Evaluation of Small Steps Big Changes

Examining the Impact of Small Steps Big Changes Provision on Children's Receptive Vocabulary Scores on Entry to Reception Class

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1 Introduction

Small Steps Big Changes (SSBC) is a programme of activities designed to give every child the best start in life in the four most socio-economically disadvantaged inner-city or urban areas of Nottingham. It is funded through the National Lottery Community Fund's A Better Start Programme. It is an early childhood programme, which targets diet and nutrition, social and emotional skills and language and communication abilities of children prior to school entry.

Because one of the aims of the programme is to develop children's language and communication abilities prior to school entry, this evaluation report first compares SSBC children (N = 74) and no-SSBC children (N = 150) from the same schools at reception (i.e., the first year of primary school; mean age = 54 months) in terms of their vocabulary scores to test whether participating in the programme has had an impact on SSBC children's vocabulary scores. Then, it looks specifically at the SSBC children who were in a high-risk group in terms of vocabulary scores, and examines their characteristics and the extent to which they engaged with language and literacy-related programmes offered by SSBC.

The findings indicate that SSBC children outperform no-SSBC children overall, but SSBC needs to target those children who speak English as an additional language, and have a disability to improve their language abilities, and promote participation in literacy-related groups and embed literacy in other groups where there is a good uptake.

2 Research context in brief

Research highlights the importance of children's early language experiences in terms of language development (Demir-Lira et al., 2019; Gottfried et al., 2015; Mendelsohn et al., 2018). Language development depends on the amount and nature of language exposure (Hoff, 2013). In particular, the child's environment (the home learning environment) is significant in supporting children's language development - promoting school readiness and long-term academic success for children

(Kluczniok et al., 2013; Linberg et al., 2020; Totsika and Sylva, 2004; Rodriguez and Tamis-LeMonda, 2011; Wheeler and Hill, 2021). The quantity and quality of parent/caregiver interaction plays a vital role in language development (Barnes and Puccioni, 2017; Linberg et al., 2020; Price and Kalil, 2019; Rodriguez et al., 2009; Wade et al., 2018; Wheeler and Hill, 2021). For example, parent-child shared reading in the early years has been associated with language development in the child's later years (Baker, 2013; Hamilton et al., 2016; Karrass and Braungart-Rieker, 2005; Flack et al., 2018; Fernald et al., 2013; Mol et al., 2008; Rodriguez and Tamis-LeMonda, 2011 Sénéchal, 2015; Vaknin-Nusbaum and Nevo, 2017; Wood, 2002).

The differences in the quantity and quality of children's language experiences are strongly associated with children's SES background (Neuman et al., 2018). Research has demonstrated that children from low SES families are more at risk of poor language skills, compared to their more advantaged peers by the time they start school, with the achievement gap widening further from as early as 18 months old (Baker, 2013; Fernald et al., 2013; Hoff, 2003; Hoff, 2013; Hurtado et al., 2008; Mol et al., 2008; Neuman et al., 2018; Niklas et al., 2021; Ramey and Ramey, 2004; Shonkoff and Phillips, 2000). Studies have highlighted factors that may hinder language development in low SES families (Fung et al., 2005, Kluczniok et al., 2013; Mol et al., 2008; Neuman et al., 2018; National Literacy Trust, 2019; Rodriguez and Tamis-LeMonda, 2011; Totsika and Sylva, 2004). For example, parents with lower levels of education may not recognise the importance of language development in early years or may not have the time or resources (e.g., books) to support reading in the home.

Likewise, disparities have been found in language development in children from minority language families (Marchman et al., 2010; Vagh et al., 2009; Thordardottir et al., 2006; Hoff et al., 2012). Research suggests bilingual minority language speaking children acquire each language at a slower rate than children acquiring one (Hoff et al., 2012), and many children from language minority homes will not have had sufficient exposure to English to achieve the same level of language skills as monolingual English-speaking children by the time they enter school (Hoff, 2013).

However, where children from minority language homes are supported (i.e., educational interventions) they can achieve academic success, thus reducing the achievement gap between them and their more advantaged monolingual peers (Hoff, 2013).

Furthermore, the recent pandemic has impacted on children's language development (Charney et al., 2021; Davies et al., 2021; Hendry et al., 2022). Research has shown the lockdown period (i.e., the closure of playgroups and playgrounds) has impacted on the social-interaction experiences that are essential for language development (Charney et al., 2021; Davies et al., 2021; Hendry et al., 2022). This has further widened the achievement gap for school readiness in children from low SES backgrounds (Pascal et al., 2020). Studies (Bergmann et al., 2022; Lee et al., 2021; Garbe et al., 2020; Pascal et al., 2020) found parents were more stressed and fatigued because of the extra responsibilities during lockdown, leaving less time for parent-child quality time such as shared reading and an increase in screen time, impacting negatively on language development (Adams et al.,2021; Bergmann et al., 2022; Wheeler and Hill, 2021). Conversely, for some families, lockdown encouraged more quality family time (i.e., they engaged in regular reading activities) during this period that had a positive impact on children's language development (Kartushina et al., 2022).

However, research evidence supports the potential of a number of strategies that can support children from low SES and minority language families which may help close the achievement gap. High-quality interventions can strengthen and promote the home learning environment in minority language and low SES homes. They can help build language skills which can lead to positive language developmental outcomes in later life, closing the achievement gap between low SES families and their more advantaged peers. For example, research on book gifting schemes (Demack and Stevens, 2013; O'Brien et al., 2014; O'Hare and Connolly, 2010; Tura et al., 2021) suggests that families who participate in the schemes often have a strengthened enthusiasm for reading, improved reading routines and improvements in their children's language development. However,

some intervention techniques (e.g., dialogic reading) may be harder to implement, particularly for families from less educated backgrounds (Fung et al., 2005, Mol et al., 2008). Overall, research underlines the importance of effective early targeted intervention to promote language development in children, highlighting both quality and quantity as key factors (Demack and Stevens, 2013; Dowdall et al., 2020; O'Brien et al., 2014; O'Hare and Connolly, 2010; Tura et al., 2021) which should be aimed at children from minority language and low SES families. That way, we can reduce the barriers to learning, support language skills of children from disadvantaged backgrounds and help them achieve their full potential (Hoff, 2013).

The above review suggests that participation in language and literacy enrichment activities provided as part of the SSBC programme should positively impact children's language development, and their receptive vocabularies in particular (i.e. the words they understand, but may not use in their own speech). However, it should be noted that the benefits of such initiatives may be difficult to determine given the negative impact that the lockdown period will have had on these children's language development.

3 Methodology

To assess whether there was any evidence that participation in SSBC activities may have positively impacted children's language abilities, we undertook a 'natural' experiment: comparing the standardised British Picture Vocabulary Scale scores of SSBC participants at school entry (Autumn 2021) to those of other children entering reception class in the same schools (and therefore living in the same areas), but who did not participate in SSBC. This only provides a single snapshot of progress and on its own is used as an indicator of whether children who engage with SSBC programmes experience better receptive language abilities than those who have not. To determine whether any observed effects on the children's vocabulary scores are attributable to different levels of engagement with the programme, or different elements within it, we have also examined how many sessions the SSBC children participated in and which ones those were. We also examined the

characteristics of the SSBC children who presented as most at risk, given low standardised vocabulary scores at school entry, and explored SSBC participation within each of the four participating Wards.

3.1 Materials

Receptive language ability was assessed using British Picture and Vocabulary Scale III (BPVS III; Dunn and Dunn, 2009). The assessment consists of 14 sets of 12 test items in each set, which increase in difficulty. Each test plate consists of four images (One correct and three distractors). One image is selected by pointing to the image (item) that depicts the word spoken by the assessor. The words cover a range of subjects which include, verbs, emotions, animals, toys and attributes. The BPVS III provides a standardised score for children aged 3 to 16 years. It has excellent internal reliability, reported as 0.91 and strong criterion validity with the Wechsler Intelligence Scale for Children (2005) (r = 0.76; Dunn and Dunn, 2009).

3.2 Procedure

Ethical approval for this evaluation was obtained from the School of Social Science Research Ethics Committee. Following ethical approval, the schools who wished to take part in the evaluation were contacted by the research team. The schools were then asked to distribute information sheets and consent forms to the families of all the children in reception. Once consent was obtained, six schools across four wards in Nottingham took part: Three schools were assessed by a member of the research team; two schools were trained to administer their own assessments; and one school shared (half and half) the assessments (i.e., following training, they assessed half the children, and a member of the research team assessed the other half). Using the British Picture Vocabulary Scale III (BPVS-III), the assessor and schools who conducted their own assessments, assessed children's (N = 234) receptive vocabulary scores. The children in each school were tested individually in a quiet room, free from distraction, which was allocated by the school. Assessment sessions lasted approximately 10-15 minutes. Prior to the assessment, the test was explained clearly to each child, to allow full understanding of the assessment. The test plates were administered as per the manual

instructions, starting with the training plates. The test was then scored in accordance with the manual instructions. For confidentially, each child and school were assigned with a unique anonymous identifier. **The BPVS was administered and scored the same way for all children, regardless of subgroup. However, it should be noted that the BPVS 3 technical information indicates that in the standardisation sample, they found that children with SEN had mean scores 11.7 points lower than the sample norm, and children with EAL typically scored 7 points lower than the sample norm. The assessors were blind to whether the children were SSBC children at the time of the assessment and no adjustment has been made for children who speak English as an additional language when scoring the BPVS.**

3.3 Participant characteristics

Initially, 234 children completed the BPVS III assessment, and 74 (31.6%) children were registered with SSBC (henceforth SSBC children) while 160 (68.4%) were not registered with SSBC (henceforth no-SSBC children). However, ten children did not have age-adjusted/standardised scores on the BPVS III due to having very low raw scores. Therefore, we excluded them from the analyses. It should be noted that all of these children were from the no-SSBC group (One female, nine males).

Out of 224 children who were included in the analyses 55.4% (n = 41) of SSBC children and 46.0% (n = 69) of no-SSBC children were female. There was no significant association between whether a child is an SSBC child or not and the children's gender[1] (see Table 1).

Table 1: Contingency Table Showing Distribution of Children by SSBC Group and gender

			Sex		Total
			Female	Male	
SSBC children	No	Count	69	81	150
		%	46.0%	54.0%	100.0%
	Yes	Count	41	33	74
		%	55.4%	44.6%	100.0%
Total		Count	110	114	224
		%	49.1%	50.9%	100.0%

[1] X^2 (1, N = 224) = 1.754, p = .185

68.9% (n = 51) of SSBC children spoke English as their first language, and 61.3% (n = 92) of no-SSBC children spoke English as their first language. There was no significant association between whether a child is an SSBC child or not and whether English was their first language or not[2], (see Table 2).

Table 2: Contingency Table Showing Distribution of Children by SSBC Group and First Language Status

			First language		Total
			English	Other	
SSBC children	No	Count	92	58	150
		%	61.3%	38.7%	100.0%
	Yes	Count	51	23	74
		%	68.9%	31.1%	100.0%
Total		Count	143	81	224
		%	63.8%	36.2%	100.0%

Overall, 93.3% (n = 209) of children did not have any disabilities, while 3.0% (n = 7) had suspected and 3.6% (n = 8) confirmed disabilities. 94.6% (n=70) of SSBC children did not have any disabilities, while 1.4% (n =1) had suspected and 4.1% (n = 3) confirmed disabilities. 92.7% (n = 139) of no-SSBC children did not have any disabilities, while 4.0% (n = 6) had suspected and 3.3% (n = 5) confirmed disabilities. There was no significant association between whether a child is an SSBC child or not and whether they had a disability or not[3] (see Table 3).

Table 3: Contingency Table Showing Distribution of Children by SSBC Group and disability status

			Disability		Total
			No	Confirmed or suspected	
SSBC children	No	Count	139	11	150
		%	92.7%	7.3%	100.0%
	Yes	Count	70	4	74
		%	94.6%	5.4%	100.0%
Total		Count	209	15	224
		%	93.3%	6.7%	100.0%

[2] X^2 (1, N = 224) = 1.235, p = .266

[3] Due to cells having expected counts less than 5, confirmed and suspected categories merged, X^2 (1, N = 224) = 0.295, p = .587

There was no difference in mean age between SSBC children (Mean = 54.73 months, SD = 3.48, Standard Error Mean = 0.28) and no-SSBC children (Mean = 54.42 months, SD = 3.57, Standard Error Mean = 0.42)[4].

In relation to area of residence (i.e., ward) 19.2% (n = 43) of children lived in Ward One, 21.0% (n = 47) in Ward Two, 13.4% (n = 30) in Ward Three and 46.4% (n =104) in Ward Four. When we consider take up of SSBC by ward, 10.8% (n = 8) of SSBC children lived in Ward One, 13.5% (n = 10) in Ward Two, 16.2% (n = 12) lived in Ward Three, and 59.5% (n = 44) in Ward Four (see Table 4 for comparison to non-SSBC children).

Table 4: Contingency Table Showing Distribution of Children by SSBC Group and Ward

			Ward				Total
			1	2	3	4	
SSBC children	No	Count	35	37	18	60	150
		%	23.3%	24.7%	12.0%	40.0%	100.0%
	Yes	Count	8	10	12	44	74
		%	10.8%	13.5%	16.2%	59.5%	100.0%
Total		Count	43	47	30	104	224
		%	19.2%	21.0%	13.4%	46.4%	100.0%

Note: Ward 1 = Bilborough/Aspley; Ward 2 = Hyson Green; Ward 3 = St Ann's; Ward 4 = Bulwell.

3.4 Analytic strategy

The analytic strategy was guided by the research questions for the evaluation, which were as follows:

1. Are the vocabulary scores associated with children who participated in SSBC higher than those of children who did not?
2. Do children who participated in SSBC and have EAL have higher or lower vocabulary scores than EAL children who did not?

[4] t (222) = -0.106, p = 0.916

3. Do children who participated in SSBC and have a disability have higher or lower vocabulary scores than children with a disability who did not?
4. Do boys or girls benefit more from SSBC participation?
5. Do children from different Wards benefit more or less from participation in SSBC?
6. Are vocabulary scores related to how many different SSBC groups and sessions children participated in?
7. Are vocabulary scores related to how many different literacy related SSBC groups and sessions children participated in?
8. Does participating in the Small Steps at Home programme affect children's vocabulary scores?
9. To what extent did SSBC children participate in literacy and non-literacy related groups?
10. What are the characteristics and literacy-related group attendance of SSBC children in the high-risk group in terms of vocabulary scores?

To address the first research question, we performed an Independent Samples T-test to compare SSBC children (n = 74) and no-SSBC children (n= 150) in terms of their scores. To address the research questions 2-5, we performed a series of two-way ANOVA and one-way ANOVA tests to compare the mean score differences between groups that have been split on two independent variables, such as SSBC children or not, and EAL children or not, and their interactions, respectively. To address research questions 6-8, we performed a series of one-way ANOVA tests to compare the mean score differences between various groups. Finally, to address research questions 9-10, we present descriptive statistics.

4 Results

Are the vocabulary scores associated with children who participated in SSBC higher than those of children who did not?

We expected SSBC children to have higher vocabulary scores at school entry compared to their non-participating peers. Findings from the comparison analysis[5] that was performed to address the first research question showed that there was a statistically significant difference in mean scores between SSBC children (Mean = 101.26 [*Raw* score mean = 61.59], Standard deviation [SD][6] = 12.26) and no-SSBC children (Mean = 97.89 [*Raw* score mean = 57.25], SD = 13.73; See Figure 1)[7]. This finding is consistent with the suggestion that, overall, engagement with SSBC is associated with better vocabulary development. It should be noted that the mean scores for both groups place the children in the 'normal' range (i.e., 85-115) for their receptive vocabulary skills.

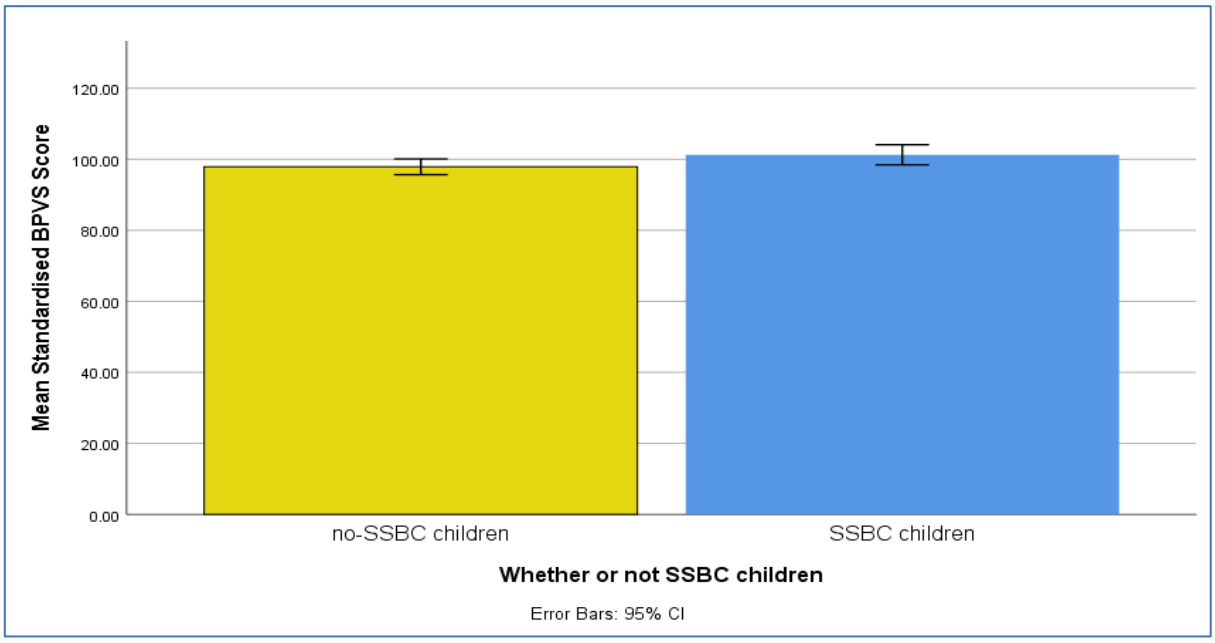
[5] Independent Samples T-test

[6] Standard deviation is a quantity expressing by how much the members of a group differ from the mean value for the group

[7] t (222) = -1.789, p = 0.038, one-tailed.

Power analysis 1: if allocation ratio is 1, total sample size needed is 128 (SSBC children = 64, no-SSBC children = 64, two tailed)
Power analysis 2: if allocation ratio is 2, total sample size needed is 144 (SSBC children = 48, no-SSBC children = 96, two tailed)
Power analysis 3: if allocation ratio is 1, total sample size needed is 42 (SSBC children = 21, no-SSBC children = 21, one tailed)
Power analysis 3: if allocation ratio is 1, total sample size needed is 114 (SSBC children = 38, no-SSBC children = 76, one tailed)
In all scenarios, effect size d is 0.5 (medium), error prob is 0.005, power is 0.8.

Figure 1: Comparing SSBC children with no-SSBC children in terms of BPVS scores

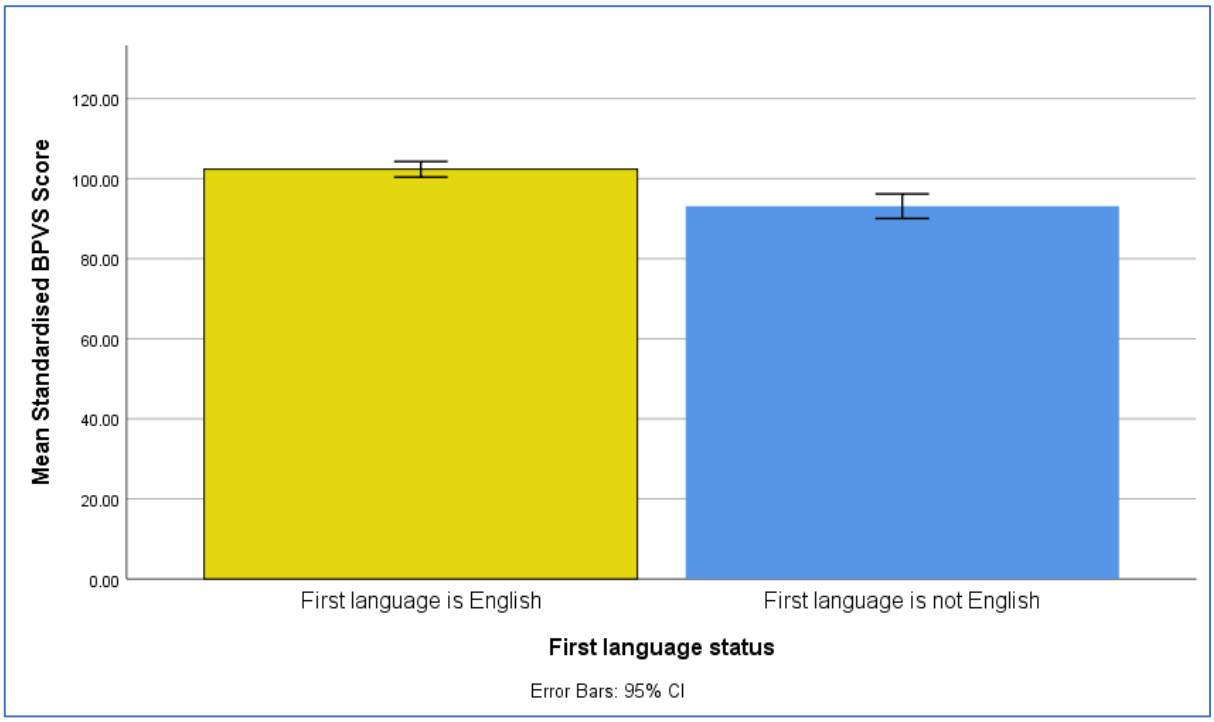


Do children who participated in SSBC and have EAL have higher or lower vocabulary scores than EAL children who did not?

We first tested[8] the relationship between EAL status and BPVS scores (irrespective of whether the children participated in the SSBC programme). Findings revealed that there was a statistically significant difference in BPVS scores between children who spoke English as an additional language (Mean = 93.11; SD = 13.88) and children who spoke English as their first language (Mean = 102.34; SD = 11.81; See Figure 2)[9]. These data suggest that, in general, children with EAL score consistently lower than the children for whom English is their main language. However, again we note that the mean scores for both groups place the children in the normal range for their receptive vocabulary levels.

[8] Independent Samples T-test
[9] t (222) = 5.267, $p < 0.001$, Cohen's d = 0.716

Figure 2: Comparing EAL children with no-EAL children in terms of BPVS scores



To address the research question 2, we then performed a comparison analysis[10] to test the interaction between SSBC participation status and EAL status. To do this, we categorised the children into one of four groups: (1) SSBC children who spoke English as their first language, (2) SSBC children who did not speak English as their first language, (3) no-SSBC children who spoke English as their first language, and (4) no-SSBC children who did not speak English as their first language. Table 6 shows the mean BPVS scores (and SDs) for each of these groups.

We then performed a test[11] to compare mean scores between these four groups. We found that the mean scores of SSBC children who speak English as their first language were higher than the mean scores of no-SSBC children who speak English as an additional language (Mean difference = 11.70)[12]. In addition, the mean scores of no-SSBC children who speak English as their first language were higher than the mean scores of no-SSBC children who speak English as an additional language

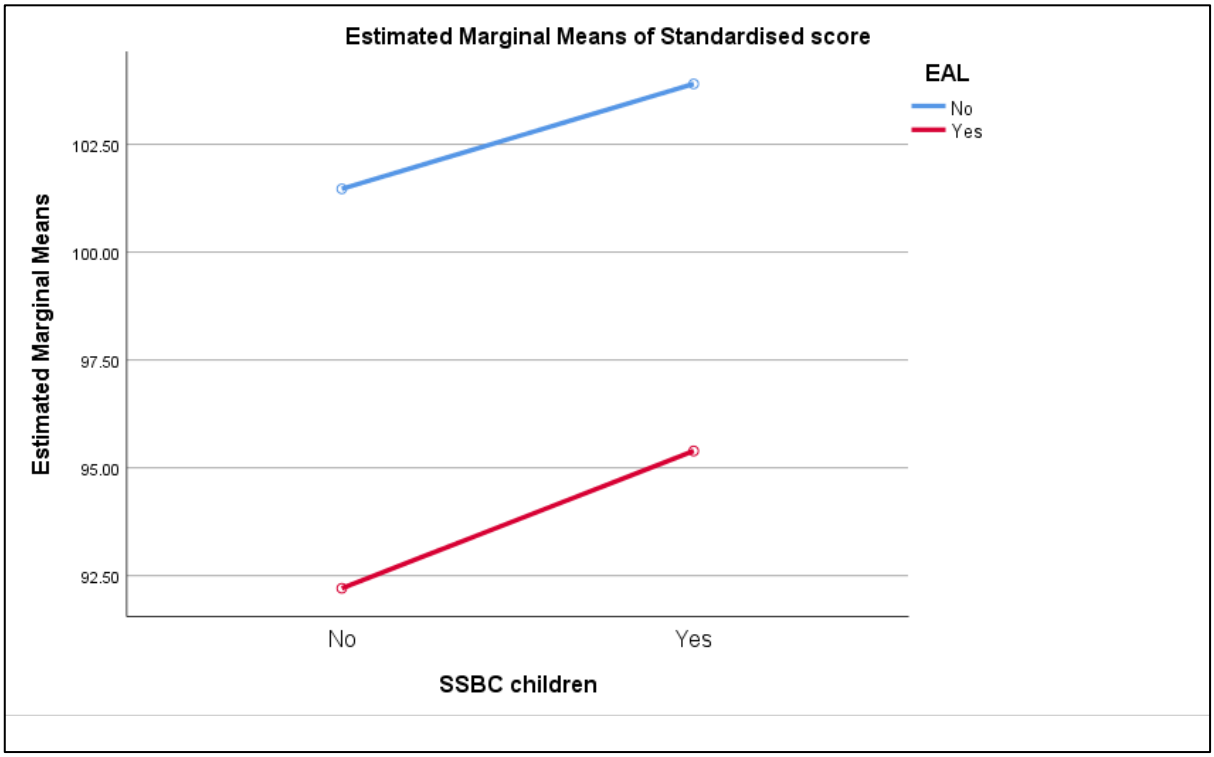
[10] Two-way ANOVA
[11] One-Way ANOVA
[12] $p < 0.001$, 95% C.I. = [5.431, 17.959], Cohen's d = 0.928

(Mean difference = 9.26)[13]. However, there were no statistically significant differences between SSBC children and their no-SSBC counterparts (e.g., SSBC children who spoke English as their first language versus no-SSBC children who spoke English as their first language) (see Table 6 and Figure 3).

Table 6: Descriptive statistics for BPVS standardised scores by SSBC and EAL group status

	N	Mean	Standard Deviation
No-SSBC, no EAL	92	101.467	12.263
No-SSBC, EAL	58	92.207	14.113
SSBC, no EAL	51	103.902	10.885
SSBC, EAL	23	95.391	13.300
Total	224	99.000	13.329

Figure 3: BPVS standardised scores by SSBC and EAL group status

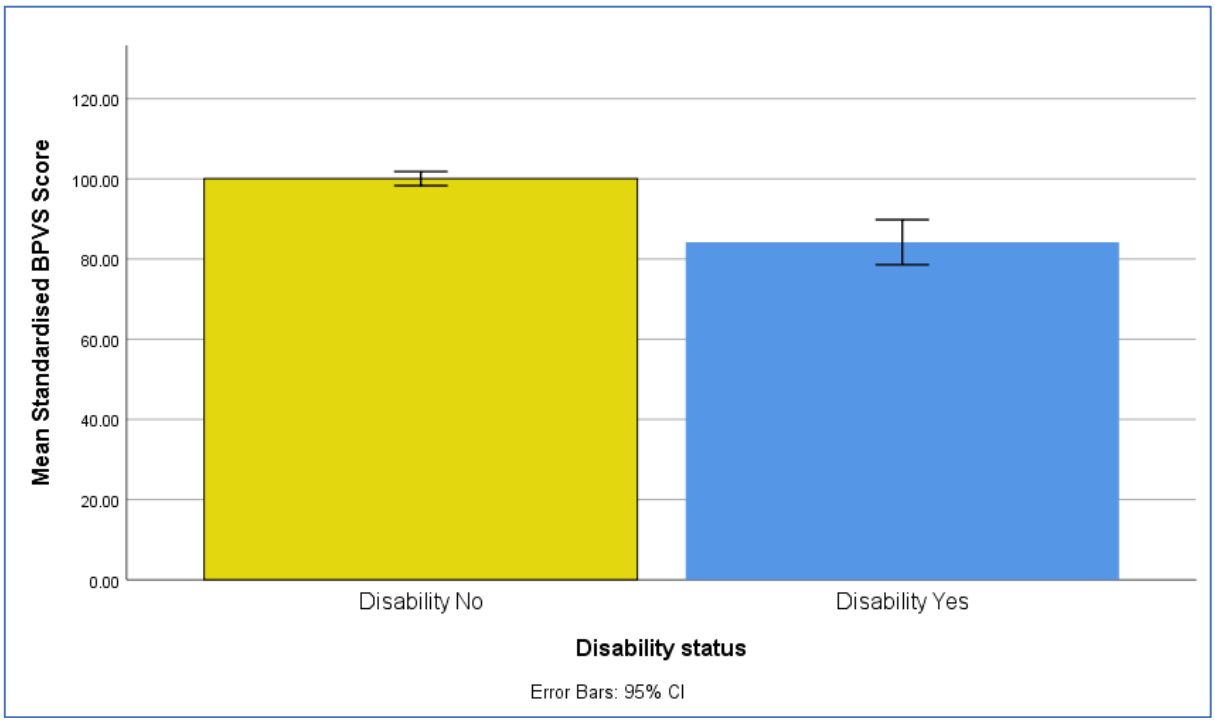


[13] $p < 0.001$, 95% C.I. = [3.386, 15.135], Cohen's d = 0.700

Do children who participated in SSBC and had a disability have higher or lower vocabulary scores than children with a disability who did not?

We first tested[14] the relationship between disability status and BPVS scores (irrespective of whether the children participated in the SSBC programme). We found that there was a statistically significant difference in BPVS scores between children with a disability (Mean = 84.2; SD = 10.14) and children without a disability (Mean = 100.06; SD = 12.91; See Figure 4)[15]. The mean score of the children with a disability is below what would be classified as typically developing (i.e., 85-115) and indicates that this group would be considered at risk for language difficulties.

Figure 4: Comparing children with disability with children without disability in terms of BPVS scores



[14] Independent Samples T-test
[15] t (222) = 4.654, p < 0.001, Cohen's d = 1.366

To address the research question 3, we first performed a comparison analysis[16] to test the interaction between SSBC participation status and disability status. We then classified the children into four groups: (1) SSBC children who were disabled, (2) SSBC children who were not disabled, (3) non-SSBC children who were disabled, and (4) non-SSBC children who were not disabled. Table 7 shows the mean BPVS scores (and SDs) for each of these groups.

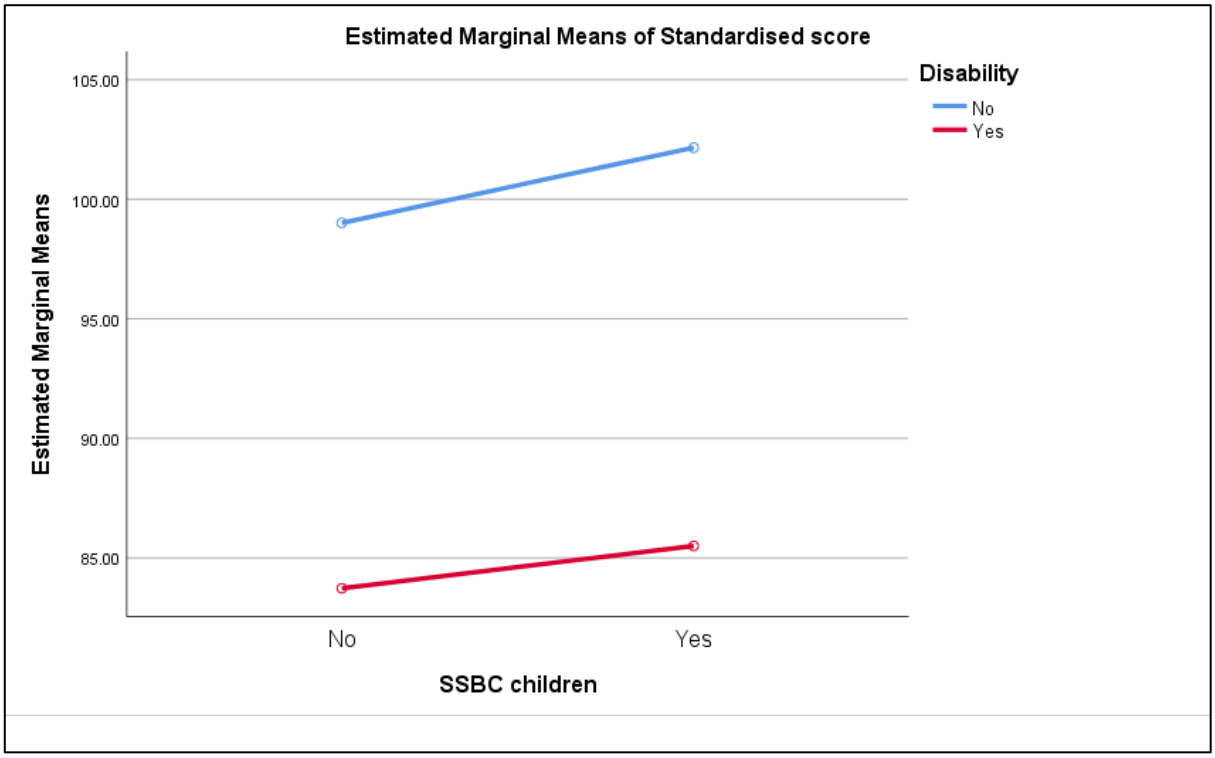
Following that we performed a test[17] to compare mean scores between these four groups. The test revealed that there were statistically significant differences in mean scores between the groups[18]. We found that mean scores of non-disabled SSBC children and non-disabled no-SSBC children were higher than the mean scores of disabled no-SSBC children (Mean difference = 18.43; 15.28, respectively)[19].The differences in the mean scores were not statistically significant between SSBC children and their no-SSBC counterparts (e.g., non-disabled SSBC children versus non-disabled no-SSBC children), (see Table 7 and Figure 5).

Table 7: Descriptive statistics for BPVS standardised scores by SSBC and disability group status

	N	Mean	Standard Deviation
Non-disabled, No-SSBC	139	99.007	13.384
Disabled, No-SSBC	11	83.727	9.951
Non-disabled, SSBC	70	102.157	11.717
Disabled, SSBC	4	85.500	12.124
Total	224	99.000	13.329

[16] Two-way ANOVA
[17] One-Way ANOVA
[18] Welsh's F (3, 12.101) = [10.753], p = 0.001; Eta-squared = 0.101
[19] p < 0.001, 95% C.I. = [8.866, 27.993], Cohen's d = 1.696; and p = 0.002, 95% C.I. = [5.869, 24.691], Cohen's d = 1.296, respectively.

Figure 5: BPVS standardised scores by SSBC and disability group status



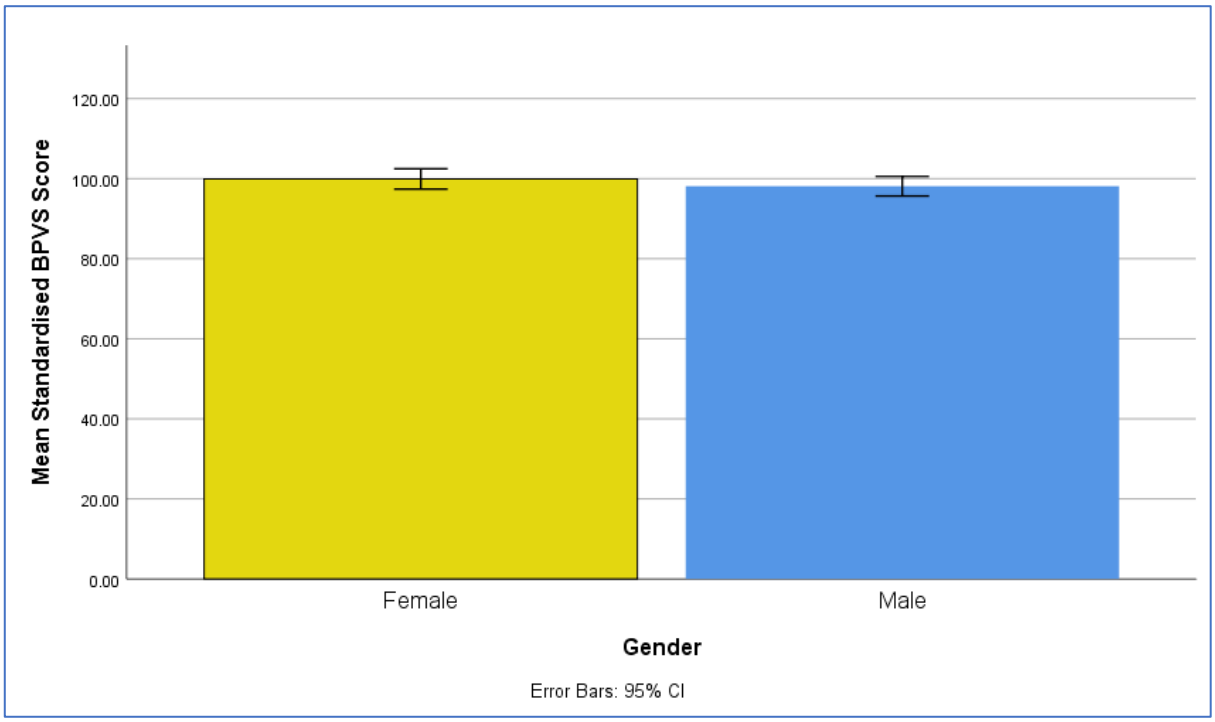
Do boys or girls benefit more from SSBC participations?

We first tested[20] the relationship between gender and BPVS scores (irrespective of whether the children participated in the SSBC programme). Findings revealed that there was no statistically significant difference in BPVS scores between female (Mean = 99.93; SD = 13.49) and male children (Mean = 98.11; SD = 13.17; See Figure 6)[21].

[20] Independent Samples T-test

[21] t (222) = 1.023, p = 0.307, Cohen's d = 0.137

Figure 6: Comparing female children with male children in terms of BPVS scores



To address the research question 4, we first performed a comparison analysis[22] to test the interaction between SSBC participation status and gender. We categorised the children into four groups: (1) female SSBC children, (2) male SSBC children, (3) female no-SSBC children, and (4) male no-SSBC. Table 8 shows the mean BPVS scores (and SDs) for each of these groups.

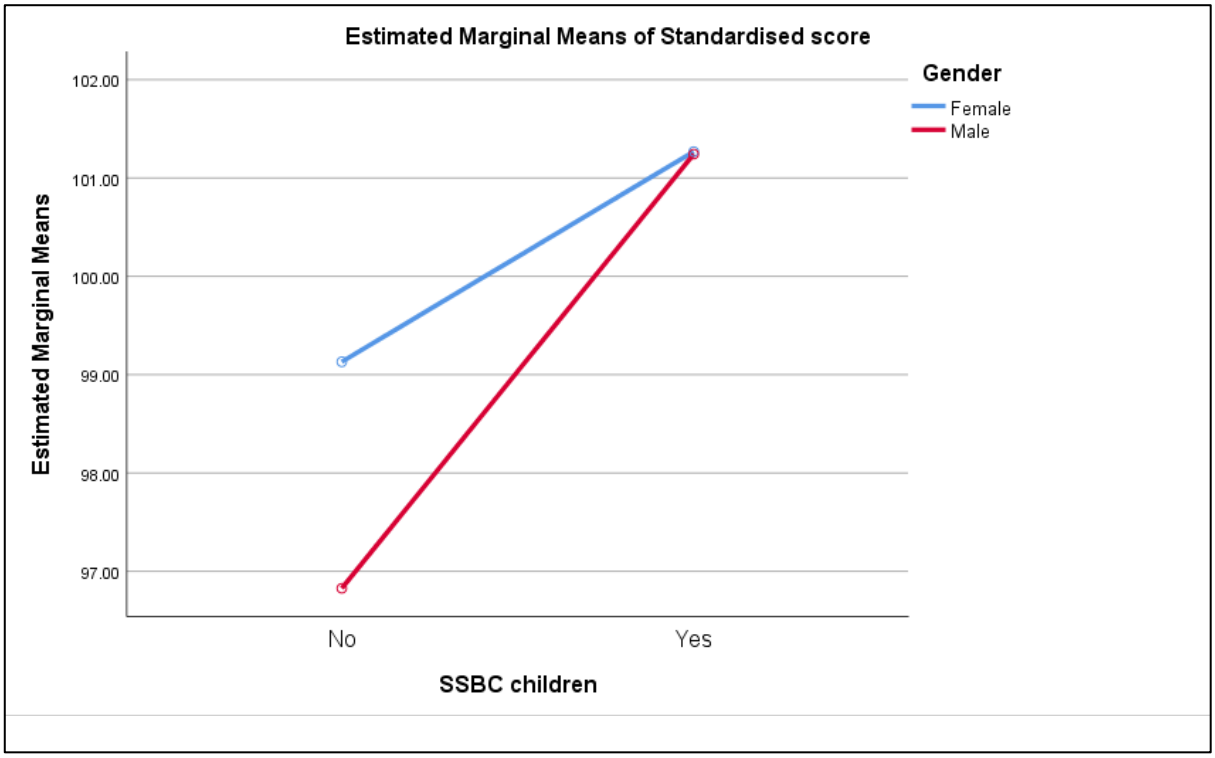
There were no statistically significant differences in mean scores between the four groups (see Table 8 and Figure 7).

Table 8: Descriptive statistics for BPVS standardised scores by SSBC and gender group status

	N	Mean	Standard Deviation
Female, No-SSBC	69	99.130	14.300
Male, No-SSBC	81	96.827	13.222
Female, SSBC	41	101.268	12.054
Male, SSBC	33	101.242	12.689
Total	224	99.000	13.329

[22] Two-way ANOVA

Figure 7: BPVS standardised scores by SSBC and gender group status



Do children from different Wards benefit more or less from participation in SSBC?

We first tested[23] the relationship between area of residency and BPVS scores (irrespective of whether the children participated in the SSBC programme). Findings revealed that there was a statistically significant difference in BPVS scores between the four different Wards[24].

We then grouped the children into eight groups: (1) SSBC children living in Ward One, (2) SSBC children living in Ward Two, (3) SSBC children living in Ward Three, (4) SSBC children living in Ward Four, (5) no-SSBC children living in Ward One, (6) no-SSBC children living in Ward Two, (7) no-SSBC children living in Ward Three, and (8) no-SSBC children living in Ward Four. Table 9 shows the mean BPVS scores (and SDs) for each of these groups.

Following that we performed a test[25] to compare mean scores between these eight groups. The test revealed that there were statistically significant differences in mean scores between the

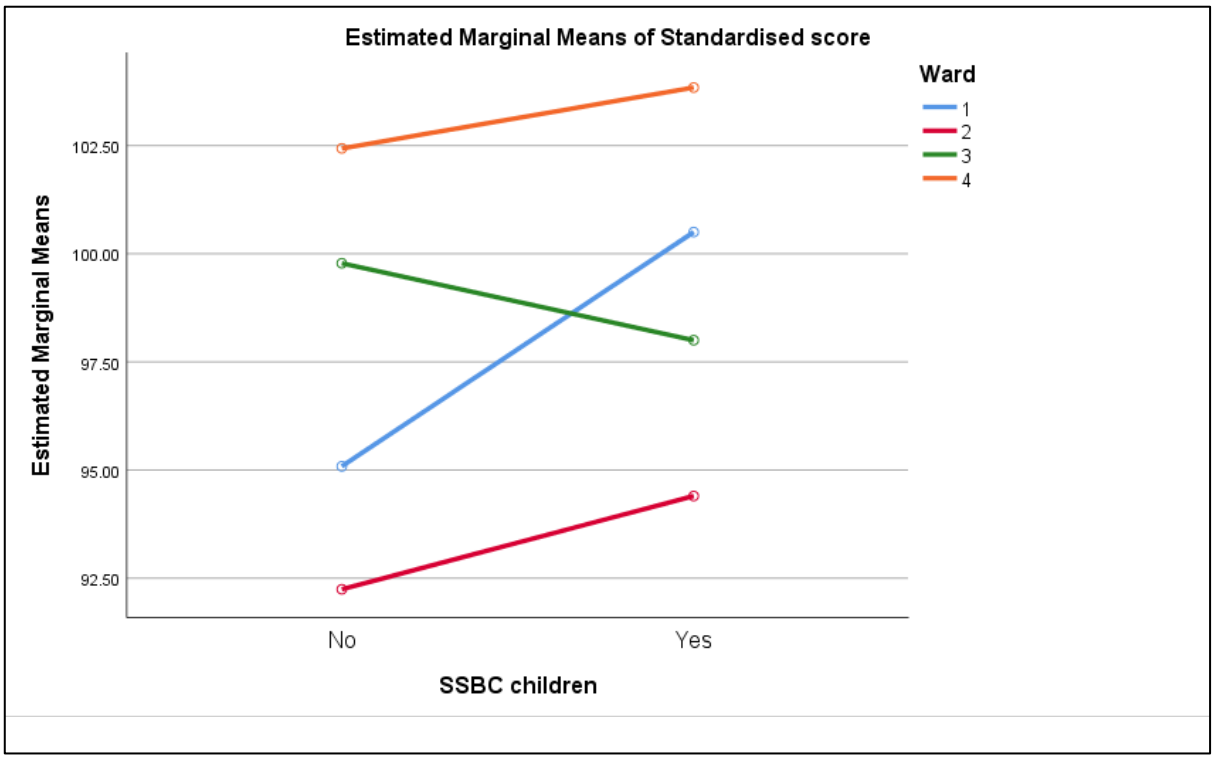
[23] One-way ANOVA
[24] Welsh's F (3, 83.922) = [7.347], $p < 0.001$; Eta-squared = 0.099
[25] One-Way ANOVA

groups[26]. We found that mean scores of SSBC children living in Ward Four were higher than the mean scores of no-SSBC children living in Ward Two (Mean difference = 11.60)[27]. There was also a significant difference between no-SSBC children living in Ward Four and no-SSBC children living in Ward Two (Mean difference = 10.19)[28] (see Table 9 and Figure 8).

Table 9: Descriptive statistics for BPVS standardised scores by SSBC and ward group status

	N	Mean	Standard Deviation
No-SSBC, Ward 1	35	95.086	13.568
No-SSBC, Ward 2	37	92.243	14.885
No-SSBC, Ward 3	18	99.778	10.963
No-SSBC, Ward 4	60	102.433	12.387
SSBC, Ward 1	8	100.500	12.490
SSBC, Ward 2	10	94.400	14.508
SSBC, Ward 3	12	98.000	14.264
SSBC, Ward 4	44	103.841	10.614
Total	224	99.000	13.329

Figure 8: BPVS standardised scores by SSBC and ward group status



[26] Welsh's F (7, 48.489) = [3.226], p = 0.007; Eta-squared = 0.106
[27] p = 0.004, 95% C.I. = [2.434, 20.761], Cohen's d = 0.719
[28] p = 0.019, 95% C.I. = [1.039, 19.341], Cohen's d = 0.566

Are vocabulary scores related to how many different SSBC groups and sessions the children participated in?

In this section of the report, we first focus on the relationship between children's vocabulary scores and the total number of groups they participated in, including Cook and Play, Fathers Read Every Day, Dolly Parton Imagination Library, Infant Massage, Small Steps at Home, Story Rhyme Time, Triple P, Chatterpillars, Family Mentor Stories, Songs, and Rhymes, Family Mentor Story Time, and other Family Mentor Community groups. We grouped the children into five groups: (1) no-SSBC children (who therefore did not participate in any SSBC groups), (2) SSBC children who participated in one group, (3) SSBC children who participated in two groups, (4) SSBC children who participated in three groups, and (5) SSBC children who participated in four or more groups. Table 10 shows the mean BPVS scores (and SDs) for each of these groups, and it can be seen that broadly speaking mean vocabulary scores increased in line with number of activities participated in. We therefore performed a test [29] to compare mean scores between these groups. The test revealed that there were no statistically significant differences in mean scores between the groups [30]

Table 10: Descriptive statistics for BPVS standardised scores by number of total activities

Total number of activities	N	Mean	Standard Deviation
No-SSBC (0)	150	97.887	13.730
1	10	97.400	12.103
2	28	100.000	12.505
3	18	103.333	8.110
4 or more	18	103.278	15.266
Total	224	99.000	13.329

Second, we examined whether BPVS scores were related to the total number of sessions that children did for the above groups. We grouped the children into five groups based on quartiles of the total number of sessions. The five groups are as follows: (1) no-SSBC children (who therefore did

[29] One-Way ANOVA
[30] Welch's F (4, 36.307) = [1.787], p = 0.153

not do any SSBC sessions), (2) SSBC children who did 1-54 sessions, (3) SSBC children who did 55-68 sessions, and (4) SSBC children who did 69-99 sessions, and (5) SSBC children who did 100-234 sessions. Table 11 shows the mean BPVS scores (and SDs) for each of these groups. There were no statistically significant differences in mean scores between the groups[31].

Table 11: Descriptive statistics for BPVS standardised scores by number of total sessions

Total number of sessions	N	Mean	Standard Deviation
No-SSBC (0)	150	97.887	13.730
1-54	19	102.737	12.206
55-68	18	99.222	11.558
69-99	19	97.895	12.004
100-234	18	105.278	12.824
Total	224	99.000	13.329

Are vocabulary scores related to how many different *literacy related* SSBC groups and sessions children participated in/did?

In this section of the report, we first focus on the relationship between children's BPVS scores and the total number of different specifically literacy and language related groups that they participated in, including Fathers Read Every day, Dolly Parton Imagination Library, Story Rhyme Time, Triple P, Family Mentor Stories, Songs, and Rhymes, Family Mentor Story Time. We grouped the children as follows: (1) no-SSBC children (who did not therefore participate in any SSBC groups[32]), (2) SSBC children who participated in one literacy-related group, and (3) SSBC children who participated in two to four literacy-related groups. Table 12 shows the mean BPVS scores (and SDs) for each of these groups. There were no statistically significant differences in mean scores between the groups[33].

[31] Welch's F (4, 42.637) = [1.726], p = 0.162
[32] One SSBC child is also in this group as they did not participate in any literacy-related groups
[33] Welch's F (2, 43.424) = [2.120], p = 0.132

Table 12: Descriptive statistics for BPVS standardised scores by number of literacy related groups attended

Total number of literacy related activities	N	Mean	Standard Deviation
No-SSBC (0)	151	97.815	13.713
1	55	101.600	11.216
2-4	18	101.000	15.262
Total	224	99.000	13.329

Second, we examined whether BPVS scores were related to the total number of sessions that children did for the above literacy-related groups. We grouped the children into five groups based on quartiles of the total number of sessions as follows: (1) no-SSBC children (who therefore did not do any SSBC sessions), (2) SSBC children who did 1-49 sessions, (3) SSBC children who did 50-53 sessions, and (4) SSBC children who did 54-56 sessions, and (5) SSBC children who did 57-130 sessions. Table 13 shows the mean BPVS scores (and SDs) for each of these groups. The mean score for the no-SSBC children[34] is 97.815 (SD = 13.713); 96.933 (SD = 12.714) for SSBC children who did 1-49 sessions; 102.909 (SD = 11.763) for SSBC children who did 50-53 sessions; 102.895 (SD = 10.723) for SSBC children who did 54-56 sessions; and 101.941 (SD =13.971) for SSBC children who did 57-130 sessions. There were no statistically significant differences in mean scores between the groups[35].

Table 13: Descriptive statistics for BPVS standardised scores by number of total literacy related sessions

Total number of literacy related activities	N	Mean	Standard Deviation
No-SSBC (0)	151	97.815	13.713
1-49	15	96.933	12.714
50-53	22	102.909	11.763
54-56	19	102.895	10.723
57-130	17	101.941	13.971
Total	224	99.000	13.329

[34] One SSBC child is also in this group as they did not do any literacy-related sessions
[35] Welch's F (4, 40.770) = [1.693], p = 0.170

Does participating in Small Steps at Home programme affect children's vocabulary scores?

In this section of the report, we focus on the relationship between children's BPVS scores and whether they received the Small Steps at Home programme. We grouped the children as follows: (1) no-SSBC children (who did not therefore participate in the programme), (2) SSBC children did not participate in the programme, and (3) SSBC children who did participate in the programme. Table 14 shows the mean BPVS scores (and SDs) for each of these groups. There were no statistically significant differences in mean scores between the groups[36].

Table 14: Descriptive statistics for BPVS standardised scores by participation in Small Steps at Home status

Small Steps at Home participation status	N	Mean	Standard Deviation
SSBC did not participate in the programme	24	99.750	11.873
SSBC participated in the programme	50	101.980	12.488
No-SSBC	150	97.887	13.730
Total	224	99.000	13.329

Second, we examined whether BPVS scores were related to the total number of Small Steps at Home sessions that children did. We grouped the children as follows: (1) no-SSBC children (who did not therefore do any sessions), (2) SSBC children who did not do any sessions, (3) SSBC children who did 1-5 sessions, and (4) SSBC children who did 6-34 sessions, and (5) SSBC children who did 35-56 sessions. Table 15 shows the mean BPVS scores (and SDs) for each of these groups. There were no statistically significant differences in mean scores between the groups[37].

[36] Welch's F (2, 58.979) = [1.928], p = 0.155
[37] Welch's F (4, 39.842) = [1.049], p = 0.394

Table 15: Descriptive statistics for BPVS standardised scores by number of total Small Steps at Home sessions

Number of Small Steps at Home sessions	N	Mean	Standard Deviation
SSBC (0)	24	99.750	11.873
1-5	13	104.077	12.453
6-34	18	101.278	11.411
35-56	19	101.211	13.923
No-SSBC	150	97.887	13.730
Total	224	99.000	13.329

To what extent did SSBC children participate in literacy and non-literacy related groups?

In this section of the report, we focus on only the SSBC children (N = 74) to explore their attendance at SSBC group activities using a Yes/ No format. Table 16 presents the descriptive statistics about literacy-related group activity attendance and non-literacy related group activity attendance. While SSBC children engagement with the Dolly Parton Imagination Library programme is high (97.3%), engagement with the other literacy-related groups were low: Fathers Reading EveryDay (1.4%), Chatterpillars (4.1%), Family Mentor Stories, Songs, Rhymes (4.1%), Family Mentor Story Time (8.1%), and Story Rhyme Time (18.9%). This compares non-favourably with attendance at non-literacy related groups, 10.8% of the children attended Infant Massage, 67.6% Small Steps at Home, 6.8% Triple P (Positive Parenting Programme), 8.1% Cook and Play, and finally 45.9% at Other Family Mentor Groups. Overall, almost all children received books from the Dolly Parton Imagination programme during their time with SSBC, but their attendance to other literacy-related groups were low. However, participating in non-literacy related groups, especially Small Steps at Home, might have supported them in terms of their language development, but it seems that that possible support did not result in a statistically significant result as we demonstrated in previous sections.

Table 16: Descriptive statistics for SSBC group activity attendance

Literacy-related groups			Non-literacy related groups		
Dolly Parton Imagination Library			**Infant Massage**		
	Frequency	Percentage		Frequency	Percentage
No	2	2.7	No	66	89.2
Yes	72	97.3	Yes	8	10.8
Fathers Reading EveryDay			**Small Steps at Home**		
No	73	98.6	No	24	32.4
Yes	1	1.4	Yes	50	67.6
Story Rhyme Time			**Triple P**		
No	60	81.1	No	69	93.2
Yes	14	18.9	Yes	5	6.8
Chatterpillars			**Cook and Play**		
No	71	95.9	No	68	91.9
Yes	3	4.1	Yes	6	8.1
Family Mentor Stories Songs Rhymes			**Other FM Community Groups**		
No	71	95.9	No	40	54.1
Yes	3	4.1	Yes	34	45.9
Family Mentor Story Time					
No	68	91.9			
Yes	6	8.1			

What are the characteristics and literacy-related group attendance of high-risk SSBC children?

We finally looked at the characteristics and attendance to literacy-related groups of SSBC children who are in the high-risk group in terms of BPVS scores. We grouped SSBC children into three groups: (1) those who scored between 70-84 (i.e., high-risk group; 10.8%), (2) those who scored between 85 and 115 (79.7%), and (3) those who scored between 115 and 131 (i.e., high-achiever group; 9.5%). Although the findings were not statistically significant, it seems that males (12.1%) were more likely to be in the high-risk group than females (9.8%; see Table 17); those who spoke English as an additional language (21.7%) were more likely to be in the high-risk group than those who spoke English as their first language (5.9%; $p = 0.031$; see Table 19); and those who did 0 to 53 literacy related sessions (13.2%) were more likely to be in the high-risk group than those who did 54-130 sessions (8.3%; see Table 20). The only statistically significant finding was in relation to disability:

children with disabilities (75%) were more likely to be in the high-risk group than children without any disabilities (7.1%; $p < 0.001$; see Table 18).

Table 17: Descriptive statistics for grouped BPVS standardised scores by gender

			Gender		Total
			Female	Male	
BPVS scores	70-84	Count	4	4	8
		%	9.8%	12.1%	10.8%
	85-114	Count	34	25	59
		%	82.9%	75.8%	79.7%
	115-131	Count	3	4	7
		%	7.3%	12.1%	9.5%
Total		Count	41	33	74
		%	100.0%	100.0%	100.0%

Table 18: Descriptive statistics for grouped BPVS standardised scores by disability

			Disability		Total
			No	Yes	
BPVS scores	70-84	Count	5	3	8
		%	7.1%	75.0%	10.8%
	85-114	Count	58	1	59
		%	82.9%	25.0%	79.7%
	115-131	Count	7	0	7
		%	10.0%	0.0%	9.5%
Total		Count	70	4	74
		%	100.0%	100.0%	100.0%

Table 19: Descriptive statistics for grouped BPVS standardised scores by first language

			First language		Total
			English	Other	
BPVS scores	70-84	Count	3	5	8
		%	5.9%	21.7%	10.8%
	85-114	Count	41	18	59
		%	80.4%	78.3%	79.7%
	115-131	Count	7	0	7
		%	13.7%	0.0%	9.5%
Total		Count	51	23	74
		%	100.0%	100.0%	100.0%

Table 20: Descriptive statistics for grouped BPVS standardised scores by total number of literacy related sessions

			Total number of literacy related sessions		Total
			0-53	54-130	
BPVS scores	70-84	Count	5	3	8
		%	13.2%	8.3%	10.8%
	85-114	Count	30	29	59
		%	78.9%	80.6%	79.7%
	115-131	Count	3	4	7
		%	7.9%	11.1%	9.5%
Total		Count	38	36	74
		%	100.0%	100.0%	100.0%

5 Discussion, recommendations and conclusion

The aim of this evaluation was to investigate whether there were any differences in vocabulary scores between children who participated in the Small Steps Big Changes (SSBC) programme in general and various SSBC groups in particular, and those children who did not participate in the programme. While doing so, we also examined children's gender, first language, disability status, and area of residency. This section of the evaluation report discusses the findings and their implications.

The first research question that we addressed was "Are the vocabulary scores associated with children who participated in SSBC higher than those of children who did not?". We found a statistically significant difference in mean vocabulary scores between SSBC children and no-SSBC children. This finding suggests that overall engagement with SSBC is associated with better vocabulary scores. However, other analyses showed that parents of the SSBC children did not engage with the literacy and language related groups as much as they did with the non-literacy/language groups (see Table 16). Therefore, the benefit of the SSBC programme in terms of vocabulary development appears to be driven by general enrichment activity from across the programme rather than targeted language and literacy elements. The recommendation for SSBC is

that the team should work more on both the nature of the literacy and language-related offers available to the parents and how the value of those groups is communicated with parents to improve their engagement with and motivation to take up the literacy offer. In addition, the team should investigate low attendance at literacy-related groups and incentivise participation in these groups to improve the literacy-related outcomes of SSBC children further. Moreover, the team could embed literacy into non-literacy groups where there is a good uptake.

The second research question that we addressed was “Do children who participated in SSBC and have EAL have higher or lower vocabulary scores than EAL children who did not?”. We found that the mean vocabulary scores of no-SSBC children who spoke English as an additional language were lower than the mean vocabulary scores of no-SSBC children who spoke English as a first language, whereas there was no difference between the vocabulary scores of the EAL and non-EAL children who participated in SSBC activities. This finding implies that participating in the SSBC programme might have improved bilingual SSBC children’s vocabulary scores such that they were performing at the same level as their monolingual peers. The recommendation for SSBC is that the benefit of the programme should be communicated to bilingual communities to increase the uptake; and SSBC should support bilingual children more in general as our data show that they are behind their monolingual counterparts in general.

The third research question that we addressed was “Do children who participated in SSBC and had a disability have higher or lower vocabulary scores than children with a disability who did not?”. The findings showed that the vocabulary scores of disabled children were significantly lower than the vocabulary scores of non-disabled children. However, there was no statistically significant difference between non-disabled SSBC and non-disabled no-SSBC children, and SSBC children with a disability. This finding implies that participating in the SSBC programme might have improved disabled SSBC children’s vocabulary scores. The recommendation for SSBC is to target disabled children more as the data show that they are behind their non-disabled counterparts to a level that

indicates that their language development is at risk. There may be a need to review the groups available to attract these children and families.

Another research question that we addressed was "Do children from different Wards benefit more or less from participation in SSBC?". The findings showed that there was no statistically significant difference between the SSBC wards. However, according to the descriptive statistics, children living in Ward 4 had the highest vocabulary scores, followed by children living in Ward 1, Ward 3, and Ward 2. When we compared SSBC children with no-SSBC children, although SSBC children's scores were higher than no-SSBC children's scores in each ward, except Ward 3, the only statistically significant difference was between the mean scores of SSBC children living in Ward 4 and mean scores of no-SSBC children living in Ward 2 (Mean difference = 11.60). Based on the descriptive statistics, the recommendation for SSBC is to focus on children living in Ward 2, where children's scores are the lowest, and investigate why SSBC children in Ward 3 is not doing better than their no-SSBC counterparts while SSBC children are doing better than their no-SSBC counterparts in Wards 1, 2, and 4.

Finally, we examined whether the number of groups and sessions that SSBC children participated in had any relationship with their vocabulary scores. The findings suggest that there is not much evidence that quantity of engagement strongly affects children's vocabulary scores, although the more they participate in activities the higher their vocabulary scores are, broadly speaking. The recommendation for SSBC is to audit the content of what is going in within sessions to understand better why volume of engagement is not adding value to vocabulary development. The literacy-based activities in particular may require examination to consider the idea of progression of activities and skills over multiple sessions, rather than just repetition.

5.1 Conclusion

In this evaluation report, we first compared SSBC children and no-SSBC children in terms of their vocabulary scores taking into account their gender, first language, disability status, and area of

residency. We then looked at the characteristics and attendance to literacy-related groups of SSBC children who are in the high-risk group in terms of vocabulary scores (< 85). The findings from this evaluation can be summarised as follows:

1. There was a statistically significant difference in mean vocabulary scores between SSBC children and no-SSBC children. This finding suggests that overall engagement with the SSBC programme is linked to better vocabulary scores.
2. Although there was a statistically significant difference in mean vocabulary scores between no-SSBC children who spoke English as an additional language and no-SSBC children who spoke English as their first language, there was no difference between SSBC children. This finding implies that participating in the SSBC programme might have improved bilingual SSBC children's vocabulary scores.
3. Although there was a statistically significant difference in mean vocabulary scores between non-disabled and disabled children, there was no difference between non-disabled SSBC and non-disabled no-SSBC children, and SSBC children with a disability. This finding implies that participating in the SSBC programme might have improved disabled SSBC children's vocabulary scores.
4. There were no statistically significant differences in mean vocabulary scores between the SSBC wards, but there was a statistically significant difference between the vocabulary scores of SSBC and no-SSBC children living in Ward 4 and no-SSBC children living in Ward 2.
5. With regards to the characteristics of SSBC children who were in the high-risk group in terms of vocabulary scores, the only statistically significant finding revealed that SSBC children with a disability were more likely to be in the high-risk group than SSBC children without any disabilities.
6. Finally, it should be noted that the findings show that engagement with the SSBC programme benefits children, but that benefit is not being driven by the literacy-related

activities as they are so poorly attended with the exception of Dolly Parton's Imagination Library.

Based on the above findings, our recommendations can be summarised as follows:

1. The SSBC team should investigate the reasons for low attendance to literacy-related groups and communicate the value of participation in these activities with parents
2. The SSBC team could embed literacy into non-literacy groups where there is good engagement
3. The SSBC team should encourage attendance to literacy-related groups apart from the Dolly Parton Imagination Library with a focus on children with disabilities, and those who speak English as a second language to increase the effect of programme on children's vocabulary scores
4. The SSBC team could work on the possibility of better suiting the groups to the needs of disabled children and families
5. The SSBC team could consider examining the content of literacy-related sessions to enhance progression across sessions.

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