

# **CHANGES IN EARLY LEARNING AND CHILDCARE USE AND OUTCOMES AT AGE 5: COMPARING TWO GROWING UP IN SCOTLAND COHORTS**

Technical annex

Authors: Line Knudsen, Eilidh Currie and Paul Bradshaw, ScotGen Social Research

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# 1

# MULTIVARIABLE REGRESSION ANALYSIS

## 1.1. Description of analysis undertaken

A key point of interest in this report is to examine whether there is an association between ELC use and characteristics and child outcomes. When examining such associations it is important to consider the influence of underlying factors and the inter-relationships between such factors and other things we are interested in. For example, the number of hours children spend in ELC is likely to be related to whether their parent or carer is in paid work, as well as their income level. Simple analysis may identify an association between weekly ELC attendance and children's social development – for example, that children who attend ELC for between 12.5 and 16 hours per week have higher levels of social difficulties than children who attend ELC for less than 12.5 hours per week. However, this association may be occurring simply because of an underlying association between ELC attendance and household income. Thus, rather than ELC attendance being associated with children's social development in its own right, the relationship found in the analysis may be due to the influence of other factors. To 'control' for the influence of other factors (e.g. household income) multivariable regression analysis was used. This form of analysis allows the examination of the relationships between an outcome variable (e.g. social development) and multiple explanatory variables (e.g. weekly ELC attendance, household income) whilst controlling for the inter-relationships between each of the explanatory variables. This means it is possible to identify whether there is an association between any single explanatory variable and the outcome variable also when other relevant variables have been controlled for. For example, to look at whether there is a relationship between duration of time spent in ELC and children's social development that does not simply occur because ELC attendance and household income are related.

To examine whether weekly duration and quality of the ELC setting were associated with children's outcomes at age 5, for each ELC measure, bivariate analysis was first undertaken to look at the relationship between the ELC measures and each of the following outcomes: adjustment to primary school, vocabulary and problem solving ability, level of social, emotional and behavioural difficulties (measured through the total difficulties scale) and level of pro-social behaviour. Where a statistically significant association was found in relation to the total difficulties measure, further analysis was undertaken for each of the individual difficulties subscales – conduct problems, emotional difficulties, hyperactivity/inattention, and peer problems.

Where the bivariate analysis showed a statistically significant association between the ELC measure and the outcome in question, multivariable regression models were fitted.

In the first step, the equivalent outcome measured at age 3 was added to the model. Where the association between the ELC measure and the outcome was subsequently not statistically significant but the outcome at age 3 was, this indicated that the differences in outcomes observed at age 5 were by and large explained by earlier differences.

ELC use – including the type of ELC provider children attend – is associated with a number of factors which are also associated with children's outcomes. For example, analysis in previous sections showed that children in higher income households are much more likely to attend private or voluntary ELC providers and also tend to have different patterns of cognitive and behavioural outcomes than those in lower income households. Thus, we should account for these differences to properly explore the associations between ELC measures and outcomes at age 5. Where an association between the ELC measure and child outcome at age 5 still held once age 3 outcome was taken into account, a number of social background variables were therefore added to the model. This was done in order to control for any relationships between these and the ELC measure which might be explaining the association found in the bivariate analysis – for example, higher vocabulary ability at age 5 being explained by other factors not already captured in the age 3 outcome, rather than by characteristics of ELC.

The multivariable analysis controlled for the following social background characteristics: household income (equivalised), highest parental level of education (household level), socio-economic classification (household level), level of area deprivation, urban/rural location and the child's gender. Details about these variables are provided in Appendix A.

In cases where an association between the ELC measure and the outcome in question was still statistically significant even after controlling for differences in social background, further tests were carried out. First, where an association with average weekly ELC duration was found, a measure of ELC quality was added to the model to test whether the association still held once the quality of the ELC setting was taken into account. Conversely, where an association with ELC quality was still statistically significant once social background characteristics were controlled for, a measure of average weekly ELC duration was added to the model to test whether the association still held once differences in the number of hours the child attended their ELC provider was taken into account.

Finally, to test whether associations between the ELC measures and child outcomes differed for children from different backgrounds, 'interaction effects' were fitted to the models. This allowed us to test whether a relationship between, for example, ELC quality and children's social development varied according to the level of household income. Where an interaction effect was found

to be significant, two separate models were fitted: one for children in the wealthiest 40% of households and one for the remaining 60%.<sup>1</sup>

## 1.2. Interpreting the results

The results for the binary logistic regression analysis are presented as odds ratios, all of which have a significance value attached. Logistic regression compares the odds of a reference category (shown in the tables) with that of the other categories. An odds ratio of greater than one indicates that the group in question is more likely to demonstrate this characteristic than is the chosen reference category, an odds ratio of less than one means they are less likely. For example, in the first 'OR' column of Table 1 which contains the results of the regression model seeking to identify factors related to exhibiting above average levels of hyperactivity at age 5, the category of 'Lowest [income] quintile' returns an odds ratio of 2.862. This indicates that the odds of children in the lowest income quintile exhibiting above average levels of hyperactivity at age 5 are 2.862 times greater than they are for children in the highest income quintile (the reference category).

Note that an odds ratio cannot be interpreted in the same way as a co-efficient. An odds ratio of 2 does not mean 'two times as likely' but instead means 'the odds are two times higher'. To understand an odds ratio we first need to describe the meaning of odds. The definition of odds is similar but significantly different to that of probability. This is best explained in the form of an example. If 200 individuals out of a population of 1000 experienced persistent poverty, the probability (p) of experiencing persistent poverty is 200/1000, thus  $p=0.2$ . The probability of not experiencing persistent poverty is therefore  $1-p = 0.8$ . The odds of experiencing persistent poverty are calculated as the quotient of these two mutually exclusive events. So, the odds in favour of experiencing persistent poverty to not experiencing persistent poverty, is therefore  $0.2/0.8=0.25$ . Suppose that 150 out of 300 people living in social rented housing experience persistent poverty compared to 50 out of 150 who live in owner occupied housing. The odds of a person living in social rented housing of experiencing persistent poverty are  $0.5/0.5=1.0$ . The odds of a person living in owner occupied housing of experiencing persistent poverty is  $0.33/0.66=0.5$ . The odds ratio of experiencing persistent poverty is the ratio of these odds,  $1.0/0.5=2.0$ . Thus the odds of experiencing persistent poverty are twice as high among people who live in social rented housing (compared to people who live in owner occupied housing – the 'reference category'). Note that this is not the same as being 'twice as likely' to experience the outcome.

Categories which have a p-value greater than 0.05 are not considered to be significant. However, cases where the p-value is only a little beyond this (e.g. 0.06) have been reported. These can be indicative of other variables which are having some impact on the model and if a lower significance threshold was set

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<sup>1</sup> These groupings were devised to ensure appropriate base sizes (30+) were achieved across all measures included in the models for each group.

(e.g. of 0.10/90% rather than 0.05/95%) would be considered statistically significant. In the tables below, levels of significance are indicated as follows:

\*\*\*  $p < .001$

\*\*  $p < .01$

\*  $p < .05$

NS Not significant

### 1.3. Multivariable regression output tables

**Table 1 Factors associated with exhibiting above average levels of hyperactivity at age 5 – testing weekly ELC duration**

<i>Base: All cases where information was provided on all measures included</i>	Weighted base	Odds ratio	95% CI	
			Lower	Upper
<b>Equivalised annual household income***</b>				
No Information	381	1.535	0.969	2.431
Lowest quintile	896	2.862	1.808	4.532
2nd quintile	703	1.857	1.254	2.750
3rd quintile	689	1.419	0.941	2.140
4th quintile	578	1.181	0.809	1.726
Highest quintile (ref)	622			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	340	1.225	0.784	1.914
Upper Standard Grades and Intermediate Vocational quals	637	1.300	0.944	1.792
Higher Grades and Upper level vocational qualifications	1205	1.044	0.808	1.349
Degree level academic and vocational qualifications (ref)	1687			
<b>Area deprivation (SIMD quintiles)**</b>				
Most deprived	827	1.709	1.184	2.467
2 <sup>nd</sup> quintile	797	1.539	1.098	2.157
3 <sup>rd</sup> quintile	769	1.177	0.830	1.669
4 <sup>th</sup> quintile	733	0.901	0.640	1.269
Least deprived (ref)	744			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	76	0.775	0.357	1.685
Semi-routine and routine occupations	791	1.146	0.796	1.650
Lower supervisory and technical occupations	312	0.825	0.530	1.282
Small employers and own account holders	287	0.873	0.561	1.359
Intermediate occupations	527	0.835	0.577	1.210
Professional and managerial occupations (ref)	1876			

<b>Table 1 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2630	1.082	0.812	1.443
Towns	522	0.978	0.663	1.443
Rural (ref)	717			
<b>Child's sex***</b>				
Female	1903	0.535	0.431	0.665
Male (ref)	1966			
<b>Level of hyperactivity difficulties at age 3***</b>				
Close to average (ref)	3089			
Slightly raised	331	2.818	1.998	3.974
High	197	5.053	3.513	7.267
Very high	252	12.006	8.564	16.829
<b>Weekly duration of ELC attendance*</b>				
30 or more hours per week	247	1.625	1.057	2.500
>16 and <30 hours per week	795	0.838	0.588	1.195
>12.5 up to 16 hours per week	1584	1.177	0.903	1.534
<=12.5 hours per week (ref)	1243			
<b>Total N (unweighted)</b>	3912			
<b>Total N (weighted)</b>	3869			
<b>Pseudo R square (Nagelkerke)</b>		0.263		

\*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$



**Table 2 Factors associated with exhibiting above average levels of hyperactivity at age 5 – testing weekly ELC duration, incl grading mix**

<b>Base: All cases where information was provided on all measures included</b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Equivalised annual household income***</b>				
No Information	345	1.624	1.004	2.628
Lowest quintile	831	2.873	1.768	4.668
2 <sup>nd</sup> quintile	647	1.842	1.212	2.798
3 <sup>rd</sup> quintile	616	1.510	0.966	2.359
4 <sup>th</sup> quintile	534	1.139	0.769	1.686
Highest quintile (ref)	560			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	309	1.216	0.768	1.924
Upper Standard Grades and Intermediate Vocational quals	600	1.324	0.945	1.855
Higher Grades and Upper level vocational qualifications	1104	1.027	0.784	1.346
Degree level academic and vocational qualifications (ref)	1521			
<b>Area deprivation (SIMD quintiles)***</b>				
Most deprived	757	1.761	1.207	2.569
2 <sup>nd</sup> quintile	732	1.587	1.115	2.259
3 <sup>rd</sup> quintile	709	1.249	0.881	1.771
4 <sup>th</sup> quintile	666	0.819	0.563	1.192
Least deprived (ref)	670			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	69	0.701	0.306	1.605
Semi-routine and routine occupations	743	1.131	0.784	1.630
Lower supervisory and technical occupations	284	0.768	0.488	1.207
Small employers and own account holders	261	0.850	0.531	1.362
Intermediate occupations	486	0.831	0.581	1.190
Professional and managerial occupations (ref)	1692			

<b>Table 2 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2398	1.076	0.795	1.458
Towns	470	1.010	0.677	1.509
Rural (ref)	667			
<b>Child's sex***</b>				
Female	1739	0.535	0.428	0.668
Male (ref)	1795			
<b>Level of hyperactivity difficulties at age 3***</b>				
Close to average (ref)	2819			
Slightly raised	300	2.598	1.806	3.738
High	177	4.437	3.043	6.470
Very high	238	11.544	8.060	16.534
<b>Weekly duration of ELC attendance*</b>				
30 or more hours per week	223	1.653	1.024	2.668
>16 and <30 hours per week	716	0.852	0.583	1.243
>12.5 up to 16 hours per week	1483	1.258	0.946	1.672
<=12.5 hours per week (ref)	1113			
<b>Quality of grading mix</b>				
Mix of grades across quality measures	2256	1.205	0.953	1.522
Average score of at least 5 across all 4 quality measures (ref)	1279			
<b>Total N (unweighted)</b>	3558			
<b>Total N (weighted)</b>	3534			
<b>Pseudo R square (Nagelkerke)</b>		0.264		

\*\*\* = p<.001; \*\* = p<.01; \* = p<.05

**Table 3 Factors associated with exhibiting above average levels of hyperactivity at age 5 – testing weekly ELC duration and incl interaction with household income**

<i>Base: All cases where information was provided on all measures included</i>	Weighted base	Odds ratio	95% CI	
			Lower	Upper
<b>Equivalent annual household income***</b>				
No Information	381	1.940	0.929	4.052
Lowest quintile	896	2.263	1.158	4.422
2nd quintile	703	1.242	0.686	2.251
3rd quintile	689	1.389	0.681	2.835
4th quintile	578	0.912	0.460	1.810
Highest quintile (ref)	622			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	340	1.227	0.783	1.921
Upper Standard Grades and Intermediate Vocational quals	637	1.307	0.950	1.798
Higher Grades and Upper level vocational qualifications	1205	1.042	0.805	1.350
Degree level academic and vocational qualifications (ref)	1687			
<b>Area deprivation (SIMD quintiles)**</b>				
Most deprived	827	1.642	1.144	2.356
2 <sup>nd</sup> quintile	797	1.500	1.068	2.109
3 <sup>rd</sup> quintile	769	1.147	0.809	1.628
4 <sup>th</sup> quintile	733	0.880	0.625	1.239
Least deprived (ref)	744			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	76	0.763	0.353	1.649
Semi-routine and routine occupations	791	1.158	0.803	1.671
Lower supervisory and technical occupations	312	0.846	0.540	1.326
Small employers and own account holders	287	0.877	0.561	1.371
Intermediate occupations	527	0.850	0.582	1.241
Professional and managerial occupations (ref)	1876			

<b>Table 3 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2630	1.075	0.803	1.437
Towns	522	0.963	0.652	1.423
Rural (ref)	717			
<b>Child's sex***</b>				
Female	1903	0.538	0.434	0.667
Male (ref)	1966			
<b>Level of hyperactivity difficulties at age 3***</b>				
Close to average (ref)	3089			
Slightly raised	331	2.819	1.997	3.977
High	197	5.219	3.632	7.499
Very high	252	12.296	8.757	17.266
<b>Weekly duration of ELC attendance***</b>				
30 or more hours per week	247	1.245	0.595	2.608
>16 and <30 hours per week	795	0.736	0.378	1.437
>12.5 up to 16 hours per week	1584	0.836	0.380	1.840
<=12.5 hours per week (ref)	1243			
<b>Interaction</b>				
Hyperactivity * Household income			***	
<b>Total N (unweighted)</b>	3912			
<b>Total N (weighted)</b>	3869			
<b>Pseudo R square (Nagelkerke)</b>		0.271		

\*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

**Table 3a Factors associated with exhibiting above average levels of hyperactivity at age 5 – testing weekly ELC duration – lowest income groups only (lowest 60%)**

<i>Base: All cases where information was provided on all measures included</i>	Weighted base	Odds ratio	95% CI	
			Lower	Upper
<b>Highest household level of education *</b>				
No qualifications, Lower and upper level Standard Grades and intermediate vocational qualifications and Other quals	774	1.456	1.019	2.081
Higher Grades and Upper level vocational qualifications	862	1.010	0.729	1.400
Degree level academic and vocational qualifications (ref)	651			
<b>Area deprivation (SIMD quintiles)*</b>				
Most deprived	672	1.834	1.148	2.931
2 <sup>nd</sup> quintile	587	1.592	1.014	2.499
3 <sup>rd</sup> quintile	447	1.297	0.780	2.155
4 <sup>th</sup> quintile	341	0.950	0.579	1.560
Least deprived (ref)	240			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	60	1.003	0.436	2.308
Lower supervisory and technical occupations, semi-routine and routine occupations	919	1.243	0.880	1.755
Small employers, own account holders, and intermediate occupations	601	0.925	0.656	1.304
Professional and managerial occupations (ref)	707			
<b>Urban/Rural classification</b>				
Urban	1566	0.944	0.671	1.328
Towns	333	0.911	0.602	1.378
Rural (ref)	388			
<b>Child's sex***</b>				
Female	1120	0.515	0.395	0.671
Male (ref)	1167			

<b>Table 3b continued</b>				
<b>Level of hyperactivity difficulties at age 3***</b>				
Close to average (ref)	1775			
Slightly raised	213	2.769	1.793	4.278
High	125	3.994	2.549	6.257
Very high	175	9.168	6.207	13.540
<b>Weekly duration of ELC attendance*</b>				
30 or more hours per week	88	1.965	1.044	3.697
>16 and <30 hours per week	403	0.867	0.567	1.327
>12.5 up to 16 hours per week	1019	1.292	0.946	1.764
<=12.5 hours per week (ref)	777			
<b>Total N (unweighted)</b>	2077			
<b>Total N (weighted)</b>	2288			
<b>Pseudo R square (Nagelkerke)</b>		0.215		

\*\*\* = p<.001; \*\* = p<.01; \* = p<.05

**Table 3b Factors associated with exhibiting above average levels of hyperactivity at age 5 – testing weekly ELC duration – highest income groups only (highest 40%)**

<b>Base: All cases where information was provided on all measures included</b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Highest household level of education</b>				
No qualifications, Lower and upper level Standard Grades and intermediate vocational qualifications and Other quals	50	1.228	0.577	2.617
Higher Grades and Upper level vocational qualifications	220	1.071	0.649	1.768
Degree level academic and vocational qualifications (ref)	930			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	58	1.648	0.677	4.015
2 <sup>nd</sup> quintile	128	1.718	0.891	3.313
3 <sup>rd</sup> quintile	226	1.424	0.774	2.623
4 <sup>th</sup> quintile	323	1.010	0.596	1.712
Least deprived (ref)	566			

<b>Table 3b continued</b>				
<b>Highest household occupational classification (NSSEC)</b>				
Lower supervisory and technical occupations, semi-routine and routine occupations	44	1.283	0.500	3.293
Small employers, own account holders, and intermediate occupations	112	1.037	0.521	2.061
Professional and managerial occupations (ref)	1045			
<b>Urban/Rural classification</b>				
Urban	806	1.469	0.806	2.678
Towns	144	0.759	0.329	1.750
Rural (ref)	251			
<b>Child's sex (p=.052)</b>				
Female	607	0.679	0.459	1.003
Male (ref)	593			
<b>Level of hyperactivity difficulties at age 3***</b>				
Close to average (ref)	1037			
Slightly raised	80	5.043	2.825	9.003
High	41	8.174	4.292	15.566
Very high	42	18.828	9.814	36.123
<b>Weekly duration of ELC attendance</b>				
30 or more hours per week	145	1.453	0.766	2.754
>16 and <30 hours per week	317	0.994	0.577	1.711
>12.5 up to 16 hours per week	375	0.875	0.498	1.537
<=12.5 hours per week (ref)	363			
<b>Total N (unweighted)</b>	1486			
<b>Total N (weighted)</b>	1200			
<b>Pseudo R square (Nagelkerke)</b>		0.195		

\*\*\* = p<.001; \*\* = p<.01; \* = p<.05

**Table 4 Factors associated with exhibiting above average levels of peer problems at age 5 – testing staffing grade**

<b>Base: All cases where information was provided on all measures included</b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Equivalised annual household income***</b>				
No Information	336	1.405	0.856	2.304
Lowest quintile	837	2.130	1.376	3.297
2nd quintile	648	1.344	0.900	2.006
3rd quintile	614	1.057	0.719	1.552
4th quintile	535	0.953	0.634	1.433
Highest quintile (ref)	564			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	311	1.774	1.071	2.939
Upper Standard Grades and Intermediate Vocational quals	600	1.306	0.843	2.022
Higher Grades and Upper level vocational qualifications	1097	1.219	0.896	1.659
Degree level academic and vocational qualifications (ref)	1527			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	757	1.147	0.744	1.770
2 <sup>nd</sup> quintile	728	1.122	0.759	1.659
3 <sup>rd</sup> quintile	710	1.095	0.750	1.598
4 <sup>th</sup> quintile	669	1.067	0.669	1.704
Least deprived (ref)	671			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	72	0.865	1.321	0.928
Semi-routine and routine occupations	741	1.321	0.928	1.878
Lower supervisory and technical occupations	280	0.976	0.615	1.548
Small employers and own account holders	261	1.528	0.934	2.498
Intermediate occupations	484	1.162	0.791	1.707
Professional and managerial occupations (ref)	1696			



<b>Table 4 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2392	1.067	0.790	1.440
Towns	475	0.965	0.655	1.422
Rural (ref)	668			
<b>Child's sex*</b>				
Female	1746	0.733	0.576	0.934
Male (ref)	1788			
<b>Peer problems score at age 3***</b>				
Close to average (ref)	2712			
Slightly raised	443	2.559	1.905	3.436
High	220	5.233	3.642	7.520
Very high	160	9.766	6.414	14.869
<b>Staffing grade (cont.) **</b>				
<b>Total N (unweighted)</b>	3564			
<b>Total N (weighted)</b>	3535			
<b>Pseudo R square (Nagelkerke)</b>		0.196		

\*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

**Table 5 Factors associated with exhibiting above average levels of peer problems at age 5 – testing staffing grade, incl ELC hours**

<b>Base: All cases where information was provided on all measures included</b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Equivalised annual household income***</b>				
No information	336	1.413	0.852	2.345
Lowest quintile	833	2.199	1.406	3.441
2nd quintile	645	1.354	0.897	2.046
3rd quintile	612	1.082	0.730	1.601
4th quintile	533	0.956	0.633	1.444
Highest quintile (ref)	561			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	311	1.745	1.046	2.911
Upper Standard Grades and Intermediate Vocational quals	598	1.271	0.817	1.977
Higher Grades and Upper level vocational qualifications	1094	1.223	0.898	1.666
Degree level academic and vocational qualifications (ref)	1518			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	754	1.135	0.735	1.753
2 <sup>nd</sup> quintile	726	1.137	0.765	1.690
3 <sup>rd</sup> quintile	707	1.108	0.758	1.620
4 <sup>th</sup> quintile	664	1.093	0.684	1.747
Least deprived (ref)	668			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	69	0.885	0.395	1.981
Semi-routine and routine occupations	740	1.306	0.914	1.865
Lower supervisory and technical occupations	280	0.967	0.609	1.535
Small employers and own account holders	261	1.531	0.931	2.518
Intermediate occupations	484	1.158	0.788	1.702
Professional and managerial occupations (ref)	1686			

<b>Table 5 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2384	1.071	0.798	1.439
Towns	472	0.940	0.631	1.401
Rural (ref)	665			
<b>Child's sex*</b>				
Female	1738	0.742	0.582	0.947
Male (ref)	1783			
<b>Peer problems score at age 3***</b>				
Close to average (ref)	2700			
Slightly raised	443	2.561	1.903	3.447
High	219	5.237	3.650	7.513
Very high	159	9.767	6.431	14.835
<b>Staffing grade (cont.) *</b>				
<b>Weekly duration of ELC attendance</b>				
30 or more hours per week	223	1.259	0.791	2.005
>16 and <30 hours per week	710	1.085	0.739	1.593
>12.5 up to 16 hours per week	1474	1.214	0.933	1.581
Less than 12.5 hours per week (ref)	1113			
<b>Total N (unweighted)</b>	3549			
<b>Total N (weighted)</b>	3520			
<b>Pseudo R square (Nagelkerke)</b>		0.197		

\*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

**Table 6 Factors associated with exhibiting above average levels of peer problems at age 5 – testing staffing grade and incl interaction with household income**

<b><i>Base: All cases where information was provided on all measures included</i></b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Equivalent annual household income</b>				
No information	336	1.315	0.798	2.168
Lowest quintile	837	2.179	1.396	3.402
2 <sup>nd</sup> quintile	648	1.365	0.908	2.053
3 <sup>rd</sup> quintile	614	1.052	0.703	1.573
4 <sup>th</sup> quintile	535	0.976	0.642	1.485
Highest quintile (ref)	564			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	311	1.742	1.053	2.883
Upper Standard Grades and Intermediate Vocational quals	600	1.306	0.841	2.026
Higher Grades and Upper level vocational qualifications	1097	1.217	0.894	1.657
Degree level academic and vocational qualifications (ref)	1527			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	757	1.167	0.756	1.802
2 <sup>nd</sup> quintile	728	1.126	0.761	1.665
3 <sup>rd</sup> quintile	710	1.095	0.749	1.600
4 <sup>th</sup> quintile	669	1.071	0.669	1.713
Least deprived (ref)	671			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	72	0.912	0.416	1.997
Semi-routine and routine occupations	741	1.322	0.927	1.885
Lower supervisory and technical occupations	280	0.978	0.618	1.546
Small employers and own account holders	261	1.494	0.913	2.444
Intermediate occupations	484	1.170	0.794	1.723
Professional and managerial occupations (ref)	1696			

<b>Table 6 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2392	1.076	0.797	1.452
Towns	475	0.959	0.652	1.408
Rural (ref)	668			
<b>Child's sex*</b>				
Female	1746	0.739	0.579	0.944
Male (ref)	1788			
<b>Peer problems score at age 3***</b>				
Close to average (ref)	2712			
Slightly raised	443	2.570	1.911	3.456
High	220	5.277	3.662	7.603
Very high	160	9.717	6.384	14.790
<b>Staffing grade (cont.) ***</b>				
<b>Interaction</b>				
Staffing grade * Household income		NS		
<b>Total N (unweighted)</b>	3564			
<b>Total N (weighted)</b>	3535			
<b>Pseudo R square (Nagelkerke)</b>		0.200		

\*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

**Table 7 Factors associated with exhibiting above average levels of peer problems at age 5 – testing grading mix**

<b>Base: All cases where information was provided on all measures included</b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Equivalised annual household income***</b>				
No Information	336	1.419	0.866	2.323
Lowest quintile	837	2.151	1.390	3.328
2nd quintile	648	1.346	0.902	2.010
3rd quintile	614	1.073	0.729	1.580
4th quintile	535	0.964	0.641	1.450
Highest quintile (ref)	564			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	311	1.790	1.081	2.964
Upper Standard Grades and Intermediate Vocational quals	600	1.305	0.845	2.016
Higher Grades and Upper level vocational qualifications	1097	1.222	0.897	1.666
Degree level academic and vocational qualifications (ref)	1527			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	757	1.170	0.758	1.806
2 <sup>nd</sup> quintile	728	1.150	0.776	1.703
3 <sup>rd</sup> quintile	710	1.127	0.774	1.641
4 <sup>th</sup> quintile	669	1.074	0.670	1.719
Least deprived (ref)	671			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	72	0.893	0.408	1.954
Semi-routine and routine occupations	741	1.322	0.931	1.878
Lower supervisory and technical occupations	280	0.975	0.614	1.548
Small employers and own account holders	261	1.525	0.934	2.492
Intermediate occupations	484	1.147	0.782	1.683
Professional and managerial occupations (ref)				

<b>Table 7 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2392	1.066	0.788	1.441
Towns	475	1.000	0.681	1.469
Rural (ref)	668			
<b>Child's sex*</b>				
Female	1746	0.728	0.571	0.928
Male (ref)	1788			
<b>Peer problems score at age 3***</b>				
Close to average (ref)	2712			
Slightly raised	443	2.562	1.913	3.430
High	220	5.274	3.674	7.569
Very high	160	9.803	6.443	14.914
<b>Quality grading mix*</b>				
Mix of grades across quality measures	2255	1.379	1.067	1.784
Average score of at least 'very good' across all four quality measures (ref)	1280			
<b>Total N (unweighted)</b>	3564			
<b>Total N (weighted)</b>	3535			
<b>Pseudo R square (Nagelkerke)</b>		0.196		

\*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

**Table 8 Factors associated with exhibiting above average levels of peer problems at age 5 – testing grading mix, incl ELC hours**

<b>Base: All cases where information was provided on all measures included</b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Equivalised annual household income***</b>				
No Information	336	1.423	0.859	2.358
Lowest quintile	833	2.213	1.414	3.463
2nd quintile	645	1.351	0.894	2.042
3rd quintile	612	1.095	0.738	1.625
4th quintile	533	0.965	0.638	1.457
Highest quintile (ref)	561			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	311	1.759	1.056	2.931
Upper Standard Grades and Intermediate Vocational quals	598	1.270	0.819	1.969
Higher Grades and Upper level vocational qualifications	1094	1.226	0.898	1.673
Degree level academic and vocational qualifications (ref)	1518			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	754	1.155	0.748	1.785
2 <sup>nd</sup> quintile	726	1.164	0.781	1.732
3 <sup>rd</sup> quintile	707	1.140	0.781	1.663
4 <sup>th</sup> quintile	664	1.099	0.686	1.762
Least deprived (ref)	668			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	69	0.910	0.409	2.025
Semi-routine and routine occupations	740	1.308	0.917	1.865
Lower supervisory and technical occupations	280	0.965	0.607	1.534
Small employers and own account holders	261	1.529	0.930	2.512
Intermediate occupations	484	1.146	0.780	1.682
Professional and managerial occupations (ref)	1686			



<b>Table 8 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2384	1.072	0.797	1.442
Towns	472	0.973	0.656	1.444
Rural (ref)	665			
<b>Child's sex*</b>				
Female	1738	0.737	0.577	0.941
Male (ref)	1783			
<b>Peer problems score at age 3***</b>				
Close to average (ref)	2700			
Slightly raised	443	2.564	1.911	3.442
High	219	5.270	3.676	7.555
Very high	159	9.809	6.467	14.878
<b>Quality grading mix*</b>				
Mix of grades across quality measures	2245	1.373	1.059	1.781
Average score of at least 'very good' across all four quality measures (ref)	1275			
<b>Weekly duration of ELC attendance</b>				
30 or more hours per week	223	1.247	0.785	1.982
>16 and <30 hours per week	710	1.063	0.724	1.563
>12.5 up to 16 hours per week	1474	1.213	0.931	1.580
Less than 12.5 hours per week (ref)	1113			
<b>Total N (unweighted)</b>	3549			
<b>Total N (weighted)</b>	3520			
<b>Pseudo R square (Nagelkerke)</b>		0.198		

\*\*\* = p<.001; \*\* = p<.01; \* = p<.05

**Table 9 Factors associated with exhibiting above average levels of peer problems at age 5 – testing grading mix and incl interaction with household income**

<i>Base: All cases where information was provided on all measures included</i>	Weighted base	Odds ratio	95% CI	
			Lower	Upper
<b>Equivalentised annual household income***</b>				
No Information	336	0.711	0.299	1.690
Lowest quintile	837	1.645	0.861	3.142
2nd quintile	648	0.867	0.449	1.674
3rd quintile	614	0.566	0.289	1.109
4th quintile	535	0.848	0.456	1.578
Highest quintile (ref)	564			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	311	1.757	1.061	2.909
Upper Standard Grades and Intermediate Vocational quals	600	1.302	0.842	2.014
Higher Grades and Upper level vocational qualifications	1097	1.213	0.890	1.655
Degree level academic and vocational qualifications (ref)	1527			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	757	1.200	0.772	1.864
2 <sup>nd</sup> quintile	728	1.172	0.787	1.745
3 <sup>rd</sup> quintile	710	1.147	0.784	1.679
4 <sup>th</sup> quintile	669	1.090	0.678	1.751
Least deprived (ref)	671			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	72	0.937	0.427	2.060
Semi-routine and routine occupations	741	1.328	0.933	1.890
Lower supervisory and technical occupations	261	0.975	0.612	1.553
Small employers and own account holders	280	1.494	0.915	2.438
Intermediate occupations	484	1.154	0.786	1.695
Professional and managerial occupations (ref)	1696			

<b>Table 9 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2392	1.064	0.787	1.437
Towns	475	1.008	0.692	1.468
Rural (ref)	668			
<b>Child's sex*</b>				
Female	1746	0.727	0.570	0.928
Male (ref)	1788			
<b>Peer problems score at age 3***</b>				
Close to average (ref)	2712			
Slightly raised	443	2.558	1.914	3.418
High	220	5.329	3.704	7.666
Very high	160	9.758	6.422	14.827
<b>Quality grading mix**</b>				
Mix of grades across quality measures	2255	0.799	0.453	1.410
Average score of at least 'very good' across all four quality measures	1280			
<b>Interaction</b>				
Grading mix * Household income		NS		
<b>Total N (unweighted)</b>	3564			
<b>Total N (weighted)</b>	3535			
<b>Pseudo R square (Nagelkerke)</b>		0.200		

\*\*\* = p<.001; \*\* = p<.01; \* = p<.05

**Table 10 Factors associated with exhibiting below average levels of pro-social behaviour at age 5 – testing grading mix**

<b>Base: All cases where information was provided on all measures included</b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Equivalised annual household income***</b>				
No Information	348	1.965	1.170	3.303
Lowest quintile	836	2.490	1.604	3.866
2 <sup>nd</sup> quintile	649	1.292	0.818	2.042
3 <sup>rd</sup> quintile	617	1.059	0.712	1.576
4 <sup>th</sup> quintile	538	0.970	0.670	1.405
Highest quintile (ref)	563			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	310	0.978	0.590	1.622
Upper Standard Grades and Intermediate Vocational quals	601	1.088	0.732	1.619
Higher Grades and Upper level vocational qualifications	1110	0.991	0.745	1.318
Degree level academic and vocational qualifications (ref)	1529			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	761	1.290	0.883	1.886
2 <sup>nd</sup> quintile	732	1.139	0.809	1.604
3 <sup>rd</sup> quintile	713	0.813	0.576	1.147
4 <sup>th</sup> quintile	670	0.841	0.590	1.200
Least deprived (ref)	674			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	74	0.797	0.311	2.042
Semi-routine and routine occupations	742	0.819	0.567	1.182
Lower supervisory and technical occupations	261	1.040	0.679	1.594
Small employers and own account holders	285	0.722	0.445	1.171
Intermediate occupations	486	0.899	0.641	1.263
Professional and managerial occupations (ref)	1701			

<b>Table 10 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2404	0.902	0.668	1.219
Towns	473	1.040	0.682	1.586
Rural (ref)	673			
<b>Child's sex***</b>				
Female	1753	0.534	0.407	0.700
Male (ref)	1798			
<b>Pro-social score at age 3***</b>				
Close to average (ref)	2529			
Slightly lowered	495	2.564	1.887	3.503
Low	340	4.959	3.528	6.971
Very low	187	7.913	5.255	11.915
<b>Quality grading mix**</b>				
Mix of grades across quality measures	2269	1.396	1.083	1.799
Average score of at least 'very good' across all four quality measures (ref)	1281			
<b>Total N (unweighted)</b>	3579			
<b>Total N (weighted)</b>	3551			
<b>Pseudo R square (Nagelkerke)</b>		0.185		

\*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

**Table 11 Factors associated with exhibiting below average levels of pro-social behaviour at age 5 – testing grading mix, incl ELC hours**

<b>Base: All cases where information was provided on all measures included</b>	<b>Weighted base</b>	<b>Odds ratio</b>	<b>95% CI</b>	
			<b>Lower</b>	<b>Upper</b>
<b>Equivalised annual household income***</b>				
No Information	348	1.960	1.160	3.310
Lowest quintile	832	2.496	1.599	3.898
2nd quintile	645	1.300	0.823	2.052
3rd quintile	615	1.046	0.700	1.563
4th quintile	536	0.973	0.670	1.413
Highest quintile (ref)	560			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	310	0.957	0.575	1.593
Upper Standard Grades and Intermediate Vocational quals	599	1.077	0.725	1.600
Higher Grades and Upper level vocational qualifications	1107	0.988	0.743	1.314
Degree level academic and vocational qualifications (ref)	1520			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	758	1.293	0.880	1.898
2 <sup>nd</sup> quintile	731	1.138	0.806	1.607
3 <sup>rd</sup> quintile	710	0.819	0.580	1.158
4 <sup>th</sup> quintile	666	0.848	0.594	1.211
Least deprived (ref)	672			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	71	0.878	0.338	2.278
Semi-routine and routine occupations	741	0.822	0.570	1.186
Lower supervisory and technical occupations	285	1.046	0.683	1.602
Small employers and own account holders	261	0.723	0.446	1.172
Intermediate occupations	486	0.902	0.642	1.267
Professional and managerial occupations (ref)	1691			

<b>Table 11 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2395	0.910	0.672	1.232
Towns	471	1.054	0.693	1.604
Rural (ref)	670			
<b>Child's sex***</b>				
Female	1744	0.540	0.411	0.710
Male (ref)	1792			
<b>Pro-social score at age 3***</b>				
Close to average (ref)	2519			
Slightly lowered	494	2.527	1.844	3.462
Low	337	4.965	3.534	6.975
Very low	186	7.956	5.270	12.012
<b>Quality grading mix**</b>				
Mix of grades across quality measures	2260	1.402	1.084	1.811
Average score of at least 'very good' across all four quality measures (ref)	1277			
<b>Weekly duration of ELC attendance</b>				
30 or more hours per week	224	0.891	0.553	1.436
>16 and <30 hours per week	715	1.030	0.759	1.399
>12.5 up to 16 hours per week	1480	1.001	0.745	1.345
Less than 12.5 hours per week (ref)	1117			
<b>Total N (unweighted)</b>	3564			
<b>Total N (weighted)</b>	3536			
<b>Pseudo R square (Nagelkerke)</b>		0.185		

\*\*\* = p<.001; \*\* = p<.01; \* = p<.05

**Table 12 Factors associated with exhibiting below average levels of pro-social behaviour at age 5 – testing grading mix and incl interaction with household income**

<i>Base: All cases where information was provided on all measures included</i>	Weighted base	Odds ratio	95% CI	
			Lower	Upper
<b>Equivalentised annual household income***</b>				
No Information	348	1.841	0.816	4.153
Lowest quintile	836	2.625	1.394	4.941
2nd quintile	649	1.271	0.608	2.659
3rd quintile	617	1.237	0.654	2.340
4th quintile	538	1.150	0.616	2.147
Highest quintile (ref)	563			
<b>Highest household level of education</b>				
No qualifications, Lower level Standard Grades and Vocational qualifications and Other quals	310	0.973	0.588	1.612
Upper Standard Grades and Intermediate Vocational quals	601	1.084	0.728	1.616
Higher Grades and Upper level vocational qualifications	1110	0.988	0.742	1.315
Degree level academic and vocational qualifications (ref)	1529			
<b>Area deprivation (SIMD quintiles)</b>				
Most deprived	761	1.292	0.884	1.887
2 <sup>nd</sup> quintile	732	1.136	0.808	1.599
3 <sup>rd</sup> quintile	713	0.810	0.573	1.146
4 <sup>th</sup> quintile	670	0.837	0.586	1.196
Least deprived (ref)	674			
<b>Highest household occupational classification (NSSEC)</b>				
Never worked	74	0.812	0.321	2.059
Semi-routine and routine occupations	742	0.822	0.570	1.185
Lower supervisory and technical occupations	261	1.047	0.682	1.607
Small employers and own account holders	285	0.720	0.444	1.166
Intermediate occupations	486	0.905	0.645	1.270
Professional and managerial occupations (ref)	1701			



<b>Table 12 continued</b>				
<b>Urban/Rural classification</b>				
Urban	2404	0.905	0.669	1.223
Towns	473	1.038	0.682	1.580
Rural (ref)	673			
<b>Child's sex***</b>				
Female	1753	0.535	0.408	0.701
Male (ref)	1798			
<b>Pro-social score at age 3***</b>				
Close to average (ref)	2529			
Slightly lowered	495	2.560	1.876	3.494
Low	340	4.975	3.538	6.997
Very low	187	7.876	5.230	11.862
<b>Quality grading mix*</b>				
Mix of grades across quality measures	2269	1.505	0.822	2.755
Average score of at least 'very good' across all four quality measures (ref)	1281			
<b>Interaction</b>				
Quality grading mix * Household income		NS		
<b>Total N (unweighted)</b>	3579			
<b>Total N (weighted)</b>	3551			
<b>Pseudo R square (Nagelkerke)</b>		0.185		

\*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$