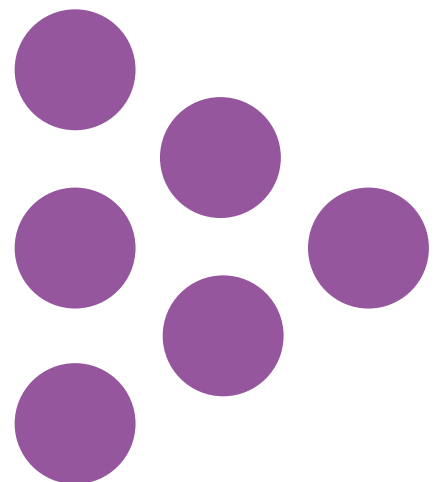

A Technical Paper

Evaluation of data from the Families Connect programme

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Evaluation of data from the Families Connect Programme: A Technical Paper

Constance Rennie
Ben Styles

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The Mere, Upton Park, Slough, Berkshire SL1 2DQ
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Contents

1	Part 1: Secondary analysis of Families Connect BPVS3 data	1
1.1	About Families Connect BPVS3 data	1
1.2	Analysis of non-matched data	1
1.3	Analysis of matched data	2
1.4	Discussion	3
2	Part 2: Secondary analysis of Families Connect teachers' and parents' data	4
2.1	About Families Connect data on parent role construct, parent efficacy and home learning environment	4
2.2	Teacher and parent correlations	5
2.3	Teacher perceptions of parental efficacy	5
2.4	Parental perceptions and behaviours	5
	References	7

1 Part 1: Secondary analysis of Families Connect BPVS3 data

1.1 About Families Connect BPVS3 data

NFER conducted secondary analysis on data provided by Save the Children UK (SCUK) that had been collected in previous cycles of Families Connect. The data was collected in the summer term 2016 (N=148) and the autumn term 2016 (N = 269). A subset of the summer 2016 data was used in an evaluation conducted by SCUK, the results of which are reported in their summer 2016 report (Bradley *et al.*, 2016). Their evaluation involved 82 families who took part in the Families Connect programme, and 51 children allocated as comparison pupils who had not taken part in the programme. The impact of the Families Connect programme on children’s vocabulary was measured using paired sample t-tests between baseline and immediate follow-up scores, and between baseline and 3 month follow-up scores, for both the intervention group and the comparison group. SCUK were able to find statistically significant improvements in British Picture Vocabulary Scale 3rd Edition (BPVS3) scores for the intervention group at the 3-month follow-up. No significant results were found immediately after the programme, and there were no significant improvements at either time points for the comparison group. Further details can be found in the report. NFER conducted a replication study of these analyses and was able to fully replicate the results found by SCUK.

Following a replication of the SCUK analysis, NFER conducted further analysis on the wider range of data made available. The analyses included descriptive statistics, regressions, and multilevel repeated measures models. The main model had been pre-specified in the technical appendix of NFER’s application to the project. This analysis was conducted for the purpose of informing analysis decisions (including sample sizes and suitability of outcome measures) for the future trial.

The primary research question was:

- What is the impact of Families Connect on children’s attainment in English, as measured by the BPVS3? (Dunn *et al.*, 2009).

As this was a multisite quasi-experimental design in which families within a school may or may not have taken part in Families Connect, the main analysis model was designed to mimic the one that will be used for the randomised controlled trial.

The BPVS3 is a one-to-one teacher-conducted assessment that measures a pupil’s receptive vocabulary. The raw score was converted into an age-standardised score with an average of 100 and standard deviation is 15. The age-standardised score was supplied to NFER as part of Save the Children’s data.

1.2 Analysis of non-matched data

A multilevel model was run on a dataset provided by Save the Children, which had not been matched to demographic variables or other scales (due to problems with matching). Included were cases that had a baseline measurement and at least one follow-up measurement (immediately or 3

months after the intervention; time point 1 (T1) and time point 2 (T2) respectively). This resulted in 210 pupils being included in the model (122 intervention and 88 comparison group). The multilevel model was a repeated measures model, with pupils at level 2, and time point at level 1. Baseline measurement of the BPVS3 was included as a covariate, as were dummy variables for the school, a time point marker, and an intervention marker.

The intervention coefficient was 1.48 (se = 0.892, $p = 0.098$). The time point coefficient was 0.373 (se = 0.585, $p = 0.525$). The effect of the intervention was converted into a Hedge's G effect size using only the between pupil variance. The Hedge's G was 0.29 (CI: -0.06; 0.64). These results suggest that there was no effect of the intervention on vocabulary scores, and there was no difference between the follow-up at T1 and T2.

An interaction term was introduced into the model; intervention*time point to further investigate the effect of time point on BPVS3 scores. The coefficient of intervention in this model was 1.49 (se = 1.03, $p = 0.15$). The coefficient of time point was 0.39 (se = 0.87, $p = 0.66$) and the coefficient of the interaction was -0.03 (se = 1.12, $p = 0.66$). Again, this suggests there was no impact of the intervention on BPVS3 scores, and that there was no difference between scores at T1 and T2.

Single level linear regressions were run on the BPVS3 scores at each time point to investigate score and residual distribution, and the effect of the intervention on vocabulary scores for specific time points.

The same covariates were included in the regressions (baseline scores, school and intervention). At T1 the coefficient for the intervention was 1.95 (se = 1.00, $p = 0.052$). At T2 the coefficient for the intervention was -0.42 (se = 1.15, $p = 0.72$). Again, these results suggest no effect.

1.3 Analysis of matched data

Further analysis was conducted on a subset of cases, which had been successfully matched to other data including demographic data and various other scales such as SEN, FSM, Teacher Perceptions of Parent Efficacy among others. As such, we were able to run further analyses, specifically models with demographic variables as covariates, to control for systematic differences between intervention and comparison groups and to investigate sub-group effects. Again, we ran a repeated measures multilevel model, with pupils at level 2, and time point at level 1. Pupils' BPVS3 score at baseline was included as a covariate, as were dummy variables for the school, a time point marker, and an intervention marker. Further covariates included were pupil-level background factors such as gender, parent and child ethnicity, disability, SEN, and English as a foreign language. 115 pupils (consisting of observations at T1, T2 or both) were included in the model, (72 intervention, and 43 control).

We found that Families Connect had a significant positive effect on pupils' BPVS3 scores; the intervention coefficient was 5.03 (se=1.91, $p=0.009$). This was converted into a Hedge's G effect size using the between pupil variance only. The Hedge's G was 1.05 (CI: 0.26; 1.84). The time point variable did not significantly predict BPVS3 scores, the coefficient was 0.82 (se=0.71, $p=0.25$). Results for the background covariates (other than baseline BPVS3) are displayed below in Table 1.

Table 1: Background covariates

Variable	Coefficient	SE	P
Gender	-0.15	1.17	0.90
Child ethnicity	1.74	2.44	0.48
Parent ethnicity	-3.02	2.05	0.14
Disability	2.37	3.78	0.53
SEN	-4.21	1.88	0.03
EFL	-4.92	3.12	0.12

Source: NFER secondary analysis of SCUK Families Connect data, 2018.

Table 1 shows that most of the other background variables did not significantly predict BPVS3 scores. Only SEN significantly predicted a lower score on the BPVS3 outcome; with SEN pupils scoring 4.21 points less than their non-SEN counterparts.

Another model was conducted to further investigate the effects of time and the intervention on pupil attainment. The above model was repeated with an interaction term included; time*intervention. We found again, that the intervention significantly predicted BPVS3 scores at follow-up, with a coefficient of 5.12 (se = 2.03, p =0.01). The time point did not significantly predict BPVS3 with a coefficient of 0.96 (se =1.22, p =0.44), and the interaction term was non-significant as well with a coefficient of -0.20 (se =1.44, p =0.89). This suggests that overall the intervention has a positive impact on pupils' vocabulary, however there is no effect of time, and although the BPVS3 scores are slightly higher at T2 than T1, this is more likely due to time effects than effects of the intervention.

Again, single level linear regressions were run on the BPVS3 scores at each time point separately to investigate score and residual distribution, and the single level effect of the intervention on vocabulary scores.

The same covariates were included in the regressions as were used in the multilevel models. At T1 the coefficient for the intervention was 4.68 (se = 1.64, p = 0.005). For T2 the coefficient was 2.55 (se = 2.08, p = 0.23). These results suggest that there is a positive effect of the intervention on vocabulary scores immediately after the intervention. However, by T2 the intervention no longer significantly predicts scores on the BPVS3, signifying the effect of Families Connect may no longer be present.

1.4 Discussion

This data was obtained from quasi-experiments so any of the effects seen are vulnerable to selection bias. There is a noticeable difference between the results of the models run on the full set of data and those run on the subset of matched data. The full set indicates no effect whereas the

matched data indicates a reasonably strong effect at the first time point. This difference could be due to adding demographic variables to the models and controlling for selection bias. However, these variables did not appear to have great explanatory power. Furthermore, there were considerable issues with data matching/collecting in some of the previous cycles and therefore it could be argued that the subset of data that could be matched to other datasets is a smaller but cleaner set of data, yielding more reliable results. Conversely, the smaller dataset might be more vulnerable to bias than the larger more complete dataset simply because cases are missing. As such, the secondary data analysis provides preliminary evidence that Families Connect has a beneficial effect on pupils' vocabulary immediately after the intervention. However, there are mixed results regarding the effect of time point on BPVS3 scores. The individual time point regressions show a distinction between time point 1 and time point 2, however, in the multilevel models there is no evidence to suggest a differential effect. Although any effect appears to have dissipated by 3-month follow-up, the interaction models would indicate this is far from a secure result.

2 Part 2: Secondary analysis of Families Connect teachers' and parents' data

2.1 About Families Connect data on parent role construction, parent efficacy and home learning environment

An important theoretical underpinning of the Families Connect (FC) programme is that creating a good learning environment at home, and increasing parents' skills and confidence to support their child's learning, will result in better educational outcomes for their child (Bradley *et al.*, 2016). The FC workshops involve a range of activities and techniques that are learnt and practised with their child during the workshop, and then further used at home. As these parental behaviours and beliefs are moderating factors in the Theory of Change (NFER, 2018), it was crucial to carefully consider which measures best capture them, and if it was necessary that these factors be assessed by the teachers, or the parents themselves.

A number of scales have been used by SCUUK to gather parents' and teachers' views on FC including:

- the Parent Role Construction (PRC) scale which captures a parent's belief about what they should be doing as regards their child's learning – it is a subscale of the Parental Role Construction for Involvement Scale (Hoover-Dempsey and Sandler, 2005).
- the Parent Efficacy Scale (PES) – a measure of parents' beliefs about their ability to influence their child's educational outcomes (Hoover-Dempsey and Sandler, 2005).
- the Home Learning Environment Scale (HLE) – a measure that captures the frequency of a range of general and work specific interactions between parents and pupils (Sylva *et al.*, 2008).

2.2 Teacher and parent correlations

Correlations were run on a number of measures used in previous FC cycles, to see how they related to each other. Table 2 displays the results of the correlations between a teacher assessed measure and parent assessed measures.

Table 2: Teacher and parent correlations

Measure 1	Measure 2	Correlation	p	Notes
PE_TQ	PE_PQ	.067	.360	Teacher perceptions and parent perceptions of parental efficacy (PE)
PE_TQ	PRC_PQ	-.025	.738	Teacher perceptions of PE and parents' beliefs about their role
PE_TQ	HLE_PQ	.151	.038*	Teacher perceptions of PE and parents' reports relating to home learning environment behaviours

Source: NFER secondary analysis of SCUK Families Connect data, 2018.

2.3 Teacher perceptions of parental efficacy

We wanted to investigate whether teacher perceptions of how efficacious parents were was an appropriate measure to use, i.e. if teachers perceived parents similarly to how parents perceived themselves, and if teachers' perceptions in any way related to what parents were doing at home, as reported by the parents. As shown in Table 1, we found that teacher and parental perceptions of parental efficacy did not correlate with each other. Furthermore, teacher perceptions of parental efficacy did not correlate with what parents thought their role as a parent was. There was however, a small but significant link between teachers' perceptions of parental efficacy (PE_TQ) and parents' reported parental behaviours at home (HLE_PQ) although the correlation was still very low. These results show that the way teachers think about parents does not relate to how parents think about themselves, but, to a limited extent, it relates to what parents are doing at home. These results led us to the conclusion that asking teachers about parental beliefs and behaviours was not as good a measure as asking the parents themselves. Therefore, it was important to include a parental questionnaire in the investigation to more accurately assess parental beliefs and behaviours.

2.4 Parental perceptions and behaviours

We also correlated the three parental measures used in previous Families Connect cycles. The results of the correlations are displayed in Table 3.

Table 3: Parental perceptions and behaviours

Measure 1	Measure 2	Correlation	p	Notes
PRC_PQ	HLE_PQ	.524	.000**	Parents' beliefs about their role and parental home learning environment behaviours
PE_PQ	HLE_PQ	.124	.082	Parents' perception of their parental efficacy and parental home learning environment behaviours
PE_PQ	PRC_PQ	.014	.841	Parents' perception of their parental efficacy and parents' beliefs about their role

Source: NFER secondary analysis of SCUK Families Connect data, 2018.

As shown in table 3, we found that parents' beliefs about their role as a parent strongly correlated with their reported behaviours at home. This signifies that, of the current measures, the factor that may be most likely to predict how a parent behaves with their child at home, is what they believe they should be doing. Whilst beliefs (PRC_PQ) correlated with behaviours (HLE_PQ), how efficacious they felt (PE_PQ) did not correlate with behaviours (HLE_PQ). In addition, what parents felt they should be doing (PRC_PQ) was independent of how good they felt they were at doing it (PE_PQ). In other words, a parent who has less confidence in their abilities may still try to help their child academically because they believe it is their role to do so, and vice-versa. In conclusion, there is a complicated interplay between beliefs, perceptions and behaviours. We will assess all three to see which, if any, of these factors are important in children's academic outcomes.

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The Mere, Upton Park, Slough, Berks SL1 2DQ
T: +44 (0)1753 574123 • F: +44 (0)1753 691632 • enquiries@nfer.ac.uk

www.nfer.ac.uk

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