



Enhancing vocabulary, print awareness and phonological awareness through shared storybook reading with low-income preschoolers

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Abstract

The current study compares the effects of two shared storybook reading (SSR) interventions on language and emergent literacy skills of low-income preschoolers. The control intervention targeted language and print awareness, skills for which there is strong evidence of the effect of SSR. The experimental intervention added a focus on phonological awareness, a skill for which there is less evidence of the effect of SSR. Following the interventions, results indicated that the experimental group ($n = 10$) outperformed the control group ($n = 13$) on phonological awareness scores, but not on vocabulary and print awareness scores. The study also compared the outcomes of the experimental intervention for the low-income participants with the skills of higher-income preschoolers who did not receive intervention. The low-income children in the experimental condition outperformed their higher-income peers ($n = 12$) on all three measures. The experimental intervention offers promising techniques for SSR activities in childcare centres.

Keywords

emergent literacy, language, preschool, prevention, storybook reading

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Introduction

In North America, approximately one third of students in the fourth grade cannot read at their grade level (Lee, Grigg and Donahue, 2007). This proportion is even higher among children reared in poverty. The gap in reading success between children from lower- and higher-income families is due in part to the amount and the quality of language- and literacy-related interactions in their environment during the preschool years (Hart and Risley, 1995). Given that the difficulties of low-income children are generally environment-related, prevention efforts can be very valuable for these children (Dickinson, McCabe and Clark-Chiarelli, 2004). The current study aims to contribute to the literature regarding the prevention of reading and writing difficulties among these preschoolers, by investigating the effects of an intervention using shared storybook reading (SSR) on language and emergent literacy development.

SSR is the interaction that occurs between a child and an adult when they share a storybook (Ezell and Justice, 2005). A review of the literature by Scarborough and Dobrich (1994) showed that the frequency of SSR accounts for 8 per cent of the variance in reading achievement in school. A meta-analysis conducted by Bus, van IJzendoorn and Pellegrini (1995) found a medium effect size ($d = 0.59$) for frequency of SSR, which explained 8 per cent of the variance not only in reading achievement, but also in language and emergent literacy skills. In fact, the relation between frequency of SSR and reading achievement is largely mediated through children's language and emergent literacy abilities (Sénéchal, LeFebvre, Thomas and Daley, 1998; Whitehurst, Epstein, Angell, Payne, Crone and Fischel, 1994). Although, it may appear that the contribution of SSR exposure to later literacy skills is limited, based on these data, the overall impact of SSR on literacy acquisition may be underestimated for several reasons. First, these studies focused on the frequency of SSR, not on the quality of the interactions. Sénéchal et al. (1998) argued that SSR activities would have more impact if explicit instruction on print-related skills were incorporated. Further, SSR intervention studies often used small sample sizes and therefore must demonstrate larger effects in order to show statistically significant results. Finally, Lonigan (1994) and Ezell and Justice (2005) convincingly argued that, unlike socioeconomic background, intelligence or temperament, the amount of SSR children receive can be easily influenced by reading programmes in educational and home settings. Moreover, these programmes are inexpensive and easily incorporated into these settings (Huebner, 2006).

SSR offers a high-quality context because it is favourable for the implementation of an embedded-explicit approach (Justice and Kaderavek, 2004), which is highly recommended for the prevention of reading and writing difficulties. First, SSR provides the adult with the opportunity to engage in positive and meaningful literacy-oriented interaction with children. An embedded-explicit approach promotes the incorporation of explicit instruction in this natural context. These explicit teaching moments are an essential element to emphasize the skills needed for literacy development (Justice, Chow, Capellini, Flanigan and Colton, 2003; Sénéchal et al., 1998). The language and literacy features of books can be overtly highlighted to the children. For example, the adult can interrupt the storyline in order to make explicit comments about these features. Direct instruction embedded in an SSR context can thus enhance skills that can facilitate literacy development.

SSR intervention studies

Research has demonstrated that SSR facilitates language development and emergent literacy in low-income preschoolers when provided by a variety of interveners (e.g. parents, teachers, speech therapists) and in diverse settings such as childcare centres, preschools and homes (e.g. Huebner, 2000; Justice and Ezell, 2002; Lonigan and Whitehurst, 1998; Whitehurst, Arnold, Epstein, Angell, Smith and Fischel, 1994). The outcome measures used in these studies varied according to the type of strategies that were incorporated in the reading sessions and were usually associated with the skills believed to be the best predictors of reading and writing achievement in school. Meta-analyses conducted by the National Early Literacy Panel (2008) and by Hammill (2004) confirmed that the best predictors of later literacy achievement are language, print awareness (including alphabet knowledge) and phonological awareness, and that these skills can be targeted in order to prevent literacy difficulties.

Language

Language skills are good predictors of future text comprehension and production (National Early Literacy Panel, 2008; Storch and Whitehurst, 2002). Low-income preschoolers enter kindergarten already showing a discrepancy in their oral language development when compared with their peers from the middle classes (Dickinson and Snow, 1987).

The seminal work of Grover J. Whitehurst and his colleagues provided strong evidence that SSR interventions using dialogic reading strategies can produce measurable gains in children's language skills, such as vocabulary and syntax (Arnold, Lonigan, Whitehurst and Epstein, 1994; Arnold and Whitehurst, 1994; Lonigan and Whitehurst, 1998; Valdez-Menchaca and Whitehurst, 1992; Whitehurst, Arnold et al., 1994; Whitehurst, Falco, Lonigan et al., 1988). Dialogic reading strategies actively engage the child through completion, recall, open-ended, wh- and distancing questions. The adult verbally evaluates and expands the child's response and repeats the initial question at a later time to verify the new learning.

Another group of studies focused specifically on vocabulary development through SSR (e.g. Elley, 1989; Justice, Meier and Walpole, 2005; Penno, Wilkinson and Moore, 2002; Robbins and Ehri, 1994; Sénéchal, 1997). According to these studies, two main factors can improve vocabulary learning: repeated exposure and elaboration of the meaning of words. Children learn new words more easily when they are exposed to them more than once during SSR (Sénéchal, 1997). They also make more gains in vocabulary development when the adult elaborates the meaning of the new word by providing a definition or a synonym, initiating role-play, pointing to a picture related to the new word or using the word in another sentence (Elley, 1989; Justice, Meier et al., 2005; Penno et al., 2002; Robbins and Ehri, 1994).

The target words selected for vocabulary instruction are a critical factor in providing a stronger foundation for text comprehension and production. According to Beck, McKeown and Kucan (2002), words can be classified into three tiers. The first tier includes high-frequency words that are used in everyday oral communication. The second comprises less-frequent words that describe relatively common concepts. The third tier is represented by specialized vocabulary or jargon specific to a field. Beck et al. (2002) recommend that vocabulary instruction target second-tier words because they are more likely to be used in books and written material.

Print awareness

Print awareness refers to the forms, conventions and functions of print, including alphabet knowledge (Justice and Ezell, 2001). It includes skills such as: understanding that print carries meaning; being aware of environmental print; being able to handle books properly; understanding the directionality of print; being familiar with major book elements such as the cover, title or author; and knowing the letters of the alphabet. These basic skills

enable children to understand what print looks like, how it works and why it is used (Adams, 1990). Before they enter kindergarten, low-income children tend to show weaker print awareness skills than their middle-class peers (Justice and Ezell, 2002).

SSR provides an appropriate context to target print awareness (Stahl, 2003). Studies have shown that print referencing strategies improve print awareness skills (Justice and Ezell, 2000, 2004; Lovelace and Stewart, 2007; van Bysterveldt, Gillon and Moran, 2006). These strategies focus children's attention towards the forms (e.g. alphabet letters), conventions (e.g. reading directionality) and functions (e.g. print represents speech) of print. During SSR, the adult can systematically and explicitly use non-verbal cues such as following the text with his or her finger while reading, or verbal cues such as interrupting reading in order to talk about a print concept explicitly.

Phonological awareness

Phonological awareness refers to sensitivity to the sound units of language, such as syllables, rhymes and phonemes, and the ability to manipulate these units (Gillon, 2004). The knowledge about the sound structure of their language that phonological awareness provides can lead the way to mastering the alphabetic principle that is needed to develop word recognition and spelling skills (Adams, 1990). Children from low-income backgrounds tend to show weaker phonological awareness skills than their peers from the middle classes before they enter kindergarten (Chaney, 1994).

In contrast to most phonological awareness training programmes that have adopted a structured and decontextualized approach, Richgels, Proremba and McGee (1996) and Hoffman (1997) proposed using a more holistic and meaningful context, such as SSR, for phonological awareness intervention. This type of intervention would facilitate the generalization of phonological awareness skills because it would use an authentic literacy-oriented context. Ezell and Justice (2005) and Hammett Price and Young Rusher (2006) developed detailed embedded-explicit approaches to target phonological awareness at the level of the syllable, rhyme and phoneme through SSR activities. However, few empirical studies have been published to verify the efficacy of these approaches.

Ukrainetz-McFadden (1998) introduced the 'sound talk' strategy, where the adult explicitly discusses and asks questions about sounds in the words during shared reading and writing activities. In a study by Ukrainetz, Cooney, Dyer, Kysar and Harris (2000) to verify the efficacy of this strategy to promote

phonological awareness, 36 middle-class children aged between five and six years were randomly assigned either to an experimental group, which received sound talk embedded in SSR sessions, or a control group, which received no intervention. The experimental programme was provided by a trained instructor, to small groups of children, on three days a week for 30 minutes, for a period of seven weeks. There was a significantly greater improvement in phonemic awareness in the children in the experimental group when compared to the control group. Skibbe, Behnke and Justice (2004) conducted a similar study in which they trained five mothers to ask questions addressing phonological awareness during SSR activities with their language-impaired four-year-old children. The mothers were asked to read a storybook four times during a one-week period. The results showed that some parents learned to use these types of questions, but results concerning the children's phonological awareness skills were not reported. Similarly, Justice, Kaderavek, Bowles and Grimm (2005) conducted a feasibility study in which 11 parents were instructed to engage in phonological awareness tasks at home after each SSR session. These parents were asked to perform these tasks with their young children with language impairment over a 10-week period. Eleven other parents, trained in vocabulary-facilitation tasks with their language-impaired children, were used as a control group. The results showed greater improvement on a rhyming task only for the children from the experimental group.

Multiple outcomes

In their review of evidence-based approaches, Justice and Pullen (2003) recommended that preventive activities, such as SSR, should target language and emergent literacy skills simultaneously. From a theoretical point of view, there are many reasons to support this recommendation. According to Lonigan (2006), vocabulary, print awareness and phonological awareness remain modular in the emergent literacy period, that is, improvement in one area does not directly lead to improvement in the others. Vocabulary growth may facilitate phonological awareness development, but the latter still needs to be addressed specifically. In addition, language skills and emergent literacy skills contribute to different but equally important components of reading and writing (Storch and Whitehurst, 2002). Language skills assist in text comprehension and production, but print awareness and phonological awareness support word recognition and spelling. Finally, phonological awareness training studies have shown that it is more powerful when combined with letter

knowledge training, an important component of print awareness (Bus and van Ijzendoorn, 1999).

From a clinical point of view, there are benefits of targeting language and emergent literacy skills simultaneously through SSR. It is an activity that is often already part of the child's daily routine, both at home and at the childcare centre. However, intervention studies using SSR have mainly addressed vocabulary and print awareness development, often in isolation, and very few have addressed phonological awareness. Whitehurst, Epstein et al. (1994) conducted an intervention study using dialogic reading strategies in SSR sessions combined with a letter and sound awareness programme. The 32-week intervention took place in the classrooms and in the homes of 164 low-income preschoolers attending Head Start programmes. Classrooms were randomly assigned to intervention and control conditions. The control condition involved the regular Head Start curriculum (an early intervention programme in the USA). The intervention produced major significant gains in writing and print awareness. The effects were less striking for other skills: improvement in linguistic awareness was detectable only on a first letter-sound identification task and changes in language skills were significant only in preschoolers whose parents were actively involved in the at-home SSR activities. This combined intervention is promising because it targets simultaneously the skills that are believed to be the best predictors of reading success. However, in contrast to SSR, it implies the implementation of a structured linguistic awareness programme, a type of activity that is not prevalent in most childcare settings.

Williams (2006) and Cabell, Justice, Vukelich, Buell and Han (2007) discussed how to incorporate phonological awareness, print awareness and language instruction into SSR. Williams (2006) based her approach on the original work of Davis (2004) who developed the Enhanced Dialogic Reading programme in her doctoral thesis. Davis (2004) trained eight middle- to upper-class parents of four- to five-year-old children with typical development to use dialogic reading strategies, including explicitly talking about language, phonological awareness and print awareness during SSR activities at home with their child. Oral language and emergent literacy skills of the children were measured before and after the training programme. Despite the small sample size ($n = 8$), the children made significant progress in the phonological awareness and print awareness measures and in the 'Mean Length of Utterance' measure in oral language. However, given that there was no control group, it is difficult to conclude that the effects were specific to the training programme. Cabell et al. (2007) detailed the Strategic and Intentional Shared Storybook Reading approach implemented by the Delaware Early Reading

First Project. This approach promotes the use of adult reading cues before, during and after reading. However, no empirical data on the efficacy of this approach were reported.

The current study

Interventions designed to prevent reading and writing difficulties are needed, especially for low-income preschoolers. There is clear evidence that SSR interventions can promote the development of language and print awareness. In order to maximize the likelihood of future reading and writing achievement, phonological awareness skills should also be addressed, but there is limited empirical evidence regarding the efficacy of targeting all three types of skills simultaneously via SSR. Further, preventive intervention should aim to bring the skills of low-income children up to the level of their higher-income peers and should be conducted under natural conditions similar to those found in childcare centres in order to increase the external validity of the results. The current study, therefore, addressed the following research questions:

1. What are the relative effects of two SSR interventions conducted in childcare centres on the performance of low-income preschoolers in language and emergent literacy tasks? The control intervention targeted skills that have been shown to improve using SSR: language and print awareness. The experimental intervention added a focus on phonological awareness, a skill for which there is less evidence of the impact of SSR.
2. Following the experimental intervention, how does the performance of low-income preschoolers in language and emergent literacy tasks compare with that of higher-income children who do not receive intervention?

Method

Study design

The study used a quasi-experimental pre-test/post-test design including an experimental, a control and a comparison group. The experimental group (EG) included low-income preschoolers who participated in the experimental SSR intervention programme, which explicitly targeted language, print awareness and phonological awareness. The control group (CG1) included low-income preschoolers who received similar SSR intervention in which only language and print awareness were explicitly targeted; phonological awareness

was not targeted explicitly, and therefore more time was dedicated to language and print awareness. The comparison group (CG2) included higher-income children who did not receive any specific intervention.

Seven classrooms of children from seven different publicly subsidized childcare centres in Québec City, Canada, participated in the study. Four of these childcare centres were located in low-income neighborhoods and three were located in higher-income neighborhoods. The four low-income classrooms were randomly and equally assigned to the experimental and the control interventions. Therefore, randomized assignment was done based on classrooms, not on single participants. This procedure kept the classrooms intact in order to increase the external validity of the results. The children assigned to the comparison condition came from the three higher-income classrooms.

Participants

Recruitment. The inclusion criteria for all the children were French as their native language (i.e. exposed to French 90 per cent of the time or more) and that reading had not yet been acquired. Exposure to French and reading status were determined by parental report. For children in the higher-income group (CG2), additional inclusion criteria were: normal language development, according to parents' and educators' reports; never having received speech-language pathology services; and a family income above the cut-off established by Statistics Canada for the classification of low income (Statistics Canada, 2006). This cut-off takes into account the annual family income before taxes, the number of members of the family unit and the size of the residential area. For children in the low-income groups (EG and CG1), the only additional inclusion criterion was a family income below Statistics Canada's low-income cut-off. Children in the low-income groups were not excluded if they received speech-language pathology services or if they showed a language delay, as reported by their parents or educators, given the high prevalence of language delays in the low-income population (Dickinson and Snow, 1987) and that language delays are a risk factor for future reading and writing success (Catts, Fey, Zhang and Tomblin, 1999). This non-exclusion criterion was applied for external validity concerns.

Forty-two eligible participants, 30 from the low-income and 12 from the higher-income environments, were screened for hearing status, cognitive skills and receptive vocabulary. Hearing screening was performed using a

Maico MA 27 portable audiometer and a GSI 37 Auto Tympanometer. Two children in the low-income day care centres did not pass the hearing screening test. They were excluded from the study and were referred for services in audiology. Cognitive skills were screened using the Leiter International Performance Scale-Revised (LIPS-R; Roid and Miller, 1997), a non-verbal battery. All children performed within -2 SD compared to their peers on the brief IQ measure. Receptive vocabulary screening was carried out using the *Échelle de vocabulaire en images Peabody* (ÉVIP; Dunn, Thériault-Whalen and Dunn, 1993). All higher-income children performed within -1.5 SD when compared with their peers, although not all low-income children did so. As noted above, low-income children were not excluded on the basis of their performance in this language test.

In total, 40 children met the inclusion criteria for the study: 28 were from low-income families and 12 from higher-income families. The data from five low-income children (three EG and two CG1) were excluded from the analysis because these children did not complete at least 50 per cent of the intervention sessions. The intervention participation rate was calculated by dividing the number of minutes of attendance for each child by the number of minutes of intervention. The mean participation rate was equivalent in EG and CG1: 85.3 per cent (SD = 10.2) for EG and 85.7 per cent (SD = 9.2) for CG1, $t(21) = .11$, $p = .92$.

Participant description. Table 1 shows the characteristics of the participants in each group. In order to determine whether the groups were similar prior to implementing the interventions and to rule out the possibility of group biases, statistical comparisons were made. The groups did not differ in age ($F(2, 32) = 0.04$, $p = .96$), gender distribution ($\chi^2(2, n = 35) = 0.03$, $p = .99$), and non-verbal IQ scores ($H(2) = 3.88$, $p = .14$). However, there were significant differences among the groups in vocabulary scores ($H(2) = 8.14$, $p = .02$), annual family income ($H(2) = 22.94$, $p < .01$), and parent education ($H(2) = 18.04$, $p < .01$). Follow-up comparisons revealed that only the scores from the higher-income group (CG2) were higher than those of the two low-income groups (EG and CG1) on all three measures ($p < .05$ for all). Finally, no difference was found in the distribution of children with language delay between EG and CG1 ($\chi^2(1, n = 23) = 0.43$, $p = .51$).

For descriptive purposes, the researcher met with one parent or the legal guardian of each child (with the exception of one child in CG1) in order to obtain measures of the children's exposure to language and literacy in their family. The performance of the child's primary caregiver on the ÉVIP (Dunn et al., 1993) was used as a measure of the language input at home; the

Table 1. Characteristics of the participants

Variables	Group		
	Experimental (EG) (n = 10)	Control (CG1) (n = 13)	Comparison (CG2) (n = 12)
Gender			
Number of males	6	8	7
Number of females	4	5	5
Number with language delay	4	7	0
Mean age in months (SD)	57.1 (4.3)	57.5 (3.6)	57.5 (2.9)
Mean vocabulary (SD) ^a	99.5 (14.3)	100.9 (18.5)	117.0 (10.3)
Mean non-verbal IQ (SD) ^b	95.7 (11.4)	92.2 (12.6)	101.8 (13.1)
Mean annual income in \$ (SD)	16,733 (12,463)	15,449 (8,514)	108,583 (56,877)
Mean parent education (SD) ^c	0.7 (0.9)	0.7 (0.8)	2.4 (0.7)

^aStandard score on the ÉVIP.

^bStandard score on the LIPS.

^c0 = high school not completed; 1 = high school completed; 2 = college completed; 3 = university degree completed.

receptive vocabulary skills of the primary caregiver were considered to be a reasonable measure of the vocabulary to which the child might be exposed at home. A family literacy questionnaire, a French adaptation of the questionnaire used by Sénéchal et al. (1998), was used to gather information about home literacy experiences. This questionnaire included questions about when the parent started reading storybooks to the child, how often they read books together, the frequency of reading requests from the child, the number of books in the home and the regularity with which the child visits the library. In addition to these family measures, an assessment of the language and literacy exposure was performed in each selected childcare centre classroom using Early Language and Literacy Classroom Observation (ELLCO) (Smith, Dickinson and Sangeorge, 2002). Table 2 shows the language and literacy exposure variables in each group. No difference among the three groups was found in the frequency of parents reading storybooks ($H(2) = 2.48, p = .29$), of children requesting reading ($H(2) = 0.43, p = .81$), and of children's library visits ($H(2) = 0.44, p = .80$). Significant differences were found in home language exposure ($H(2) = 10.26, p < .01$), number of books in the home ($H(2) = 8.34, p = .02$), reading onset ($H(2) = 6.23, p = .04$), and childcare centre language and literacy exposure ($H(2) = 23.56, p < .01$). Follow-up comparisons revealed that CG2 had

Table 2. Language and literacy exposure of the participants

Variables	Group		
	Experimental (EG) M (SD)	Control (CG1) M (SD)	Comparison (CG2) M (SD)
Home language exposure ^a	101.6 (16.0)	107.6 (10.6)	119.2 (8.6)
Home reading experience			
Frequency of reading/week	3.8 (2.4)	5.0 (3.8)	5.8 (2.5)
Frequency of reading requests ^b	3.6 (1.2)	3.8 (1.3)	3.9 (1.1)
Frequency of child library visits ^b	2.3 (1.1)	2.3 (1.1)	2.0 (1.0)
Number of books in the home ^c	2.5 (1.3)	2.4 (0.7)	3.5 (0.9)
Reading onset in months	13.3 (10.1)	17.7 (11.4)	8.3 (6.0)
Childcare language and literacy exposure ^d	69.1 (6.3)	84.5 (5.7)	88.0 (3.0)

^aParent standard score on the ÉVIP.

^b1 = never, 2 = seldom, 3 = sometimes, 4 = often, 5 = very often.

^c0 = none, 1 = 1–20, 2 = 21–40, 3 = 41–60, 4 = 61–80, 5 = over 80.

^dTotal score on the ELLCO.

higher scores than the two other groups for home language exposure ($p < .01$ for both) and for number of books in the home ($p = .04$ for EG and $p < .01$ for CG1). The parents of CG2 started to read books earlier to their children than did the parents of CG1 ($p = .02$). The scores for CG1 and CG2 were higher than EG in childcare language and literacy exposure ($p < .01$ for both).

Overall, these descriptive data confirm that the characteristics and the home language and literacy exposure of EG and CG1 were equivalent – the only difference was related to the childcare language and literacy exposure – and that children in EG and CG1 came from more at-risk families according to their socioeconomic status (SES) profiles and their language and literacy exposure, than did the children in CG2.

Material

Criterion-referenced instruments rather than norm-referenced tests were chosen as measures of language and emergent literacy skills because they are more appropriate for monitoring progress in specific areas (McCauley and Swisher, 1984) and norm-referenced tests of the relevant skills were not available in French. All instruments used in the current study are available from the first author.

Language measure. A receptive vocabulary instrument, similar to those developed in other studies on vocabulary acquisition from storybooks (e.g. Robbins and Ehri, 1994; Sénéchal, 1997), was developed to measure the knowledge of 15 vocabulary words that were targeted by the interventions (see Appendix). Words judged to be in the second tier according to Beck et al. (2002) were targeted. The criterion used to judge if a word is part of the second tier was based on how often it appeared in children's school books, which was verified using two French lexical databases: NOVLEX (Lambert and Chesnet, 2001) and MANULEX (Lété, Sprenger-Charolles and Colé, 2004). Words that occurred fewer than 100 times per million words in both databases were retained.

For each word, the child was asked to point to its corresponding picture among four different black and white drawings presented on a page. The picture of the target item in the test was different from the picture in the storybooks. The whole instrument included three practice items, 15 items relating to the target vocabulary words and 10 other easy high-frequency items (e.g., apple, truck) that were included in order to maintain the child's motivation during the assessment. The order of the items in the instrument was randomly assigned. Each item was worth 1 point for a maximum of 25 points.

Print awareness measure. A French adaptation of the Preschool Word and Print Awareness (PWPA) protocol (Justice and Ezell, 2001) was developed with the authorization of the authors. The PWPA uses adult-child SSR interaction with the picture book *Nine Ducks Nine* (Hayes, 1990); a French adaptation of this book was also developed with the authorization of the publisher. During the interaction, the examiner asked questions about 14 print-related concepts. Each answer is worth 1 or 2 points for a maximum of 17 points.

Phonological awareness measure. The *Épreuve préscolaire de conscience phonologique* (ÉPCP; Lefebvre, Girard, Desrosiers, Trudeau and Sutton, 2008) was used to measure phonological awareness. This instrument includes four tasks: rhyme judgment, initial consonant comparison, syllable segmentation and syllable deletion. To control for possible lexical and semantic biases, the measure uses non-words controlled for their length, syllabic structure and type of phoneme. Each task includes two training items, four practice items and 10 assessment items. The instrument also uses manipulation of wooden blocks to make the task more concrete for the child (e.g. separation of two blocks to illustrate syllable segmentation). The first two tasks (rhyme judgment and initial consonant comparison) require a yes/no response and the last two (syllable segmentation and deletion) require an oral response from the child. Each answer is worth 1 point for a maximum of 40 points.

Procedures

Assessments. The measures were administered to all children two to three weeks before beginning the interventions and then within two to three weeks after completion. The pre-test assessments were performed by the first author and trained graduate students, before the classroom randomization took place, in order to keep the experimenters blind to the classroom assignment. The post-tests were administered by a trained graduate student who was blind to the intervention for the low-income children, and by the first author for the higher-income children. The 30- to 40-minute assessment sessions took place in the childcare centres, in a separate room where visual and auditory distracters were reduced. The examiners completed the response forms on site. The phonological awareness assessments were recorded on audiotape for interrater reliability measures. For this purpose, four research assistants, blind to the intervention, listened to the children's oral production in the syllabic segmentation and syllable elision tasks from 17 per cent of the phonological awareness assessments that were randomly selected. Agreement between the first and second scoring of these tasks was 96 per cent.

Interventions. The children in EG and CG1 received four sessions a week each, from Monday to Thursday, for 10 weeks in their respective childcare centre classrooms. Each session lasted 20–30 minutes. All 160 (4 classes \times 4 sessions/week \times 10 weeks) SSR sessions were conducted by the first author. The intervention used the same five storybooks in the same order (see Appendix), each for four consecutive sessions within the same week. The same book was used again for a week after a five-week interval. These books were chosen according to the following criteria: length of approximately 25–35 pages, large and clear illustrations, few sentences on each page, use of dialogue marks and a repetitive story plot. In addition to the children participating in the study, the other children in the classroom were also included in the SSR sessions in order to keep the classrooms intact for external validity purposes. Reading sessions were provided to classrooms of seven to nine children.

In each SSR session, the adult interrupted the storyline on 11 occasions for EG and on 10 occasions for CG1 in order to incorporate various strategies. For EG, there were two interruptions for dialogic reading strategies, three for vocabulary-facilitation strategies, three for print referencing strategies and three for phonological awareness-facilitation strategies. For CG1, there were three interruptions for dialogic reading strategies, three for vocabulary-facilitation strategies, four for print referencing strategies and none for

phonological awareness-facilitation strategies. The interruptions for the vocabulary-facilitation strategies in CG1 lasted longer than those in EG, so that the amount of time spent on facilitation strategies was equivalent in the two groups receiving intervention.

The dialogic reading strategies (Whitehurst et al., 1988) prompted the children to actively engage in the storybook reading sessions and encouraged them to think beyond the content of the book by making inferences about the characters' feelings, connecting the story content to their background knowledge, giving explanations, resolving problems and making predictions. For example, the experimenter asked the children: 'Why does Emile have red dots on his face?'

The vocabulary-facilitation strategies targeted words that were in the second tier according to Beck et al. (2002) (see Appendix). The adult elaborated on the vocabulary words in many ways: by providing a definition or a synonym (e.g. 'Reeds are plants that grow near lakes.');

by showing the concept in the illustration or in the room; by miming; and by using the new word in another context (e.g. 'He got spattered by paint. We can also get spattered by mud or water.'). In order to increase the time on vocabulary elaboration in CG1 versus EG, the experimenter added explanations by using the children's background experience related to the new word (e.g. 'If you look carefully in your house, you might find a baseboard heater at the bottom of a wall to heat the room.').

The print referencing strategies targeted 10 print awareness concepts: book cover, book title, print and picture differentiation, onset of reading, print directionality, author and illustrator, dialogue marks, written language units (letter, sentence and paragraph), uppercase and lowercase differentiation and letters of the alphabet. The adult provided explicit verbal and non-verbal cues (e.g. the experimenter showed the upper left corner of a paragraph while saying: 'When we read, we always start with the first word in the upper left corner of the text.').

Finally, the phonological awareness-facilitation strategies, used only with EG, consisted of incorporating non-words into the reading of the storybook. For example, the experimenter inserted the non-word *fari* between two words in a sentence when he read the storybook. Non-words were used to bypass children's natural focus on the meaning of the words rather than on their form (van Kleeck, 1995). During the first week of the experimental intervention, before introducing the phonological awareness strategies, the children in EG were trained to flag the non-words embedded in the storyline. In the following weeks, when a non-word was identified, the experimenter wrote it on a

piece of paper to provide a concrete visual cue for the phonological awareness manipulations (e.g. tearing the word in two parts for syllable segmentation). The writing of the non-word in front of the children also provided an opportunity for the experimenter to demonstrate explicitly how to use the alphabetic principle (sound-letter correspondence) when trying to spell a new word. Nine phonological skills were then taught in this order: syllable segmentation, syllable blending, rhyme judgement, oddity judgement according to rhyme, initial syllable deletion, final syllable deletion, syllable inversion, initial consonant comparison and oddity judgement according to initial phoneme. The non-words used in the intervention with EG were different from those used in the pre-test and post-test (ÉPCP).

During a one-week period, the facilitation strategies used in the interventions targeted the same three vocabulary words and three print awareness concepts for both programmes, plus one phonological awareness skill in EG only (see Appendix). The facilitation strategies put increasing demands on the children throughout each week: the adult provided models at the beginning of the week and progressively reduced this support so that, at the end of the week, he directly prompted the children to demonstrate their skills. The phonological awareness strategies were used only in the last three sessions of the week in EG; they were not introduced on Mondays in order to allow the children to focus on the meaning of the story, as suggested by Hammett Price and Young Rusher (2006).

Treatment fidelity. In order to rule out the possibility of an effect caused by a unique storyteller for both programmes, treatment fidelity analyses were completed. Session lengths in the four classrooms were equivalent: mean session lengths were 24.9 minutes ($SD = 3.3$) and 25.5 minutes ($SD = 3.0$) for the two EG classrooms, and 24.5 minutes ($SD = 2.5$) and 24.1 minutes ($SD = 3.2$) for the two CG1 classrooms. There was no difference among the four classrooms ($F(3, 156) = 1.53, p = .21$).

Thirty of the 160 sessions were randomly selected and videotaped for analysis. An independent examiner, blind to the interventions, coded the videos, using a matrix identifying the occurrence of the 27 different facilitation strategies detailed in the Appendix that were used by the adult. The analysis compared the theoretical and observed matrices of the presence or absence of these strategies (27 strategies \times 30 storybook reading sessions = 810 cells). The theoretical matrix of the strategies was determined before beginning the interventions. The observed matrix was the one completed by the independent examiner. Only 42 of the 810 cells were different (5.2 per cent). For the 15 sessions in EG, 22 of the 405 cells (5.4 per cent) were different, and

for the 15 sessions in CG1, 20 of the 405 cells (4.9 per cent) were different. Thus, a 95 per cent treatment compliance rate was found in each given programme, compared to the theoretical programme described in the Appendix.

Analyses

To compare the relative effects of the two SSR interventions, three one-way between-groups analysis of covariance (ANCOVA) with an α level of .05 were conducted. The independent variable was type of intervention (experimental or control). The dependent variables were post-test scores on vocabulary, print awareness and phonological awareness tasks, respectively. Participants' pre-test scores on these tasks were used as the covariate in order to control for pre-existing differences between groups. To compare the performance of low-income children following the experimental intervention and that of the higher-income children who did not receive any specific intervention, the same three analyses mentioned above were performed. Preliminary verifications were conducted to ensure that there was no major violation of the ANCOVA assumptions. Because the groups were unequal in size, a type I sum of squares was used in order to weight marginal means by the size of the groups.

Results

After adjusting for the pre-test scores between EG and CG1, the children in EG performed significantly better than those in CG1 in the phonological awareness tasks in the post-test ($F(1,20) = 21.58, p < .01$). There were no significant differences in the post-test in vocabulary scores ($F(1,20) = 2.62, p = .12$), and print awareness scores ($F(1,20) = 0.06, p = .81$). After adjusting for the pre-test scores between EG and CG2, the children in EG performed significantly better in the post-test than the children in CG2 in vocabulary scores ($F(1,19) = 23.31, p < .01$), print awareness scores ($F(1,20) = 10.92, p < .01$) and phonological awareness scores ($F(1,19) = 11.81, p < .01$). Table 3 summarizes the scores of all groups for all measures in the pre- and post-tests.

Discussion

Two major findings came out of this study. It provides evidence that SSR interventions using explicit facilitation strategies can enhance not only

Table 3. Mean language and emergent literacy scores (SD) of the participants

Measures (maximum score)	Group					
	Experimental (EG)		Control (CG1)		Comparison (CG2)	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Vocabulary (25)	14.0 (2.2)	22.6 (1.3)	16.2 (2.4)	22.6 (1.3)	18.3 (2.3)	19.8 (2.1)
Print awareness (17)	6.5 (2.8)	15.0 (1.8)	5.1 (2.5)	14.4 (2.2)	9.6 (3.2)	11.8 (3.4)
Phonological awareness (40)	15.2 (5.9)	29.5 (5.6)	13.9 (7.8)	17.8 (8.1)	19.0 (7.5)	22.8 (8.2)

vocabulary and print awareness, but also phonological awareness in low-income preschoolers within a natural educational setting, such as in a child-care centre. It also suggests that SSR interventions can contribute to bridging the gap in some language and emergent literacy skills between the children from low-income families and those from higher-income environments.

Effects of the interventions

The results show that the experimental SSR intervention was more efficient than the control intervention in improving scores simultaneously for vocabulary, print awareness and phonological awareness in low-income preschoolers. Thus, value is added to the intervention when strategies targeting phonological awareness are incorporated, even if this involves devoting less time to strategies targeting other components (language and print awareness).

These findings are consistent with Davis's (2004) study of enhanced dialogic reading and with Whitehurst, Epstein et al.'s (1994) intervention study in which SSR was combined with a letter and sound awareness programme. In both studies, only skills explicitly targeted in the intervention improved significantly. The findings of the current study also suggest that explicit instruction is more efficient than implicit learning in the area of emergent literacy. In their intervention study with vulnerable preschoolers, Justice et al. (2003) also found that growth in emergent literacy was greater during an emergent literacy intervention that included explicit instruction than during an SSR intervention that included only dialogic reading strategies. Sénéchal et al. (1998) found that additional support for SSR provided by teaching may be necessary to improve reading and writing performance.

However, the current results are inconsistent with Huebner (2006) who reported that the gain produced by dialogic reading usually decreases

dramatically in group settings, even in a group of two children, compared to the one-on-one interaction in dialogic reading studies. Considerable gains were observed in both interventions in the current study, despite the fact that the intervention took place with seven to nine children at a time. Three factors could explain this discrepancy. The repeated reading and explicit instructions used in the current study may have maximized the impact of the intervention compared with dialogic reading in which repeated use of the same book and of explicit teaching is not mandatory. In addition, the criterion-referenced measures used in the current study may have been more sensitive to development in the targeted skills than the norm-referenced tests often used in dialogic reading efficacy studies.

Language and emergent literacy skills in socioeconomic groups

The results show that the language and emergent literacy post-test scores of the low-income children who received the experimental intervention exceeded those of their higher-income peers, even when they were adjusted for pre-test scores. The experimental intervention is thus promising for its contribution to helping low-income children to catch up with their higher-income peers in some language and emergent literacy skills. Given the restricted range of skills measured by the criterion-referenced tests used, especially in vocabulary, where a clear 'teach to the test' effect was observed, we cannot generalize the results to broader skills such as receptive and expressive language as measured by norm-referenced tests.

There is evidence that prevention among children who enter school with weaker language and emergent literacy skills can be valuable under certain conditions. Vellutino and Scanlon (2002) found that intervention significantly reduces the prevalence of children experiencing reading and writing difficulties in school only if it is provided early and intensively, and if it is adapted to the children's individual strengths and weaknesses. SSR strategies included in the experimental intervention are then good candidates to meet these requirements.

Clinical implications

In the experimental intervention, explicit strategies were incorporated into the SSR sessions to enhance the language and emergent literacy skills that make important contributions to reading and writing achievement in school. The innovative feature of this SSR intervention is the use of non-words to perform

phonological awareness tasks. The use of non-words also gave rise to secondary benefits during the intervention. Asking the children to flag non-words embedded in the storyline prompted them to signal when they did not understand a word. In fact, the children in EG raised their hands when they heard a word or an expression they did not know, thinking that they were non-words. Thus, embedding non-words in the reading sessions may also be useful for identifying words that are unfamiliar and that may be appropriate vocabulary intervention targets. This strategy also, incidentally, kept the children motivated to listen carefully to the whole story because they had to maintain their attention in order to identify the non-words embedded in the storyline. Consequently, the high frequency of repeated reading was more acceptable in EG than in CG1. The adult conducting the intervention noted anecdotally that CG1 children made some negative comments about the length of the reading sessions and the repeated use of the same book that were not observed in EG.

It is reasonable to suggest that strategies targeting phonological awareness could be introduced in existing SSR activities in childcare centres in addition to print referencing strategies, vocabulary elaborations and dialogic reading strategies. The experimental SSR intervention does not require any specific material other than storybooks adapted to the children's level, pieces of paper and a pen. However, training would be necessary: educators tend not to use many of these techniques in their current SSR activities (Girolametto, Weitzman, Lefebvre and Greenberg, 2007). Given the greater complexity of the experimental intervention compared to most other SSR interventions that focus on one area of language and emergent literacy, careful planning of the training will be required. There is convincing evidence that parents and educators can be trained relatively quickly to use dialogic reading strategies (Arnold et al., 1994; Huebner, 2000; Lonigan and Whitehurst, 1998) or print referencing strategies (Ezell and Justice, 2000; Justice and Ezell, 2000), using observational learning through a videotape training format combined with face-to-face expert demonstration. Justice, Kaderavek et al. (2005) successfully trained parents to engage their children in phonological awareness tasks at the end of storybook reading sessions, by explaining the goal, modelling and providing practice opportunities followed by feedback from an expert. A combination of approaches, including explanations, interactive discussions, videotape demonstration and analysis, role-playing, handouts and coaching (e.g. the Hanen in-service training format) seems more promising for training educators to use multiple strategies for facilitating language and emergent literacy skills (Flowers, Girolametto, Weitzman and Greenberg, 2007; Girolametto et al., 2007).

The current study involved French-speaking preschoolers; however, there is evidence that strategies to facilitate language and emergent literacy can produce positive effects in children speaking other languages, particularly English (e.g. Justice and Ezell, 2000; Sénéchal, 1997; Ukrainetz et al., 2000). However, in order to apply the current experimental programme to preschoolers speaking other languages, it will be necessary to modify the non-words used for the phonological awareness-facilitation strategies, and the sequence of phonological tasks the children are asked to perform in order to reflect the specificity of the language of intervention.

Limitations of the study

Although the number of children in each group was small, restricting the generalization of the results beyond similar groups of children, statistically significant results were nonetheless obtained. Given that the interventions were delivered by a qualified speech-language pathologist, other studies are needed to verify if similar results can be obtained when the interventions are provided by trained educators in childcare centres or by trained caregivers in home settings. Furthermore, the quantitative measures gathered in the current study may not be fully representative of the children's performance in language and emergent literacy tasks in a natural context. For example, children may succeed in phonological awareness tasks with non-words, but not with real words. Adding additional outcome measures would provide more compelling evidence for the efficacy of experimental intervention. In addition, the potential impact of the intervention on other important language skills that contribute to reading and writing acquisition has not been investigated. A more comprehensive assessment of oral language skills would be useful in future studies. A follow-up study of these participants is also needed to verify whether gains in language and emergent literacy from the SSR sessions are maintained over time and whether they are associated with reading and writing success in school. Finally, few children with language disorders in EG and CG1 were receiving intervention services in speech-language pathology; that might also have contributed to their progress during the interventions.

Conclusions

The findings support the view that explicit instruction incorporated in SSR contexts can be used as a preventive activity with low-income preschoolers.

This embedded approach effectively increased skills that are highly predictive of later reading and writing achievement in school, and thus could potentially contribute to a reduction in reading failure in schools if it is used intensively, and early on, during the child's development.

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Appendix

Content of the 10-week SSR interventions

Storybook: *Qu'est-ce que tu fais là?* (Gamble, 2001)

Week 1: 2 DRS^a for EG and 3 for CGI: prediction, inferences on characters' feelings; 3 VFS^b for both groups: *roseaux* (reeds), *escalada* (scaled), *plinthé* (baseboard); 3 PRS^c for EG and 4 for CGI: book cover, print/picture differentiation, onset of reading; 3 PAFS^d for EG only: non-word flagging training (*vanzi*, *sinfon*, *danbin/koutin*, *plouvon*, *kiplon/krouplon*, *fanvolin*, *tonpada*)^e

Storybook: *Émile est malade* (Romeo, 2005)

Week 2: 2 DRS for EG and 3 for CGI: explanation, connection to background knowledge; 3 VFS for both groups: *gommettes* (stickers), *éclaboussé* (spattered), *varicelle* (chicken pox); 3 PRS for EG and 4 for CGI: book title, onset of reading, print directionality; 3 PAFS for EG only: syllable segmentation (*fânzi*, *oubin*, *tilon/pumon*, *natin*, *livu/dilpon*, *mascron*, *pontalimo*)

Storybook: *Le plus féroce des loups* (Poillevé, 2003)

Week 3: 2 DRS for EG and 3 for CGI: inferences on characters' feelings, problem solving; 3 VFS for both groups: *tanière* (*lair*), *dodu* (*plump*), *chaumière* (*thatched cottage*); 3 PRS for EG and 4 for CGI: book title, dialogue marks, alphabet; 3 PAFS for EG only: syllable blending (*jouvin*, *machon*, *nazini/golin mufan*, *banzon/bilna*, *plouskri*, *jabulmon*)

Storybook: *Et si j'étais...* (Timmers, 2000)

Week 4: 2 DRS for EG and 3 for CGI: connection to background knowledge, prediction; 3 VFS for both groups: *trompe* (*trunk*), *palimés* (*webbed*), *tentacules* (*tentacles*); 3 PRS for EG and 4 for CGI: letter/sentence/paragraph concepts, uppercase/lowercase differentiation, alphabet; 3 PAFS for EG only: rhyme judgment (*malou*, *linou*, *nonplinningo*, *kauna*, *fonto/laftus*, *jimal*, *tilus*)

Storybook: *Petit cochon veut voler* (Cort, 2004)

Week 5: 2 DRS for EG and 3 for CGI: inferences on characters' feelings, connection to background knowledge; 3 VFS for both groups: *échasses* (*stilts*), *pelage* (*fur*), *ressort* (*spring*); 3 PRS for EG and 4 for CGI: author/illustrator, dialogue marks, uppercase/lowercase differentiation; 3 PAFS for EG only: rhyme oddity (*jonada*, *mintou*, *linba*, *mouki*, *neulou*, *rallidujon*, *tammin*, *boulin*, *polan*, *linon*, *marou/ratif*, *vimos*, *roukif*, *ridouli*, *zoumo*, *rétouli*)

Week 6: DRS for EG and 3 for CGI: connection to background knowledge, explanation, 3 VFS for both groups: *roseaux*, *escalada*, *plinthé*, 3 PRS for EG and 4 for CGI: author/illustrator, dialogue marks, print directionality, 3 PAFS for EG only: first syllable deletion (*kona*, *sinou*, *téral/roupon*, *pallu*, *noulé/galno*, *falkré*, *tolpat*)

Week 7: 2 DRS for EG and 3 for CGI: problem solving, inferences of? on characters' feelings; 3 VFS for both groups: *gommettes*, *éclaboussé*, *varicelle*; 3 PRS for EG and 4 for CGI: alphabet, print/picture differentiation, uppercase/lowercase differentiation; 3 PAFS for EG only: last syllable deletion (*fimo*, *choba*, *dajjirma*, *dano*, *kédan/lispou*, *falkron*, *chamildo*)

Week 8: 2 DRS for EG and 3 for CGI: prediction, explanation; 3 VFS for both groups: *tanière*, *dodu*, *chaumière*; 3 PRS for EG and 4 for CGI: print/picture differentiation, onset of reading, letter/sentence/paragraph concepts; 3 PAFS for EG only: syllable inversion (*zolu*, *vémi*, *témou/silou*, *rapo*, *pouna/nalti*, *mistra*, *kouldas*)

Week 9: 2 DRS for EG and 3 for CGI: explanation, problem solving; 3 VFS for both groups: *trompe*, *palimés*, *tentacules*; 3 PRS for EG and 4 for CGI: book cover, book title, author/illustrator; 3 PAFS for EG only: Initial consonant comparison (*zali*, *zomé*, *toupo/vinou*, *paron*, *pantijanon*, *joupi*, *sitou*)

Week 10: 2 DRS for EG and 3 for CGI: inferences on characters' feelings, connection to background knowledge; 3 VFS for both groups: *échasses*, *pelage*, *ressort*; 3 PRS for EG and 4 for CGI: book cover, print directionality, letter/sentence/paragraph concepts; 3 PAFS for EG only: initial consonant oddity (*fari*, *félo*, *jati*, *jélon*, *bino*, *békoni/chiapon*, *chova*, *danlou*, *dukin*, *souna*, *simul péran*, *poma*, *garni*, *goupin*, *ânpo*, *télan*)

^aDRS: Interruptions for dialogic reading strategies. ^bVFS: Interruptions for vocabulary-facilitation strategies. ^cPRS: Interruptions for print referencing strategies. ^dPAFS: Interruptions for phonological awareness-facilitation strategies. ^eNon-words used on Tuesday/Wednesday/Thursday.