



Cost–Benefit Analysis Of The Services Provided By Blue Smile In Primary Schools In Cambridgeshire

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Blue Smile is a charity providing arts-based therapy and mental health support to children age 3-13 in Cambridgeshire schools. Find out more at www.BlueSmile.org.uk.

Introduction

This project will attempt to show that early intervention by Blue Smile to both identify and then manage children undergoing adverse child events (ACEs) improves both their current and their future health and wellbeing.

We will use published reports and papers to link these improvements with cost savings in later life and hence justify the expenditure incurred in identifying and treating affected children.

Methods

There are four stages in our economic evaluation of Blue Smile's 1:1 support service.

1. Quantification of the impact of the 1:1 support service on the mental health of children aged 4-11.
2. Quantification of the link between better mental health in early years and improved later outcomes between the ages of 11 and 60.
3. Estimation of the potential economic benefit of improved later outcomes in monetary terms for children in the 1:1 support service.
4. Calculation of the value for money of the 1:1 support service.

We estimate the benefits of the 1:1 support scheme using an approach that closely follows the framework set out in a recent report by Paull and Xu of Frontier Economics (1). This report is an important part of the value for money component of the Department for Education's (DFE) Study of Early Education and Development (SEED), and it has been peer reviewed by Government and leading academics.

This was also recently used by a similar organisation to estimate their cost-benefit for interventions with younger children(2).

One of the key challenges in evaluating the 1:1 support scheme, as in other evaluations of early interventions, is that benefits arise over a long period of time. This means that data on the observed later outcomes for children who receive 1:1 support from Blue Smile will not be available for many years. We therefore rely on retrospective evidence from previous related studies reported in Paull and Xu to assess the strength of the links between improved mental health in childhood and a range of later outcomes.

Paull and Xu's approach is particularly useful in the context of this study because it assesses the monetary value of improved mental health in early years, based on the Strengths and Difficulties Questionnaire (SDQ) measure of child development that is used by Blue Smile to evaluate the impact of the 1:1 support service. This is a well-established metric used to evaluate therapeutic interventions with children and adolescents.

Details of the four key stages in our approach are

1: Quantification of the impact of 1:1 support on early mental health

The impact of the 1:1 support service on children's mental health is assessed using evaluation data collected by Blue Smile and stored as a database of over 1200 children who have been assessed and managed by their staff over 2 years.

We tabulate and describe the initial state of each child, the treatment provided and the outcome of that treatment in terms of improvement in standardised scores.

This comprises a set of SDQ assessments completed by teachers and parents before and after 1:1 support for a large sample of children aged 4-11 who received 1:1 support in 2019/20

2: Quantification of the link between early mental health and later outcomes

The data on the impact of the 1:1 support service on children's mental health is linked to changes in the likelihood of a range of later outcomes, based on evidence reported in Paull and Xu (1) that is discussed in the Annex.

3: Estimation of the value of improved later outcomes

The economic benefits of the service are estimated by monetising the value of the expected improvements in the relevant later outcomes. We use monetary values for these outcomes that are reported in Paull and Xu (1) to calculate the total lifetime benefit per child of the service.

The total benefits from the service are those that accrue to the children themselves (through increased lifetime earnings), the government (through reduced expenditure on public services), and other citizens (through reduced crime).

4: Calculation of the value for money of the Blue Smile service

The estimated total benefit for each individual and government spend is matched with the service delivery cost to assess value for money. This includes both the net benefit (i.e. total benefit less delivery cost), and the benefit-cost ratio.

Estimated benefits of the 1:1 support service

We had planned to estimate the economic benefits of the service by monetising the value of the expected improvements in seven later outcomes. However not all of these can be reliably quantified in monetary terms and some will not have a significant financial benefit to either the individual or society in general.

When reviewing a similar study (Frontier SEED VfM Report 2020), the following table showing estimated value of improving child development at ages three and four was given as their estimates of the benefit of their services.

Table 7: Estimated value of improving child development at ages three and four

Value per child of associated difference in final outcomes (beneficiary)	Value of 1 standard deviation increase in BAS		Value of 1 standard deviation decrease in SDQ	
	Age 3	Age 4	Age 3	Age 4
Lower SEN (govt)	£165	£171	£13	£14
Lower truancy (govt)	no link	no link	£31	£33
Lower exclusion (govt)	no link	no link	£22	£23
Lower youth crime (govt)	£10	£10	£35	£36
Lower adult crime (govt)	no link	no link	£4	£4
Lower adult crime (society)	no link	no link	£11	£11
Lower smoking (govt)	£27	£28	- £91	- £94
Lower smoking (private)	- £72	- £75	£248	£257
Lower smoking (society)	- £32	- £33	£108	£112
Lower depression (govt)	£90	£94	£191	£198
Higher employment (govt)	£579	£600	£1,215	£1,259
Higher employment (private)	£899	£932	£1,887	£1,955
Higher wage (govt)	£1,910	£1,979	£882	£913
Higher wage (private)	£4,868	£5,043	£2,246	£2,327
Total govt	£2,781	£2,881	£2,303	£2,386
Total private	£5,695	£5,900	£4,381	£4,539
Total society	- £32	- £33	£119	£123
Grand total	£8,444	£8,748	£6,803	£7,048

From this it is clear that over 90% of the benefit comes from a combination of

- employment v unemployment

and

- when employed, the level of income to be expected.

We will thus just use these two employment benefits to match against service costs.

This does not therefore capture all the potential benefits and so will, of necessity, give a conservative view.

As per other studies, we also do not include an estimate of the impact of better mental health on **well-being and quality of life** in adolescence and adulthood. This limitation is not unique to this study and reflects the lack of consensus on how such intangible outcomes should be valued in monetary terms. Also, the monetary valuations we use are unlikely to capture all the costs that are related to poor outcomes in later life associated with poor mental health in childhood, including for example:

- costs associated with children taken into care;
- costs of alcohol or drug abuse; and
- costs of adult mental health illnesses such as depression.

Allowing for natural recovery and fading of improvements

It is important to consider what proportion of the estimated improvement in SDQ scores based on teacher and parent assessments can be causally attributed to the 1:1 support service. This is a well-known issue in economic evaluation which can result in benefits being overstated if not taken into account.

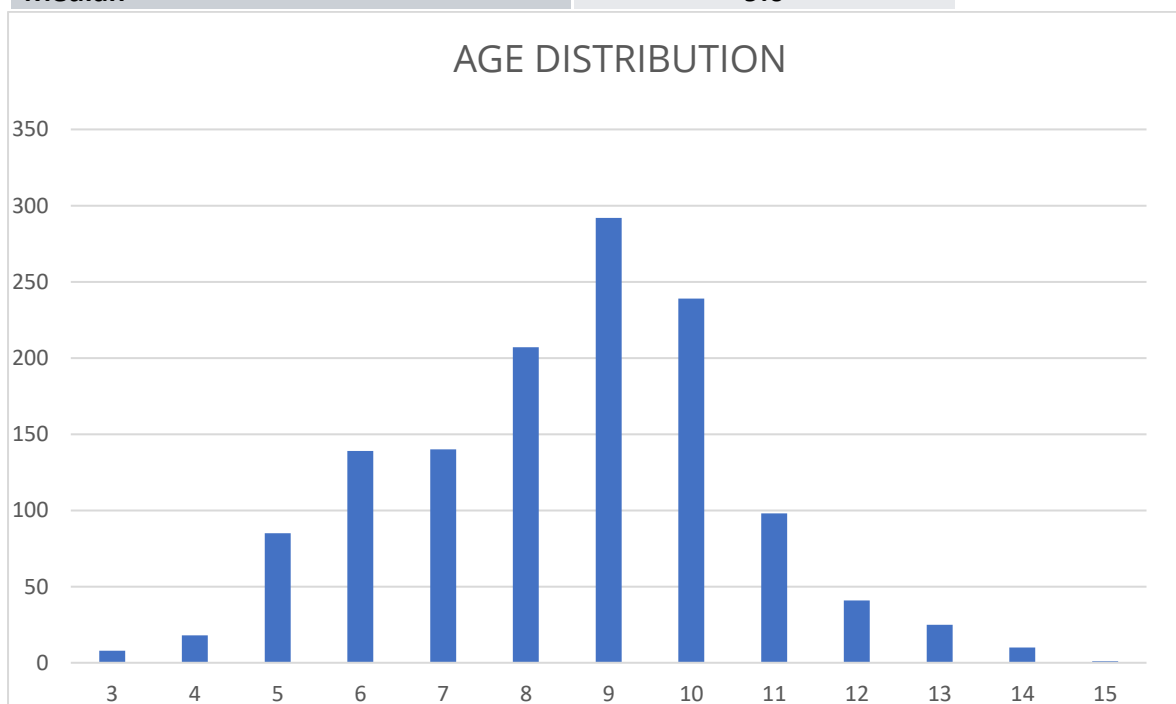
As noted earlier, it is likely that some children will get better without 1:1 support due to natural recovery. However, the natural recovery rate cannot be measured accurately in the absence of a control sample which assesses outcomes for a comparable group of children who do not receive 1:1 support.

Results

Age

The table and figure show the age distribution of the children who received care from Blue Smile in 2019/220.

Age (years)	No. of children	% n=1315
3	8	1%
4	18	1%
5	85	6%
6	139	11%
7	140	11%
8	207	16%
9	292	22%
10	239	18%
11	98	7%
12	41	3%
13	25	2%
14	10	1%
15	1	0%
NK	12	1%
Total	1315	100%
Mean	9.3	
SD	8.8	
Median	9.0	



Ethnicity

This table shows the ethnic distribution of these children

CODE	DESCRIPTION	No. of children	%
WBRI	White - British	975	74%
WIRI	White - Irish	5	0%
WIRT	Traveller: Irish heritage	5	0%
WOTH	Any other white background	41	3%
WROM	Gypsy / Roma	2	0%
MWBC	Mixed: White/Caribbean	27	2%
MWBA	Mixed: White/Black African	17	1%
MWAS	Mixed: White/Asian	10	1%
MOTH	Mixed: Any other mixed background	14	1%
AIND	Indian	1	0%
APKN	Pakistani	1	0%
ABAN	Bangladeshi	6	0%
AOTH	Any other Asian background	6	0%
BCRB	Black Caribbean	10	1%
BAFR	Black African	7	1%
BOTH	Any other Black background	2	0%
CHIN	Chinese	3	0%
OOth	Any other ethnic background	5	0%
REFU	Refused	2	0%
NOBT	Info not obtained	8	1%
	OTHER	168	13%
	TOTAL	1315	100%

As there are so few numbers in ethnic groups other than White British, no further analysis by ethnic group has been undertaken.

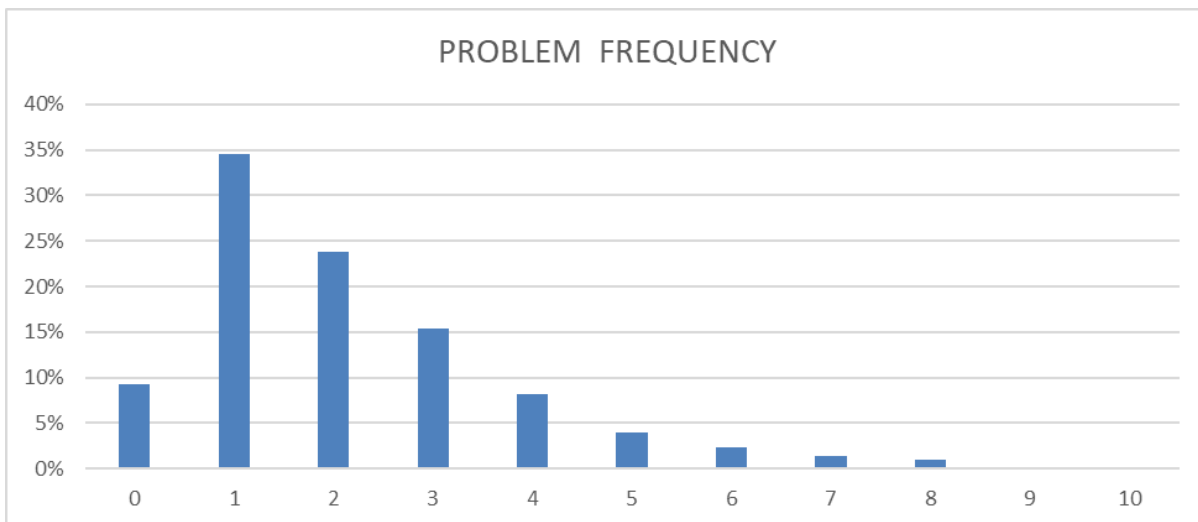
It would appear that this distribution reasonably matches that of the children in the schools' catchment areas and so suggests that there is not an ethnicity effect .

Problem frequencies

“Problems” in this context refers to adverse events or circumstances that a child has experienced, eg parental separation, bereavement or bullying, as reported on referral to Blue Smile by the child’s school. Where no problems are reported, the school has referred due to concerns with the child’s emotional wellbeing but is not aware of (or has not reported) adverse experiences in the child’s life.

This table and figure below show the problem frequency per child.

PROBLEM FREQUENCY	No. of children	% n=1315
0	122	9%
1	455	35%
2	313	24%
3	202	15%
4	107	8%
5	52	4%
6	31	2%
7	18	1%
8	13	1%
9	1	0%
10	1	0%
Total	1315	100%



Types of problems

This table shows the types of problems recorded.

TYPES OF PROBLEMS	No. of problems	% n=2904	% children with problem
1 - Family breakdown/parental separation/reconstituted family	751	26%	57%
2 - Bereavement, grief and loss	221	8%	17%
3 - Bullying or victim of bullying	162	6%	12%
4 - Stress or post traumatic stress	273	9%	21%
5 - Illness or hospitalisation (child or family)	179	6%	14%
6 - Looked after/fostered or adopted	102	4%	8%
7 - Experience abuse or neglect. Child in need. Child protection issue.	203	7%	15%
8 - Domestic violence	261	9%	20%
9 - Parental substance abuse/misuse	123	4%	9%
10 - Sibling relationships	229	8%	17%
11 - Parent/carer/family mental illness issues	259	9%	20%
12 - Parental imprisonment	54	2%	4%
13 - Young carers	28	1%	2%
14 - Other problem	59	2%	4%
Total	2904	100%	

With 1,193 children being reported as having one or more problems, the total 2904 problems gives a mean of 2.4 problems per child and 2.2 per child overall. The main problems are stress (11%), family breakdown (26%), domestic violence (9%), and family mental health issues (9%).

Clearly several of these issues are related and combinations are shown next.

Problem Combinations

This table shows the other problems for children with a family breakdown.

MOST COMMON PROBLEM COMBINATIONS	No. of children	% n=751
1 - Family breakdown/parental separation/reconstituted family	751	
WITH		
2 - Bereavement, grief and loss	34	5%
3 - Bullying or victim of bullying	30	4%
4 - Stress or post traumatic stress	49	7%
5 - Illness or hospitalisation (child or family)	27	4%
6 - Looked after/fostered or adopted	26	3%
7 - Experience abuse or neglect. Child in need. Child protection issue.	47	6%
8 - Domestic violence	72	10%
9 - Parental substance abuse/misuse	30	4%
10 - Sibling relationships	0	0%
11 - Parent/carer/family mental illness issues	52	7%
12 - Parental imprisonment	13	2%
13 - Young carers	7	1%
14 - Other problem	6	1%

The main secondary problem is domestic violence (10%) followed by mental illness issues (7%) and stress (7%)

The next table shows the other problems of those children with family mental health issues.

	No. of children	% n=259
11 - Parent/carer/family mental illness issues	259	
WITH		
1 - Family breakdown/parental separation/reconstituted family	3	1%
2 - Bereavement, grief and loss	39	15%
3 - Bullying or victim of bullying	26	10%
4 - Stress or post traumatic stress	63	24%
5 - Illness or hospitalisation (child or family)	36	14%
6 - Looked after/fostered or adopted	12	5%
7 - Experience abuse or neglect. Child in need. Child protection issue.	56	22%
8 - Domestic violence	59	23%
9 - Parental substance abuse/misuse	36	14%
10 - Sibling relationships	59	23%
12 - Parental imprisonment	14	5%
13 - Young carers	7	3%
14 - Other problem	6	2%

Here, the four main secondary problems are stress (24%), domestic violence (23%), sibling relationships (23%) and abuse or neglect (22%).

Services provide by Blue Smile

This table and chart show the number of 1:1 sessions that each child has with a Blue Smile staff member.

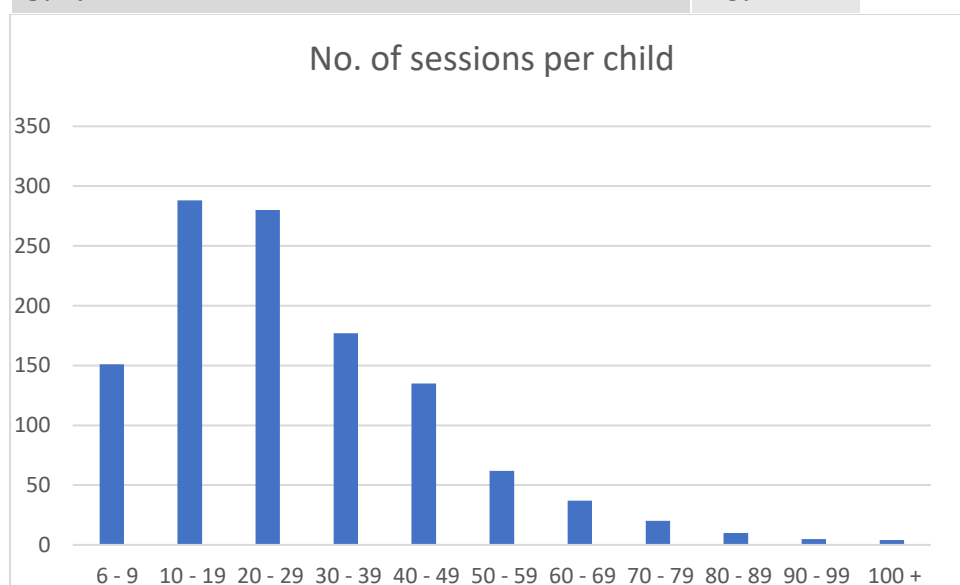
The 146 children with less than 6 sessions have been excluded as their treatment is either ongoing or could not be considered a full course of treatment if already stopped.

TOTAL NUMBER OF SESSIONS PER CHILD	No. of children (*)	% n=1169
6 - 9	151	13%
10 - 19	288	25%
20 - 29	280	24%
30 - 39	177	15%
40 - 49	135	12%
50 - 59	62	5%
60 - 69	37	3%
70 - 79	20	2%
80 - 89	10	1%
90 - 99	5	0%
100 +	4	0%
Total	1169	100%

Under 6 sessions are excluded

(*) Those whose treatment is completed

Median	24
Mean	27.6
S.D.	18.2



Each child has an average (median) of 24 sessions. With several having significantly larger numbers of sessions (6% have over 60) the mean is almost 28 with a relatively large standard deviation of 18.2 i.e. a positively skewed distribution.

The value of these larger numbers of sessions is discussed later in the paper.

Child Assessments by Parents and Teachers

For children undergoing any type of trauma or difficulty the Strengths and Difficulties Questionnaire (SDQ) is a well recognised scoring method which asks about 25 attributes, some positive and others negative. These 25 items are divided between 5 scales:

1. emotional symptoms (5 items)
2. conduct problems (5 items)
3. hyperactivity/inattention (5 items)
4. peer relationship problems (5 items)
5. Prosocial behaviour (5 items)

The outcomes of the first three areas for the children in this study are shown below.

PARENTAL OBSERVATIONS						
OUTCOMES	SDQ P EMOTIONAL		SDT P CONDUCT		SDQ P HYPERACTIVITY	
Conduct score change	No. of children	% n=252	No. of children	% n=252	No. of children	% n=252
Improved	156	62%	160	63%	126	50%
No change	41	16%	55	22%	67	27%
Deteriorated	55	22%	37	15%	59	23%
Total scored	252	100%	252	100%	252	100%
Unscored	1106	81%	1106	81%	1106	81%
Total	1358	100%	1358	100%	1358	100%
TEACHER OBSERVATIONS						
OUTCOMES	SDQ T EMOTIONAL		SDQ T CONDUCT		SDQ T HYPERACTIVITY	
Conduct score change	No. of children	% n=262	No. of children	% n=262	No. of children	% n=262
Improved	139	55%	113	45%	130	52%
No change	48	19%	77	31%	56	22%
Deteriorated	75	30%	72	29%	76	30%
Total scored	262	100%	262	100%	262	100%
Unscored	1096	81%	1096	81%	1096	81%
Total	1358	100%	1358	100%	1358	100%

As can be seen, there are over 80% of missing values for each individual area and so the results need to be taken with caution.

Two observations are

1. About one third fell into each category of worse / same / better
2. Teacher estimates of improvement were more conservative than those of parents

In spite of the amount of missing data for each, there are far more overall scores as shown in the table below

Total Score Distributions at Start and End

TOTAL SDQ SCORE	PARENTAL OBSERVATIONS			
	AT START OF SUPPORT		AT END OF SUPPORT	
	No. of children (*)	% n=1126	No. of children (*)	% n=803
0 - 4	23	2%	70	9%
5 - 9	100	9%	164	20%
10 - 14	207	18%	197	25%
15 - 19	289	26%	179	22%
20 - 24	257	23%	104	13%
25 - 29	175	16%	69	9%
30 - 34	67	6%	18	2%
35 - 39	7	1%	2	0%
40 - 44	0	0%	0	0%
45 - 39	1	0%	0	0%
50 +	0	0%		
Total	1126	100%	803	100%
MEDIAN SCORE	19		14	
MEAN SCORE	18.6		14.3	
S.D.	7.2		7.4	
MINIMUM	1		1	
MAXIMUM	45		36	

TOTAL SDQ SCORE	TEACHER OBSERVATIONS			
	AT START OF SUPPORT		AT END OF SUPPORT	
	No. of children (*)	% n=1145	No. of children (*)	% n=846
0 - 4	80	7%	94	11%
5 - 9	162	14%	200	24%
10 - 14	254	22%	210	25%
15 - 19	273	24%	172	20%
20 - 24	223	19%	114	13%
25 - 29	117	10%	46	5%
30 - 34	33	3%	8	1%
35 - 39	2	0%	2	0%
40 - 44	1	0%	0	0%
45 - 39	0	0%	0	0%
50 +				
Total	1145	100%	846	100%
MEDIAN SCORE	16		12	
MEAN SCORE	15.9		13.1	
S.D.	7.4		7.1	
MINIMUM	1		1	
MAXIMUM	45		36	

As shown in the tables and the statistics, there was an improvement overall from a median of 16 to 12 and a mean of 16 to 13.

The distribution of the paired comparison for each child is shown in the table below.

Change In Total Score Distributions From Start To End

CHANGE IN SDQ SCORE	PARENTAL OBSERVATIONS		TEACHER OBSERVATIONS	
	No. of children (*)	% n=767	No. of children (*)	% n=821
-34 to -30	1	0%	0	0%
-29 to -25	0	0%	0	0%
-24 to -20	9	1%	7	1%
-19 to -15	30	4%	30	4%
-14 to -10	93	12%	68	8%
-9 to -5	219	29%	197	24%
-4 to -2	177	23%	173	21%
-1 to 0	88	11%	118	14%
1 to 4	94	12%	143	17%
5 - 9	48	6%	70	9%
10 - 14	6	1%	10	1%
15 - 19	2	0%	5	1%
Total	767	100%	821	100%

MEDIAN SCORE CHANGE	-4	-3
MEAN SCORE CHANGE	-4.5	-3.0
S.D.	6.1	6.4
MINIMUM	-32	-23
MAXIMUM	15	20

SDQ REDUCTION BY -2 OR MORE		
Number of children	529	475
Proportion	69%	58%

This shows that for between 58% (teacher assessment) and 67% (parent assessment) they improved by a score of 2 or more which meant that the treatment for them is cost beneficial.

Estimated benefit of the 1:1 support service for children in 2020 / 21

The table below shows the estimated benefit for the 1:1 support service related to all the 821 children who received 1:1 support in the school year of 2020 / 21 and had both start and end assessments by their teacher.

Estimated employment benefit of 1:1 support service

CHANGE IN SDQ SCORE	ESTIMATED BENEFIT PER CHILD	NUMBER OF CHILDREN	TOTAL BENEFIT
-24 to -20	£28,000	7	£196,000
-19 to -15	£21,000	30	£630,000
-14 to -10	£14,000	68	£952,000
-9 to -5	£7,000	197	£1,379,000
-4 to -2	£4,500	173	£778,500
-1 to 0	£2,000	118	£236,000
1 to 4	£0	143	£0
5 - 9	£0	70	£0
10 - 14	£0	10	£0
15 - 19	£0	5	£0
		821	£4,171,500
BENEFIT PER CHILD			£5,081

The estimated net benefit thus ranges from £0 for children with no improvement or worsening to £28,000 for those with most benefit with a mean estimate of £5,081. This compares with an average net benefit of £4,782 found in a similar study.

The benefits per improvement group are very conservative as they relate to employment over 40 years. Even at the best improvement levels of -24 to -20 they have only been estimated as £28,000 i.e. less than £500 per year. Doubling each of these benefits would thus double the overall benefit per child from just over £5,000 to £10,000.

As noted before, these are only the employment benefits.

Cost of the 1:1 support service

We estimate the cost of the 1:1 support service based on financial data provided by Blue Smile relating to the total cost of providing services in primary schools in the first 6 months of 2022 as per below

EXPENDITURE	6 months ended 31 January 2022
Partner School service	£56,554
Outreach service	£16,502
Other services	£2,440
Staff costs	£73,993
Overheads	£50,072
Total	£199,561
ANNUAL COSTS (2X 6MONTHS)	£399,122

The total annual cost is thus about £400k

The numbers of session provided each year is given in the table below

YEAR THAT THERAPY ENDED	No. of children (*)	TOTAL SESSIONS	Mean Sessions per child
2021 (2 months)	17	543	32
2021	141	4149	29
2020	113	1096	10 (COVID year)
2019	165	4585	28
2018	165	5031	30
2017	156	3833	25
2016	90	2658	30
2015	104	3133	30
2014	92	2795	30
2013 and earlier	126	8537	68
Total	1169	36,360	31

So, apart from 2020 when services were restricted due to COVID, there have been about 150 children discharged each year with each of them having an average of 30 sessions

So for the $150 * 30 = 4,500$ sessions provided in an average year, the total cost of £400k per annum gives an overall mean cost of £89 per session which sums to about £2,600 per child.

This is almost identical to the costs found in the Economics report for Place2Be.

Estimated value for money of 1:1 support service

We assess the value for money of the 1:1 support service by considering two standard measures commonly used in economic evaluations:

- **Net benefit of the service**, calculated by subtracting the cost of the 1:1 support service from the present value of the monetary benefits attributed to the service. This provides a summary measure of the extent to which benefits exceed delivery costs.
- **Benefit to cost ratio of the service**, calculated by dividing the present value of the monetary benefit by the cost of the 1:1 support service. This ratio shows the value of benefits for every £1 of cost incurred in delivering the service.

The table below shows that the overall net benefit is about £2,500 per child with a benefit to cost ratio of almost 2. This means that the overall return per child is almost double the cost of the service with a benefit of £2 for every £1 spent by the service.

	COST PER CHILD	LIFETIME BENEFIT PER CHILD		NET BENEFIT	BENEFIT : COST RATIO
OVERALL	£2,600	£5,081		£2,481	1.95

A similar study had benefits between £5.0 and £7.3 for every £1 incurred in delivering the service but used far less stringent methods of forecasting future gains.

Interpretation of our results

Our results are based on several assumptions which are set out in the report.

We have adopted a conservative approach to avoid overstating the net benefit of the 1:1 support service.

There are, however, two assumptions that are particularly important to our results viz

- The calculation of benefits is based on a forecast of the expected impact of individual 1:1 support in primary school on later life outcomes, rather than on actual observed outcomes for those children who receive 1:1 support. Our analysis therefore relies on the assumption that the linkages between improved mental health in early years and later outcomes reported in Paull and Xu (1) are both robust and relevant to the children who received 1:1 support from Blue Smile.
- As explained above, we have used a conservative estimate of the lifetime employment benefit to take account of potential natural recovery and fading out of initial improvements. However, we acknowledge that this is a broad assumption which may not be accurate, and the true figure may be higher or lower.

Conclusion

Overall, we consider that our analysis shows the potential for 1:1 support services in primary schools to generate significant economic benefits resulting from improved outcomes for children in adolescence and adulthood.

Use

This work will give a basis to justify increased grants by both central and local government bodies and hence enable further spending by Blue Smile in areas that show the greatest potential.

Increased government borrowing.

Higher unemployment will cause a fall in tax revenue because there are fewer people paying income tax and also spending less (hence lower VAT). Also, the government will have to spend more on unemployment and related benefits. The government doesn't just pay unemployment benefit, but a family who has unemployment will be more likely to receive housing benefit and income support. One study shows that the cost to the Exchequer for one person being unemployed is £6,243 a year in benefits and lost tax revenue.

While the work done by Blue Smile totally cannot remove the trauma, if it limits the effects on health, crime and especially employment then the long-term savings will outweigh the costs of treating the affected children.

It must also be remembered that not all of life is monetary. Any child affected by ACEs will have many personal issues including lack of self-worth, unhappiness, coping with physical and mental trauma, lack of confidence, difficulties in relationships. All of these left untreated will have a marked effect on the child's quality of life – both as a child, an adolescent and an adult.

Further Work

Questions that may need to be answered are:

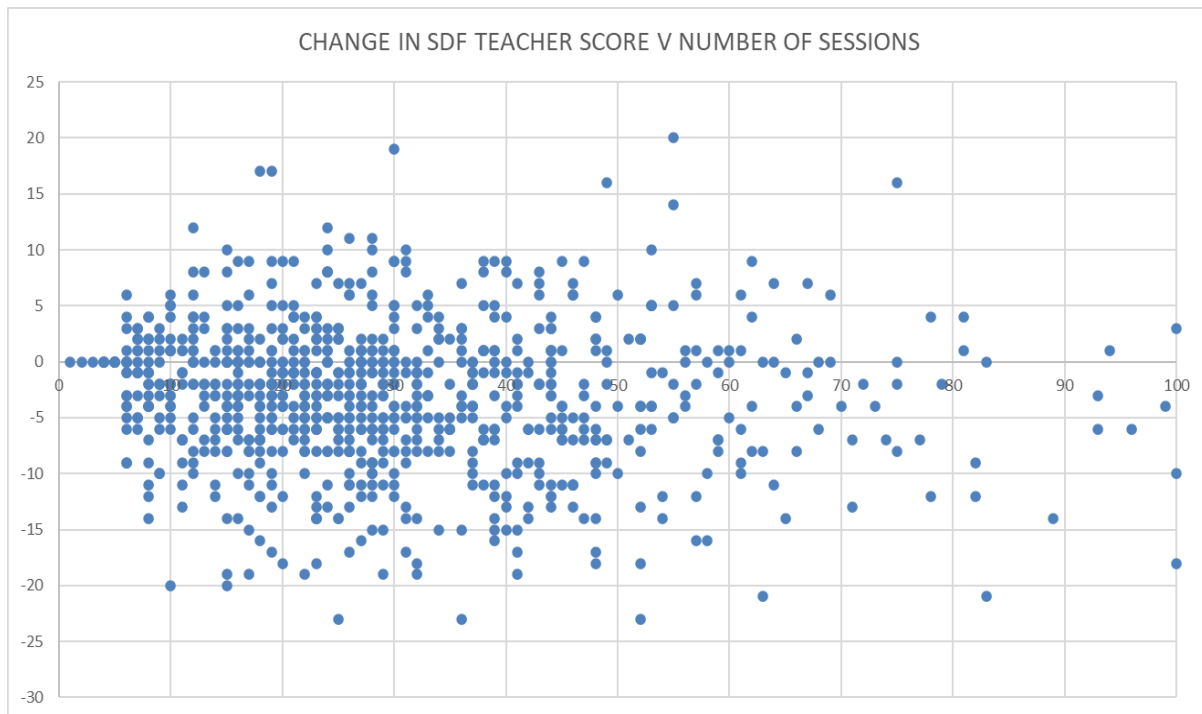
Question 1: Do the higher number of sessions add benefit ?

The chart below shows the relationship between the numbers of sessions and the teacher assessment of benefit.

As shown by the chart and the almost zero correlation of just -0.075, there is no relationship between the number of sessions and the change in the child's SDF score i.e. those with just 10 - 20 sessions appear to do as well as those with over 30 sessions. This suggests that having fewer sessions per child initially could provide a similar outcome for most children. Those who need more sessions can be selected by the teachers as required.

Such an approach would give an average of about 14 sessions per child compared with the current 28. This would increase the cost benefit per child from just £50 to at least **£2,500 per child**.

CORELATION -0.075



Question 2: it would be useful to investigate the feasibility of identifying a robust control or comparison group for use in future evaluations to provide more definitive evidence on the causal impact of the 1:1 support service. This might include, for example, benchmarking changes in SDQ scores amongst children who receive individual 1:1 support against children who do not.

Question 3: Blue Smile’s ongoing evaluation of their programme is likely to improve the assumptions made about the impact of 1:1 support on children’s mental health and the links to later outcomes. We understand that Blue Smile plan to evaluate data from one-year follow-up assessments with children who completed 1:1 support. This should shed light on how well improvements from 1:1 support are sustained over time.

Annex 1 Evidence on the links from SDQ in early years to later outcomes

Paull and Xu (2017) draw on a retrospective study by Carneiro et al. (2011) to establish the link between SDQ scores in early years and several outcomes in later life. The Carneiro study is based on longitudinal data from the National Child Development Survey (NCDS), which is a cohort study based on all individuals born in Great Britain in a single week in March 1958. It uses this data to assesses the relationship between children's cognitive skills and mental health at age 7 and the likelihood of:

- truancy, exclusion, youth crime and smoking by age 16; and
- crime, depression, employment and hourly wages at age 42.

There are three limitations of this evidence that are important to bear in mind:

1. Our use of the retrospective evidence in Carneiro (2011) means that we rely on the assumption that the links between SDQ scores in early years and later outcomes for children who receive 1:1 support in 2016/17 are similar in the NCDS sample several decades ago.
2. The NCDS used teacher ratings of children's behaviour using the Bristol Social Adjustment Guides (BSAG) to assess mental health (the SDQ measure was not available in the NCDS). Paull and Xu (2017) therefore assumed that standardised improvements in the BSAG measure would approximate to improvements on the SDQ scale. In practice, however, the correspondence between these rating scales is unlikely to be perfect.
3. The NCDS observed children's outcomes at age 7 and 11, but not during intervening years. Following Paull and Xu (2017) we assume that the reported impacts at age 7 in Carneiro et al. (2011) are a reasonable proxy for pupils of all ages between 4 and 11.

Evidence on the monetary valuations of improved later outcomes

Paull and Xu (2017) provide monetary valuations for each of the seven later outcomes included in this study. These outcomes arise over an individual's life between the ages of 11 and 60, depending on the outcome. Paull and Xu draw on several sources of evidence to estimate the relevant monetary values (see Table 6 of Paull and Xu for details) which are selected to avoid double-counting of benefits. For example, the impact of reduced depression in adulthood on future earnings is not separately included since this is captured through the link between children's early mental health and earnings.

We use the monetary values associated with improvements in later outcomes relating to a one standard deviation reduction in SDQ in early years that are reported in column 4 of Table 7 of Paull and Xu (2017). These values represent the expected change in the lifetime value per child .

First, the values in Table 7 of Paull and Xu relate to the present value of the future benefits from improved outcomes associated with a one standard deviation decrease in SDQ at age 3. We therefore translate them into equivalent figures for a one standard deviation decrease in SDQ for children in this study.

With these adjustments we obtain an estimate of the lifetime value of a one standard deviation reduction in the SDQ scores.

A similar study of an economic evaluation of Place2Be’s Counselling Service in Primary Schools showed the following table for lifetime benefits gained from an average child they had treated.

Table A3: Gross monetary values of 1:1 support service per child for average change in SDQ

Outcome	Private	Government	Total
Employment	£3,073	£1,979	£5,052
Wages	£3,658	£1,436	£5,094
Total	£6,731	£3,415	£10,146

Table 15: Breakeven impacts for total value for money Delivery cost per child Value of an impact of 1 standard deviation Breakeven impacts where benefit = cost In standard deviations In outcome metric

Reduction in SDQ at ages three and four

Age	Delivery cost per child	Value of 1 s.d. change in SDF score	BREAKEVEN IMPACT (S.D.)	BREAKEVEN IMPACT (SDF SCORE)
Three	£2,451	£6,803	0.36	1.78
Four	£2,120	£7,048	0.3	1.49

The table above shows that where there is a mean change of about 1.5 to 1.8 then the intervention is paying for itself .

Annex 2 SCENARIOS OF ALL BENEFITS GAINED

BENEFIT SCENARIOS								PROPORTION PREVENTED = 50%
Area	Event	INDIVIDUAL Cost PER EVENT	EXPECTED NUMBER OF EVENTS	LIFETIME Cost	RATE PER 100 CHILDREN SEEN	RATE SAVED	COST SAVED	COST SAVED PER CHILD SEEN
TOTAL							£2,087,000	£20,870
Education	Special needs school	£50,000	1	£50,000	10%	5%	£250,000	£2,500
						0%	£0	£0
						0%	£0	£0
Judiciary	Stay in prison	£34,000	5	£170,000	1%	0.5%	£85,000	£850
	Probation service	£8,000	6	£48,000	5%	2.5%	£120,000	£1,200
	Police costs	£9,000	10	£90,000	5%	2.5%	£225,000	£2,250
							£0	
							£0	
Health	hospital admission	£4,000	12	£48,000	5%	2.5%	£120,000	£1,200
	Drug rehab	£8,000	10	£80,000	5%	2.5%	£200,000	£2,000
							£0	
							£0	
Employment	Lost output	£12,000	20	£240,000	5%	2.5%	£600,000	£6,000
	Unemployment benefit	£6,000	20	£120,000	5%	2.5%	£300,000	£3,000
							£0	
							£0	
	Contact CSA lifetime	£47,000	1	£47,000	2%	1.0%	£47,000	£470
							£0	
Social services	Child safeguarding	£18,000	1	£18,000	10%	5%	£90,000	£900
	Housing	£60,000	1	£60,000	10%	5%	£300,000	£3,000

This table gives an overview of all types of savings and a way of producing scenarios based on the local circumstances. The employment figures are similar to those used in the main study .

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