National College for Teaching & Leadership

High Potential Senior Leaders programme evaluation: Impact analysis

Final Research Report

Daniel Muijs and Hamis Mugendawala

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Executive Summary

In this report we describe the findings of the impact evaluation of the High Potential Senior Leaders programme (HPSL)[1]. The findings draw on quantitative analyses of a range of datasets, including: HPSL participant datasets, Near Misses (i.e. those candidates not, but almost, accepted onto the programme), HPSL School engagement dataset, the National Professional Qualification for Headship (NPQH) participant dataset, the National Pupil Database (NPD) and the Schools Workforce Census (SWC).

We looked at three main questions:

1. What are the characteristics of HPSL participants and the schools they work in, how do they compare to the national population, and do they change over time?
2. Do HPSL participants move into leadership roles more frequently and/or rapidly than their peers?
3. Is there a relationship between participation in the HPSL programme and attainment?

To answer the first question, we merged HPSL participant data to the School Workforce Census database and analysed demographic characteristics and roles of HPSL participants for each participating cohort. We then matched HPSL School Engagement Data with the National Pupil Database to look at school characteristics.

To answer the second question, we used Propensity Score Matching to create a matched sample of HPSL participants and comparison teachers. Role and payscale, as well as demographic data (age, gender, ethnicity), school phase, and membership in the Near Misses dataset were used to create the matched sample. We then compared the HPSL participants and a comparison sample for each cohort for each year up to 2014 (the last year for which we have School Workforce Census data).

To answer the third question we again used Propensity Score Matching, this time to create a matched sample of schools participating and not participating in the programme. Attainment and pupil intake data (gender, free school meals (FSM), special educational needs (SEN), the income deprivation affecting children index (IDACI), language) were used to create the matched sample. Multilevel models were

[1] Fieldwork for this evaluation was conducted in 2015 and the reporting completed in Summer 2016. It therefore relates to a previous design of the HPSL programme. In Autumn 2016, DfE ran a procurement exercise for a re-designed HPSL programme. Ambition School Leadership (created from the merger of Future Leaders and Teaching Leaders) was successful in bidding for this, and have a contract to deliver until 2022.

then used to analyse National Pupil Database data to explore the relationship of interest.

The key findings from these analyses are as follows:

- Participants in the HPSL programme are more likely to be male, black and minority ethnic (BME) and younger than the population of teachers as a whole
- Participants in the HPSL programme are less likely to be classroom teachers and more likely to be in middle and senior leadership roles than the population of teachers when they join the programme. This is to be expected as this is the group targeted by the programme.
- Over time, there is significant movement of participants into senior leadership, and, to a lesser extent, headteacher roles, which is reflected in changes to payscales.
- Participants in the HPSL programme work in schools that serve significantly more disadvantaged communities than the population of schools, but that are relatively high performing. They are predominantly located in major urban areas (with London alone accounting for over a third of participants), and have a greater proportion of pupils who do not have English as their home language. This remains the case across HPSL cohorts and years of participation.
- Compared to their matched comparison sample, HPSL participants have significantly greater and more rapid movement into senior leadership roles and into leadership payscales than teachers in the comparison group. This happens consistently across cohorts. This is suggestive of a programme effect, as demographically the participant and comparison groups remain substantively similar over time.
- Compared to NPQH participants, HPSL participants are less likely to be in senior leadership at the start of the programme. NPQH graduates tend to progress gradually into headship, while HPSL participants, starting from a lower hierarchical position, tend to move into senior leadership rapidly.
- No clear evidence was found of a relationship between participation in the programme at the school level and attainment.

Introduction

Background

The High Potential Senior Leaders Programme, which has been delivered under the brand name the Future Leaders programme, is a three year leadership development programme designed specifically to raise levels of pupil achievement in challenging schools by developing high-potential middle and senior leaders to become headteachers in these schools. The programme was delivered through a commissioned charity, The Future Leaders Trust[2]. Graduates of the HPSL programme were expected to take up a headship position in a challenging school within four years of commencing the programme.

The development programme takes place in two phases. In phase one, the first year of the programme, participants take part in Foundations an intensive 2 week residential induction course and then are placed into a new senior leadership role in a 'challenging' school. They are supported by a leadership development advisor (LDA) [3], given responsibilities across the range of different leadership skills expected of a senior leader, including a whole school improvement project, and undertake training courses. In the second phase of the programme, years 2 and 3, participants are expected (and supported) to secure a senior leadership role in a challenging school and continue to a lesser degree to receive support from a leadership development advisor, continue leading at least two whole school improvement projects and undertake training courses.

Impact Analysis

In this report we describe the findings of the impact evaluation of the High Potential Senior Leaders (HPSL) programme. The findings draw on quantitative analyses of a range of datasets, including: HPSL participant datasets, Near Misses (i.e. those candidates not, but almost, accepted onto the programme), HPSL School engagement dataset, the National Professional Qualification for Headship (NPQH) participant dataset, the National Pupil Database (NPD) and the Schools Workforce Census (SWC).

[2] Fieldwork for this evaluation was conducted in 2015 and the reporting completed in Summer 2016. It therefore relates to a previous design of the HPSL programme. In Autumn 2016, DfE ran a procurement exercise for a re-designed HPSL programme. Ambition School Leadership (created from the merger of Future Leaders and Teaching Leaders) was successful in bidding for this, and have a contract to deliver until 2022.

[3] a serving or newly retired head

We present these findings in five parts. In the first part we describe the characteristics of both the HPSL participants and the schools they worked in, and how these have evolved over time, and compare these to the population of teachers and schools.

In the second part we look at the extent to which HPSL participants have moved into leadership roles more frequently and/or rapidly than their peers. To this end we constructed a matched comparison sample of teachers using the School Workforce Census, Near Misses and NPQH data.

In the third part we compare the progress of HPSL participants with participants in NPQH, looking at the demographic characteristics of both groups and their progression into leadership.

In the fourth part we look at the question of whether there is a relationship between participation in the HPSL programme and attainment. To do this we again created a matched sample of engaged and non-engaged schools. We then ran a number of multilevel models.

In the fifth and final section we look at the relationship between participation in the HPSL programme and attainment of disadvantaged pupils, using multilevel modelling.

Part 1: Characteristics of HPSL participants and change over time

In this section we provide a descriptive overview of the characteristics of participants and schools involved in the programme. Analyses looked at:

- Roles of all HPSL participants by cohort
- Level of change in role over time
- Participant characteristics such as gender, ethnicity, and age
- Characteristics of schools engaged in the HPSL programme, including overall Ofsted judgement, phase, location, and key aggregated pupil characteristics.

To do these analyses, we used data from HPSL participants dataset, the School Workforce Census; Ofsted inspection data; and school-level data derived from the NPD.

The first step was to check and clean the SWC data, and disaggregate it by year (the raw dataset was one field for all years from 2010, thus containing multiple entries per person). The HPSL participant data was then checked and cleaned. As the original dataset did not include a variable for matching, a revised dataset had to be requested. This again had to be checked and cleaned, as some errors in data input were present. The SWC datasets were then matched with the Future Leaders Trust's participant datasets. Matching was carried out using a propensity score matching method. The matching was found to be successful, with no statistically significant differences between the two groups for the variables of interest[4], and no significant difference in the distribution of propensity scores between the treatment and comparison groups[5].

In the following sets of analyses we present, firstly, the full SWC dataset, showing the characteristics of the teaching profession from 2010 to 2014 (the first and last years we have data for. Then we look at each cohort in turn, starting with the 2011 cohort. Some recoding of categories was undertaken due to small numbers making the full distinctions unviable for the HPSL sample. Thus, for age, the two oldest age groups were merged. In terms of roles, the category 'middle leaders' was created by merging middle level leadership roles such as head of department and head of year, while the 'senior leaders' category was created by merging senior level non-headteacher roles such as deputy and assistant head.

[4]Independent samples t-test, 0.05 level of significance
[5] Mann-Whitney U-test

The population

In this table we present data from the full population of teachers as identified through the Schools Workforce Census. Later sections compare HPSL participants to a matched comparison sample.

Table 1: Population distribution in key variables based on School Workforce Census data, in percentages.

	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)
Female	74.6	74.9	75.0	75.2	75.4
BME	13.4	13.7	13.8	14.6	15.1
<25	5.4	5.3	5.5	5.6	5.9
25-29	15.9	16.0	16.3	16.6	16.7
30-34	16.2	16.7	17.1	17.3	17.2
35-39	14.2	14.3	14.4	14.5	14.9
40-44	12.1	12.5	13.0	13.5	13.8
45-49	11.2	11.4	11.4	11.4	11.5
50-54	11.4	10.8	10.0	9.7	9.6
55-59	10.6	9.9	9.1	8.3	7.5
>59	3.1	3.1	3.1	3.1	3.0
Role: Other education or non-education	3.9	3.8	3.2	3.1	2.9
Role: Classroom teacher	78.1	78.2	78.8	78.7	78.4
Role: Middle leader	5.1	5.1	5.0	5.0	5.1
Role: Senior leader	8.4	8.4	8.5	8.8	9.3

	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)
Role: Headteacher	4.5	4.5	4.4	4.4	4.4
Part-time	21.4	21.8	21.6	21.9	21.9
Phase: Nursery	0.3	0.3	0.3	0.3	0.3
Phase: Primary	47.1	47.9	48.1	48.4	49.0
Phase: Secondary	48.2	47.3	46.9	45.6	44.3
Phase: All Through	0.8	0.9	1.1	1.2	1.5
Phase: Special	3.5	3.6	3.6	4.5	4.6
Payscale: Unqualified Teacher Pay Scale	3.6	3.4	3.2	3.0	3.6
Payscale: Main Scale	36.8	36.5	37.1	37.8	39.8
Payscale: Upper Scale	44.8	45.3	45.1	44.5	41.8
Payscale: Advanced/excellent scales	1.1	1.0	0.9	0.7	0.6
Payscale: Leadership scales	13.8	13.6	13.7	17.0	14.2

These analyses show that the teaching population was three quarters female across the period studied. The proportion of BME teachers increased over the period, from 13% to 15%. The teaching profession also became somewhat younger over this period. Roles remained relatively constant, with around 78% being classroom teachers, 5% middle leaders and 4.5% headteachers. There was a reduction in the number of people in ‘other’ roles, and an increase in senior leaders (from 8.5% to 9%). There was a slight increase in the proportion of teachers working in primary schools, and a reduction in the number in secondary schools between 2010 and 2014.

Cohort 2011

Table 2: 2011 cohort distribution in key variables based on School Workforce Census data, in percentages.

	2010 n=47 (%)	2011 N=43 (%)	2012 n=40 (%)	2013 n=40 (%)	2014 N=37 (%)
Female	55.3	53.5	52.5	52.5	56.8
BME	10.6	10.3	17.5	17.5	16.2
<25	2.1	0.0	0.0	0.0	0.0
25-29	21.3	18.6	10.0	7.5	0.0
30-34	36.2	34.9	37.5	42.5	45.9
35-39	25.5	27.9	25.0	25.0	27.0
40-44	12.8	14.0	22.5	20.0	18.9
45-49	2.1	4.7	5.0	5.0	8.1
50-54	0.0	0.0	0.0	0.0	0.0
55-59	0.0	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0	0.0
Role: Other education or non-education	4.3	0.0	0.0	0.0	0.0
Role: Classroom teacher	66.0	11.6	7.5	7.5	5.4
Role: Middle leader	17.0	0.0	7.5	10.0	5.4
Role: Senior leader	12.8	88.4	85.0	77.5	81.1
Role: Headteacher	0.0	0.0	0.0	5.0	8.1

	2010 n=47 (%)	2011 N=43 (%)	2012 n=40 (%)	2013 n=40 (%)	2014 N=37 (%)
Part-time	4.3	0.0	0.0	0.0	2.7
Phase: Nursery	0.0	0.0	0.0	0.0	0.0
Phase: Primary	0.0	0.0	0.0	2.5	2.7
Phase: Secondary	89.1	88.4	82.5	85.0	86.5
Phase: All Through	8.7	11.6	17.5	12.5	8.1
Phase: Special	2.2	0.0	0.0	0.0	2.7
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	28.9	2.3	2.5	0.0	8.1
Payscale: Upper Scale	37.8	9.3	12.5	15.0	5.4
Payscale: Advanced/excellent scales	11.1	2.3	0.0	0.0	0.0
Payscale: Leadership scales	22.2	86.0	85.0	85.0	86.5

At application (2010) participants in the HPSL programme from the 2011 cohort were more likely to be male, less likely to be BME, and more likely to fall in the younger age categories than the population of teachers. In terms of role, they were more likely to be middle leaders, and less likely to be classroom teachers. There were no senior leaders or headteachers in the cohort. They were more likely to be on the leadership and advanced pay scales than the population. The vast majority of HPSL participants (90%) worked in secondary schools, though a further 9% worked in all through schools.

Looking at changes over time, the demographic characteristics of the HPSL participants remained broadly the same, though sample attrition led to some increase in the proportion of BME participants, and changes to the age categories reflect natural ageing of the cohort. Over time, there was significant progress of participants into senior leadership roles (from 12.8% to 81.1%) and headship (from 0

to 8.1%). This generally occurred from the first year of participation. The extent to which this represents a programme effect as opposed to regular career development will be explored in subsequent analyses (section 2).

Cohort 2012

Table 3: Cohort 2012 distribution in key variables based on School Workforce Census data, in percentages.

	2011 N=61	2012 n=56	2013 n=56	2014 N=48
Female	59.0	55.4	55.4	62.5
BME	18.0	25.0	25.0	22.9
<25	0.0	0.0	0.0	0.0
25-29	27.9	23.6	12.5	10.4
30-34	39.3	30.9	39.3	39.6
35-39	19.7	29.1	28.6	27.1
40-44	8.2	9.1	14.3	16.7
45-49	4.9	5.5	3.6	4.2
50-54	0.0	1.8	1.8	2.1
55-59	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0
Role: Other education or non-education	1.6	1.8	0.0	0.0
Role: Classroom teacher	65.6	18.2	12.5	6.3
Role: Middle leader	14.8	1.8	0.0	2.1
Role: Senior leader	18.0	78.2	87.5	87.5

	2011 N=61	2012 n=56	2013 n=56	2014 N=48
Role: Headteacher	0.0	0.0	0.0	4.2
Part-time	4.9	0.0	0.0	6.3
Phase: Nursery	0.0	0.0	0.0	0.0
Phase: Primary	0.0	0.0	0.0	2.1
Phase: Secondary	96.7	96.4	94.6	93.8
Phase: All Through	3.3	3.6	3.6	4.2
Phase: Special	0.0	0.0	1.8	0.0
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0
Payscale: Main Scale	28.3	0.0	0.0	0.0
Payscale: Upper Scale	38.3	12.7	10.7	6.3
Payscale: Advanced/excellent scales	8.3	1.8	0.0	8.3
Payscale: Leadership scales	25.0	85.5	89.3	85.4

In the 2012 cohort, participants at entry were again more likely to be young and male than the population of teachers as a whole. In contrast to the 2011 cohort they were more likely to be BME. They were again more likely be in middle and senior leadership roles. They were also more likely than the population to be on leadership pay scales. They were less likely to be employed Part-time. In terms of school phase the vast majority were from secondary schools (the programme not being open to primaries at this point) with around 3% in all-through schools.

Over the four years studied sample attrition was 20%. Generally it would appear that BME participants were less likely to attrite, increasing therefore as a proportion of the sample. There was some movement across phases, with a slight reduction in the proportion employed in secondary schools (though this remains over 90%). By 2014 6.4% had gone into part-time employment. There was significant movement of

participants into leadership roles over time. Starting from 18% in 2011, by 2014 almost 92% of participants found themselves in senior leadership or headship roles. The greatest increase occurred in the first year (18% to 79%), but there was a further 14% increase in subsequent years. The proportion on leadership payscales increased from 25% to 85%. In section 2 we will explore whether these changes are greater than those for the matched comparison sample.

Cohort 2013

Table 4: Cohort 2014 distribution in key variables based on School Workforce Census data, in percentages.

	2012 n=67	2013 n=61	2014 N=60
Female	55.2	55.7	56.7
BME	23.9	23.0	26.7
<25	0.0	0.0	0.0
25-29	17.9	9.8	6.7
30-34	50.7	52.5	48.3
35-39	13.4	19.7	25.0
40-44	10.4	8.2	8.3
45-49	7.5	9.8	10.0
50-54	0.0	0.0	1.7
55-59	0.0	0.0	0.0
>59	0.0	0.0	0.0
Role: Other education or non-education	1.5	1.6	0.0
Role: Classroom teacher	58.2	13.1	8.3

	2012 n=67	2013 n=61	2014 N=60
Role: Middle leader	19.4	8.2	1.7
Role: Senior leader	19.4	75.4	86.7
Role: Headteacher	1.5	1.6	3.3
Part-time	1.5	3.3	1.7
Phase: Nursery	0.0	0.0	1.7
Phase: Primary	10.6	11.5	10.0
Phase: Secondary	84.8	77.0	81.7
Phase: All Through	4.5	11.5	6.7
Phase: Special	0.0	0.0	0.0
Payscale: Unqualified Teacher Pay Scale	1.5	0.0	0.0
Payscale: Main Scale	21.2	1.7	5.0
Payscale: Upper Scale	42.4	18.3	5.0
Payscale: Advanced/excellent scales	4.5	0.0	1.7
Payscale: Leadership scales	30.3	80.0	88.3

In the 2013 cohort, participants at entry were again more likely to be young and male than the population of teachers as a whole. As in 2012 they were more likely to be BME. They were again more likely to be in middle and senior leadership roles. In this cohort, over 20% were already in senior leadership roles at the start of their participation in the HPSL programme. They were also more likely than the population to be on leadership pay scales. They were less likely to be employed Part-time. In terms of school phase the vast majority were from secondary schools, though just

over 10.5% worked in the primary sector, this as a result of the primary pilot starting in 2013.

Over the three years studied sample attrition was 11%. There was little demographic change. However, as in previous cohorts there was significant movement into leadership roles, with the proportion in senior leadership and headship increasing from 21% to over 90%, and the proportion on leadership pay scales increasing from 30% to 88%.

Cohort 2014

Table 5: Cohort 2014 distribution in key variables based on School Workforce Census data, in percentages.

	2013 n=80	2014 N=75
Female	56.3	54.7
BME	20.0	20.0
<25	0.0	0.0
25-29	23.8	16.0
30-34	46.3	46.7
35-39	16.3	20.0
40-44	10.0	10.7
45-49	3.8	6.7
50-54	0.0	0.0
55-59	0.0	0.0
>59	0.0	0.0

	2013 n=80	2014 N=75
Role: Other education or non-education	0.0	1.3
Role: Classroom teacher	45.0	20.0
Role: Middle leader	12.5	4.0
Role: Senior leader	41.3	70.7
Role: Headteacher	1.3	4.0
Part-time	5.0	1.3
Phase: Nursery	0.0	0.0
Phase: Primary	27.5	25.3
Phase: Secondary	63.8	64.3
Phase: All Through	6.2	8.0
Phase: Special	2.5	2.7
Payscale: Unqualified Teacher Pay Scale	0.0	0.0
Payscale: Main Scale	20.0	12.0
Payscale: Upper Scale	35.0	16.0
Payscale: Advanced/excellent scales	0.0	0.0
Payscale: Leadership scales	45.0	72.0

In demographic terms, the 2014 cohort was similar to previous HPSL cohorts. Participants at entry were again more likely to be young, BME and male than the population of teachers as a whole. As in 2012 they were more likely to be BME. They were also more likely to be in leadership roles, with over 40% already being in senior

leadership roles prior to their participation in the HPSL programme. They were also more likely than the population to be on leadership pay scales. They were less likely to be employed Part-time. In terms of school phase the majority were from secondary schools, though in this cohort the proportion working in primary increased to 25%.

Over the two years studied sample attrition was 6%. There was little demographic change. However, as in previous cohorts, there was significant movement into leadership roles. Participants were expected to move into senior leadership in the residency year, and did so. This represents a major change as prior to this most were not in senior leadership roles.

Cohort 2015

Table 6: Cohort 2015 distribution in key variables based on School Workforce Census data, in percentages.

	2014 N=91
Female	63.7
BME	31.9
<25	0.0
25-29	20.9
30-34	30.8
35-39	19.8
40-44	18.7
45-49	6.6
50-54	3.3
55-59	0.0
>59	0.0

	2014 N=91
Role: Other education or non-education	0.0
Role: Classroom teacher	41.8
Role: Middle leader	20.9
Role: Senior leader	35.2
Role: Headteacher	2.2
Part-time	3.3
Phase: Nursery	0.0
Phase: Primary	20.9
Phase: Secondary	74.7
Phase: All Through	2.2
Phase: Special	2.2
Payscale: Unqualified Teacher Pay Scale	0.0
Payscale: Main Scale	27.5
Payscale: Upper Scale	25.3
Payscale: Advanced/excellent scales	3.2
Payscale: Leadership scales	44.0

For the 2015 cohort we can only look at data on programme participants, not their evolution into leadership roles. Compared to previous cohorts, the number of female participants has increased (to over 60%), and this is also the case for BME participants, who are significantly overrepresented compared to the population.

Similarly to previous cohorts participants are more likely to be in leadership and 'other' roles, and on leadership payscales. More than a third were already in senior leadership roles at the start of their participation in the HPSL programme.

Older cohorts

While we only have SWC data from 2010, and it is therefore not possible to look at changes from participation for cohorts prior to 2011, we can look at their position in the years from 2010 to 2014. These data are presented below.

Cohort 2007

Table 7: 2007 cohort distribution in key variables based on School Workforce Census data, in percentages.

	2010 N=23	2011 N=23	2012 N=22	2013 N=21	2014 N=22
Female	52.2	52.2	50.0	47.6	50.0
BME	43.5	43.5	50.0	47.6	50.0
<25	0.0	0.0	0.0	0.0	0.0
25-29	0.0	0.0	0.0	0.0	0.0
30-34	13.0	8.7	4.5	4.8	0.0
35-39	26.1	26.1	36.4	33.3	31.8
40-44	26.1	30.4	27.3	33.3	31.8
45-49	21.7	21.7	13.6	9.5	18.2
50-54	8.7	8.7	9.1	9.5	9.1
55-59	4.3	4.3	9.1	9.5	9.1
>59	0.0	0.0	0.0	0.0	0.0

	2010 N=23	2011 N=23	2012 N=22	2013 N=21	2014 N=22
Role: Other education or non-education	0.0	0.0	0.0	0.0	0.0
Role: Classroom teacher	0.0	4.3	0.0	0.0	4.5
Role: Middle leader	0.0	0.0	4.5	4.8	4.5
Role: Senior leader	82.6	65.2	63.6	47.6	40.9
Role: Headteacher	17.4	30.4	31.8	47.6	50.0
Part-time	4.3	4.3	0.0	0.0	0.0
Phase: Nursery	0.0	0.0	0.0	0.0	0.0
Phase: Primary	0.0	0.0	0.0	4.8	4.5
Phase: Secondary	95.7	91.3	81.8	76.2	81.8
Phase: All Through	4.3	8.7	18.2	19.0	13.6
Phase: Special	0.0	0.0	0.0	0.0	0.0
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	0.0	0.0	0.0	0.0	0.0
Payscale: Upper Scale	0.0	4.3	0.0	0.0	0.0
Payscale: Advanced/excellent scales	0.0	0.0	4.5	4.8	9.1
Payscale: Leadership scales	100.0	95.7	95.5	95.2	90.9

While overall numbers are small, there are some interesting findings from this cohort. One is the large proportion of participants from BME backgrounds, who formed about half of the cohort. Another is that all HPSL participants from the 2007 cohort were in senior leadership in 2010. The third is the pronounced move into headship in

the period from 2010 to 2014, with the proportion of headteachers increasing from 17% to 50%.

Cohort 2008

Table 8: 2008 cohort distribution in key variables based on School Workforce Census data, in percentages.

	2010 N=42	2011 N=40	2012 N=42	2013 N=39	2014 N=32
Female	40.5	47.5	47.6	41.0	37.5
BME	35.7	37.5	31.0	33.3	40.6
<25	0.0	0.0	0.0	0.0	0.0
25-29	2.4	0.0	0.0	0.0	0.0
30-34	42.9	35.0	26.2	12.8	3.2
35-39	26.2	30.0	33.3	38.5	48.4
40-44	16.7	10.0	14.3	25.6	29.0
45-49	9.5	22.5	21.4	15.4	16.1
50-54	2.4	2.5	4.8	7.7	3.2
55-59	0.0	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0	0.0
Role: Other education or non-education	0.0	0.0	0.0	0.0	0.0
Role: Classroom teacher	4.8	5.0	4.8	7.7	9.4
Role: Middle leader	2.4	2.5	2.4	2.6	3.1
Role: Senior leader	92.8	90.0	76.2	64.1	50.0

	2010 N=42	2011 N=40	2012 N=42	2013 N=39	2014 N=32
Role: Headteacher	0.0	2.5	16.7	25.6	37.5
Part-time	4.8	5.0	7.1	7.7	6.3
Phase: Nursery	0.0	0.0	0.0	0.0	0.0
Phase: Primary	0.0	0.0	2.4	2.6	3.1
Phase: Secondary	92.9	92.5	90.5	92.3	81.3
Phase: All Through	7.1	7.5	4.8	5.1	12.5
Phase: Special	0.0	0.0	2.4	0.0	3.1
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	0.0	0.0	0.0	0.0	9.4
Payscale: Upper Scale	7.1	7.5	4.9	7.7	6.3
Payscale: Advanced/excellent scales	2.4	2.5	2.4	2.6	6.3
Payscale: Leadership scales	90.5	90.0	92.7	89.7	78.1

In the 2008 cohort over 90% of participants were in senior leadership positions by 2010. As in the 2007 cohort there was substantive movement into headship over the period from 2010 to 2014 (from 0 to 38%).

Cohort 2009

Table 9: 2009 cohort distribution in key variables based on School Workforce Census data, in percentages.

	2010 N=44	2011 N=45	2012 N=42	2013 N=42	2014 N=41
Female	52.3	51.1	57.1	57.1	51.2
BM	22.7	22.2	21.4	21.4	26.8
<25	0.0	0.0	0.0	0.0	0.0
25-29	9.1	6.7	0.0	0.0	0.0
30-34	43.2	26.7	21.4	19.0	9.8
35-39	31.8	44.4	45.3	42.9	46.3
40-44	11.4	11.1	26.2	23.8	29.3
45-49	4.5	11.1	11.9	11.9	7.3
50-54	0.0	0.0	0.0	2.4	7.3
55-59	0.0	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0	0.0
Role: Other education or non-education	0.0	0.0	0.0	0.0	0.0
Role: Classroom teacher	6.8	11.1	9.5	9.5	9.8
Role: Middle leader	2.3	2.2	2.4	0.0	0.0
Role: Senior leader	90.9	84.4	78.6	73.8	61.0
Role: Headteacher	0.0	2.2	7.2	16.7	29.3
Part-time	2.3	2.2	2.4	2.4	4.9

	2010 N=44	2011 N=45	2012 N=42	2013 N=42	2014 N=41
Phase: Nursery	0.0	0.0	0.0	0.0	0.0
Phase: Primary	0.0	0.0	2.4	2.4	2.4
Phase: Secondary	90.7	88.9	88.1	88.1	92.7
Phase: All Through	9.3	8.9	9.5	9.5	2.4
Phase: Special	0.0	2.2	0.0	0.0	2.4
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	0.0	2.2	0.0	0.0	4.9
Payscale: Upper Scale	13.6	11.1	10.2	4.9	7.3
Payscale: Advanced/excellent scales	4.5	2.2	2.4	2.4	0.0
Payscale: Leadership scales	81.8	84.4	87.4	92.7	87.8

The 2009 cohort again showed that the vast majority were working in senior leadership positions by 2010 (over 90%). There was again movement from senior management team (SMT) to headship, with 29% being headteachers by 2014, up from 0% in 2010. However, around 10% remained classroom teachers. The percentage of BME participants was larger than the proportion in the population, though lower than in the 2008 and in particular 2007 cohorts.

Cohort 2010

Table 10: 2010 cohort distribution in key variables based on School Workforce Census data, in percentages.

	2010 N=59	2011 N=63	2012 N=62	2013 N=55	2014 N=59
Female	44.1	46.0	43.5	43.6	45.8
BME	18.6	20.6	17.7	16.4	18.6
<25	0.0	0.0	0.0	0.0	0.0
25-29	20.3	12.7	9.7	3.6	1.7
30-34	33.9	36.5	33.9	30.9	25.4
35-39	18.6	19.0	25.8	21.8	28.8
40-44	15.3	22.2	19.4	27.3	25.4
45-49	8.5	7.9	9.7	12.7	13.6
50-54	3.4	1.6	1.6	3.6	5.1
55-59	0.0	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0	0.0
Role: Other education or non-education	0.0	0.0	0.0	0.0	0.0
Role: Classroom teacher	13.6	11.1	12.9	9.1	6.8
Role: Middle leader	6.8	7.9	4.8	5.5	3.4
Role: Senior leader	78.0	81.0	82.2	83.7	81.4
Role: Headteacher	1.7	0.0	0.0	1.8	8.5
Part-time	1.7	0.0	1.6	3.6	3.4

	2010 N=59	2011 N=63	2012 N=62	2013 N=55	2014 N=59
Phase: Nursery	0.0	0.0	0.0	0.0	0.0
Phase: Primary	1.7	1.6	1.6	1.8	3.4
Phase: Secondary	89.8	93.7	93.5	89.1	86.4
Phase: All Through	8.5	4.8	4.8	5.5	6.8
Phase: Special	0.0	0.0	0.0	3.6	3.4
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	0.0	3.2	3.2	0.0	5.1
Payscale: Upper Scale	16.9	11.1	9.7	14.5	6.8
Payscale: Advanced/excellent scales	1.7	0.0	3.2	1.8	1.7
Payscale: Leadership scales	81.4	85.7	83.9	83.6	86.4

The 2010 cohort shows a slightly different picture. In 2010, just under 80% were in senior leadership positions, a percentage that increased to 90% by 2014. The movement into headship was less pronounced than in previous cohorts, with only 8.5% being headteachers by 2014. This cohort was more male and white than previous cohorts.

Summary of teacher characteristics

Overall, in all cohorts identified, we can see that participants in the HPSL programme were more likely to be male, BME and younger than the population of teachers as a whole, which is partly due to the sample largely being made up of secondary teachers, and being predominantly urban in nature (see section 1.9). At the start of participation, they were also less likely to be classroom teachers and more likely to be in middle and senior leadership roles than the population of teachers. Over time, there was significant movement of participants into senior leadership, and, to a lesser extent, headteacher roles, which was reflected in changes to payscales. In the

older cohorts we can see significant movement into headship between 2010 and 2014.

Characteristics of engaged schools

In this section we analysed the characteristics of engaged schools, as compared to the population as a whole, for the period 2010-2015 for which we have suitable data. In the tables below we compare the overall sample of schools with engaged schools for key demographic variables, such as percentage pupils eligible for free school meals and attainment, for each year from 2010 to 2015 at KS4 and from 2013 to 2015 at KS2. Independent samples t-tests were conducted to look at whether the differences found were statistically significant.

Table 11: KS4 School characteristics 2010-2012, all compared to HPSL participants.

	2010		2011		2012	
	All schools	HPSL participants (n=73)	All schools	HPSL participants (n=102)	All schools	HSPL participants (n=152)
Mean IDACI index	**.17 (.14; .00-.70)**	**.41 (.12; .15-.68)**	**.17 (.14; 0-.66)**	**.39 (.10; .12-.62)**	**.16 (.14; 0-.63)**	**.36 (.12; 0-58)**
Per cent level 4 incl English and Maths (prior attainment)	**39.1 (32; 0-100)**	**46.4 (14; 21-87)**	**42.2 (33; 0-100)**	**49.0 (13; 3-94)**	**41.7 (33; 0-100)**	**51.0 (14; 0-99)**
Per cent eligible for free school meals	**13.2 (13; 0-100)**	**32.0 (16; 6-76)**	**13.5 (17; 0-100)**	**32.1 (16; 6-78)**	**13.8 (17, 0-100)**	**28.9 (15; 0-74)**
Per cent SEN Statemented or Action+	**17.8 (8; 0-100)**	**14.7 (10; 1-57)**	**22.2 (35; 0-100)**	**12.6 (7; 0-37)**	**22.0 (36; 0-100)**	**12.1 (10; 0-100)**

	2010		2011		2012	
	All schools	HPSL participants (n=73)	All schools	HPSL participants (n=102)	All schools	HSPL participants (n=152)
Per cent SEN – School action	**11.2 (11; 0-100)**	**19.9 (12; 2-69)**	**7.3 (10; 0-100)**	**18.3 (10; 3-61)**	**6.7 (9; 0-100)**	**15.2 (11; 0-71)**
Per cent boys	54.4 (25; 0-100)	48.9 (21; 0-100)	**55.2 (26; 0-100)**	**50.0 (19; 0-100)**	55.3 (25; 0-100)	51.9 (19; 0-100)
Per cent non English speaking	**8.8 (9; 0-100)**	**31.2 (23; 0-100)**	**7.4 (16; 0-100)**	**35.2 (27; 0-99)**	**7.6 (16; 0-100)**	**32.0 (28; 0-99)**

Significant differences at .01 level in bold. Standard deviation, minimum and maximum in brackets

Table 12: KS4 School characteristics 2013-2015, all compared to HPSL participants.

	2013		2014		2015	
	All schools	HPSL participants (n=195)	All schools	HPSL participants (n=240)	All schools	HPSL participants (n=268)
Mean IDACI index	**.16 (.14; 0-.79)**	**.35 (.12; 0-.60)**	**.16 (.14; 0-.71)**	**.34 (.11; .08-.62)**	**.16 (.14; 0-.65)**	**.33 (.12; 0-.76)**
Per cent level 4 incl English and Maths (prior attainment)	**40.3 (34; 0-100)**	**53.6 (14; 0-97)**	**43.5 (35; 0-100)**	**56.6 (16; 0-99)**	**44.7 .32; 0-100)**	**57.0 (17; 0-100)**
Per cent eligible for free school meals	**14.2 (18; 0-100)**	**28.7 (15; 0-83)**	**14.0 (17; 0-100)**	**27.1 (14; 0-68)**	**13.9 .17; 0-100)**	**24.7 (14; 0-73)**
Per cent SEN _ Statemented or Action +	**21.2 (36; 0-100)**	**11.3 (11; 0-100)**	**21.6 (36; 0-100)**	**10.7 (11; 0-100)**	**16.3 (34; 0-100)**	**4.6 (13; 0-100)**
Per cent SEN – School action	**6.0 (8; 0-100)**	**14.7 (11; 0-64)**	**5.6 (8; 0-100)**	**12.0 (8; 0-100)**	**7.1 (5; 0-100)**	**13.5 (7; 0-36)**
Per cent boys	**55.6 (25; 0-100)**	**51.2 (18; 0-100)**	**55.6 (25; 0-100)**	**49.3 (19; 0-100)**	**55.3 (25; 0-100)**	**51.4 (18; 0-100)**
Per cent non English speaking	**7.7 (16; 0-100)**	**29.1 (27; 0-97)**	**8.0 (16; 0-100)**	**30.2 (27; 0-97)**	**8.3 (16; 0-100)**	**29.2 (27; 0-98)**

Significant differences at .01 level in bold. Standard deviation, minimum and maximum in brackets

As can be seen in tables 11 and 12, schools participating in the HPSL programme differed from the population in quite a consistent fashion over time. Schools engaged in HSPL had higher numbers of pupils eligible for free school meals (typically around double), a higher IDACI index (showing greater levels of deprivation in pupil's home area), more than three times more pupils who speak a language other than English at home, a somewhat smaller percentage of boys, and higher levels of attainment at KS4. The picture that emerged of schools engaged in HPSL is therefore one of higher performing schools located in more disadvantaged and higher non-English speaking areas. These mean differences did mask significant variation between HPSL engaged schools, however. Standard deviations were quite large, and the range for e.g. attainment varied greatly between schools in the programme.

Table 13: KS2 School characteristics 2013-2015, all compared to HPSL participants.

	2013		2014		2015	
	All schools	HPSL participants (n=13)	All schools	HPSL participants (n=39)	All schools	HPSL participants (n=70)
Per cent Average Points Scores	27.9 (3.52; 3.6-36)	26.7 (2.51; 20-29.7)	28.2 (3.57; 9.68-37.5)	27.6 (2.52; 18.4-31.6)	**28.3 (3.56; 6.6-36.2)**	**27.2 (4.09; 12.4-31.7)**
Per cent eligible for free school meals	**18.4 (17; 0-100)**	**33.8 (20; 0-66)**	**17.5 (16; 0-100)**	**34.9 (18; 3-85)**	**16.5 (16; 0-100)**	**33.2 (16; 0-89)**
Per cent SEN _ Statemented or Action +	14.4 (21; 0-100)	21.7 (25; 0-100)	14.2 (21; 0-100)	15.3 (20; 0-100)		
Per cent SEN – School action	11.6 (10; 0-100)	16.5 (10; 0-38)	10.7 (09; 0-100)	13.0 (10; 0-45)		
Per cent	51.9	56.2	52.0	51.6	51.9	55.0 (12;

	2013		2014		2015	
	All schools	HPSL participants (n=13)	All schools	HPSL participants (n=39)	All schools	HPSL participants (n=70)
boys	(14; 0-100)	(16; 38-100)	(14; 0-100)	(14; 34-100)	(13; 0-100)	35-100)
Per cent non English speaking	13.0 (22; 0-100)	24.1 (26; 0-71)	**13.4** **(22; 0-100)**	**41.9** **(32; 0-97)**	**13.8** **(22; 0-100)**	**31.0** **(28; 0-97)**

Significant differences at .01 level in bold. Standard deviation, minimum and maximum in brackets

The smaller sample sizes at KS2, particularly in 2013, made results less significant. Nonetheless, schools engaged in HPSL were characterised as having twice as many pupils eligible for free school meals as the population, and also had a far greater proportion of pupils whose home language was not English. They also tended to be slightly lower performing, though only significantly so in 2015. Gender balance varied somewhat by year. As in KS4 there was significant variation between schools participating in the HPSL programme on all variables.

As well as these demographic characteristics we looked at the classification of engaged schools (all cohorts) by urbanicity of their local authority, using the Office for National Statistics 6-scale classification. Results are shown in table 14.

Table 14: Urbanicity of schools

Type	Percentage of schools
Major Urban	63.4
Large Urban	13.1
Other Urban	12.9
Significant Rural	2.4
Rural-50	8.2
Rural-80	1.8

We can see that majority of engaged schools were located in major urban areas (e.g. London, Greater Manchester), with most of the remaining schools also located

in urban areas. 36.2% were located in Greater London. This provides one explanation for the higher attainment in engaged schools, along with the greater proportion of girls and pupils who do not have English as their home language, both groups that tend to perform well nationally.

Overall, the profile of schools in the HPSL programme is that of a group of schools in challenging circumstances, serving communities that are significantly more disadvantaged than the population on a number of key measures.

Part 2. Analysis of participant progression to leadership posts

2.1. Creating a matched sample

In part 1 we looked at the change in roles of HPSL participants relative to the population as a whole. This is instructive, but cannot in itself indicate a programme effect in light of the initial differences in characteristics between participants and the population of teachers, as highlighted in tables 1 to 6. We therefore undertook to match each HPSL participant to a matched comparator using propensity score matching methods.

To enable matching the participants were first divided into cohorts, based on the year in which they joined the programme. Thus, a teacher who took part in the HPSL programme in 2011 would be part of the 2011 cohort. Cohort variables were created for this purpose. HPSL participants were then matched to the previous year, e.g. 2011 cohort participants using 2010 data, establishing a baseline position for each participant.

Procedure

The first step was to select an appropriate set of matching variables. As the key outcome of interest was participants' career trajectories, current role and payscale were used as central matching variables. In addition, demographic characteristics were used to match the participants to a suitable comparison group.

The following characteristics were tested as predictors of group membership (HPSL or comparison)

1. Current role. This was a recode of the variable Role1. This original variable contained 80 categories, though most contained very few respondents (e.g. 3 participants worked as chaperones for pupils). For the purpose of analysis this variable was recoded into the categories: Classroom Teacher, Middle leader (e.g. Head of Department), Senior leader (e.g. Deputy Head), Headteacher/Principal (including Executive Headteacher) and Other.

2. Full-time or Part-time status

3. Payscale. This was a recode of the variable Payscale Estimated, to reduce the number of categories with very few respondents. The recoded categories were: Unqualified Teacher Pay Scale, Main Scale, Upper Scale, Advanced Skills/Excellent Teacher scales, and Leadership Scales.

The demographic variables used were:

1. Gender

2. Ethnicity. The large number of categories here were recoded into two main categories : BME and White British/Irish

3. Age category. The original variable was recoded into numeric values, and the 60-64 and 65 and over categories were combined due to very small numbers in the latter. The recoded variables therefore had 8 categories.

Originally we intended to also use the disability variable. However, the number of missing values from this variable was very large, with almost 50% falling into the 'information not obtained', 'Information not yet obtained' and 'Refused' categories, so this variable was omitted.

In addition, teachers were matched on two additional variables that were not included in the Propensity Score Matching analyses, as absolute matches were sought:

1. Near misses. The near misses datafile was used to search for candidates who had applied for but narrowly missed being accepted for the Future Leaders programme.

2. Phase of education. In light of the differential career structures in primary, secondary and special education, an exact match on phase was sought.

The matching process then had a number of phases. Firstly, the HPSL group was compared with non-HPSL on the selected variables. In these analyses we used T-tests to do this. In the following phase binary logistic regression analyses were carried out. These had two purposes: firstly, to enable us to check whether the selected variables were indeed significant predictors of group selection, and, secondly, to enable calculation of propensity scores which formed the basis of the matching procedure in terms of providing the criterion on which matches were selected.

Following the calculation of the propensity scores, a matching method needs to be used to select the matched sample. Various methods exist to do this. In previous studies we found that Nearest Neighbour matching was appropriate, but we also used Caliper matching where a maximum difference between HPSL and comparison school scores was allowed. A number of criterion scores were set (.001, .005, .01) but only very few matches did not reach the criterion threshold (between 0 and 5 depending on phase and cohort), and no overall significant difference was found, so we proceeded with Nearest Neighbour matching for these analyses.

In the next phase, matched samples were selected. We then needed to check whether successful balancing had been achieved. Two methods were used to do this. Firstly, at the individual variable level t-tests were used to look at whether any significant differences remained between HPSL and comparison groups. Secondly, to test the extent to which the overall distribution of propensity scores was similar the Mann-Whitney U-test was calculated.

This procedure was followed for each cohort (see above under 2), as the pre-participation comparison baseline was different for each cohort (e.g. those schools starting in 2011 need to be matched on data from 2011). In the next sections we will present the results by phase and cohort.

Results

SWC data was available for 2010 to 2014, so matching was done for each of these cohorts. No measurable impact is possible for those participating in 2015 and 2016 at this stage.

Pre-matching statistics

Table 15 shows the results of the T-tests for mean differences between HPSL and non-HPSL participants pre-matching. Ordinal variables such as role and age category were quantified by scaling the response categories. Results show that HPSL and non-HPSL differed significantly on most variables in most years, with BME for the 2010, 2011 and 2012 cohorts being the exception. Participants in the programme were more likely to be male, younger, in a more junior role and in full time employment than the population of teachers as a whole.

Table 15: Pre-matching. Means for HPSL and non-HPSL groups on key variables.

	2010 cohort (N=118)		2011 cohort (N=118)		2012 cohort (N=132)		2013 cohort (N=132)		2014 cohort (N=166)	
	non-HPSL	HPSL	Non-HPSL	HPSL	Non-HPSL	HPSL	Non-HPSL	HPSL	Non-HPSL	HPSL
Gender	**.25**	**.56**	**.25**	**.44**	**.25**	**.42**	**.25**	**.45**	**.25**	**.46**
BME	.86	.81	.86	.89	.86	.80	**.85**	**.74**	**.85**	**.78**
Age	**3.62**	**2.61**	**3.58**	**2.69**	**3.52**	**2.56**	**3.47**	**2.54**	**3.42**	**2.40**
Role[6]	**1.17**	**0.80**	**1.17**	**0.44**	**1.17**	**0.47**	**1.17**	**.70**	**1.17**	**.93**
FT/PT	**.78**	**.98**	**.78**	**1.00**	**0.78**	**1.00**	**.78**	**.97**	**.78**	**.99**
Payscale	**2.85**	**4.64**	**2.85**	**4.76**	**2.85**	**4.77**	**2.85**	**4.58**	**2.82**	**4.27**

Bold indicates significant difference at the .05 level using independent samples t-test.

[6] Role was quantified on a four point scale, with the mean taken within each group

Post-matching statistics

Suitable matches were found for all participants. Table 16 shows the T-tests for mean differences between Future Leaders and non-Future Leaders schools post-matching. Results show that they no longer differed significantly on any of the variables selected.

Table 16: Post-matching. Means for HPSL and non-HPSL groups on key variables.

	2010 cohort (N=118)		2011 cohort (N=118)		2012 cohort (N=132)		2013 cohort (N=132)		2014 cohort (N=166)	
	non-HPSL	HPSL	Non-HPSL	HPSL	Non-HPSL	HPSL	Non-HPSL	HPSL	Non-HPSL	HPSL
Gender	.56	.56	.42	.44	.42	.42	.45	.45	.43	.46
BME	.80	.81	.90	.90	.82	.80	.76	.74	.79	.78
Age	2.69	2.68	2.64	2.69	2.59	2.56	2.53	2.54	2.49	2.40
Role	.80	.80	.39	.44	.42	.47	.67	.70	.92	.93
FT/PT	.98	.98	1.00	1.00	1.00	1.00	.97	.97	.99	.99
Payscale	4.64	4.64	4.71	4.75	4.77	4.77	4.58	4.58	4.34	4.27

Bold indicates significant difference at the .05 level using independent samples t-test.

The Mann-Whitney U-tests showed that there were no significant differences in the distribution of propensity scores between the HPSL and comparison groups.

Conclusion of matching process

Overall, it proved possible to create a balanced matched sample for the participants on key intake variables, which should allow us to develop relatively robust analyses of the impact of engagement in HPSL on student outcomes. Of course, a number of caveats need to be taken into account. Firstly, the intake variables used are of course not exhaustive in terms of the factors that may distinguish HPSL participants from non-participants. We could not, for example, take account of factors such as personality. This does leave open the possibility that any differences found in subsequent analyses may reflect pre-existing differences rather than the effects of the HPSL programme. However, the sample size should allow us to draw sufficiently robust conclusions in this regard.

In the next sections we will compare changes over time between HPSL participants and matched non-participants in both the demographic and role variables by cohort.

2.2. Cohort 2011.

Table 17: 2011 cohort. HPSL and comparison samples, in percentages

	2010 (%)		2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
Female	55.3	53.2	53.5	54.8	52.5	62.2	52.5	59.5	56.8	60.0
BME	10.6	12.8	10.3	13.3	17.5	13.5	17.5	10.8	16.2	11.4
<25	2.1	2.1	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
25-29	21.3	21.3	18.6	16.7	10.0	18.9	7.5	5.4	0.0	0.0
30-34	36.2	34.0	34.9	35.7	37.5	32.4	42.5	43.2	45.9	34.3
35-39	25.5	27.7	27.9	26.2	25.0	24.3	25.0	27.0	27.0	34.3
40-44	12.8	12.8	14.0	14.3	22.5	21.6	20.0	16.2	18.9	22.9

	2010 (%)		2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
45-49	2.1	2.1	4.7	4.8	5.0	2.7	5.0	5.4	8.1	8.6
50-54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0
55-59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Role: Other education or non-education	4.3	4.3	0.0	4.8	0.0	2.7	0.0	0.0	0.0	0.0
Role: Classroom teacher	66.0	66.0	**11.6**	**69.0**	**7.5**	**70.3**	**7.5**	**75.4**	**5.4**	**80.0**
Role: Middle leader	17.0	17.0	**0.0**	**11.9**	**7.5**	**10.8**	**10.0**	**10.2**	**5.4**	**5.7**
Role: Senior leader	12.8	12.8	**88.4**	**14.3**	**85.0**	**16.2**	**77.5**	**14.4**	**81.1**	**14.3**
Role: Headteacher	0.0	0.0	**0.0**	**0.0**	**0.0**	**0.0**	**5.0**	**0.0**	**8.1**	**0.0**
Part-time	4.3	4.3	0.0	7.1	**0.0**	**13.5**	**0.0**	**13.5**	2.7	17.1
Phase: Nursery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase: Primary	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	2.7	0.0
Phase: Secondary	89.1	93.5	88.4	92.7	82.5	91.7	85.0	91.9	86.5	91.4

	2010 (%)		2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
Phase: All Through	8.7	4.3	11.6	4.9	17.5	5.6	12.5	5.4	8.1	5.7
Phase: Special	2.2	2.2	0.0	2.4	0.0	2.7	0.0	2.7	2.7	2.9
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	28.9	28.9	**2.3**	**29.3**	**2.5**	**22.2**	**0.0**	**16.7**	**8.1**	**22.9**
Payscale: Upper Scale	37.8	37.8	**9.3**	**39.0**	**12.5**	**38.9**	**15.0**	**47.2**	**5.4**	**51.4**
Payscale: Advanced/excellent scales	11.1	11.1	**2.3**	**9.8**	**0.0**	**11.1**	**0.0**	**5.6**	**0.0**	**2.9**
Payscale: Leadership scales	22.2	22.2	**86.0**	**22.0**	**85.0**	**27.8**	**85.0**	**30.6**	**86.5**	**22.9**

Statistically significant differences at p<.01 level in bold

The HPSL and comparison samples were matched on 2010 data, and this is reflected in the fact that no significant differences appeared in this baseline year. Sample attrition saw some divergence emerge in demographic characteristics like gender and ethnicity, but these remained small and non-significant, which was also true of changes to phase. Over time, and particularly from 2012 onwards, there was a tendency for teachers in the comparison group to more frequently be working Part-time than HPSL participants. However, the main significant differences emerged on

roles and payscales. From 2011 onwards, participants in the programme were much more likely to be in senior leadership positions than their counterparts in the comparison group. By 2014 almost 90% of the HPSL group were in senior leadership and headteacher roles, whereas for the comparison group this proportion remained under 20% in all years. The main move into senior leadership happened in 2011, but subsequently there was significant movement into headship in 2013 and 2014.

2.3. Cohort 2012.

Table 18: 2012 cohort. HPSL and comparison samples., in percentages

	2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
Female	59.0	59.0	55.4	57.6	55.4	58.6	62.5	59.3
BME	18.0	18.0	25.0	18.2	25.0	19.0	22.9	16.7
<25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	27.9	27.9	23.6	22.7	12.5	12.1	10.4	3.7
30-34	39.3	39.3	30.9	27.3	39.3	41.4	39.6	44.4
35-39	19.7	19.7	29.1	27.3	28.6	22.4	27.1	26.9
40-44	8.2	8.2	9.1	15.2	14.3	19.0	16.7	22.2
45-49	4.9	4.9	5.5	6.1	3.6	3.4	4.2	0.0
50-54	0.0	0.0	1.8	1.5	1.8	1.7	2.1	3.7
55-59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
Role: Other education or non-education	1.6	1.6	1.8	1.8	0.0	1.7	0.0	0.0
Role: Classroom teacher	65.6	65.6	**18.2**	**50.1**	**12.5**	**46.6**	**6.3**	**48.1**
Role: Middle leader	14.8	14.8	**1.8**	**19.5**	**0.0**	**19.0**	**2.1**	**16.7**
Role: Senior leader	18.0	18.0	**78.2**	**28.6**	**87.5**	**31.0**	**87.5**	**33.3**
Role: Headteacher	0.0	0.0	0.0	0.0	**0.0**	**1.7**	**4.2**	**1.9**
Part-time	4.9	4.9	**0.0**	**7.1**	**0.0**	**13.8**	6.3	14.8
Phase: Nursery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase: Primary	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0
Phase: Secondary	96.7	98.4	96.4	95.4	98.5	94.8	93.8	92.6
Phase: All Through	3.3	1.6	3.6	4.5	1.5	5.2	4.2	7.4
Phase: Special	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0

	2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	28.3	28.3	**0.0**	**20.9**	**0.0**	**17.6**	**0.0**	**9.3**
Payscale: Upper Scale	38.3	38.6	**12.7**	**40.6**	**10.7**	**42.1**	**6.3**	**50.0**
Payscale: Advanced/excellent scales	8.3	8.3	**1.8**	**1.5**	**0.0**	**1.8**	**8.3**	**1.9**
Payscale: Leadership scales	25.0	25.0	**85.5**	**38.0**	**89.3**	**38.6**	**85.4**	**38.9**

Statistically significant differences at p<.01 level in bold

The 2012 cohort showed a similar trend to the 2011 cohort. The baseline year showed no differences, and demographic changes over time were minor and non-significant. Both the comparison and HPSL groups showed movement into senior leadership, but the change was significantly greater for the HPSL group, with more than twice as many HPSL participants than comparison group teachers in senior and headteacher roles by 2014. Again, it was notable that the major change in both groups already occurred in 2012, though there was a further growth from 78% to 92% of participants into senior leadership by 2014. The role changes were reflected in differences in payscales.

2.4. Cohort 2013.

Table 19: 2013 cohort. HPSL and comparison samples., in percentages

	2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
Female	55.2	55.2	55.7	54.4	56.7	50.0
BME	23.9	23.9	23.0	24.2	26.7	19.0
<25	0.0	0.0	0.0	0.0	0.0	0.0
25-29	17.9	17.9	9.8	10.6	6.7	1.7
30-34	50.7	50.7	52.5	53.0	48.3	53.4
35-39	13.4	13.4	19.7	18.2	25.0	27.6
40-44	10.4	10.4	8.2	9.1	8.3	6.9
45-49	7.5	7.5	9.8	9.1	10.0	10.3
50-54	0.0	0.0	0.0	0.0	1.7	0.0
55-59	0.0	0.0	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0	0.0	0.0
Role: Other education or non-education	1.5	1.5	1.6	3.2	0.0	1.7
Role: Classroom teacher	58.2	59.7	**13.1**	**53.2**	**8.3**	**53.4**
Role: Middle leader	19.4	19.4	**8.2**	**22.6**	**1.7**	**19.0**

	2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
Role: Senior leader	19.4	17.9	**75.4**	**17.7**	**86.7**	**24.1**
Role: Headteacher	1.5	1.5	1.6	3.2	3.3	1.7
Part-time	1.5	1.5	3.3	3.0	1.7	5.2
Phase: Nursery	0.0	0.0	0.0	0.0	1.7	0.0
Phase: Primary	10.6	10.6	11.5	10.6	10.0	8.8
Phase: Secondary	84.9	87.9	77.0	84.8	81.7	86.0
Phase: All Through	4.5	1.5	11.5	4.5	6.7	1.8
Phase: Special	0.0	0.0	0.0	0.0	0.0	3.5
Payscale: Unqualified Teacher Pay Scale	1.5	1.5	0.0	0.0	0.0	0.0
Payscale: Main Scale	21.2	21.2	**1.7**	**19.1**	**5.0**	**17.2**
Payscale: Upper Scale	42.4	42.4	**18.3**	**45.3**	**5.0**	**53.4**
Payscale: Advanced/excellent scales	4.5	4.5	**0.0**	**4.8**	**1.7**	**5.2**

	2012 (%)		2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison	HPSL	Comparison
Payscale: Leadership scales	30.3	30.3	**80.0**	**30.8**	**88.3**	**24.1**

Statistically significant differences at p<.01 level in bold

For the 2013 cohort, there were again only limited changes to demographics of the HPSL and comparison groups following the baseline year (2012), and the two groups did not differ significantly on demographics or phase in any of the studied years. In terms of roles, however, there were significant differences. Comparison teachers saw limited movement into middle and senior leadership roles over time (from 37% to 43%), while for the HPSL participants there was strong movement into senior leadership roles in particular (from 19% to 87%). The main change happened in 2013, but there was additional significant movement into senior leadership in the following year (from 77% to 90%) These differences were again reflected in the payscales.

2.5. Cohort 2014.

Table 20: 2014 cohort. HPSL and comparison samples., in percentages

	2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison
Female	56.3	56.3	54.7	55.7
BME	20.0	20.0	20.0	15.7
<25	0.0	0.0	0.0	0.0

	2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison
25-29	23.8	23.8	16.0	11.4
30-34	46.3	46.3	46.7	54.3
35-39	16.3	16.3	20.0	20.0
40-44	10.0	10.0	10.7	5.7
45-49	3.8	3.8	6.7	8.6
50-54	0.0	0.0	0.0	0.0
55-59	0.0	0.0	0.0	0.0
>59	0.0	0.0	0.0	0.0
Role: Other education or non-education	0.0	1.3	1.3	0.0
Role: Classroom teacher	45.0	45.0	**20.0**	**37.1**
Role: Middle leader	12.5	11.3	**4.0**	**17.1**
Role: Senior leader	41.3	41.3	**70.7**	**44.3**
Role: Headteacher	1.3	1.3	**4.0**	**1.4**
Part-time	5.0	5.0	1.3	2.9
Phase: Nursery	0.0	0.0	0.0	0.0
Phase: Primary	27.5	27.5	25.3	25.7
Phase: Secondary	63.8	66.3	64.3	68.6
Phase: All Through	6.2	3.8	8.0	4.3
Phase: Special	2.5	2.5	2.7	1.4

	2013 (%)		2014 (%)	
	HPSL	Comparison	HPSL	Comparison
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0
Payscale: Main Scale	20.0	20.0	**12.0**	**22.9**
Payscale: Upper Scale	35.0	35.0	**16.0**	**25.7**
Payscale: Advanced/excellent scales	0.0	0.0	**0.0**	**1.4**
Payscale: Leadership scales	45.0	45.0	**72.0**	**50.0**

Statistically significant differences at p<.01 level in bold

Notable for the 2014 cohort was how many participants (and therefore comparison group members) were already senior leaders at the start of the programme. Nevertheless, in 2014 HPSL participants were significantly more likely to be in senior leadership than comparison group members, having increased the proportion from 43% to 75%, while among the comparison group the increase was a much more modest one, from 43% to 46%. A similar evolution was present in the payscales data.

2.6. To what extent do participants move into senior leadership into challenging schools

To analyse this question we looked at the sample of leaders in each cohort who moved into senior leadership or headship, and compared the demographic characteristics of the schools they worked in with the population averages. This was done for each cohort.

Cohort 2011

Table 21: School characteristics of schools employing HPSL participants in senior leadership positions compared to the population. 2011 cohort.

	2011		2012		2013		2014	
	All schools	2011 cohort HPSL participants in senior leadership roles	All schools	2011 cohort HPSL participants in senior leadership roles	All schools	2011 cohort HPSL participants in senior leadership roles	All schools	2011 cohort HPSL participants in senior leadership roles
Mean IDACI index	.17	.34	.16	.36	.16	.34	.16	.30.0
Per cent level 4 incl English and Maths	42.2	48.2	41.7	42.6	40.3	53.9	43.5	53.3
Per cent eligible for free school meals	13.5	28.2	13.8	27.9	14.2	25.9	14.0	24.1
Per cent SEN _ Statemented or Action +	22.2	13.7	22.0	12.8	21.2	10.8	21.6	10.5
Per cent SEN – School action	7.3	17.6	6.7	13.1	6.0	12.7	5.6	10.8
Per cent boys	55.2	48.2	55.3	48.9	55.6	49.7	55.6	49.6

	2011		2012		2013		2014	
	All schools	2011 cohort HPSL participants in senior leadership roles	All schools	2011 cohort HPSL participants in senior leadership roles	All schools	2011 cohort HPSL participants in senior leadership roles	All schools	2011 cohort HPSL participants in senior leadership roles
Per cent non English speaking	7.4	30.5	7.6	28.0	7.7	27.4	8.0	23.5

It is clear from table 21 that HPSL participants who had moved into senior leadership continued to work in schools that were far more disadvantaged than the national population, and that this remained the case across the four years following programme participation. In particular, they worked in schools with higher proportions of pupils eligible for FSM, higher indices for multiple deprivation affecting children, and a far higher proportion of pupils who did not have English as their first language. However, they tended to work in schools with higher proportions of girls and higher levels of attainment than the national average. This may be related to the higher levels of attainment in these schools.

Cohort 2012

Table 22: School characteristics of schools employing HPSL participants in senior leadership positions compared to the population. 2012 cohort.

	2012		2013		2014	
	All schools	2012 cohort HPSL participants in senior leadership roles	All schools	2012 cohort HPSL participants in senior leadership roles	All schools	2012 cohort HPSL participants in senior leadership roles
Mean IDACI index	.16	.34	.16	.31.9	.16	.33
Per cent level 4 incl English and Maths	41.7	52.6	40.3	54.4	43.5	51.8
Per cent eligible for free school meals	13.8	26.8	14.2	25.2	14.0	24.0
Per cent SEN _ Statemented or Action +	22.0	10.7	21.2	9.8	21.6	8.6
Per cent SEN – School action	6.7	16.4	6.0	16.7	5.6	10.5
Per cent boys	55.3	49.7	55.6	49.7	55.6	45.0
Per cent non English speaking	7.6	25.1	7.7	21.8	8.0	27.9

The picture for the 2012 cohort was similar, with HPSL participants in senior leadership roles working in schools with higher levels of disadvantage and higher numbers of pupils speaking a language other than English.

Cohort 2013

Table 23: School characteristics of schools employing HPSL participants in senior leadership positions compared to the population. 2013 cohort.

	2013		2014	
	All schools	2013 cohort HPSL participants in senior leadership roles	All schools	2013 cohort HPSL participants in senior leadership roles
Mean IDACI index	.16	.36	.16	.37
Per cent level 4 incl English and Maths	40.3	53.5	43.5	54.8
Per cent eligible for free school meals	14.2	28.5	14.0	31.2
Per cent SEN _ Statemented or Action +	21.2	10.9	21.6	10.9
Per cent SEN – School action	6.0	12.3	5.6	14.0
Per cent boys	55.6	52.9	55.6	51.6
Per cent non English speaking	7.7	28.8	8.0	28.3

The same trends were obvious for the 2014 cohort, with HPSL participants obtaining senior leadership posts in schools with twice as many pupils eligible for FSM and

over three times as many non-English speakers, but also slightly lower proportions of boys and higher levels of attainment.

Cohort 2014

Table 24: School characteristics of schools employing HPSL participants in senior leadership positions compared to the population. 2014 cohort.

	2014	
	All schools	20124cohort HPSL participants in senior leadership roles
Mean IDACI index	.16	.35
Per cent level 4 incl English and Maths	43.5	54.8
Per cent eligible for free school meals	14.0	29.1
Per cent SEN _ Statemented or Action +	21.6	12.2
Per cent SEN – School action	5.6	16.1
Per cent boys	55.6	46.8
Per cent non English speaking	8.0	18.4

2.7. Conclusion

In order to provide a more accurate view of the impact of the HPSL programme on the trajectories of participants, propensity score matching was used to match each participant to a comparison teacher, using key demographic variables such as gender and age, as well as school phase, role and payscale. This was done for each cohort. Successful matching was achieved. We then looked at change over time both in terms of demographics and role and payscale. The results were clear and

consistent across cohorts, in that while no significant differences emerged over time on the demographic make-up of the participant and comparison groups, there was significantly greater movement into senior leadership roles and into leadership payscales for the HPSL participants than for the comparison group. This is suggestive of a programme effect, with the caveat that we could only control for measurable characteristics in our databases, and not for unmeasured factors (e.g. personality) which may also explain these differences. The largest change in role happened during the first (residency) year, but there was significant further movement of participants into leadership roles in subsequent years.

We also looked at the extent to which participants were indeed working in challenging schools. Results clearly showed that HPSL participants who obtained senior leadership positions worked in schools that had higher levels of disadvantage in terms of percentages pupils eligible for Free School Meals (usually around twice as many), had a higher average Index of Deprivation Affecting Children (on average twice as high), and had a far greater number of pupils who did not have English as their home language (two to three times the population average). Their schools, however, also contained fewer boys, and were on average high attaining.

Part 3: Comparison of HPSL participants to NPQH participants

In this section we compared HPSL participants to participants in the NPQH programme. In the first section we compared their demographic characteristics and progress to leadership, in the second section we looked at the characteristics of schools they worked in. The NPQH participant datafile was recoded to create cohorts by year the participant graduated from NPQH. These files were then merged with the SWC and HPSL participant databases. Below we compare demographics and progress of NPQH and HPSL participants by cohort

3.1. Cohort 2011.

Table 25: 2011 cohort. HPSL and NPQH, in percentages

	2010 (%)		2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH
Female	55.3	67.5	53.5	67.4	52.5	67.8	52.5	67.3	56.8	67.3
BME	10.6	10.6	10.3	10.1	17.5	9.7	17.5	10.8	16.2	9.8
<25	2.1	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	21.3	18.8	18.6	0.7	10.0	0.1	7.5	0.0	0.0	0.0
30-34	36.2	26.7	34.9	15.6	37.5	12.2	42.5	8.2	45.9	4.9
35-39	25.5	20.1	27.9	25.5	25.0	23.8	25.0	22.9	27.0	20.2
40-44	12.8	12.8	14.0	22.1	22.5	24.5	20.0	26.9	18.9	28.3
45-49	2.1	17.4	4.7	19.3	5.0	20.3	5.0	20.0	8.1	21.1
50-54	0.0	10.8	0.0	11.6	0.0	13.0	0.0	15.1	0.0	16.7
55-59	0.0	3.4	0.0	4.6	0.0	5.6	0.0	5.9	0.0	7.8
>59	0.0	0.8	0.0	0.4	0.0	0.4	0.0	0.9	0.0	1.1

	2010 (%)		2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH
Role: Other education or non-education	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Role: Classroom teacher	66.0	11.2	11.6	8.0	7.5	6.4	7.5	4.8	5.4	5.5
Role: Middle leader	17.0	0.3	0.0	0.3	7.5	0.1	10.0	0.1	5.4	0.1
Role: Senior leader	12.8	73.7	88.4	65.9	85.0	49.6	77.5	39.5	81.1	33.5
Role: Headteacher	0.0	14.8	0.0	25.9	0.0	43.9	5.0	55.6	8.1	60.9
Part-time	4.3	4.8	0.0	4.6	0.0	4.1	0.0	4.4	2.7	4.5
Phase: Nursery	0.0	1.4	0.0	1.4	0.0	1.4	0.0	1.6	0.0	1.5
Phase: Primary	0.0	72.7	0.0	72.6	0.0	73.0	2.5	71.6	2.7	71.5
Phase: Secondary	89.1	19.6	88.4	19.4	82.5	19.0	85.0	18.4	86.5	18.4
Phase: All Through	8.7	0.7	11.6	0.7	17.5	0.8	12.5	0.7	8.1	0.9
Phase: Special	2.2	5.6	0.0	5.9	0.0	5.8	0.0	7.6	2.7	7.7

	2010 (%)		2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	28.9	1.7	2.3	0.9	2.5	0.5	0.0	0.5	8.1	1.2
Payscale: Upper Scale	37.8	8.6	9.3	7.1	12.5	5.7	15.0	4.6	5.4	5.1
Payscale: Advanced/ excellent scales	11.1	0.7	2.3	0.2	0.0	0.0	0.0	0.4	0.0	0.0
Payscale: Leadership scales	22.2	89.0	86.0	91.7	85.0	93.8	85.0	94.6	86.5	93.7

At baseline, NPQH participants differed from HPSL participants in a number of ways. They were more likely to be female and were on average older than HPSL participants. As a programme that caters for all school phases, NPQH had a majority of participants from the primary sector. Notably, almost 89% were already in senior leadership or headteacher roles on entering the programme, compared to just under 13% for HPSL participants. This was reflected in payscales. Following participation NPQH participants start to move into headship positions, the proportion in headship increasing by between 5% and 10% a year. Starting from a lower baseline, HPSL participants more often moved into senior leadership rather than headship positions initially, though overall their progression was more rapid than that of NPQH participants.

3.2. Cohort 2012.

Table 26: 2012 cohort. HPSL and NPQH participants., in percentages

	2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH
Female	59.0	69.1	55.4	69.5	55.4	69.5	62.5	69.0
BME	18.0	9.9	25.0	10.7	25.0	11.1	22.9	11.6
<25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	27.9	1.8	23.6	0.9	12.5	0.5	10.4	0.3
30-34	39.3	16.3	30.9	12.5	39.3	9.8	39.6	6.7
35-39	19.7	28.4	29.1	27.8	28.6	25.3	27.1	23.7
40-44	8.2	24.0	9.1	25.4	14.3	26.0	16.7	26.8
45-49	4.9	17.3	5.5	19.0	3.6	20.9	4.2	21.8
50-54	0.0	10.0	1.8	11.1	1.8	12.6	2.1	14.6
55-59	0.0	2.1	0.0	3.0	0.0	4.4	0.0	5.5
>59	0.0	0.1	0.0	0.2	0.0	0.5	0.0	0.9
Role: Other education or non-education	1.6	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Role: Classroom teacher	65.6	10.3	18.2	7.0	12.5	5.5	6.3	4.5
Role: Middle leader	14.8	0.5	1.8	0.4	0.0	0.3	2.1	0.2
Role: Senior leader	18.0	79.9	78.2	70.2	87.5	54.0	87.5	43.8

	2011 (%)		2012 (%)		2013 (%)		2014 (%)	
	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH
Role: Headteacher	0.0	9.4	0.0	22.5	0.0	40.3	4.2	50.6
Part-time	4.9	5.9	0.0	4.5	0.0	3.5	6.3	3.5
Phase: Nursery	0.0	1.2	0.0	1.3	0.0	1.3	0.0	1.1
Phase: Primary	0.0	72.3	0.0	72.6	0.0	71.9	2.1	72.1
Phase: Secondary	96.7	20.9	96.4	20.7	98.5	19.6	93.8	19.7
Phase: All Through	3.3	0.6	3.6	0.6	1.5	0.8	4.2	0.8
Phase: Special	0.0	5.0	0.0	4.9	1.8	6.4	0.0	6.3
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1
Payscale: Main Scale	28.3	1.2	0.0	0.7	0.0	0.5	0.0	0.9
Payscale: Upper Scale	38.3	8.6	12.7	5.4	10.7	4.9	6.3	4.0
Payscale: Advanced/excellent scales	8.3	1.0	1.8	0.7	0.0	0.4	8.3	0.0
Payscale: Leadership scales	25.0	89.3	85.5	93.1	89.3	94.1	85.4	95.1

The 2012 cohort showed a similar trend to the 2011 cohort. Again NPQH participants were older and more likely to be female than HPSL participants. In this cohort they were, however, far less likely to be BME. At baseline, 80% of NPQH participants were already in senior leadership roles, compared to just 18% of HPSL participants. A further 9% of NPQH participants were already headteachers or principals, compare to none of the HPSL participants. Again, NPQH participants, unsurprisingly in light of their starting position, moved into headship, with the proportion of headteachers in this group increasing gradually from 9 to 50% over the four year period studied here. HPSL participants moved into senior leadership, the proportion rising rapidly from 18% to 78% in the first year, and then gradually increasing further to reach 87% by year 4, with a further 4% moving into headship.

3.3. Cohort 2013.

Table 27: 2013 cohort. HPSL and NPQH participants.

	2012		2013		2014	
	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH
Female %	55.2	64.9	55.7	64.4	56.7	64.8
BME%	23.9	10.9	23.0	11.2	26.7	11.2
<25	0.0	0.0	0.0	0.0	0.0	0.0
25-29	17.9	2.9	9.8	0.8	6.7	0.4
30-34	50.7	19.9	52.5	17.5	48.3	12.8
35-39	13.4	26.9	19.7	25.2	25.0	24.6
40-44	10.4	24.3	8.2	26.0	8.3	28.1
45-49	7.5	16.8	9.8	18.3	10.0	19.0
50-54	0.0	7.8	0.0	9.9	1.7	12.0
55-59	0.0	1.3	0.0	2.3	0.0	3.0
>59	0.0	0.0	0.0	0.0	0.0	0.1

	2012		2013		2014	
	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH
Role: Other education or non-education	1.5	0.0	1.6	0.0	0.0	0.0
Role: Classroom teacher	58.2	10.7	13.1	7.7	8.3	5.0
Role: Middle leader	19.4	0.4	8.2	0.2	1.7	0.3
Role: Senior leader	19.4	82.0	75.4	74.2	86.7	60.0
Role: Headteacher	1.5	6.9	1.6	17.9	3.3	34.7
Part-time	1.5	4.2	3.3	3.8	1.7	3.6
Phase: Nursery	0.0	0.3	0.0	0.4	1.7	0.4
Phase: Primary	10.6	65.1	11.5	64.6	10.0	64.4
Phase: Secondary	84.9	26.9	77.0	26.2	81.7	25.5
Phase: All Through	4.5	1.4	11.5	1.4	6.7	1.8
Phase: Special	0.0	6.3	0.0	7.4	0.0	7.9
Payscale: Unqualified Teacher Pay Scale	1.5	0.0	0.0	0.0	0.0	0.0
Payscale: Main Scale	21.2	1.2	1.7	0.5	5.0	0.7
Payscale: Upper	42.4	7.8	18.3	6.3	5.0	4.2

	2012		2013		2014	
	HPSL	NPQH	HPSL	NPQH	HPSL	NPQH
Scale						
Payscale: Advanced/ excellent scales	4.5	0.5	0.0	0.1	1.7	0.4
Payscale: Leadership scales	30.3	90.5	80.0	93.1	88.3	94.7

The 2013 cohort showed a similar picture, with NPQH participants more likely to be female and less likely to be BME than HPSL participants. They were also older, and more likely to work in primary schools. They were also far more likely to be in senior leadership positions when they started the programme. Over time, they moved gradually into headship positions. HPSL participants moved more rapidly into senior leadership positions, though less frequently into headship.

3.4. Cohort 2014.

Table 28: 2014 cohort. HPSL and NPQH participants

	2013		2014	
	HPSL	NPQH	HPSL	NPQH
Female	56.3	61.4	54.7	61.8
BME	20.0	8.4	20.0	8.4
<25	0.0	0.0	0.0	0.0
25-29	23.8	3.1	16.0	2.1
30-34	46.3	22.5	46.7	17.4
35-39	16.3	28.9	20.0	29.4

	2013		2014	
	HPSL	NPQH	HPSL	NPQH
40-44	10.0	25.8	10.7	27.0
45-49	3.8	14.6	6.7	16.8
50-54	0.0	4.6	0.0	6.3
55-59	0.0	0.5	0.0	1.1
>59	0.0	0.0	0.0	0.0
Role: Other education or non-education	0.0	0.0	1.3	0.0
Role: Classroom teacher	45.0	9.0	20.0	4.9
Role: Middle leader	12.5	0.7	4.0	0.4
Role: Senior leader	41.3	71.8	70.7	71.0
Role: Headteacher	1.3	8.5	4.0	23.7
Part-time	5.0	4.7	1.3	3.9
Phase: Nursery	0.0	0.3	0.0	0.3
Phase: Primary	27.5	64.9	25.3	65.7
Phase: Secondary	63.8	27.3	64.3	26.2
Phase: All Through	6.2	1.2	8.0	1.3
Phase: Special	2.5	6.4	2.7	6.6
Payscale: Unqualified Teacher Pay Scale	0.0	0.0	0.0	0.0
Payscale: Main Scale	20.0	1.1	12.0	0.6
Payscale: Upper Scale	35.0	6.9	16.0	4.3
Payscale: Advanced/ excellent scales	0.0	0.3	0.0	0.4

	2013		2014	
	HPSL	NPQH	HPSL	NPQH
Payscale: Leadership scales	45.0	91.7	72.0	94.7

The same patterns were evident for the 2014 cohort, though for this cohort we only had data for one year following the respective programmes.

3.5. Conclusion

At baseline, NPQH participants differed from HPSL participants in a number of ways across cohorts. They were more likely to be female and were on average older than HPSL participants, and in later cohorts less likely to be BME. As a programme that caters for all school phases, a majority of NPQH participants worked in the primary sector. In contrast to HPSL participants, most NPQH participants were already in senior leadership or headteacher roles on entering the programme. Following participation NPQH participants started to move gradually into headship positions. Starting from a lower baseline, HPSL participants more often moved into senior leadership rather than headship positions initially, though overall their progression was more rapid than that of NPQH participants.

Part 4. Relationship between schools' engagement with the HPSL programme and outcomes for pupils

In part 4 we explore the relationship between schools participation in the HPSL programme and pupil outcomes. To do this, we compared performance in engaged schools[7] with a comparator sample. We again used propensity score matching to create a matched comparison sample. Once the matched sample was developed, we used multilevel modelling of the National Pupil database to look at the relationship between participation in the programme and outcomes.

4.1. Matching

In order to compare the performance of schools engaged in HPSL to comparator schools, we used propensity score matching (PSM) to create a matched comparison sample of schools that did not significantly differ from HPSL engaged schools prior to the school becoming a part of the programme.

To create the comparison sample, school level data was employed, as the school is the unit of analysis for this particular intervention. PSM was used to match each school to a comparator school so HPSL effects can be estimated.

To enable matching, the schools were first divided into cohorts, based on the year in which participant leaders were first recorded in each of the schools. Thus, a school in which HPSL participants were first present in 2011 would be part of the 2011 cohort. Cohort variables were created for this purpose. In addition, as some schools would join the HPSL programme but not necessarily have participants in all subsequent years, a set of participant variables were created for each year.

Procedure

A key element in developing appropriate matched samples is the selection of the input variables. It was essential to ensure that key factors that may influence selection into the HPSL programme and comparison groups and the measurement of HPSL programme effects were controlled for as much as possible. In this case, the key factors selected were intake characteristics at the school level, particularly those that relate to pupil characteristics. This is for two main reasons:

1. Educational research has consistently shown such characteristics to be significant predictors of student outcomes that therefore need to be controlled

[7] Engaged schools are both those hosting residency year placements and those employing Future Leaders after their residency year.

for in any analysis of the effects of the HPSL programme(see Chapman & Muijs, 2014);
2. Analysis of the demographics of HPSL schools showed that these differed significantly from the population in terms of these key characteristics.

The following characteristics were tested as predictors of group membership (HPSL or comparison)

1. School attainment levels. At KS2 this was measured using points score measures, to provide sufficient levels of variance. For KS4 we used the percentage achieving 5A*-C GCSE including English and Mathematics. This measure was consistent across the time period of the study and ensured sufficient rigour in not including equivalencies.
2. Percentage pupils eligible for Free School Meals
3. Mean school level IDACI score
4. Percentage speaking a first language other than English at home
5. Mean school-level SEN. Two variables were used, SEN-A, indicating pupils eligible for School Action, and SEN-PS, those eligible for School Action Plus or statemented.
6. Percentage boys

Following the calculation of the propensity scores we used both Nearest Neighbour and Caliper matching. No overall significant difference was found, so we proceeded with one-to-one Nearest Neighbour matching for these analyses. Replacement was only employed in the few cases that HPSL participants shared a nearest neighbour. In these cases the next nearest was chosen.

In the next phase matched schools were selected. T-tests were used to look at whether any significant differences remained between HPSL and comparison groups. Secondly, to test whether the extent to which the overall distribution of propensity scores was similar the Mann-Whitney U-test was calculated.

This procedure was followed for each cohort, as the pre-participation comparison baseline was different for each cohort (e.g. those schools starting in 2011 need to be matched on data from 2010 and earlier). In the next sections we will present the results by phase and cohort.

Key stage 4 results

Pre-matching statistics

Table 29 shows the results of the T-tests for mean differences between HPSL and non-HPSL schools pre-matching. Results show that HPSL and non-HSPL schools differed significantly on most variables in most years, with attainment for the 2010 and 2012 cohorts and gender for 2011, 2012, 2013 and 2015 being the exception. HPSL schools had significantly more disadvantaged intakes according to IDACI and FSM measures, and significantly more pupils whose home language was not English. However, they tended to have higher levels of attainment than the non-HPSL schools.

Table 29: KS4 Pre-matching. Means for HPSL and non-HPSL groups on key variables.

Bold indicates significant difference at the .05 level using independent samples t-test.

	2009 cohort (N=58)		2010 cohort (N=34)		2011 cohort (N=68)		2012 cohort (N=82)	
	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL
IDACI	**.16**	**.39**	**.24**	**.40**	**.17**	**.37**	**.16**	**.35**
FSM	**.17**	**.30**	**.12**	**.25**	**.13**	**.28**	**.14**	**.29**
SENPS	**.07**	**.09**	**.08**	**.14**	**.08**	**.13**	**.22**	**.14**
SENA	**.10**	**.20**	**.11**	**.16**	**.11**	**.18**	**.07**	**.17**
Language	**.09**	**.32**	**.09**	**.18**	**.09**	**.27**	**.08**	**.28**
Attainment	**.35**	**.38**	.37	.42	**.39**	**.44**	.42	.44
Gender	**.54**	**.49**	**.55**	**.42**	.54	.50	.55	.55

	2013 cohort (N=98)		2014 cohort (N=98)		2015 cohort (N=108)		2016 cohort (N=106)	
	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL
IDACI	**.17**	**.29**	**.17**	**.33**	**.17**	**.29**	**.17**	**.34**
FSM	**.14**	**.23**	**.15**	**.25**	**.14**	**.24**	**.14**	**.25**
SENPS	**.22**	**.13**	**.21**	**.10.**	**.21**	**.15**	**.16**	**.07**
SENA	**.07**	**.16**	**.06**	**.13**	**.06**	**.12**	**.02**	**.04**
Language	**.08**	**.20**	**.08**	**.24**	**.09**	**.18**	**.09**	**.26**
Attainment	**.42**	**.48**	**.41**	**.52**	**.44**	**.53**	**.36**	**.44**
Gender	.55	.50	**.55**	**.48**	.55	.55	**.55**	**.52**

Post-matching statistics

Suitable matches were found for all schools. Table 30 shows the T-tests for mean differences between HPSL and non-HPSL schools post-matching. Results show that they no longer differed significantly on any of the variables selected.

Table 30: KS4 Post-matching. Means for HPSL and non-HPSL groups on key variables.

Bold indicates significant difference at the .05 level using independent samples t-test.

	2009 cohort (N=58)		2010 cohort (N=34)		2011 cohort (N=68)		2012 cohort (N=82)	
	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL
IDACI	.40	.39	.36	.40	.37	.37	.32	.34
FSM	.32	.30	.18	.25	.26	.28	.26	.29
SENPS	.11	.09	.14	.14	.13	.13	.12	.14
SENA	.20	.20	.15	.16	.18	.18	.18	.16
Language	.25	.32	.15	.18	.34	.31	.28	.28
Attainment	.36	.38	.45	.42	.45	.44	.42	.43
Gender	.48	.49	.36	.42	.47	.50	.55	.55

	2013 cohort (N=98)		2014 cohort (N=98)		2015 cohort (N=108)		2016 cohort (N=106)	
	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL
IDACI	.31	.29	.32	.33	.28	.29	.34	.34
FSM	.23	.23	.21	.25	.20	.24	.23	.25
SENPS	.13	.13	.08	.10	.13	.15	.07	.07
.02SENA	.14	.16	.12	.13	.13	.12	.02	.03
Language	.22	.20	.20	.24	.13	.18	.25	.26
Attainment	.43	.48	.51	.52	.56	.53	.45	.44
Gender	.55	.55	.44	.48	.53	.54	.54	.52

The Mann-Whitney U-test shows that there was no significant difference in the distribution of propensity scores between the HPSL and comparison groups.

Key Stage 2 Results

As Key Stage 2 leaders only started participating in the project from the 2013 cohort, there are no analyses for the cohorts before this year. We also found that the number in 2013 was too small for meaningful analyses to be conducted. Hence these analyses are for the cohorts from 2014 onwards.

Pre-matching statistics

Table 31 shows the results of the T-tests for mean differences between HPSL and non-HPSL schools pre-matching. Results show that HPSL and non-HPSL schools differed significantly on FSM eligibility and language spoken in the home, with HPSL schools having more pupils eligible for FSM and more non-native English speakers.

Table 31: KS2 Pre-matching. Means for HPSL and non-HPSL groups on key variables.

	2014 cohort (N=38)		2015 cohort (N=82)		2016 cohort (N=62)	
	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL
FSM	**.18**	**.33**	**.18**	**.35**	**.16**	**.30**
SENPS*	.14	.16	.14	.14		
SENA*	.12	.13	.11	.13		
Language	**.13**	**.57**	**.13**	**.32**	**.14**	**.23**
Attainment	.27	.28	.28	.27	.28	.28
Gender	**.52**	**.46**	.52	.52	.52	.53

* No longer provided in the 2016 KS2 NPD

Bold indicates significant difference at the .05 level using independent samples t-test.

Post-matching statistics

Suitable matches were found for all schools. Table 32 shows the T-tests for mean differences between HPSL and non-HPSL schools post-matching. Results show that they no longer differed significantly on any of the variables selected.

Table 32: KS2 Post-matching. Means for HPSL and non-HPSL groups on key variables.

	2014 cohort (N=38)		2015 cohort (N=82)		2016 cohort (N=62)	
	Not HPSL	HPSL	Not HPSL	HPSL	Not HPSL	HPSL
FSM	.26	.33	.36	.35	.27	.30
SENPS*	.14	.16	.15	.14		
SENA*	.13	.13	.12	.13		
Language	.63	.57	.36	.32	.33	.23
Attainment	.28	.28	.26	.27	.28	.28
Gender	.50	.46	.53	.52	.52	.53

* Not provided in the 2016 KS2 NPD

Bold indicates significant difference at the .05 level using independent samples t-test.

The Mann-Whitney U-test shows that there was no significant difference in the distribution of propensity scores between the HPSL and comparison groups.

Conclusion of matching process

Overall, it proved possible to create a balanced matched sample for the HPSL schools on key intake variables preceding participation, which allowed us to develop relatively robust analyses of the impact of engagement with HPSL on student outcomes. Of course, a number of caveats need to be taken into account. Firstly, while the school intake variables used are known to be of importance they are not exhaustive in terms of the factors that may distinguish HPSL schools and influence selection. In particular, factors relating to school processes and qualities (e.g. leadership) were not included in the analyses. While indicators of such factors may be accessed through Ofsted reports, there are serious problems in using this data

source for matching, such as the different times at which schools are inspected, changing inspection frameworks and issues of reliability and halo effects which have led us to not use this data source. However, this does leave open the possibility that any differences found in subsequent analyses may reflect pre-existing differences in school effectiveness or leadership quality rather than the effects of the HPSL programme. In terms of the intake data it is well-known that NPD does not have particularly strong variables on pupil social background. However, FSM and IDACI have been found to be decent proxies, and much of the impact of Socio-Economic Status and disadvantage is mediated through prior attainment in any case, allowing us to be quite confident that any differences found in subsequent analyses are unlikely to reflect differences in school intake. Finally, it is clear and expected that matching works better for those cohorts where the sample sizes are larger.

4.2. Multilevel modelling - methodology

Following the successful matching process, we used multilevel modelling to look at the relationship between being part of Future Leaders and pupil outcomes. Two-level logistic multilevel models (for KS4, for KS2 the outcome variable was continuous), with pupils nested in schools, were used in the absence of classroom level data in the NPD.

The hierarchical structure of the data in the NPD, and the established existence of a school-level effect in the data, make the use of multilevel modelling the most appropriate methodology for statistical analysis. Multilevel modelling is an adaptation of the general linear model for hierarchical datasets, which partitions the variance in the dependent variable across the relevant levels (here pupils, schools and possibly alliances).

Models were run separately for each year of the analysis, as the use of time series approaches is inappropriate due to the fact that the attainment data relates to a different cohort of pupils every year. As we would not expect any impact in year 1, we looked at year 2 and beyond of participation.

Notwithstanding the fact that we matched the schools on key pupil intake variables prior to joining the programme, it was nonetheless necessary to include these in the final multilevel models, for two reasons. Firstly, we needed to account for the fact that the matching model did not include data at the pupil level. Secondly, we needed to take into account that pupil intake characteristics of schools can change over time, due to changes in a school's popularity or developments (e.g. new housing) in the school's local area. These and related factors could mean that changes over time in attainment could be wrongly attributed to the presence of HPSL participants when they were in fact the result of changes to the pupil intake of a school. We have

therefore included the main statistically significant predictors of pupil outcomes in the models, these being Free School Meal eligibility and IDACI scores as measures of disadvantage, SEN status, home language other than English and gender. These jointly provide a sufficient control for pupil characteristics.

The models were run in three phases. In phase 1 an empty model was run, with only a constant as predictor as a baseline model with which subsequent models could be compared. In the second phase, the pupil-level background variables were added as controls, and in the third phase the key variable of interest, whether or not pupils attended a school in the HPSL programme, was added. In the tables below, we only present the final model which includes the key HPSL participation variable as this is the model of interest to these analyses.

4.3 KS4 Cohort 2011 – multilevel models

Table 33: Key Stage 4 Cohort 2011 – Final multilevel model.

	2011		2012		2013		2014		2015	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	**0.88**	**0.13**	**0.89**	**0.12**	**0.85**	**0.15**	**0.71**	**0.19**	**0.73**	**0.19**
Gender	**-0.52**	**0.13**	**-0.33**	**0.14**	**-0.14**	**0.04**	**-0.21**	**0.05**	**-0.32**	**0.05**
IDACI	**-0.48**	**0.05**	**-0.50**	**0.05**	**-0.52**	**0.14**	**-0.69**	**0.15**	**-0.91**	**0.14**
Non-English speaking	**-2.26**	**0.08**	**-2.20**	**0.09**	**-0.56**	**0.05**	**-0.53**	**0.05**	**-0.24**	**0.06**
FSM	**-1.58**	**0.05**	**-1.67**	**0.06**	**-2.08**	**0.09**	**-1.95**	**0.09**	**-0.61**	**0.05**
SEN Action+ or Statemented	**-0.18**	**0.06**	-0.08	0.06	**-1.82**	**0.07**	**-1.78**	**0.08**	**-1.93**	**0.15**
SEN School Action	-0.05	0.04	**-0.13**	**0.04**	**0.20**	**0.06**	0.10	0.06	**-1.37**	**0.14**
HPSL participant	-0.04	0.168	0.10	0.15	0.23	0.18	0.04	0.23	0.01	0.22

Significant coefficients in bold (p<.05).

As can be seen in table 33, for schools first engaged in cohort 2011 KS4 attainment was negatively related to social background (FSM, IDACI), SEN, being a boy and being from a non-English speaking home. Being part of the HPSL programme was not significantly related to attainment. These findings were consistent across years.

4.4 KS4 Cohort 2012 – multilevel models

Table 34: Key Stage 4 Cohort 2012 – Final multilevel model.

	2012		2013		2014		2015	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	**0.45**	**0.15**	**0.33**	**0.15**	0.12	0.15	0.01	0.14
Gender	**-0.24**	**0.04**	**-0.31**	**0.04**	**-0.19**	**0.04**	**-0.32**	**0.04**
IDACI	-0.11	0.13	0.28	0.13	**-0.47**	**0.05**	**-0.48**	**0.14**
FSM	**-0.44**	**0.04**	**-0.44**	**0.04**	**-2.00**	**0.10**	0.08	0.05
SEN Action+ or Statemented	**-2.24**	**0.08**	**-2.0**	**0.08**	**-1.70**	**0.08**	**-0.51**	**0.05**
SEN School Action	**-1.54**	**0.06**	**-1.68**	**0.06**	-0.03	0.05	**-2.10**	**0.20**
Non-English speaking	0.05	0.05	0.09	0.05	-0.25	0.14	**-1.97**	**0.22**
HPSL participant	0.10	0.18	0.24	0.18	0.29	0.18	0.23	0.16

Significant coefficients in bold (p<.05).

The picture for schools first engaged in cohort 2012 was somewhat more variable for the control variables, though generally speaking social background, gender and SEN were all related to attainment at KS4. Being part of the HPSL programme was not significantly related to attainment.

4.5. KS4 Cohort 2013 – multilevel models

Table 35: Key Stage 4 Cohort 2013 – Final multilevel model.

	2013		2014		2015	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	**0.41**	**0.19**	**0.49**	**0.18**	0.04	0.23
Gender	**-0.18**	**0.04**	**-0.29**	**0.04**	**-0.35**	**0.04**
IDACI	**-0.83**	**0.13**	**-0.83**	**0.13**	**-1.08**	**0.14**
FSM	**-0.55**	**0.05**	**-0.62**	**0.05**	0.04	0.05
SEN Action+ or Statemented	**-2.20**	**0.07**	**-2.03**	**0.08**	**-0.66**	**0.05**
SEN School Action	**-1.77**	**0.06**	**-1.71**	**0.06**	**-1.85**	**0.16**
Non-English speaking	-0.08	0.05	0.02	0.05	**-1.47**	**0.17**
HPSL participant	**0.64**	**0.25**	0.35	0.22	**0.63**	**0.28**

Significant coefficients in bold (p<.05).

For the 2013 cohort there were again significant relationships with social background, gender and SEN. For this cohort of schools, HPSL participation was also significant and positive, this in 2013 and 2015.

4.6. KS4 Cohort 2014 – multilevel models

Table 36: Key Stage 4 Cohort 2014 – Final multilevel model.

	2014		2015	
	Coefficient	Standard error	Coefficient	Standard error
Constant	**0.41**	**0.19**	0.04	0.23
Gender	**-0.18**	**0.04**	**-0.35**	**0.043**
IDACI	**-0.83**	**0.13**	**-1.08**	**0.14**
FSM	**-0.55**	**0.05**	0.04	0.059
SEN Action+ or Statemented	**-2.20**	**0.07**	**-0.66**	**0.054**
SEN School Action	**-1.77**	**0.06**	**-1.85**	**0.165**
Non-English speaking	-0.08	0.05	**-1.47**	**0.178**
HPSL participant	**0.64**	**0.25**	**0.63**	**0.282**

Significant coefficients in bold (p<.05).

The 2014 cohort showed significant positive relationships between being part of the HPSL programme and attainment in both 2014 and 2015. The effect sizes were weak to modest. As in previous cohorts there was a negative relationship between social disadvantage, having SEN and being male and attainment in both years.

4.7. KS4 Cohort 2015 – multilevel models

Table 37: Key Stage 4 Cohort 2015 – Final multilevel model.

	2015	
	Coefficient	Standard error
Constant	**0.76**	**0.13**
Gender	**-0.31**	**0.03**
IDACI	**-1.04**	**0.11**
FSM	**0.12**	**0.05**
SEN Action+ or Statemented	**-0.71**	**0.04**
SEN School Action	**-1.76**	**0.11**
Non-English speaking	**-1.32**	**0.12**
HPSL participant	-0.26	0.18

Significant coefficients in bold (p<.05).

No significant relationship between HPSL participation and attainment was found for the 2015 cohort. All control variables were significant, though unusually there was a weak positive relationship with FSM eligibility.

4.8. KS2 Cohort 2014 – multilevel models

For KS2 we only looked at the 2014 and 2015 cohorts as the 2013 cohort was too small for meaningful comparisons to be made, owing to this year being the pilot for the primary programme.

Table 38: Key Stage 2 Cohort 2014 – Final multilevel model.

	2014		2015	
	Coefficient	Standard error	Coefficient	Standard error
Constant	**28.16**	**0.27**	**27.05**	**0.36**
Gender	0.07	0.19	**0.45**	**0.13**
FSM	-0.20	0.23	**-0.75**	**0.15**
SEN Action+ or Statemented	**-5.29**	**0.32**	**-6.45**	**0.22**
SEN School Action	**-3.31**	**0.30**	**-4.15**	**0.21**
Non-English speaking	-0.12	0.25	**-0.48**	**0.17**
HPSL participant	**1.09**	**0.51**	0.26	0.53

Significant coefficients in bold (p<.05).

The picture for the KS2 2014 cohort was a mixed one. SEN is negatively related to attainment in both years, but gender, FSM and language spoken at home were only significant in 2015. Being part of the HPSL programme was significantly (but weakly) related to attainment in 2014 but not 2015.

4.9. KS2 Cohort 2015 – multilevel models

Table 39: Key Stage 2 Cohort 2015 – Final multilevel model.

	2015	
	Coefficient	Standard error
Constant	**27.14**	**0.34**
Gender	**-0.34**	**0.15**
FSM	**-1.34**	**0.17**
Non-English speaking	-0.01	0.18
HPSL participant	0.55	0.79

Significant coefficients in bold (p<.05).

The SEN variables were not present in the 2015 KS3 NPD dataset. Being male and eligible for FSM were negatively related to attainment. HPSL participation was not significant.

4.10 Conclusion

Multilevel modelling was used to look at the relationship between participation in the HPSL programme and attainment, using a matched sample of participant and comparison schools. The analyses included control variables for social background (FSM, IDACI, gender, SEN and language spoken at home). Overall, there was only limited support for an impact from HPSL involvement on attainment. While the relationship was in all cases positive (indicating higher attainment in HPSL schools), the relationship was only significant for the 2014 KS4 cohort and in two of three years for the 2013 KS4 cohort, and the effect size was weak to modest. This is not altogether surprising, as the indirect effect of leadership on attainment (see Hallinger, 2013; Muijs, 2010) means that analyses looking at a direct effect of leadership development on attainment rarely show strong effects.

5. Impact on disadvantaged students

In order to look at possible impacts on disadvantaged students, we selected only students eligible for Free School Meals for comparison. We found that in all cases IDACI became non-significant, as would be predicted.

5.1. KS4 Cohort 2011 – multilevel models

Table 40: Key Stage 4 Cohort 2011 – Final multilevel model.

	2011		2012		2013		2014		2015	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	0.17	0.18	0.08	0.19	0.22	0.20	-0.22	0.24	-0.30	0.27
Gender	-0.39	0.29	-0.19	0.30	-0.15	0.09	-0.10	0.10	-0.09	0.10
IDACI	**-2.11**	**0.14**	**-2.09**	**0.16**	-0.46	0.29	-0.01	0.32	-0.43	0.33
Non-English speaking	**1.50**	**0.11**	**1.59**	**0.13**	**2.10**	**0.15**	**1.83**	**0.17**	**0.54**	**0.12**
SEN Action+ or Statemented	**0.44**	**0.11**	**0.27**	**0.11**	**-1.90**	**0.13**	**-1.76**	**0.16**	**-1.77**	**0.25**
SEN School Action	-0.05	0.09	**-0.25**	**0.09**	**0.44**	**0.10**	**0.34**	**0.12**	**-1.30**	**0.26**
HPSL participant	-0.06	0.17	0.20	0.17	0.12	0.20	0.03	0.24	-0.02	0.28

Significant coefficients in bold (p<.05).

For this subsample of the 2011 cohort, SEN and being a native English speaker remained negatively related to attainment. HPSL programme engagement was not significant.

5.2. KS4 Cohort 2012 – multilevel models

Table 41: Key Stage 4 Cohort 2012 – Final multilevel model.

	2012		2013		2014		2015	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	0.11	0.20	0.05	0.19	-0.49	0.20	-0.76	0.19
Gender	-0.23	0.08	-0.27	0.08	-0.12	0.09	**-0.38**	**0.09**
IDACI	-0.33	0.27	-0.14	0.28	-0.36	0.29	-0.30	0.32
SEN Action+ or Statemented	**-2.08**	**0.14**	**-2.07**	**0.15**	**-1.87**	**0.18**	**-2.95**	**0.60**
SEN School Action	**-1.50**	**0.11**	**-1.66**	**0.12**	**-1.62**	**0.14**	**-2.30**	**0.53**
Non-English speaking	**0.21**	**0.09**	**0.28**	**0.09**	**0.268**	**0.10**	**0.56**	**0.10**
HPSL participant	-0.06	0.21	0.04	0.19	0.31	0.19	0.28	0.17

Significant coefficients in bold (p<.05).

A similar picture emerged for the 2012 cohort, with HPSL programme engagement not significant in the analyses.

5.3. KS4 Cohort 2013 – multilevel models

Table 42: Key Stage 4 Cohort 2013 – Final multilevel model.

	2013		2014		2015	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	0.21	0.19	0.25	0.21	0.23	0.23
Gender	-0.18	0.08	**-0.27**	**0.09**	**-0.30**	**0.10**
IDACI	-0.51	0.29	0.16	0.32	-0.08	0.24
SEN Action+ or Statemented	**-2.12**	**0.14**	**-2.24**	**0.18**	**-2.14**	**0.16**
SEN School Action	**-2.00**	**0.13**	**-1.88**	**0.15**	**-1.85**	**0.16**
Non-English speaking	0.12	0.11	**0.31**	**0.12**	0.21	0.17
HPSL participant	0.07	0.20	0.03	0.20	0.07	0.23

Significant coefficients in bold (p<.05).

SEN was again the main predictor of attainment for cohort 2013. HPSL programme engagement was not significant.

5.4. KS4 Cohort 2014 – multilevel models

Table 43: Key Stage 4 Cohort 2014 – Final multilevel model.

	2014		2015	
	Coefficient	Standard error	Coefficient	Standard error
Constant	-0.14	0.15	-0.52	0.16
Gender	**-0.19**	**0.07**	**-0.23**	**0.08**
IDACI	-0.33	0.24	-0.47	0.27
SEN Action+ or Statemented	**-1.74**	**0.14**	**0.54**	**0.09**
SEN School Action	**-1.73**	**0.12**	**-2.08**	**0.29**
Non-English speaking	**0.31**	**0.09**	**-0.75**	**0.25**
HPSL participant	-0.08	0.15	0.03	0.15

Significant coefficients in bold (p<.05).

The 2014 cohort saw a stronger relationship with gender than previous cohorts, with boys doing worse. The same remained true of pupils with SEN. The results for language were inconsistent. HPSL programme engagement was not significant.

5.5. KS4 Cohort 2015 – multilevel models

Table 44: Key Stage 4 Cohort 2015 – Final multilevel model.

	2015	
	Coefficient	Standard error
Constant	-0.31	0.15
Gender	-0.15	0.08
IDACI	-0.29	0.25
SEN Action+ or Statemented	**0.61**	**0.10**
SEN School Action	**-1.52**	**0.20**
Non-English speaking	**-1.27**	**0.26**
HPSL participant	-0.23	0.15

Significant coefficients in bold (p<.05).

No significant relationship between HPSL participation and attainment was found for the 2015 cohort.

5.6. KS2 Cohort 2014 – multilevel models

For KS2 we only looked at the 2014 and 2015 cohort as the 2013 cohort was too small for meaningful comparisons to be made due to this being the pilot year for the primary programme.

Table 45: Key Stage 2 Cohort 2014 – Final multilevel model.

	2014		2015	
	Coefficient	Standard error	Coefficient	Standard error
Constant	28.51	0.58	26.818	0.607
Gender	-0.10	0.37	0.424	0.411
SEN Action+ or Statemented	**-5.38**	**0.53**		
SEN School Action	**-3.20**	**0.52**		
Non-English speaking	-0.04	0.43	0.785	0.493
HPSL participant	0.90	0.61	0.77	0.66

Significant coefficients in bold (p<.05).

Only SEN was significant for the 2013 KS2 subsample.

5.7. KS2 Cohort 2015 – multilevel models

Table 46: Key Stage 2 Cohort 2015 – Final multilevel model.

	2015	
	Coefficient	Standard error
Constant	**25.81**	**0.66**
Gender	**-0.59**	**0.28**
Non-English speaking	0.22	0.35
HPSL participant	0.87	0.84

Significant coefficients in bold (p<.05).

The SEN variables were not present in the 2015 KS23 NPD dataset. Being male was negatively related to attainment. HPSL participation was not significant.

5.8. Conclusion

Overall there was no evidence of impact on attainment of disadvantaged pupils.

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