squared	0.35	0.35	0.35	0.35	0.35

Notes: Standard errors in parentheses. *indicates significant at 10 per cent level. ** indicate significant at 5 per cent level *** indicates significant at 1 per cent level.

report coefficient estimates for the early years education variables. Full results are available on request.

The first column of table 4 shows the estimated coefficient for a dummy variable identifying whether a child had attended any early years education. The model includes all the control variables discussed above. The attendance coefficient is positive but not statistically significant. Comparing this estimate with the differences shown in figure 2, we note that including all the other variables in the model reduces the difference in scores by whether a child attended early years education from three to less than one.

The estimates in the next three columns show the impact for different characteristics of early years education. In each case the models include the same control variables as in the first column plus our three measures of early years education. The variables are entered into three separate equations and show how the overall estimate given in the first column varies by the particular characteristic of the early years experience.

We find that attending full-time has a positive significant impact on the total FSPA score, increasing it by 1.5 points. Attendance part-time with one provider or more than one provider is not statistically significant. Starting at early years education before a child's first birthday and when they were aged two also have a positive and statistically significant impact on the FSPA score, again increasing the score by around 1.5 points. Starting when aged one and aged three had no impact on the score, but starting after age four had a large negative and significant impact reducing the score by around 3 points. Estimates by type of provider show that only attendance at pre-school has a positive significant impact on the FSPA score increasing it by on average 1.4 points.

If we include all three measures in the same model, all the estimated coefficients on our early years measures become statistically insignificant. The coefficients on the age started variables for less than 12 months, 12–24 months and 36 months are not significantly different from each other so simplifying the specification of age started to combine these three categories yields a significant estimate. When we include age started variables in the models, then none of the estimated coefficients on the full-time or part-time variables are statistically significant in any specification of the model, and are dropped from the final specification reported in table 4. This finding is in line with the EPPE results that full-time early years education does not influence child outcomes.

Our final specification reported in column 5 indicates that the age the child started early years education has the biggest influence on the scores. Starting before age three increases, on average, the FSPA score by 1.5 points, but starting early years education after age four reduces the FSPA score by on average three points.

None of the different types of provider have a significant impact on the FSPA scores and there were no significant differences between them at the conventional 5 per cent significance level. This is in contrast to previous results which have indicated that maintained sector providers had the largest positive impact on child outcome measures.

It is not possible to be completely sure about the categories of provider reported in the survey. The pre-school label is quite a generic one and it is easy to imagine that parents might term pre-school as any form of provider. Nursery schools and classes are typically in the maintained sector and it is notable from these results that these providers do not have a positive impact on the FSPA scores.

The evidence on the overall impact of attendance at early years education is in contrast to previous evidence on child outcomes, and it is also notable that the positive difference in scores shown in figure 2 is no longer evident once we include a full set of control variables. Where attendance at provision is nearly universal then it may not be surprising to find estimates that are not statistically significant, because one of the groups concerned is relatively small. However, this is a large data set and even with just 7 per cent of children not attending provision we have nearly 600 children not attending provision in the sample.

Other possible explanations for such results are that when nearly all children attend provision then the positive effects previously observed become diluted by children who do not greatly benefit from the provision, but still attend because nearly all other children attended some provision.

Next we turn to the six areas of learning to see whether early years education has an impact on different aspects of child development. Table 5 reports estimates for ordered probit models that include the full set of control variables together with a dummy variable for whether a child attended early years education. This is analogous to the results presented in column 1 of table 4 for the overall FSPA score. We found that early years education

Table 5. The impact of attending provision on FSPA achievement

	PSE	MD	CLL	CD	KUW	PD
Attended some early years education	0.05 (0.05)	0.01 (0.05)	0.06 (0.05)	-0.01 (0.06)	0.10** (0.05)	0.02 (0.05)
Cut Point 1	2.60*** (0.30)	4.63*** (0.30)	5.45*** (0.32)	2.68*** (0.32)	3.37*** (0.31)	3.14*** (0.31)
Cut Point 2	3.82*** (0.30)	5.66*** (0.33)	6.70*** (0.32)	3.84*** (0.32)	4.35*** (0.31)	3.95*** (0.31)
Cut Point 3	5.21*** (0.30)	7.16*** (0.34)	7.98 (0.33)	5.28*** (0.33)	5.56*** (0.31)	5.30*** (0.31)
Number of observations	7939	7939	7939	7939	7939	7939
F (57, 141)	22.0	28.0	31.9	18.7	21.1	23.0

Notes: Standard errors in parentheses. *indicates significant at 10 per cent level. ** indicate significant at 5 per cent level *** indicates significant at 1 per cent level.

Table 6. The impact of early years education on early learning goals

	PSE	MD	CLL	CD	KUW	PD
Age started						
Less than 36 months	0.11* (0.06)	0.05 (0.06)	0.08 (0.06)	0.10* (0.06)	0.16** (0.06)	0.14** (0.06)
36-48 months	0.06 (0.05)	0.03 (0.05)	0.04 (0.05)	0.00 (0.06)	0.09 *(0.05)	0.06 (0.06)
More than 48 months	-0.10 (0.09)	-0.24*** (0.09)	-0.24*** (0.09)	-0.20** (0.09)	-0.08 (0.10)	-0.11 (0.09)
Type of provider						
Nursery school/ class	-0.03 (0.05)	-0.01 (0.05)	-0.00 (0.04)	-0.05 (0.04)	-0.03 (0.05)	-0.06 (0.05)
Playgroup	0.03 (0.04)	-0.01 (0.04)	0.02 (0.04)	-0.04 (0.03)	-0.02 (0.03)	-0.05 (0.03)
Pre-school	0.10* (0.05)	0.05 (0.04)	0.05 (0.04)	0.01 (0.04)	0.04 (0.04)	0.03 (0.04)
Childminder	0.04 (0.05)	0.04 (0.04)	0.03 (0.04)	0.03 (0.04)	-0.00 (0.04)	0.01 (0.04)
Day nursery	-0.13** (0.05)	0.01 (0.05)	0.01 (0.05)	-0.04 (0.05)	-0.03 (0.05)	-0.03 (0.05)
Cut Point 1	2.63*** (0.32)	4.74*** (0.33)	5.55*** (0.33)	2.75*** (0.32)	3.41*** (0.32)	3.21*** (0.32)
Cut Point 2	3.86*** (0.31)	5.77*** (0.33)	6.80*** (0.33)	3.92*** (0.32)	4.40*** (0.32)	4.03*** (0.32)
Cut Point 3	5.26*** (0.31)	7.27*** (0.34)	8.08 (0.34)	5.36*** (0.33)	5.61*** (0.32)	5.38*** (0.32)
Number of observations	7939	7939	7939	7939	7939	7939
F (64, 134)	22.0	24.9	27.9	17.9	19.1	21.9

Notes: Standard errors in parentheses. *indicates significant at 10 per cent level. ** indicate significant at 5 per cent level *** indicates significant at 1 per cent level.

did not have a significant impact on the FSPA score, but here we find a significant impact for one of the six areas of learning: knowledge and understanding of the world. The impact is small, an estimated coefficient of 0.1 compared with differences between the cut points of the model of around 1. This suggests that although the impact of attending early years education was statistically significant, it will only move a relatively small number of children up a category in the outcome variable.

Table 6 replicates the model presented in column 5 of table 4 for each of the six areas of learning. Included in the model are the full set of control variables together with variables that identify the age the child started early years education and the type of provider attended. Again the results are

broadly in line with the model of table 4 and again all impacts are relatively small compared with the differences in the cut points in the models.

The positive significant effects from starting at early years education before age three are confined to knowledge and understanding of the world and physical development. The negative significant effects from starting at early years education after age four relate to mathematical development, communication, language and literacy and creative development. The type of provider effects are largely insignificant, the only significant estimates relate to personal, social and emotional development and indicate a positive influence from attendance at pre-school and a negative influence from attending a day nursery.

Discussion and conclusions

After consideration of a range of aspects of early years education we find only a limited impact of attendance on child outcomes as measured by the FSPA. This is true for an overall measure of achievement as well as achievement on six separate scales that cover a variety of areas of development. This is in contrast to much of the earlier evidence on the impact of early years education on child outcomes recorded at similar ages. The large differences in outcomes derived in raw comparisons disappear when we control for family and child characteristics.

The more detailed results in relation to age started early years education are largely in line with previous literature, at least in terms of the direction of impact. Starting early years education earlier typically enhances child development, although the evidence for a negative impact from starting after age four requires further investigation. The evidence concerned with full-time attendance shows little impact, again in line with previous UK literature, but the evidence regarding the type of provider shows little difference for different types of provider and is in contrast to much of the previous literature. This could be the result of a levelling in quality by type of provider.

The data do not allow us to consider the quality of provision as measured by observation scales like the Early Childhood Environment Rating Scale (ECERS). The EPPE study results (Sammons *et al.*, 2007; Sylva *et al.*, 2008) and results at age three using the MCS data (Mathers *et al.*, 2007) have highlighted the importance of such measures of quality. It can be argued that the child outcome measures themselves are evidence of quality of provision, but it is important to consider the observational measure used elsewhere in the literature. This is not possible for the full MCS sample, but further exploration of information on quality of provision based on 300 settings and roughly 600 MCS children is required to see if high quality provision leads to better FSPA outcomes for children.

Further investigation is also required of the relatively few children who did not take up any early years education although the evidence reported here suggests that parents who do not take advantage of the free provision are not, on average, seeing lower rates of achievement for their children.

The results for different types of outcome measure are

new and interesting. The type of provider has some influence on the personal, social and emotional development of a child, but the age the child started provision has no influence. The more cognitive aspects of development, mathematical and creative development and communication language and literacy are all damaged by a late start at early years education, and knowledge and understanding of the world is enhanced by an early start. Physical development is also found to benefit from an earlier start.

It is important to consider whether the results hold true for other measures of child development. The MCS offers the opportunity to explore other cognitive and social development measures for children, so before firmly concluding that early years education does not have much impact on child outcomes, examination of other outcome measures is required. In addition outcomes of early years education are not restricted to children. The childcare element of free provision may enable parents to work, although the free provision of five two and a half hour sessions per week would typically make it necessary to have to some paid for provision in order to work, certainly if the work were to be full-time.

NOTES

- I All three and four-year olds in England are entitled to a free early education place. A free early education place was first introduced for all four year-olds in 1998. Pilots for providing places for three year-olds began in 1999, and in 2004 the guarantee of a free place was extended to all three year-olds. In April 2006, the entitlement was extended to 38 weeks per year for all settings; prior to this, children in maintained settings were receiving funding equivalent to 38 weeks per year, while those in other settings received just 33 weeks. The entitlement is set to increase to 15 hours per week by 2010 (by 2009 for the 25 per cent most disadvantaged children), along with greater flexibility in usage, such as the option to spread the entitlement over three days per week instead of five.

Plans are also underway to extend the free entitlement to two year-olds. In 2006, pilot schemes started to provide early education and care for 12,000 disadvantaged two year-olds in 32 local authorities. The Children's Plan, published in 2007, announced that the pilots for two year-olds would be extended to reach 20,000 disadvantaged children in 63 local authorities and, at the 2008 Labour Party Conference, Gordon Brown announced an intention to make places available for all two year-olds in future.

The free place currently entitles children to up to two years of early education before they reach compulsory school age. Compulsory school age is defined as the start of the school term following a child's fifth birthday, although it is worth

noting that in practice many children begin their school education (reception classes) before reaching compulsory school age. Children become eligible for free early education from either the beginning of September, January or April, following their third birthday.

- 2 The personal, social and emotional development and mathematical development areas of learning constitute three scales each, communication, language and literacy, four scales, whilst the other three areas of learning are based on single scales.
- 3 Respondents were also asked separately about current childcare use. We focus on the questions about provision ever attended, firstly because we are interested in attendance at formal provision, and the questions about current use focus on mostly informal care (with the exception of day nurseries and childminders) and secondly because we are most interested in attendance prior to starting school; by the time of interview at sweep 3, most children were already attending school.

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