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Evaluating the Effectiveness of a 'Real-World' Shared Reading Intervention for Preschool Children and Their Families: A Randomised Controlled Trial

Jamie Lingwood

Department of Linguistics & Phonetics, University of Leeds, Leeds, UK

Josie Billington

Department of English, University of Liverpool, Liverpool, UK

Caroline Rowland

Language Development Department, Max Planck Institute for Psycholinguistics, Nijmegen, the Netherlands; ESRC LuCiD Centre, University of Liverpool, Liverpool, UK and Donders Institute for Brain, Cognition & Behaviour, Radboud University, Nijmegen, the Netherlands

Background: Shared reading interventions can impact positively on preschool children's language development and on their caregiver's attitudes/behaviours towards reading. However, a number of barriers may discourage families from engaging with these interventions, particularly families from lower socio-economic status (SES) backgrounds. We investigated how families from such backgrounds responded to an intervention designed explicitly to overcome these barriers.
Methods: In a preregistered cluster randomised controlled trial, 85 lower SES families and their 3-year-old to 4-year-old children from 10 different preschools were randomly allocated to take part in The Reader's Shared Reading programme (intervention) or an existing 'Story Time' group at a library (control) once a week for 8 weeks. Three outcome measures were assessed at baseline and post intervention: (1) attendance, (2) enjoyment of the reading groups and (3) caregivers' knowledge of, attitudes and behaviours towards reading. A fourth – children's vocabulary – was assessed at baseline and 4 weeks post intervention.
Results: Families were significantly more likely to attend the intervention group and rated it more favourably, compared with the control group. However, there were no significant effects on caregivers' knowledge, attitudes and behaviours or on children's language.
Conclusion: The intervention was only successful in engaging families from disadvantaged backgrounds in shared reading. Implications for the use, duration and intensity of shared reading interventions are discussed.

Keywords: intervention, shared reading, socio-economic status, vocabulary

Highlights

:

What is already known about this topic

- Shared reading interventions have the potential to impact positively on child language and on their caregivers' attitudes/behaviours.
- However, a number of barriers may discourage families from participating or engaging with these interventions, particularly families from lower socio-economic status (SES) backgrounds.

What this paper adds

- We investigated how families from lower SES backgrounds responded to an intervention designed to overcome these barriers by, in particular, emphasising the enjoyment of reading, rather than its educational value.
- This paper evaluates a real-world intervention programme designed and developed by a third sector organisation, as opposed to a researcher-designed shared reading intervention.
- Families were significantly more likely to attend the intervention group and rated it more favourably, compared with the control group.

Implications for theory, policy or practice

- These findings highlight the importance of evaluating the effectiveness of real-world interventions that have been designed outside of the research community.
- Despite the intervention using evidence-based interactive reading techniques, which have been shown to positively impact on child language, this shared reading intervention did not have a significant effect on caregivers' home literacy practices or on child language.
- Testing longer/more intensive interventions or interventions that engage teachers and other practitioners, as well as families, would be a fruitful avenue for future research.

Introduction

An effective method to promote preschool children's language development is shared book reading. Preschool children whose parents read with them regularly tend to develop a larger vocabulary, which has a positive effect on later literacy attainment (Blanden, 2006). Similarly, reading interventions can be effective at boosting children's language, particularly shared reading interventions that teach caregivers to hold conversations about what might be happening in the book, rather than simply reading the text (e.g., see Bus, Van Ijzendoorn & Pellegrini, 1995; Mol, Bus, de Jong & Smeets, 2008). It is thought that such interventions boost children's language not only because they encourage parents to model rare vocabulary and complex sentence structures that rarely occur in everyday speech (Cameron-Faulkner & Noble, 2013) but because they encourage conversation between

parent and child. This gives the child an opportunity to practice using language, which also has a positive effect on language development (Hoff, 2006).

However, reading interventions seem to have a smaller, or no, effect with children from lower socio-economic status (SES) backgrounds (Manz, Hughes, Barnabas, Bracaliello, & Ginsburg-Block, 2010; Mol et al., 2008). This means that they may actually increase, rather than decrease, the language achievement gap between children from higher and lower SES backgrounds (Roberts, Jurgens & Burchinal, 2005). Thus, before implementing shared reading interventions, we must address the issue of why shared reading interventions do not work equally well across the SES spectrum (Manz et al., 2010; see also Bus et al., 1995; Flack, Field, & Horst, 2018; Mol et al., 2008; Noble et al., 2019 for additional references on shared reading interventions.)

For an intervention programme to succeed, families must sign up and complete the programme (attendance) and engage with the intervention materials (fidelity; Moray, Ghate & Merwe, 2004; Lingwood, Levy, Billington & Rowland, 2019). However, low participation rates are common, particularly with interventions involving families (Janes & Kermani, 2001; Neuhauser et al., 2015; Whittaker & Cowley, 2012). This is especially the case with reading interventions because reading is sometimes viewed as an alien, 'middle class' activity that only highly educated parents enjoy (McCarthey, 1997). Because participation is central to the effectiveness of emergent literacy interventions (Reese, Sparks & Levya, 2010), reduced attendance is likely to hamper any intervention gains (Pillinger & Wood, 2013; Whitehurst et al., 1988). Thus, overcoming the barriers that prevent parents attending and engaging is the first step in designing a successful intervention (Lingwood et al., 2019).

The goal of the present study was to determine whether we can increase the success of a family-focused shared reading intervention by reducing physical and psychological barriers to engagement. We assessed a preschool shared reading programme that had been explicitly designed by a charity (The Reader) to engage families by promoting the enjoyment of shared reading between parents and preschool children. We compared The Reader's shared reading programme with an existing shared reading programme run by Liverpool City Council, called 'Story Time'. In the remainder of this introduction, we discuss some of the barriers to engagement that such parents face, and how The Reader's programme attempts to overcome these barriers, before summarising the aims of the present study.

Barriers to engagement

Three factors have been implicated in poor engagement with intervention programmes (see Whittaker & Cowley, 2012, for a review). The first is 'personal life/practical factors', such as lack of support in the home and long working hours, that can disproportionately affect lower SES families (Day, 2013) and leave caregivers with less time and energy to devote to reading activities (Snow, Dubber, & de Blauw, 1982). The second factor is the location and timing of the programme. Most directly, programmes held at inconvenient times or locations will be poorly attended (Smith et al., 2014), but in addition, a requirement to travel to potentially unfamiliar 'third spaces' like libraries/community centres (where many interventions take place) can also be daunting for parents (Coe, Gibson, Spencer & Stuttaford, 2008; Smith et al., 2014). Third, engagement is likely to be affected by caregivers' own experiences of education in general and literacy education in particular. Caregivers who have had negative experiences with education are likely to view school, and

education-linked establishments like libraries, as places where they experienced failure (Harris & Goodall, 2007).

The Reader's Shared Reading programme is designed to overcome, or at least reduce, these physical and psychological barriers. To address the first and second points previously mentioned – lack of time and working commitments and the barriers that can be raised by inconvenient times and locations – the programme is designed to make participation as easy as possible. The intervention takes place in the child's preschool or nursery, where caregivers go every day to drop off and pick up their children. Sessions take place as soon as the children arrive at preschool/nursery so that parents arrive, with their children, at the normal time and simply stay for an extra hour. Conversely, in many other existing reading groups such as Liverpool City Council's 'Story Time', families have to travel to a library to participate, and reading groups run at fixed times and locations that may not be convenient for parents to attend.

The Reader's programme is also flexible. Children whose parents work, and who are looked after by other family members (e.g., grandparents), can attend with these carers instead, and though carers are encouraged to attend all sessions, they are not censored if they cannot make some. To encourage parents to feel comfortable, unlike the 'Story Time' groups, the child's teacher is heavily involved in recruiting parents, and all parents are invited to attend a short taster session, where they meet the project worker who will run the programme and experience the programme first hand. Only then are they asked if they wish to sign up. In addition, all sessions are run by only one project worker, which allows her/him to start to build relationship with the families, whereas 'Story Time' groups rely on volunteers and are therefore more likely to be run by different project workers each week.

Third, to address the problem that parents may have negative feelings towards reading and school, the programme is explicitly tailored to emphasise the enjoyment of reading, rather than the importance of reading for literacy. Facilitators used an interactive reading style in which they and the children are encouraged to talk about, and round, the book. They also encouraged the children and parents to play an active role in the reading session by asking open questions and prompting them to talk about the story. In contrast, 'Story Time' groups are closer to a 'quiet time', especially within a library setting. We know that caregivers who enjoy reading are more likely to raise children who also enjoy reading (Duursma, Augustyn & Zuckerman, 2008). Conversely, when caregivers do not feel familiar with books, or do not find books a source of pleasure in themselves, shared book reading is less likely to become embedded in family practice, less likely to be sustained and less likely to be enjoyed by children (Bus, Leseman & Keultjes, 2000). Thus, enjoyment of reading is at the heart of The Reader's strategy to engage people who do not usually read for pleasure (see Billington, Longden & Robinson, 2016). For more details on the research on The Reader's programme, see also Billington, Farrington, et al. (2016) and Longden, Davis, Carroll and Billington (2016).

The logic behind the programme is that once parents and children learn how to enjoy shared reading together, this will engender a positive change in their attitude towards reading, which should then lead to increased shared book reading at home in the long term. To support this assertion, a number of studies have shown that interventions designed to promote reading for pleasure can positively impact on caregivers' and children's attitudes towards reading. For example, in a large sample of 608 families, Meyer et al. (2016) found that parents who participated in a book-lending scheme designed to encourage shared reading at home reported positive experiences at the end of the 6-week intervention.

Additionally, Goux, Gurgand and Maurin (2017) showed that an intensive 7-month reading intervention designed to promote reading enjoyment engendered a significant improvement in low-performing preschool children's attitude to reading, relative to a control group. Promoting reading for pleasure can also lead to increases in caregivers' book reading with children (Huebner, 2010) and children's interest in books (Chow, McBride-Chang, Cheung & Chow, 2008). The first goal of the present paper was, thus, to evaluate the success of the programme at overcoming three barriers to intervention success: by focusing on making it easy for parents to attend sessions, on making families feel comfortable attending sessions and on helping families to enjoy shared reading.

The second goal was to evaluate whether The Reader intervention was successful at boosting the children's language development. During the sessions, project workers read with children using techniques shown to be successful at boosting children's language development. For example, they used an interactive reading style in which they and the children were encouraged to talk about the story, which has been shown to be effective at boosting vocabulary development in a number of studies (see Bus et al., 1995; Mol et al., 2008, for reviews). They also encouraged the children and parents to play an active role in the reading session by asking open questions and prompting them to talk about the story (see Hoff, 2006). Books were chosen carefully to model new vocabulary appropriate to the children's age range, and new words were explained using words and gestures (e.g., to demonstrate the difference between big and small). Then, in the final few sessions, the parents were taught to use these techniques during shared reading themselves, which again parents are not explicitly taught at 'Story Time' reading sessions. Note that all these techniques have been shown to affect children's vocabulary, but some of this evidence is based on adults reading one to one with a single child. There is less evidence demonstrating its effectiveness when one adult reads with a group of children. Thus, in the current study, we assessed whether this group-based programme had a significant effect on children's language development.

Finally, this paper evaluated an intervention that was designed and developed by a third sector organisation and not by the research community (i.e., a real-world intervention; an intervention programme that is already being used in the community, not one created specifically for the study by the researchers). Most studies on shared reading interventions have focused on evaluating researcher-designed shared reading interventions, which means that 'there is decidedly little evidence regarding the nature, quality, and impact of real-world professional development offerings and the value-added of such investments' (Piasta et al., 2017, p. 356). Most studies with lower SES groups focus on researchers training parents directly not via an independent organisation (e.g., Murray et al., 2016; Vally, Murray, Tomlinson & Cooper, 2015). Additionally, most intervention programmes run in schools are not designed by researchers, and there is evidence that these are likely to be less effective than researcher-devised programmes. Researcher-devised programmes are often delivered on a smaller scale and are more intensive than real-world programmes, both of which can inflate effect sizes. In addition, when they are adopted by the community, they are almost always modified in order to fit in with the constraints of the curriculum and the working day but are rarely re-evaluated after adoption (Markussen-Brown et al., 2017). Thus, it is crucial to assess intervention programmes as they are currently being used in the community.

In summary, shared reading interventions can impact positively on caregivers' attitudes and behaviours towards reading and on children's language. However, many barriers can stop families, especially families from lower SES backgrounds, engaging in such

programmes. In the present study, we evaluated the success of one programme designed to overcome some of these barriers. This – The Reader's Shared Reading programme – is based around small groups led by trained project workers coming together weekly to read aloud. It has successfully promoted reading among groups who do not normally read (see Billington, Longden & Robinson, 2016) and has recently been extended to families with young children in areas of deprivation to encourage shared reading between caregivers and children.

In the present study, across two school terms, 3-year-old to 4-year-old children and their caregivers were randomly allocated to either The Reader's Shared Reading programme (intervention) or an active control group. Because our goal was to evaluate whether The Shared Reading programme added value over and above a standard reading group, our control group families attended an existing 'Story Time' group at their local library, where reading sessions were similar in length to the intervention reading groups. We predicted that families in the intervention group would (1) attend more reading groups than families in the control group and (2) rate the reading groups in the intervention more favourably; that (3) caregivers' knowledge of, attitudes and behaviours towards reading would become more positive in the intervention group, relative to the control group; and that (4) children in the intervention group would have larger language gains than children in the control group.

Method

Supplementary materials, including more details of study design, which will facilitate replication, are available at https://osf.io/suy8h/.

Participants

This was a parallel 1:1, double-blind study conducted according to CONSORT guidelines and preregistered at clinicaltrials.gov (NCT02659579). To detect a medium/large effect size with a two-sided 5% significance level and a power of 80%, 85 caregivers and their 3 to 4 year olds (M = 3;8, SD = 0;4; range 2;11-4;6) were recruited from 10 preschools in Liverpool, United Kingdom. We based the expectation of medium/large effect sizes on the literature (see Bus et al., 1995; Mol et al., 2008) and The Reader's desire to assess cost effectiveness; a small effect size would mean that the programme would not be cost effective to implement. Nurseries were in socially deprived areas and were matched based on English indices of deprivation, preschool size and Ofsted inspection and regulation ratings prior to random assignment. Five nurseries (50%) were in the first decile, three nurseries were in the second decile (30%) and two nurseries were in the third decile (20%). Across two school terms, lasting approximately 3 months each, participating preschools were randomly allocated to intervention and control groups using simple cluster randomisation conducted by the third author. Overall, the intervention and control groups were similar with regard to demographic characteristics (see Table 1). In a change to the preregistration protocol, the planned exclusion criteria (namely, children born less than 37 weeks who weighed less than 5 lb 9 oz at birth) were not applied because this would have excluded 33% of the participants. This is because our families were from disadvantaged communities, where such issues tend to be more common (supplementary analyses showed that applying the exclusion criteria makes no difference to the pattern of results).

Table 1. Demographic characteristics of sample at baseline. Numbers refer to mean (*SD*) for children's age and *N* (%) for other rows.

	Intervention	Control
	(*n* = 43)	(*n* = 42)
Child age (months)	43.24 (4.00)	44.90 (4.70)
Child sex		
Male	20 (46.5%)	19 (45%)
Female	23 (53.5%)	23 (55%)
Caregiver education		
No formal qualifications	5 (15%)	1 (4%)
1–4 GCSEs/O levels (at any grade) NVQ level 1	4 (12%)	8 (32%)
5+ GCSEs (grades A*-C)/O levels (passes)/NVQ level 2	12 (36%)	8 (32%)
1 A Level/2–3 AS Levels	1 (3%)	0 (0%)
2+ A Levels/NVQ Level 3	7 (21%)	4 (16%)
University degree/HND/HNC/NVQ Level 4 or 5	4 (12%)	3 (12%)
Postgraduate degree or similar (e.g., PGCE, PhD, MA)	0 (0%)	1 (4%)
Family household income per month		
£0–£14,000	15 (52%)	10 (36%)
£14,001–£24,000	8 (28%)	8 (29%)
£24,001–£42,000	4 (14%)	9 (32%)
£42,000 or more	2 (7%)	1 (4%)

Ethical approval was granted by the University of Liverpool ethics committee. All caregivers gave informed consent and were reimbursed with vouchers and three books.

Measures

We compared outcomes (attendance at the reading groups; change in caregivers' knowledge, attitudes and behaviours towards reading; and child language gains) across intervention and control groups. Caregivers' knowledge, attitudes and behaviours towards reading were assessed at baseline and post intervention. All of these materials are available at: https://osf.io/suy8h/. Language gains were assessed at baseline and 4 weeks post intervention, to ensure enough time for caregivers to implement what they had learned in the final training sessions.

Attendance and enjoyment

The facilitators running the reading groups collected attendance information across the 8 weeks. After the reading groups had finished, we asked caregivers to evaluate how much they and their children enjoyed the reading project.

Knowledge, attitudes and behaviours towards reading

We assessed caregivers' knowledge of, attitudes and behaviours towards reading through several questionnaires. The Family Questionnaire was completed at baseline. Other questionnaires were completed by the same caregiver at baseline and after the final reading group had finished.

Family Questionnaire. This assessed demographic information including maternal education and monthly household income before tax. It was originally devised for the norming sample of the UK-Communicative Development Inventory (see Alcock et al., 2019, for details about construction). Items relating to marriage/work status and child sleeping habits were omitted.

Home Life Questionnaire. This assessed home literacy-related behaviours and attitudes. There were 9 Likert scale questions, some of which broadly assessed reading behaviours (number of questions = 4, score range = 1 to 5), including questions on how often they or family members read with their child in a typical week (at bed times and other times); how many hours caregivers themselves read in a typical day; and number of non-children's books in the home; others that assessed attitudes (number of questions = 4, range = 1 to 4), including questions on caregivers' own reading habits: whether they were confident in their own reading ability; how relaxing they found reading; how enjoyable they found reading; and whether they found the time to read for themselves); and others that assessed child interest (number of questions = 1, range = 1 to 4), which asked how interested children were during shared book reading. The maximum possible score was 40.

Children's title and author checklists. Questioning parents directly about their reading habits can lead to inflated scores because reading is seen as a socially desirable activity (Hamilton, 2013; Sénéchal, LeFevre, Hudson & Lawson, 1996). Thus, we administered an adaptation of Sénéchal et al.'s (1996) indirect measures of storybook exposure – title/author checklists – that represent a reliable and valid alternative proxy for measuring children's storybook exposure (Hamilton, 2014; Stanovich & West, 1989). Parents were presented with a list of titles and authors of children's storybooks, intermixed with foils, and asked to indicate those which they recognise.

Sénéchal et al.'s (1996) checklists were adapted by Noble, Cameron-Faulkner and Rowland (in prep), who updated them via interviews with local librarians and current UK bestseller lists (e.g., Amazon and Waterstones) to represent the books most likely to be ready by families with children in the age range. Real titles (27) and author names (28) were interspersed with foils (27 and 28, respectively). Caregivers were asked to tick any titles or authors they recognised. They were told they did not have to have read the books to tick them and were instructed to refrain from guessing. Separate title and author checklist scores were calculated by subtracting the number of incorrectly recognised authors and titles (foils) from the number of correctly recognised authors (maximum score = 28; minimum scores = −28) and titles (maximum score = 27; minimum scores = −27).

Parent–Child Relationship Inventory. This assessed parents' attitudes towards parenting and their children (Gerard, 1994). However, following protocol validity guidelines, we did not obtain enough responses to include it.

Children's language. The Clinical Evaluation of Language Fundamentals-Preschool-2 UK (CELF Preschool-2) (Wiig, Secord & Semel, 2004) measures a broad range of expressive and receptive language abilities. We used all three subtests from the CELF Preschool-2 core language score scale: sentence structure, word structure and expressive vocabulary. A core language standardised score that accounts for children's age was generated from the three raw scores. Core language standardised scores range from 45 to 155.

The British Picture Vocabulary Scale Third Edition (BPVS3) (Dunn, Dunn, Styles & Sewell, 2009) assesses children's receptive vocabulary from the age of 3–16 years. Standardised scores range from 70 to 139+.

Procedure

Eligible children and their caregiver were invited to a 'taster' session in their child's preschool. At the end of this session, caregivers were invited to enrol in the research by a trained research assistant. After consenting, caregivers were asked to fill out a baseline questionnaire pack, then asked to attend groups held either in the preschool (The Reader's Shared Reading programme) or their local library ('Story Time' groups).

Trained research assistants, blind to group allocation, completed the CELF Preschool-2 and BPVS3 language tests with children in their nursery prior to the intervention (baseline). Post testing began 4 weeks after the final reading group because we wanted to give parents time to implement the techniques they had learnt, as described in the introduction. All testing took place within a 3-week window.

Reading groups

Caregivers and their children were asked to attend a weekly reading group run by a facilitator for 8 weeks. The Reader's Shared Reading groups took place in preschools at the beginning of the day. The facilitator had a university degree and had previously participated in an intensive 3-day 'Read to Lead' course based on developing reading, facilitation and communication skills. The Reader delivers a number of shared reading groups for adults across Liverpool where, typically, a trained project worker facilitates spontaneous discussion of both the book (e.g., characters, narrative, language and themes) and subjective responses to it (e.g., thoughts, emotions and personal reflection). These reading groups had recently been adapted for early years' settings in the following way. For 5 weeks, the project worker ran 'Magical Storytimes': interactive shared book reading, nursery rhymes and craft activity sessions (1 h approximately). During the sessions, project workers read with children using techniques shown to be successful at boosting children's language development. For example, they used an interactive reading style in which they and the children were encouraged to talk about, and round, the book, rather than focus on the text. They also encouraged the children and parents to play an active role in the reading session by asking open questions and prompting them to talk about the story. Books were chosen carefully to model new vocabulary appropriate to the children's age range, and new words were explained using words and gestures (e.g., to demonstrate the difference between big and small). For the final 3 weeks, the project worker supplemented 'Magical Storytimes' with 'Stories for You and Yours', in which caregivers were offered models of, and practice in, how to read interactively for enjoyment with their child and read aloud with other

caregivers (an additional 30 min). Therefore, in 'Stories for You and Yours', the parents were taught to use these techniques during shared reading themselves.

The 'Story Time' reading groups took place in local libraries across Liverpool and were run by local library staff and volunteers. The staff and volunteers had varying levels of education, and all had received training from Liverpool libraries in reading aloud. Similar to the The Reader's Shared Reading groups, the 'Story Time' reading groups consisted of shared reading, nursery rhymes, songs and crafts suitable for children under the age of 5 years, (approximately 1 h). However, the reading sessions were markedly different in so far as the group leader was a librarian who had received on-the-job training (rather than a trained 'Reader Leader' skilled in storytelling), and there was considerably less emphasis on interactive responses from the children. 'Story Time' is, thus, closer to a 'quiet time', especially within a library setting, so calm, relaxed, passive listening was both the norm and aim of the session. Additionally, unlike The Reader's shared reading groups where sessions took place as soon as the children arrive at preschool/nursery, sessions took place in local libraries. All 'Story Time' reading groups therefore ran at fixed times and were held within easy walking distance of the child's school.

Group size for both groups was typically between 3 and 10 dyads. In both reading groups, families received a text message reminding them of the time and location of the reading group at the start of every week. All children in both reading groups were given a 'Young Reader's library card' at the start of the project and every time they attended a reading group, they received a sticker.

Data analysis

SPSS version 22 (SPSS Inc 2006) was used for the main statistical analyses and R version 3.6.0 (R Core Team, 2018) and Studio version 1.1.456 (RStudio Team, 2019) were used for exploratory analyses. Data, scripts and output files are available in a project folder: https://osf.io/suy8h/. Attendance at the groups was analysed using an independent *t*-test with group (intervention and control) as the independent variable and number of sessions attended as the dependent variable. A principal component analysis (PCA) was conducted on the Home Life Questionnaire data at baseline to observe how the questions loaded to specific factors. Variables relating to caregivers' knowledge of books, attitudes and behaviours towards reading were analysed using mixed analyses of variance (ANOVAs) with group (intervention and control) as the independent variable and knowledge of books, attitudes and behaviours from questionnaire scores (pre and post) as the dependent variables. To test language gains, we ran mixed ANOVA tests with group (intervention and control) as the independent variable and standardised scores (pre and post) as the dependent variables. To test whether group or attendance predicted change scores, we ran linear regressions.

Results

Attendance

As predicted, families who took part in The Reader's Shared Reading programme attended significantly more sessions ($M = 4.23$, $SD = 2.94$; 53% attendance) than families in the 'Story Time' group ($M = 0.69$, $SD = 1.35$; 9% attendance; $t(59.29) = -7.16$, $p < 0.001$,

d = 1.55). Although attendance dropped off after week 1, it remained stable across weeks 2–8 in both groups (Figure 1).

Enjoyment of the reading groups

As predicted, caregivers in The Reader's Shared Reading groups rated their, and their children's, enjoyment of the sessions significantly more highly than caregivers in the 'Story Time' group (Figure 2; caregivers' enjoyment: $t(23.50) = -3.40$, $p < 0.01$, $d = 1.08$; children's enjoyment: $t(43) = -3.26$, $p < 0.01$, $d = 0.95$).

Knowledge, attitudes and behaviours towards reading

Home Life Questionnaire. A PCA using direct oblim rotation was conducted using data from all participants who completed the Home Life Questionnaire at baseline (n = 71) to examine whether the items would associate with or attach to specific factors. Based on the results of the scree test (eigenvalues > 1), the point of inflexion and including loadings above the 0.4 threshold (Field, 2005) all nine items were initially examined and successfully loaded to three factors. However, the items "I find reading enjoyable" and "I feel relaxed when I am reading" showed high multicollinearity with one another (r = 0.94). Therefore, one item ("I feel relaxed when I am reading") was randomly eliminated, and the PCA was rerun with this item omitted. This PCA showed that sampling adequacy for the 8-item scale was adequate (Kaiser–Meyer–Olkin = 0.63) and above the recommended 0.5 threshold (Field, 2005), and Bartlett's test of sphericity demonstrated that correlations between items were large enough for PCA ($X^2(36) = 98.18$, $p < .001$). The PCA revealed three factors, which cumulatively explained 67.44% of the variance. Factor loadings are shown in Table 2.

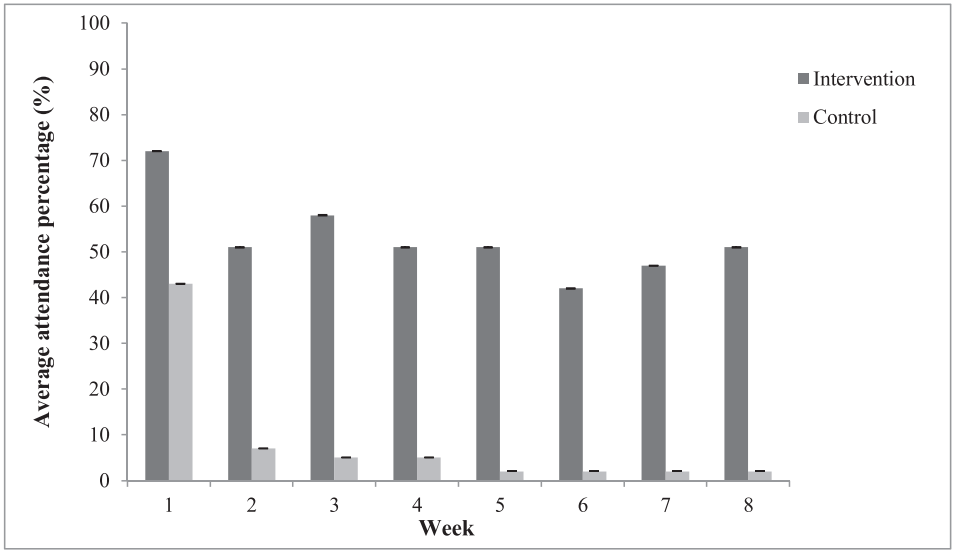

Figure 1. Average weekly attendance at reading groups (n = 85)

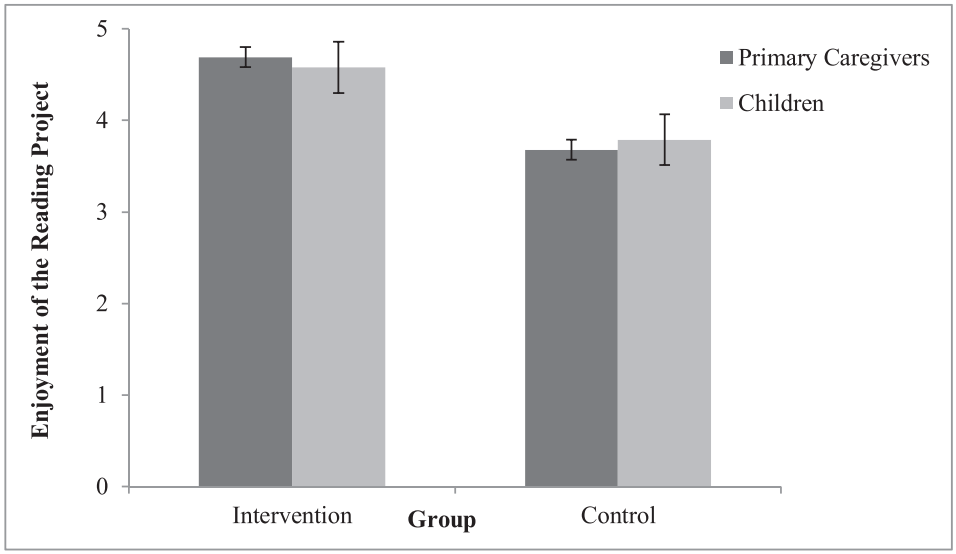

Figure 2. Caregiver and child enjoyment (n = 45)

Table 2. Factor loadings of the Home Life Questionnaire (n = 71).

	Component		
Scale item	1	2	3
1. Please rate the following statement: I feel confident in my reading ability	.93		
2. Please rate the following statement: I find reading enjoyable	.83		
3. When reading a book with your child, on average, how interested in the book are they?	.67		
4. In a typical week how often do you or other members of the family, read books to your child at other times		.83	
5. In a typical week how often do you or other members of the family, read books to your child at bedtime		.76	
6. On a typical day, how much time do you spend reading for pleasure?			.89
7. Please have a guess at the number of non-children's (i.e. adult) books in your household			.74
8. Please rate the following statement: It is difficult to find the time to read			.60

To examine pre-intervention to post intervention changes between groups, three composite measures were created and named using the three factors identified from the PCA. Descriptive statistics are presented in Table 3. Maximum scores were factor 1:12, factor 2:10 and factor 3:14. Contrary to predictions, the scores did not differ between intervention and control groups. Factor 1 (caregiver/child reading enjoyment) scores did not significantly change from pre-intervention to post intervention ($F(1, 33) = 1.58$, $p = 0.22$, $n_p^2 = 0.05$), or between groups ($F(1, 33) = 1.36$, $p = 0.25$, $n_p^2 = 0.04$), and there was no interaction between time and group ($F(1, 33) = 0.23$, $p = 0.63$, $n_p^2 = 0.01$). Factor 2 (reading with children) scores also did not significantly change from pre-intervention to post intervention ($F(1, 30) = 0.02$, $p = 0.89$, $n_p^2 = 0.001$), or between groups ($F(1, 30) = 0.92$,

Table 3. Mean (*SD*) scores for Home Life Questionnaire (three factors) and title and author checklists pre-intervention and post intervention.

		Pre		Post	
Measure	*N*	Intervention	Control	Intervention	Control
Caregiver/child reading enjoyment	35	10.42 (1.98)	11.00 (1.15)	10.84 (1.01)	11.19 (0.98)
Reading with children	29	6.65 (2.15)	7.53 (1.41)	7.00 (1.80)	7.27 (2.09)
Caregiver reading for pleasure	33	8.21 (1.75)	9.36 (3.15)	8.74 (1.24)	10.07 (2.87)
Number of titles correctly recognised	41	1.79 (2.34)	2.35 (3.33)	3.96 (2.90)	4.53 (4.96)
Number of authors correctly recognised	41	0.67 (1.49)	2.65 (4.42)	1.33 (2.14)	3.00 (4.47)

$p = 0.34$, $n_p^2 = 0.03$), nor was there an interaction ($F(1, 30) = 1.08$, $p = 0.31$, $n_p^2 = 0.04$). However, we note that there was a non-significant numerical increase in the reading with children's scores in the intervention group, from baseline to post test. Factor 3 (reading for pleasure) scores did not change significantly from pre-intervention to post intervention, although in this case, p was exactly equal to 0.05, and there was a medium effect size ($F(1, 31) = 4.20$, $p = 0.05$, $n_p^2 = 0.12$). However, there was no difference between caregivers across groups ($F(1, 40) = 2.82$, $p = 0.10$, $n_p^2 = 0.08$) and no interaction ($F(1, 31) = 0.10$, $p = 0.76$, $n_p^2 = 0.01$).

Title and author checklists. Descriptive statistics are presented in Table 3. Caregivers correctly recognised significantly more book titles ($M = 3.11$, $SD = 3.31$) than authors ($M = 1.76$, $SD = 3.27$) ($F(1, 39) = 18.55$, $p < 0.001$, $n_p^2 = 0.32$), and overall, caregivers' recognition of titles and authors increased from baseline to post test ($F(1, 39) = 9.93$, $p < 0.01$, $n_p^2 = 0.20$). However, there were no differences in caregivers' recognition of children's book titles and authors between the two groups ($F(1, 39) = 2.01$, $p = 0.16$, $n_p^2 = 0.05$), nor was there an interaction ($F(1, 39) = 2.53$, $p = 0.12$, $n_p^2 = 0.06$), contrary to our prediction.

Children's language. There were no differences in baseline scores between groups for CELF Preschool-2 standardised scores ($t(78) = 0.51$, $p = 0.61$, $d = 0.11$) and BPVS3 standardised scores ($t(76) = 0.62$, $p = 0.54$, $d = 0.13$), suggesting that the children in our groups did not differ significantly in their language at baseline (Table 4). To test the effect of the intervention, we compared how much children's vocabulary had improved from baseline to 4-week follow-up across the two reading groups. Contrary to our prediction, there was no difference in vocabulary growth between the two groups. For the CELF

Table 4. Children's standardised scores at baseline and 4 weeks after intervention. Data for Intervention and Control columns indicate mean scores (*SD*).

		Pre		Post	
	N	Intervention	Control	Intervention	Control
CELF Preschool-2	75	91.71 (17.86)	93.73 (12.77)	94.71 (16.31)	92.95 (24.56)
BPVS3	73	92.85 (27.87)	95.90 (18.84)	95.00 (27.59)	101.53 (12.05)

Preschool-2 scores, there was no main effect of time ($F(1, 73) = 0.23$, $p = 0.64$, $n_p^2 = 0.01$), or group ($F(1, 73) = 0.01$, $p = 0.97$, $n_p^2 = 0.01$) and no interaction between group and time ($F(1, 73) = 0.66$, $p = 0.42$, $n_p^2 = 0.01$). For the BPVS3 scores, there was no main effect of time ($F(1, 71) = 2.48$, $p = 0.12$, $n_p^2 = 0.03$), no main effect of group ($F(1, 71) = 1.11$, $p = 0.30$, $n_p^2 = 0.02$) and no interaction between group and time ($F(1, 71) = 0.50$, $p = 0.48$, $n_p^2 = 0.01$).

Finally, we used linear regression to determine whether there was an effect of attendance on language gains. The first model analysed the effect of group and attendance on standardised CELF Preschool-2 change scores ($n = 75$). The model predicted only 2% of variance in standardised CELF change scores and was not significant ($R^2 = 0.02$, $F(2, 72) = 0.58$, $p = 0.57$), with neither group ($\beta = 0.02$, $p = 0.90$) nor attendance ($\beta = 0.11$, $p = 0.48$) as significant predictors. Similarly, a linear regression analysis analysing the effect of group and attendance on BPVS3 change scores ($n = 73$) predicted only 1% of the variance and was not significant ($R^2 = 0.01$, $F(2, 70) = 0.28$, $p = 0.76$), with neither group ($\beta = -0.05$, $p = 0.76$) nor attendance ($\beta = -0.04$, $p = 0.79$) as significant predictors.

In a post hoc exploratory analysis, which was not preregistered, we examined the effects of the intervention on children with lower and higher language skills separately using a median split. Mean scores are presented in Table 5. Lower vocabulary scores tended to increase from time 1 to time 2 for both the intervention and control groups, whereas higher vocabulary scores remained more stable over time for both groups.

Exploratory analyses

Previously, we concluded that there was no effect of intervention group on either language outcomes. The next step was to perform additional analyses to determine whether we can confidently state that the effects of the intervention group on language outcomes are, indeed, absent. It is important to establish whether the results can, with a certain level of confidence, be attributed to a real lack of an effect or whether the most likely explanation is a statistical confound such as lack of power (Lakens, McLatchie, Isager, Scheel & Dienes, 2018). Thus, in accordance with Lakens et al. 2018, we used post hoc power analysis and simulations to determine the likelihood of detecting a significant effect with the observed effect size and the collected sample size.

We performed post hoc power simulations to assess whether the sample sizes in the present study provided sufficient power to detect effects in our data, if such effects exist. This involved resampling the data with replacement and refitting the models used in the main analysis ($R = 1{,}000$ simulations) and then performing further power simulations to identify

Table 5. Lower and higher standardised scores at baseline and 4 weeks after intervention. Data for Intervention and Control columns indicate mean scores (*SD*).

		Pre		Post	
Language score	*N*	Intervention	Control	Intervention	Control
Lower CELF2 scores	32	75.53 (12.21)	81.94 (6.15)	82.40 (14.04)	85.53 (12.74)
Lower BPVS3 scores	33	77.56 (28.61)	82.90 (23.04)	88.22 (24.02)	94.20 (12.14)
Higher CELF2 scores	43	104.47 (8.90)	102.08 (9.05)	104.42 (10.42)	98.21 (29.43)
Higher BPVS3 scores	40	111.20 (10.95)	103.76 (9.77)	103.13 (30.16)	105.92 (9.82)

the sample size that would be necessary to reach 80% power with the effect sizes we observed. Simulations were set to terminate at 10,000 participants, so this is the upper bound. In order to be able to perform these analyses, the ANOVA models were rewritten as mixed-effects models (see project folder for code). Table 6 reports the power (β) levels for the main effects of interest in the regression models (intervention versus control group) at the sample sizes collected in the present research. It also reports the sample sizes that would be needed for us to observe significant effects with the observed effect sizes 80% of the time.

These data suggest that our study was not underpowered (i.e., that we did have enough power to detect the predicted effects if they existed). For all contrasts reported in Table 4, the proportion of simulations that yielded a p value of less than 0.05 at the recruited sample sizes was low (below 10% in both cases), and for all contrasts, we would need substantially larger sample sizes for significant differences to be observed 80% of the time.

However, we also want to know whether our study is powered to detect meaningful effects and so for our second analysis, we ran equivalence tests using the two one-sided test procedures (Lakens et al., 2018). Equivalence tests provide a robust way of examining whether there are no meaningful differences across groups. Therefore, they allow us to determine whether we can reject the presence of effects as large as, or larger than, a minimal effect size of interest and accept the null hypothesis of equivalence. For the purpose of these analyses, we specified a Cohen's d of 0.5 as the minimal effect size of interest, given the previous shared book reading literature (Manz et al., 2010; Mol et al., 2008).

Table 7 reports the results for the main contrast of interest (intervention versus control group). For standardised CELF scores, the probability of detecting the presence of effects as large as, or larger than, Cohen's $d = 0.5$ is extremely low (below 5%) and so we can be reasonably confident that we have enough power to detect/reject effects of $d = 0.5$ or

Table 6. Results of power simulations for the two main comparisons of interest for the two language outcome measures: CELF-Preschool-2 standardised scores and BPVS3 standardised scores.

Outcome measure	Comparison	*N*	β level	*N* required for 80% power
CELF2 standardised score	Intervention vs. control	85	.09	697
BPVS3 standardised score	Intervention vs. control	85	.08	195

Notes: *N* is sample size in the current study. Power (β level) is the proportion of the simulations that yielded a p value of less than 0.05. *N* required for 80% power is the sample size required to observe significant effect at these effect sizes 80% of the time.

Table 7. Results of equivalence tests for the two main comparisons of interest for the two language outcome measures: CELF-Preschool-2 standardised scores and BPVS3 standardised scores.

Outcome	Comparison	*t*	*df*	*p*
CELF2 standardised score	Intervention versus control	−1.77	51.10	.04
BPVS3 standardised score	Intervention versus control	−0.57	90.57	.29

Notes: The inferential statistics here report the probability that we can reject the hypothesis that the effect size is at or above Cohen's $d = 0.5$.

higher. For standardised BPVS scores, detecting the presence of effects as large as, or larger than, Cohen's $d = 0.5$ is low (below 30%) but not high enough for us to detect/reject the effect confidently.

Discussion

Many barriers can prevent families, especially families from lower SES backgrounds, from engaging in shared reading intervention programmes. In the present study, we evaluated the success of one programme – The Reader's Shared Reading – designed to overcome some of these barriers.

The programme had a significant positive effect on attendance, and on caregivers' reports of their and their children's, enjoyment of the sessions. Families were significantly more likely to attend The Reader's Shared Reading groups than the 'Story Time' groups, with attendance rates slightly higher than those reported in previous studies with families from similar backgrounds (Lonigan, Anthony, Bloomfield, Dyer & Samwel, 1999; Whitehurst et al., 1988). In addition, the Shared Reading groups were rated more favourably than the 'Story Time' groups. These findings suggest that The Reader successfully encouraged attendance, and that caregivers' and children's enjoyment was maintained to the end. This is not a trivial achievement: recruiting, retaining and engaging families with an intervention are important first steps in promoting a shared reading culture (Moray et al., 2004).

In sum, our findings suggest that by focusing on reading as a pleasurable activity, we can encourage families to attend, and enjoy, reading groups. Please note, however, that the differences may also be partially attributable to the differences in the content, timing and location of The Reader's Shared Reading groups and the 'Story Time' groups. We consider the role that these factors may have played in encouraging families to attend and engage with the reading groups.

We know that some parents may not feel confident in accessing certain services (Coe et al., 2008) and in visiting 'third spaces' like libraries/community centres. Thus, holding the sessions at a convenient time and in a familiar space – their child's preschool – is important (Lingwood et al., 2019). Preschools may be attached to schools in the United Kingdom, but they do not have the same education focus as schools and are not laid out in the same way. Instead, they emphasise learning through play and are designed with play in mind. Thus, families may be more comfortable attending their child's preschool than an unfamiliar public setting such as a library.

Additionally, The Reader groups took place in the child's preschool or nursery, where caregivers go every day to drop off and pick up their children. Sessions took place as soon as the children arrived at preschool/nursery so that parents arrive, with their children, at the normal time and simply stay for an extra hour. Conversely, in the 'Story Time' groups, families had to travel to a library to participate (albeit within a maximum one mile radius of their child's school), and reading groups ran at fixed times and locations that may not have been convenient for parents to attend. These factors may have discouraged families from attending (Smith et al., 2014).

Additionally, in The Reader groups, the group facilitator was educated to degree level and specifically trained in storytelling-related reading, facilitation and communication skills. As a result, the children were encouraged to talk about what was happening in the story. Children and parents were also encouraged to play an active role in the reading

session by asking open questions that prompted them to talk about the story. In contrast, in the 'Story Time' groups, the library staff had varying levels of education and did not receive specific training in storytelling. Therefore, there was considerably less emphasis on interactive responses from the children and parents, which might have been less engaging for families. Identifying the factors that encourage or discourage attendance at and engagement in interventions is an important challenge for future studies.

Contrary to our second prediction, we found no effect of the intervention on families' knowledge, attitude and behaviour, neither with our indirect measures (title and author checklist) nor our direct measure (Home Life questionnaire), which measured caregiver/child reading enjoyment, reading with children in a typical week and caregiver reading for pleasure. In terms of caregiver/child reading enjoyment, it could be argued that there was little scope for improvement because the factor rating score was already close to ceiling at pretest (10.42/12), although there was more scope for change in the reading with children in a typical week (intervention pretest score = 6.65/10) and in the caregiver reading for pleasure scores (8.21/14).

However, there were some potentially promising results. In particular, we found numerical increases in reading with children in a typical week in the intervention group, relative to the control group, as well as numerical increases in reading for pleasure when the means were collapsed across group. Thus, it may be that a longer, more intensive intervention would have yielded bigger effect sizes. Consistent with this, studies that tested longer interventions, and implemented later follow-up measures, have reported gains in both caregivers' frequency/duration of reading with children and number of hours spent reading with children (Huebner, 2010). In addition, there is evidence that children from lower SES families require more intensive interventions than children from higher SES families. Indeed, Lonigan, Purpura, Wilson, Walker and Clancy-Menchetti (2013) found that a 10 to 20 min per day, 5 days a week, year-long shared book reading intervention increased vocabulary gains in preschoolers at risk for reading difficulties. Thus, we suggest that our intervention was too short to instil substantial changes and that further work is needed to determine the minimum length and intensity required to engender significant change.

Finally, contrary to our third prediction, the intervention group did not show significant vocabulary gains compared with the control group. Post hoc power simulations and equivalence tests confirmed that these are likely to be true null effects for our CELF-Preschool-2 language measure. However, the equivalence test result for the BPVS3 measure was not as clear, so we cannot determine whether meaningful differences (defined as Cohen's *d* of.05 or above) exist between the groups in terms of their impact on receptive vocabulary. Nonetheless, our power analyses showed that these effects on BPVS3 scores are small and so we would need larger sample sizes to have enough power to detect significant effects at 80% power. In conclusion, further research with a larger sample size is needed to draw robust conclusions about the effect of the intervention on children's BPVS3 scores, but even then, we expect effect sizes to be small.

There are three possible explanations why the intervention group did not show significant vocabulary gains compared with the control group. The first – that shared reading does not affect language – is not our favoured conclusion given the amount of literature demonstrating its effect (e.g., Bus et al., 1995; Mol et al., 2008). A second explanation is that shared reading is less effective when an adult reads with a group than with individual children (Wasik & Slavin, 1993). The literature here is mixed. Elbaum, Vaughn, Hughes and Moody's (2000) meta-analysis showed that at-risk children who

received a one-to-one reading intervention performed similarly on language outcome measures to children who participated in a small group intervention, whereas Marulis and Neuman (2010) reported a similar lack of difference when comparing large and small groups. However, others have reported bigger effect sizes on language outcomes for children in larger versus smaller groups (Mol, Bus & de Jong, 2009). It is likely that different interventions favour different group sizes; for example, Powell, Burchinal, File and Kontos (2008) reported that children are more engaged in academic activities in smaller group but more engaged in play activities when alone. The effect of group size should be investigated further.

The third explanation concerns lack of attendance. Although the intervention group families attended significantly more sessions than the control group families, they still only attended 53% of the groups on average. Thus, despite our efforts to encourage attendance and engagement, the children may not have taken part in enough sessions to affect their language. This is crucial because the degree to which families engage or participate has been shown to be important in the effectiveness of emergent literacy interventions (Reese et al., 2010; Whittaker & Cowley, 2012). For example, Pillinger and Wood (2013) found that a 6-week dialogic reading intervention failed to significantly improve children's language gains relative to a control group and argued that lack of parental engagement, as measured by log books and tape recordings of reading sessions, may have contributed to this null result. Further work is, thus, necessary to determine how much engagement is required before we see substantial gains in children's language.

Practical implications

These findings highlight the importance of evaluating the effectiveness of real-world interventions designed outside of the research community. The Reader's Shared Reading was successful at encouraging attendance and engagement with the intervention using evidence-based solutions (e.g., by building relationships with families through book reading 'taster' sessions and by holding groups in familiar and local locations and at a time of day convenient for families). Despite this, the intervention did not have a significant effect on caregivers' home literacy practices or on children's language development.

In the future, programme design should take into account the fact that caregivers with busy lives are unlikely to attend every session. Although caregivers committed to, and enjoyed The Reader's Shared Reading programme, they missed about half of the reading sessions on average. This likely reflects the fact that families with young children have a number of stresses in their everyday lives, which leave caregivers with less time or energy with which to engage in such activities (Snow et al., 1982). That said, there is some evidence that participating in interventions that emphasise parent–child interactions can alleviate some of this stress (Huebner, 2000). These themes have been explored in other papers from this project (see Hall, Levy & Preece, 2018; Lingwood et al., 2019). Therefore, it is important to provide the kind of support that motivates families to attend interventions.

Mayer, Kalil, Oreopoulos and Gallegos (2018) argued that the financial and practical stressors that disadvantaged parents face mean that disadvantaged parents are more likely to discount the future more than advantaged parents. This is because these stressors force parents to deal only with the present, leaving little time or energy for parents to think about

the future. However, encouragingly, Mayer et al. showed that behavioural tools such as weekly text reminders, goal setting (e.g., committing to reading a book a day with my child) and social rewards (e.g., monetary incentives) encouraged disadvantaged families to think about the future benefit of engaging in a reading intervention. These tools more than doubled the amount of time that disadvantaged families spent reading with their children, relative to a control group who did not receive these behavioural tools. Note that in the current study, both weekly text reminders and social rewards (monetary incentives and library card incentives) were used to encourage families to attend and engage with both the intervention and the control group. Nonetheless, future studies should explore how behavioural tools might mediate engagement and attendance by encouraging families to think about the future gains of an intervention.

We also suggested previously that the programme may not have been long enough to have a significant effect on family reading habits. Notwithstanding this point, the danger of significantly intensifying or lengthening an intervention is that it may discourage caregivers from attending. It may be hard to find a happy medium between an intervention long and intensive enough to have an effect and one that is flexible enough to fit into caregivers' lifestyles. One solution may be to run the weekly sessions with children even when caregivers do not attend. This would ensure that children benefit from weekly reading sessions even when caregivers are not present or when attendance does not translate into changed literacy practices in the home. Additionally, The Reader could run occasional caregiver-focused sessions, alongside the weekly sessions. This would increase intensity without jeopardising momentum.

Finally, organisations could train practitioners, such as teachers, preschool staff, volunteers, and library staff, as facilitators, especially because practitioner-focused interventions may be more effective than caregiver-focused ones (Marulis & Neuman, 2010). A dual practitioner–caregiver approach would allow practitioners to undertake training that enables them to run shared reading sessions in the preschool and caregivers to undertake training that allowed them to implement what they have learned in the home. Additionally, assessments that link directly to the intervention often have more positive outcomes than those that do not (Marulis & Neuman, 2010). Therefore, preschool education policymakers and practitioners should be looking more favourably at explicit instruction interventions than they are currently. A comparison of the effectiveness of explicit and implicit methods is crucial to improve vocabulary for very young children.

Summary

Families were significantly more likely to attend The Reader's Shared Reading programme than the 'Story Time' groups and rated The Reader's programme more favourably than the 'Story Time' groups. However, the programme did not have a significant effect on home literacy practices nor did it improve children's vocabulary. Nonetheless, the intervention may or may not have had a significant effect on other language measures and behaviours during shared book reading. Although beyond the scope of the current paper, we are also investigating this in Lingwood, Lampropoulou, de Bezenac, Billington and Rowland (in prep). Testing longer/more intensive interventions or interventions, which engage early year's practitioners, as well as families, would be a fruitful avenue for future research on improving children's language development across the whole SES spectrum.

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Data Availability Statement

Data, scripts and output files are available in a project folder (https://osf.io/suy8h/) (Lingwood, J., Billington, J., & Rowland, C. (2020). RCT.xlsx, *Open Science Framework, Version 1*. Available: https://osf.io/f7ktu/?view_only=e6f0b6f865ea4aa38de679afba014790).

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Dr Jamie Lingwood (j.lingwood@leeds.ac.uk) is a research fellow in the Department of Linguistics & Phonetics at the University of Leeds.

Professor Josie Billington (jbilling@liverpool.ac.uk) is a professor in the Department of English and deputy director for the Centre for Research into Reading, Literature and Society at the University of Liverpool.

Professor Caroline Rowland (Caroline.Rowland@mpi.nl) is the director of the Language Development Department at the Max Plank Institute for Psycholinguistics, Professor at the Donders Institute at Radboud University and professor at the ESRC International Centre for Language and Communicative Development (LuCiD Centre) at the University of Liverpool.

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Address for correspondence: Jamie Lingwood, Department of Linguistics & Phonetics, University of Leeds, Michael Sadler Building, Leeds LS2 9JT, UK. Email: j.lingwood@leeds.ac.uk