



Department
for Education

Pre-school and early home learning effects on A-level outcomes

**Effective Pre-School, Primary &
Secondary Education Project (EPPSE)
Research Report**

Technical Report

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Introduction

This Technical Appendix provides the detailed statistical models that are described in the 'Pre-school and early home learning effects on A-level outcomes' main research report.

Here we present the main results of logistic regressions and multilevel multiple regressions that tested the effects of the early years HLE and other measures of the HLE at later ages (KS1, KS2 and KS3) and several measures of children's pre-school experience as predictors of their later KS5 attainment, while controlling for the effects of other background influences .

The analyses show that there are lasting effects of early years experiences in shaping students' longer term academic outcomes up to age 18. They also point to the relative strength of other influences that help to contextualise the HLE and pre-school findings.

First, findings are reported for whether or not students entered any AS-levels. Then the results for whether or not they entered any A-level examinations. Logistic regressions were used to test the likelihood of taking any AS or A-levels.

Findings

Entering any AS-level examination

Logistic regressions were used to investigate the likelihood expressed as Odds Ratios (OR) that students entered any AS-level examination when they (see Table 1):

- were girls (OR=1.35) compared with boys
- were of Bangladeshi (OR=4.69), Indian (OR=4.33) or Pakistani (OR=2.56) ethnic origin when compared with White British students
- had mothers with degree or higher degree (OR=3.37) when compared with no qualification levels
- had fathers with degree or higher degree (OR=2.17) when compared with no qualification levels
- were from families with higher salary (OR=3.67) when compared with no earned income
- **experienced a more stimulating (higher scores) early years HLE (OR=2.17) when compared with the lowest levels**
- experienced medium and high KS1 outing (OR=1.55) when compared with lower levels
- experienced medium KS2 educational computing (OR=1.29) when compared with lower levels
- experienced medium and high KS3 enrichment (OR=3.37) when compared with lower levels
- **had attended pre-school (OR=1.49) when compared with not attending**
- **had attended a highly effective pre-school in early number concept (OR=1.78) and in pre-reading (OR=1.71)**
- **had attended a high quality pre-school – ECERS-E (OR=1.88)**

In addition, a few background characteristics were found to have a negative effect reducing the likelihood of taking any AS-levels:

- health problems were associated with lower likelihood of taking any AS-levels (OR=0.73)
- students from lower SES families were less likely to take AS-levels (OR=0.48) than higher SES families

- students who attended a secondary school with a more disadvantaged intake (higher %FSM students at school level) were less likely to take AS-levels (OR=0.99).

Table 1: Taking any AS-levels

	Coef.	Std. Error	Odds Ratios	Sig
Age	0.01	0.01	1.01	
Gender	0.3	0.1	1.35	**
Ethnic group (compared to White UK)				
White European Heritage	0.29	0.3	1.34	
Black Caribbean Heritage	0.94	0.24	2.55	***
Black African Heritage	0.52	0.33	1.67	
Any Other Ethnic Minority	0.93	0.31	2.54	**
Indian	1.47	0.33	4.33	***
Pakistani	0.94	0.24	2.56	***
Bangladeshi	1.55	0.44	4.69	***
Mixed Race	0.28	0.22	1.33	
Early health problem (compared to none)				
1+ Health problem	-0.31	0.11	0.73	**
KS1 family salary (compared to no salary)				
£2500-15000	0.05	0.16	1.05	
£17500-27500	0.46	0.17	1.58	**
£30000-35000	0.58	0.2	1.79	**
£37500-66000	0.54	0.19	1.72	**
£67500-132000	1.3	0.39	3.67	***
Missing	0.46	0.17	1.58	**
Parents' highest SES at age 3/5 (compared to professional, non-manual)				
Other professional non-manual	-0.27	0.28	0.77	
Skilled non-manual	-0.43	0.29	0.65	
Skilled manual	-0.73	0.31	0.48	*
Semi-skilled	-0.72	0.32	0.49	*
Unskilled	-0.72	0.44	0.49	
Never worked	-0.25	0.41	0.78	
Missing	-0.02	0.67	0.98	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.13	0.18	1.13	
Academic age 16	0.33	0.15	1.39	*
Academic age 18	0.78	0.22	2.18	***
Degree or higher degree	1.21	0.24	3.36	***

	Coef.	Std. Error	Odds Ratios	Sig
Other professional	1.22	0.45	3.37	**
Missing	-0.63	0.43	0.53	
Father's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.56	0.19	1.75	**
Academic age 16	0.27	0.16	1.31	
Academic age 18	0.69	0.22	2	**
Degree or higher degree	0.78	0.24	2.17	**
Other professional	0.52	0.48	1.69	
Absent father	0.22	0.16	1.25	
Missing	-0.55	0.7	0.58	
Early years HLE (compared to 0-13)				
14-19	0.18	0.18	1.19	
20-24	0.11	0.18	1.12	
25-32	0.3	0.18	1.35	
>33	0.77	0.23	2.17	***
KS1 HLE outing (compared to low)				
KS1 HLE outing medium	0.36	0.13	1.43	**
KS1 HLE outing high	0.44	0.21	1.55	*
KS2 HLE educational computing (compared to low)				
KS2 HLE educational computing medium	0.25	0.11	1.29	*
KS2 HLE educational computing high	0.17	0.18	1.18	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	0.78	0.11	2.18	***
KS3 HLE enrichment high	1.22	0.16	3.37	***
FSM school level (continuous)	-0.01	0	0.99	*
Intercept	-2.05	0.37		***
Number of students	2500			
Deviance (-2 x Log Restricted-Likelihood)	2671			
* p<0.05, ** p<0.01, *** p<0.001				

Entering any A-level examinations

The results for A-level entry show strong similarities to those found for AS-level entry. It must be remembered that at the time students typically entered AS-levels as a precursor for A-levels.

Overall:

- Girls were more likely to take any A-levels (OR=1.40) than boys.
- Students of Bangladeshi (OR=4.40), Indian (OR=3.67) and Black Caribbean (OR=2.27) ethnic origin were more likely to take any A-levels than White British students
- Students who had early behavioural problems were less likely to take A-levels (OR=0.64) than students who did not have any behavioural problems
- Students who had early health problems were less likely to take A-levels (OR=0.65) than students who did not have any health problems
- Students from families with higher salary were more likely to take A-levels (OR=3.14) than students from families with no salaries
- Students from families with lower SES less likely to take A-levels (OR=0.52) than students from families with higher SES
- Students whose mothers had a degree or higher degree were more likely to take A-levels (OR=3.36) than students whose mothers did not have any qualification levels
- Students whose fathers had a degree or higher degree were more likely to take A-levels (OR=1.93) than students whose fathers did not have any qualification levels
- **Students who experienced higher levels of early Years HLE were more likely to take A-levels (OR=2.41)**
- Students who experienced medium KS1 outing – more likely to take A-levels (OR=1.35)
- Students who experienced medium KS3 parental support– more likely to take A-levels (OR=1.33)
- Students who experienced medium and high KS3 enrichment – more likely to take A-levels (OR=3.10)
- Students who attended a secondary school with higher %FSM at school level were less likely to take A-levels (OR=0.99)

- Students whose neighbourhood had a higher percentage of White British people were less likely to take A-levels (OR=0.99)
- **No pre-school effects**
- **Students who had attended a highly effective primary school in English were more likely to take A-levels (OR=1.87) than students who had attended a primary school with lower effectiveness**

Table 2: Taking any A-levels

	Coef.	Std. Error	Odds Ratios	Sig
Age	0.01	0.01	1.01	
Gender	0.33	0.1	1.40	**
Ethnic group (compared to White UK)				
White European Heritage	0.41	0.31	1.51	
Black Caribbean Heritage	0.82	0.27	2.27	**
Black African Heritage	0.65	0.35	1.92	
Any Other Ethnic Minority	0.59	0.33	1.81	
Indian	1.3	0.35	3.67	***
Pakistani	0.53	0.29	1.70	
Bangladeshi	1.48	0.46	4.40	**
Mixed Race	0.53	0.22	1.69	*
Early behavioural problems (compared to none)				
1+ Behavioural problem	-0.44	0.17	0.64	**
Early health problem (compared to none)				
1+ Health problem	-0.43	0.12	0.65	***
KS1 family salary (compared to no salary)				
£2500-15000	0.23	0.18	1.26	
£17500-27500	0.57	0.18	1.76	**
£30000-35000	0.63	0.2	1.88	**
£37500-66000	0.62	0.19	1.85	**
£67500-132000	1.15	0.34	3.14	***
Missing	0.48	0.19	1.62	**
Parents' highest SES at age 3/5 (compared to professional, non-manual)				
Other professional non-manual	-0.14	0.25	0.87	
Skilled non-manual	-0.32	0.27	0.73	
Skilled manual	-0.64	0.29	0.53	*
Semi-skilled	-0.65	0.31	0.52	*
Unskilled	-0.94	0.49	0.39	
Never worked	0.04	0.41	1.04	
Missing	-0.76	0.74	0.47	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.14	0.19	1.16	

	Coef.	Std. Error	Odds Ratios	Sig
Academic age 16	0.36	0.16	1.44	*
Academic age 18	0.86	0.22	2.36	***
Degree or higher degree	1.21	0.23	3.36	***
Other professional	1.04	0.42	2.83	*
Missing	-0.76	0.51	0.47	
Father's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.43	0.2	1.53	*
Academic age 16	0.27	0.17	1.30	
Academic age 18	0.44	0.23	1.55	
Degree or higher degree	0.66	0.24	1.93	**
Other professional	-0.09	0.49	0.91	
Absent father	0.14	0.18	1.15	
Missing	0.48	0.74	1.61	
Early years HLE (compared to 0-13)				
14-19	0.23	0.2	1.26	
20-24	0.26	0.2	1.29	
25-32	0.25	0.2	1.28	
>33	0.88	0.24	2.41	***
KS1 HLE outing (compared to low)				
KS1 HLE outing medium	0.3	0.13	1.35	*
KS1 HLE outing high	0.32	0.22	1.37	
KS2 HLE individual activities (compared to low)				
KS2 HLE individual activities medium	0.22	0.11	1.25	
KS2 HLE individual activities high	0.17	0.18	1.19	
KS3 HLE support (compared to low)				
KS3 HLE support medium	0.29	0.12	1.33	*
KS3 HLE support high	0.07	0.17	1.07	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	0.66	0.12	1.94	***
KS3 HLE enrichment high	1.13	0.16	3.10	***
FSM school level (continuous)	-0.01	0	0.99	**
% White British (continuous)	-0.01	0	0.99	*
Intercept	-2.59	0.38		***
Number of students	2496			
Deviance (-2 x Log Restricted-Likelihood)	2511			
* p<0.05, ** p<0.01, *** p<0.001				

Taking four or more AS-levels

In addition to investigating entry to any AS or A-levels, further analyses examined how far the pre-school and HLE measures predicted whether students entered 4 or more AS-levels or 3 or more A-levels, as these are the typical numbers of examinations that shape entry to higher education at degree level.

Below are the background characteristics and their statistically significant associations showing the increased likelihood of taking four or more AS-levels.

- Older (in months) students were more likely to take 4+AS-levels (OR=1.05) than younger students
- Students of Bangladeshi, Indian and of other ethnic origin were more likely to take 4+AS-levels (OR=3.77) than White UK
- Presenting more than one early behaviour problem was associated with negative probability of taking 4+AS-levels (OR=0.65) than no behaviour problems
- Presenting more than one early health problem was associated with negative probability of taking 4+AS-levels (OR=0.67) than no health problems
- Students from families with higher salary were more likely to take 4+AS-levels (OR=3.73) than students from families with no income
- Students from families with lower SES were less likely to take 4+AS-levels (OR=0.14) than students from higher SES families
- Students whose mothers had higher education levels were more likely to take 4+AS-levels (OR=2.51) than students whose mothers had no qualification
- Students whose father had higher education levels were more likely to take 4+AS-levels (OR=1.68) than students whose father had no qualification
- **Higher scores in early Years HLE was associated with higher likelihood to take 4+AS-levels (OR=1.64) than lower scores**
- Experiencing medium KS2 individual activities was associated with higher probability to take 4+AS-levels (OR=1.56) than experiencing lower levels
- Experiencing medium and high KS3 enrichment was associated with higher probability to take 4+AS-levels (OR=3.43) than experiencing lower levels
- Students who attended a secondary school with higher % FSM school level were less likely to take 4+AS-levels (OR=0.98)

- Students whose neighbourhood had a higher percentage of White British people White British neighbourhood were less likely to take 4+AS-levels (OR=0.99)
- Students with higher IMD score were less likely to take 4+AS-levels (OR=0.99)
- Students with higher IDACI score - less likely to take 4+AS-levels (OR=0.47)
- **No effects for pre-school and primary school**

Table 3: Taking 4 or more AS-levels

	Coef.	Std. Error	Odds Ratios	Sig
Age	0.05	0.02	1.05	**
Gender	0.18	0.11	1.19	
Ethnic group (compared to White UK)				
White European Heritage	0.38	0.32	1.47	
Black Caribbean Heritage	0.68	0.29	1.98	*
Black African Heritage	0.38	0.37	1.46	
Any Other Ethnic Minority	0.82	0.35	2.26	*
Indian	0.9	0.36	2.47	*
Pakistani	0.34	0.32	1.40	
Bangladeshi	1.33	0.49	3.77	**
Mixed Race	0.35	0.24	1.42	
Early behavioural problems (compared to none)				
1+ Behavioural problem	-0.43	0.18	0.65	*
Early health problem (compared to none)				
1+ Health problem	-0.4	0.13	0.67	**
KS1 family salary (compared to no salary)				
£2500-15000	0.26	0.2	1.30	
£17500-27500	0.41	0.2	1.51	*
£30000-35000	0.67	0.22	1.96	**
£37500-66000	0.67	0.21	1.95	**
£67500-132000	1.32	0.33	3.73	***
Missing	0.33	0.2	1.39	
Parents' highest SES at age 3/5 (compared to professional, non-manual)				
Other professional non-manual	-0.26	0.24	0.77	
Skilled non-manual	-0.67	0.25	0.51	**
Skilled manual	-1.05	0.29	0.35	***
Semi-skilled	-1.01	0.31	0.36	**
Unskilled	-1.95	0.67	0.14	**
Never worked	-0.78	0.45	0.46	
Missing	-1.65	0.82	0.19	*
Mother's highest qualifications level at age 3/5 (compared to none)				

	Coef.	Std. Error	Odds Ratios	Sig
Vocational	0.26	0.21	1.3	
Academic age 16	0.37	0.18	1.45	*
Academic age 18	0.83	0.24	2.28	***
Degree or higher degree	0.92	0.24	2.51	***
Other professional	0.75	0.43	2.11	
Missing	-0.08	0.52	0.92	
Father's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.38	0.22	1.46	
Academic age 16	0.14	0.19	1.15	
Academic age 18	0.32	0.25	1.38	
Degree or higher degree	0.52	0.24	1.68	*
Other professional	-0.22	0.52	0.80	
Absent father	-0.04	0.2	0.96	
Missing	0.69	0.79	2	
Early years HLE (compared to 0-13)				
14-19	0.08	0.21	1.09	
20-24	0	0.22	1	
25-32	0.08	0.21	1.09	
>33	0.5	0.25	1.64	*
KS2 HLE individual activities (compared to low)				
KS2 HLE individual activities medium	0.44	0.12	1.56	***
KS2 HLE individual activities high	0.34	0.19	1.40	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	0.76	0.12	2.13	***
KS3 HLE enrichment high	1.23	0.16	3.43	***
FSM school level (continuous)	-0.02	0	0.98	***
% White British (continuous)	-0.01	0	0.99	***
Intercept	-2.24	0.38		***
Number of students	2496			
Deviance (-2 x Log Restricted-Likelihood)	2261			
* p<0.05, ** p<0.01, *** p<0.001				

Taking three or more A-levels

Statistically significant effects for predicting the probability of taking three or more A-levels were found for the following background characteristics:

- *Gender* - Girls were more likely to take 3+A-levels (OR=1.48) than boys
- *Ethnicity* - Bangladeshi, Indian, Black Caribbean and mixed raced students were more likely to take 3+A-levels (OR=6.70) than White UK students
- More than one *early behaviour problems* was associated with lower likelihood to take 3+A-levels (OR=0.56)
- More than one *early health problems* was associated with lower likelihood to take 3+A-levels (OR=0.68)
- Higher *salary* - more likely to take 3+A-levels (OR=5.35)
- Lower *SES* - less likely to take 3+A-levels (OR=0.53)
- Higher *mother's education levels* - more likely to take 3+A-levels (OR=2.89)
- Higher *father's education levels* - more likely to take 3+A-levels (OR=2.37)
- **Very high early Years HLE - more likely to take 3+A-levels (OR=1.97)**
- High and medium *KS1 outing* – more likely to take 3+A-levels (OR=1.71)
- Medium and *high KS3 enrichment* – more likely to take 3+A-levels (OR=3.82)
- Higher *%FSM school level* - less likely to take 3+A-levels (OR=0.98)
- Higher *% White British neighbourhood* - less likely to take 3+A-levels (OR=0.99)
- *IMD* - less likely to take 3+A-levels (OR=0.99)
- *IDACI* - less likely to take 3+A-levels (OR=0.44)
- *No Employment* - less likely to take 3+A-levels (OR=0.19)
- **No effects for pre-school**
- **Primary school effectiveness in English - more likely to take 3+A-levels (High - OR=1.56)**

Table 4: Taking 3 or more A-levels

	Coef.	Std. Error	Odds Ratios	Sig
Age	0.01	0.02	1.01	
Gender	0.4	0.11	1.48	***
Ethnic group (compared to White UK)				
White European Heritage	0.36	0.33	1.43	
Black Caribbean Heritage	0.79	0.29	2.20	**
Black African Heritage	0.59	0.37	1.80	
Any Other Ethnic Minority	0.17	0.39	1.19	
Indian	1.29	0.36	3.65	***
Pakistani	0.3	0.33	1.35	
Bangladeshi	1.9	0.48	6.70	***
Mixed Race	0.61	0.24	1.83	*
Early behavioural problems (compared to none)				
1+ Behavioural problem	-0.58	0.19	0.56	**
Early health problem (compared to none)				
1+ Health problem	-0.38	0.13	0.68	**
KS1 family salary (compared to no salary)				
£2500-15000	0.46	0.21	1.58	*
£17500-27500	0.71	0.21	2.03	***
£30000-35000	0.97	0.23	2.63	***
£37500-66000	0.84	0.22	2.31	***
£67500-132000	1.68	0.34	5.35	***
Missing	0.64	0.22	1.90	**
Parents' highest SES at age 3/5 (compared to professional, non-manual)				
Other professional non-manual	0.02	0.24	1.02	
Skilled non-manual	-0.3	0.26	0.74	
Skilled manual	-0.64	0.3	0.53	*
Semi-skilled	-0.57	0.32	0.57	
Unskilled	-1.17	0.61	0.31	
Never worked	0.07	0.44	1.08	
Missing	-0.68	0.85	0.50	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.17	0.22	1.18	
Academic age 16	0.43	0.19	1.54	*
Academic age 18	0.94	0.24	2.56	***
Degree or higher degree	1.06	0.25	2.89	***
Other professional	0.99	0.43	2.70	*
Missing	-0.31	0.56	0.74	
Father's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.34	0.23	1.41	

	Coef.	Std. Error	Odds Ratios	Sig
Academic age 16	0.27	0.2	1.31	
Academic age 18	0.42	0.26	1.52	
Degree or higher degree	0.86	0.25	2.37	***
Other professional	-0.5	0.56	0.61	
Absent father	0.21	0.21	1.23	
Missing	0.21	0.87	1.23	
Early years HLE (compared to 0-13)				
14-19	0.16	0.22	1.18	
20-24	0.08	0.23	1.08	
25-32	0.11	0.22	1.12	
>33	0.68	0.26	1.97	**
KS1 HLE outing (compared to low)				
KS1 HLE outing medium	0.42	0.15	1.52	**
KS1 HLE outing high	0.54	0.23	1.71	*
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	0.75	0.12	2.11	***
KS3 HLE enrichment high	1.34	0.16	3.82	***
FSM school level (continuous)	-0.02	0	0.98	**
% White British (continuous)	-0.01	0	0.99	**
Intercept	-3.27	0.41		***
Number of students	2496			
Deviance (-2 x Log Restricted-Likelihood)	2170			
* p<0.05, ** p<0.01, *** p<0.001				

Total KS5 points score

Having established that students' past pre-school and early years HLE experiences can shape patterns of entry to AS and A-level examinations post 16, the next step is to test whether there are any continuing effects on students' overall attainment outcomes at KS5. Here we use the KS5 total points score as the outcome measure. Interestingly, although early years experiences at home and in terms of pre-school had been found to be significant predictors of routes and the likelihood of examination entry, there were no statistically significant effects on total KS5 attainment.

- Girls – higher total points (ES=0.22)
- Early behavioural problem - lower total points (ES=-0.21)
- Higher salary - higher total points (ES=0.37)
- Higher mother's education levels - higher A-level points (Degree ES=0.50)
- Higher father's education levels - higher A-level points (Degree ES=0.27)
- **No significant early years HLE effects**
- Medium and high KS3 enrichment –higher A-level points (ES=0.48)
- Higher %FSM school level (ES=-0.18)
- **No significant effects for pre-school or primary school academic effectiveness**

Table 5: Predicting total KS5 score

	Coef.	Std. Error	Effect Size	Sig
Age	2.34	1.82	0.07	
Gender	47.32	12.98	0.22	***
Ethnic group (compared to White UK)				
White European Heritage	-37.76	36.23	-0.17	
Black Caribbean Heritage	22.84	32.17	0.10	
Black African Heritage	6.69	43.09	0.03	
Any Other Ethnic Minority	-58.53	41.63	-0.27	
Indian	38.54	36.83	0.18	
Pakistani	28.90	32.64	0.13	
Bangladeshi	50.62	56.22	0.23	
Mixed Race	11.38	27.88	0.05	
Early behavioural problems (compared to none)				
1+ Behavioural problem	-45.42	21.13	-0.21	*
KS1 family salary (compared to no salary)				
£2500-15000	1.08	23.21	0.00	
£17500-27500	58.43	23.81	0.27	*
£30000-35000	60.29	26.70	0.28	*
£37500-66000	49.74	25.01	0.23	*
£67500-132000	80.80	35.52	0.37	*
Missing	17.84	23.12	0.08	

	Coef.	Std. Error	Effect Size	Sig
Parents' highest SES at age 3/5 (compared to professional, non-manual)				
Other professional non-manual	-11.95	25.75	-0.05	
Skilled non-manual	-26.05	28.56	-0.12	
Skilled manual	-34.82	33.54	-0.16	
Semi-skilled	-34.18	35.87	-0.16	
Unskilled	-87.50	55.07	-0.40	
Never worked	-15.54	52.45	-0.07	
Missing	33.50	126.35	0.15	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	4.31	25.69	0.02	
Academic age 16	34.61	22.33	0.16	
Academic age 18	60.33	29.09	0.28	*
Degree or higher degree	109.52	29.04	0.50	***
Other professional	75.86	50.89	0.35	
Missing	-42.43	57.02	-0.19	
Father's highest qualifications level at age 3/5 (compared to none)				
Vocational	-8.44	26.52	-0.04	
Academic age 16	-24.87	23.52	-0.11	
Academic age 18	-11.66	30.40	-0.05	
Degree or higher degree	58.60	28.71	0.27	*
Other professional	61.42	59.84	0.28	
Absent father	-39.82	23.93	-0.18	
Missing	-95.66	119.84	-0.44	
Early years HLE (compared to 0-13)				
14-19	7.27	25.33	0.03	
20-24	-6.82	25.75	-0.03	
25-32	6.85	25.21	0.03	
>33	15.76	28.95	0.07	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	48.35	14.13	0.22	***
KS3 HLE enrichment high	105.31	17.95	0.48	***
FSM school level (continuous)	-1.25	0.57	-0.18	*
Intercept	584.41	44.14		***
Variance-school level	3458.38	1240.31		***
Variance-student level	47996.30	2077.17		***
Total variance	51454.68			
Number of students	1350			
Number of schools	422			
Deviance (-2 x Log Restricted-Likelihood)	18056.84			
Intra-school correlation (ICC)	0.0672			
% Reduction student variance	11.7			
% Reduction school variance	69.2			
% Reduction total variance	21.5			
* p<0.05, ** p<0.01, *** p<0.001				

KS5 AS-levels points

Further analyses split the results in total AS and total A-level points. For total AS points the following results were noted. Here the primary school academic effectiveness measure in English was found to have a modest positive effect. Only KS2 and KS3 HLE measures were significant, but no continued early years HLE or pre-school effects on overall AS attainment.

- Indian – higher AS-levels points (ES=0.44) than White UK
- More than one behavioural problem – lower AS-levels points (ES=-0.31)
- More than one health problem – lower AS-levels points (ES=-0.18)
- Higher salary – higher AS-levels points (ES=0.44)
- Lower SES – lower AS-levels points (ES=-0.69)
- Higher mother’s education levels – higher AS-levels points (Degree-ES=0.36)
- Higher father’s education levels – higher AS-levels points (Degree-ES=0.47)
- **No Early Years HLE effect**
- Medium KS2 individual activities– higher AS-levels points (ES=0.21)
- Medium KS3 parental interest– lower AS-levels points (ES=-0.27)
- Medium and high KS3 enrichment outside school– higher AS-levels points (ES=0.60)
- Higher %FSM school level (ES=-0.18)
- **No effects for pre-school**
- **Primary school academic effectiveness in English - higher AS-levels points (ES=0.29)**

Table 6: Predicting AS-level score

	Coef.	Std. Error	Effect Size	Sig
Age	2.08	1.44	0.08	
Gender	8.66	10.45	0.05	
Ethnic group (compared to White UK)				
White European Heritage	10.85	29.15	0.06	
Black Caribbean Heritage	42.06	25.82	0.23	
Black African Heritage	-33.86	35.32	-0.19	
Any Other Ethnic Minority	26.47	32.53	0.15	
Indian	78.95	29.47	0.44	**
Pakistani	11.22	25.95	0.06	
Bangladeshi	71.66	45.89	0.4	

	Coef.	Std. Error	Effect Size	Sig
Mixed Race	32.1	22.62	0.18	
Early behavioural problems (compared to none)				
1+ Behavioural problem	-56.09	16.43	-0.31	***
Early health problem (compared to none)				
1+ Health problem	-32.88	11.76	-0.18	**
KS1 family salary (compared to no salary)				
£2500-15000	3.97	18.21	0.02	
£17500-27500	32.84	18.66	0.18	
£30000-35000	37	20.86	0.20	
£37500-66000	51.81	19.65	0.29	**
£67500-132000	80.16	28.09	0.44	**
Missing	35.95	18.1	0.2	*
Parents' highest SES at age 3/5 (compared to professional, non-manual)				
Other professional non-manual	-33.31	20.8	-0.18	
Skilled non-manual	-50.45	22.96	-0.28	*
Skilled manual	-73.39	26.62	-0.41	**
Semi-skilled	-47.36	28.45	-0.26	
Unskilled	-124.65	42.1	-0.69	**
Never worked	17.94	42.28	0.1	
Missing	-37	78.18	-0.2	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	14.46	20.16	0.08	
Academic age 16	22.09	17.26	0.12	
Academic age 18	53.09	23.05	0.29	*
Degree or higher degree	64.42	22.66	0.36	**
Other professional	61.66	40.45	0.34	
Missing	-72.11	43.52	-0.40	
Father's highest qualifications level at age 3/5 (compared to none)				
Vocational	40.84	20.9	0.23	
Academic age 16	8.06	18.46	0.04	
Academic age 18	45.43	23.85	0.25	
Degree or higher degree	85.65	22.87	0.47	***
Other professional	10.27	48.12	0.06	
Absent father	1.01	18.73	0.01	
Missing	4.43	80.18	0.02	
Early years HLE (compared to 0-13)				
14-19	13.41	19.95	0.07	
20-24	-3.95	20.37	-0.02	
25-32	-4.32	19.85	-0.02	
>33	40.01	22.89	0.22	

	Coef.	Std. Error	Effect Size	Sig
KS2 HLE individual activities (compared to low)				
KS2 HLE individual activities medium	38.65	11.56	0.21	***
KS2 HLE individual activities high	27.11	17.88	0.15	
KS3 HLE parental interest (compared to low)				
KS3 HLE parental interest medium	-48.52	16.25	-0.27	**
KS3 HLE parental interest high	-0.35	12.07	0	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	56.16	11.72	0.31	***
KS3 HLE enrichment high	109.29	15.01	0.60	***
FSM school level (continuous)	-1.09	0.44	-0.18	*
Intercept	149.3	35.44		***
Variance-school level	1747.86	680.99		***
Variance-student level	32832.73	1318.49		***
Total variance	34580.59			
Number of students	1462			
Number of schools	442			
Deviance (-2 x Log Restricted-Likelihood)	19418.14			
Intra-school correlation (ICC)	0.0505			
% Reduction student variance	15			
% Reduction school variance	81.6			
% Reduction total variance	28.2			
* p<0.05, ** p<0.01, *** p<0.001				

KS5 A-levels points

Overall the results for Total KS5 A-level points were broadly similar. However, for this attainment at A-level the early years HLE shows a modest, significant positive effect (ES 0.30). Again the KS3 HLE measures are significant too. The academic effectiveness of the primary school in English also shows a similar sized positive effect (0.29) but no lasting pre-school effects were found.

- Indian and Bangladeshi students– higher A-levels points (ES=0.46; ES=0.76)
- More than one early behavioural problem –lower A-levels points (ES=-0.27)
- More than one early health problem –lower A-levels points (ES=-0.17)
- Higher family salary – higher A-levels points (ES=0.60)
- Lower family SES – lower A-levels points (ES=-0.59)
- Higher mother’s education levels – higher A-levels points (Degree-ES=0.43)

- Higher father's education levels – higher A-levels points (Degree- ES=0.38)
- **Higher levels of early Years HLE – higher A-levels points (Degree - ES=0.30)**
- Medium KS3 parental interest– lower A-levels points (ES=-0.22)
- Medium and high KS3 enrichment outside school – higher A-levels points (ES=0.58)
- Higher %FSM school level (ES=-0.19)
- **No significant effects for pre-school**
- **Primary school academic effectiveness in English - higher A-levels points (ES=0.29)**

These results show that the early years HLE continues to predict students' later A-level attainment, in terms of total KS5 points even though the effects did not reach statistical significance for total AS points. In addition the academic effectiveness of the primary school attended (in English) predicts better outcomes in the longer term in terms of both total AS and total A-level points. Pre-school effects were not found to have a significant continuing effect on attainment, however.

Table 7: Predicting A-level score

	Coef.	Std. Error	Effect Size	Sig
Age	1.65	2.39	0.04	
Gender	23.36	16.94	0.08	
Ethnic group (compared to White UK)				
White European Heritage	38.62	48.32	0.13	
Black Caribbean Heritage	82.7	42.7	0.27	
Black African Heritage	5.43	58.55	0.02	
Any Other Ethnic Minority	-9.47	53.86	-0.03	
Indian	139.03	48.83	0.46	**
Pakistani	49.81	42.89	0.17	
Bangladeshi	228.58	76.09	0.76	**
Mixed Race	119.11	37.52	0.40	**
Early behavioural problems (compared to none)				
1+ Behavioural problem	-80.72	27.25	-0.27	**
Early health problem (compared to none)				
1+ Health problem	-49.71	19.52	-0.17	*
KS1 family salary (compared to no salary)				
£2500-15000	32.3	30.23	0.11	
£17500-27500	80.49	30.93	0.27	**
£30000-35000	97.1	34.59	0.32	**
£37500-66000	104.54	32.58	0.35	**
£67500-132000	180.35	46.6	0.60	***
Missing	45.88	29.84	0.15	
Parents' highest SES at age 3/5 (compared to professional, non-manual)				
Other professional non-manual	-39.49	34.49	-0.13	
Skilled non-manual	-58.79	38.05	-0.20	
Skilled manual	-96.51	44.16	-0.32	*
Semi-skilled	-80.44	47.23	-0.27	
Unskilled	-177.08	69.87	-0.59	*
Never worked	66.67	70.15	0.22	
Missing	-42.39	129.6	-0.14	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	-1.26	33.45	0	
Academic age 16	26.7	28.66	0.09	
Academic age 18	87.75	38.19	0.29	*
Degree or higher degree	129.49	37.53	0.43	***
Other professional	120.54	67.12	0.40	
Missing	-143.11	72.25	-0.48	*

	Coef.	Std. Error	Effect Size	Sig
Father's highest qualifications level at age 3/5 (compared to none)				
Vocational	38.5	34.69	0.13	
Academic age 16	3.26	30.63	0.01	
Academic age 18	45.47	39.57	0.15	
Degree or higher degree	115.32	37.96	0.38	**
Other professional	25.67	79.81	0.09	
Absent father	-0.46	31.07	0	
Missing	4.02	133.02	0.01	
Early years HLE (compared to 0-13)				
14-19	23.52	33.1	0.08	
20-24	17.8	33.8	0.06	
25-32	5.48	32.93	0.02	
>33	90.32	37.93	0.30	*
KS3 HLE parental interest (compared to low)				
KS3 HLE parental interest medium	-65.42	26.88	-0.22	*
KS3 HLE parental interest high	10.27	19.95	0.03	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	73.19	19.44	0.24	***
KS3 HLE enrichment high	174.8	24.88	0.58	***
FSM school level (continuous)	-1.91	0.73	-0.19	**
Intercept	192.27	58.44		**
Variance-school level	4406.34	1982.8		***
Variance-student level	90735.28	3686.1		***
Total variance	95141.63			
Number of students	1462			
Number of schools	442			
Deviance (-2 x Log Restricted-Likelihood)	20899.27			
Intra-school correlation (ICC)	0.0463			
% Reduction student variance	13.7			
% Reduction school variance	86			
% Reduction total variance	30.4			
* p<0.05, ** p<0.01, *** p<0.001				

Taking two or more AS and A-levels in facilitating subjects

Similar background effects were found for the probabilities of taking two or more AS or A-level examination in facilitating subjects:

- Older students were more likely to take two or more AS or A-levels in facilitating subjects than younger students
- Boy were more likely to take two or more AS or A-levels in facilitating subjects than girls
- Socially disadvantaged students were less likely to take two or more AS or A-levels in facilitating subjects than less disadvantaged students
- **No early years HLE or pre-school effects**

Table 8: Taking 2 or more AS-levels in facilitating subjects

	Coef.	Std. Error	Odds Ratios	Sig
Age	0.04	0.02	1.04	*
Gender	-0.47	0.12	0.62	***
Ethnic group (compared to White UK)				
White European Heritage	0.34	0.35	1.40	
Black Caribbean Heritage	-0.81	0.35	0.44	*
Black African Heritage	0	0.39	1.0-	
Any Other Ethnic Minority	0.44	0.37	1.55	
Indian	0.57	0.35	1.76	
Pakistani	-0.19	0.31	0.82	
Bangladeshi	1.54	0.6	4.69	*
Mixed Race	0.51	0.26	1.67	*
Early years HLE (compared to 0-13)				
14-19	-0.35	0.26	0.71	
20-24	-0.32	0.26	0.72	
25-32	-0.33	0.25	0.72	
>33	-0.09	0.28	0.92	
Socially disadvantaged	-0.55	0.14	0.58	***
Intercept	0.57	0.25		
Number of students	1243			
Deviance (-2 x Log Restricted-Likelihood)	1658			
* p<0.05, ** p<0.01, *** p<0.001				

Table 9: Taking 2 or more A-levels in facilitating subjects

	Coef.	Std. Error	Odds Ratios	Sig
Age	0.04	0.02	1.04	*
Gender	-0.41	0.13	0.66	**
Ethnic group (compared to White UK)				
White European Heritage	-0.12	0.35	0.89	
Black Caribbean Heritage	-0.66	0.38	0.52	
Black African Heritage	-0.19	0.43	0.83	
Any Other Ethnic Minority	0.37	0.44	1.45	
Indian	0.36	0.36	1.43	
Pakistani	-0.15	0.36	0.86	
Bangladeshi	2.37	0.79	10.74	**
Mixed Race	0.33	0.27	1.38	
Early years HLE (compared to 0-13)				
14-19	-0.05	0.29	0.95	
20-24	-0.13	0.29	0.88	
25-32	-0.18	0.28	0.83	
>33	0.16	0.3	1.17	
Socially disadvantaged	-0.52	0.16	0.59	***
Intercept	0.22	0.28		
Number of students	1045			
Deviance (-2 x Log Restricted-Likelihood)	1389			
* p<0.05, ** p<0.01, *** p<0.001				



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