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Text features and preschool teachers' use of print referencing

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Storybook features, such as linguistic richness and print salience, potentially influence how a teacher references print. This study addressed two research questions: (1) to what extent does the linguistic richness and print salience of children's storybooks relate to teachers' use of print referencing? and (2) to what extent is there an interplay between storybooks' linguistic richness and print salience when predicting teachers' use of print referencing? Fifty-seven teachers participated in a whole-group read-aloud intervention while including print-referencing behaviours. Researchers analysed teacher videos in order to (1) document teachers' use of print referencing and (2) document the storybook's linguistic features and print salience. Results indicated that print salience is highly positively related to teachers' use of print referencing. Also, the constructs of Print Salience Metric (PSM) and total words predicted teachers' use of print referencing, and the interaction between PSM and mean length of sentence was significant for storybooks with moderate and high PSM scores.

In recent years, an increasing amount of attention has been directed towards describing and improving the quality of preschool classrooms (Dickinson, Darrow & Tinubu, 2008; LoCasale-Crouch et al., 2007), especially in regard to the language and literacy environment (Justice, Mashburn, Hamre & Pianta, 2008; LoCasale-Crouch et al., 2007; Mashburn, 2008). Understanding how best to support children's emergent literacy development is a particularly important aspect of the language and literacy environment. Emergent literacy refers to the reading and writing skills young children acquire throughout their preschool years prior to formal reading instruction (Teale & Sulzby, 1989; Whitehurst & Lonigan, 1998, 2001). Adult–child shared book reading, which is an essential part of a quality preschool programme, is known to positively promote children's emergent literacy skills (Aram, 2006; Bus, van IJzendoorn & Pellegrini, 1995; National Early Literacy Panel [NELP], 2008; Neuman, 1996).

In fact, many important emergent literacy skills can be explicitly increased through adult–child shared book reading through subtle manipulations of the activity. For instance, adults can modify their reading interactions with children to emphasise children's development of vocabulary (i.e., learning specific words) and comprehension (i.e., understanding story grammar) (Hindman, Connor, Jewkes & Morrison, 2008; Mol, Bus & de Jong, 2009; Neuman & Roskos, 1993; Wasik, Bond & Hindman, 2006). Of relevance to this study, adults reading with young children also can use certain techniques to explicitly facilitate aspects of children's print knowledge. Print knowledge is an area of emergent literacy development that describes the young child's knowledge about print meaning (e.g., print represents spoken language), book organisation (e.g., top and bottom of the page, directionality), letters (e.g., letter names and sounds) and words (e.g., letters make up words; see Justice & Ezell, 2004). Fostering young children's growth in print knowledge is a compelling aspect of emergent literacy research because it is one of the more consistent and unique predictors of children's later reading achievement, particularly in word recognition (Ehri, 2006; Hammill, 2004; NELP, 2008). For example, Morris, Bloodgood and Perney (2003) found that print knowledge (and specifically a measure of alphabet knowledge) was the strongest predictor of first-grade reading achievement in comparison to measures of spelling and phoneme segmentation.

Shared book reading serves as an important context for promoting young children's print knowledge particularly when the adult reader explicitly references print (Ezell & Justice, 2000; Justice & Ezell, 2000; Justice, Kaderavek, Fan, Sofka & Hunt, 2009; Justice & Lankford, 2002; NELP, 2008). This reading style, called print referencing, involves the adults' incorporation of explicit attention to the words, letters and functions of print within the text by making verbal and nonverbal references, such as asking questions about print and pointing to print. Recent studies have examined preschool teachers' use of print referencing when reading books in their classrooms (see Girolametto, Weitzman, Lefebvre & Greenberg, 2007; Justice & Ezell, 2004; Justice et al., 2009) and show that children's print knowledge is accelerated when their teachers use print referencing (e.g., Justice et al., 2009). As an important complement to such work, and to improve our understanding of the role of the storybooks used in this approach to emergent literacy intervention, this study considered whether aspects of the storybook influence the frequency of print referencing as it occurs in a teacher-led shared book reading. Although the materials used in emergent literacy interventions have rarely been studied empirically, some work has shown that the materials used can play an important role, not only in teachers' implementation (Zucker, Justice & Piasta, 2009), but also in children's literacy gains (Wasik et al., 2006).

Print referencing: overview of instructional approach

Although adults reading with young children seldom make explicit reference to print within texts, they can easily be taught to do so, as found in studies of parents, graduate students and teachers (Girolametto et al., 2007; Justice & Ezell, 2000, 2002; Justice et al., 2009; Lovelace & Stewart, 2007). Study findings demonstrate that parents can be instructed to use print-referencing style during home book reading (Justice & Ezell, 2000) and trained graduate students can effectively implement a print-referencing style within preschool classrooms (Justice & Ezell, 2002; Lovelace & Stewart, 2007). Additional work shows that preschool teachers readily incorporate a print-referencing style with professional development (PD; Girolametto et al., 2007; Justice et al., 2009). Importantly, implementation of

print-referencing book reading protocols result in significant increases in children's short- and long-term literacy skills (Justice et al., 2009; Piasta et al., 2010).

One recent study explicitly examined the impact of teacher PD on teachers' use of print referencing over the course of an academic year (Piasta et al., 2010). In this randomised controlled trial, 85 preschool teachers were randomly assigned to one of three conditions using two instructional approaches: (1) group book reading using a print-referencing style (high- or low-dose conditions); or (2) 'regular' book reading (i.e., business as usual condition). The print-referencing teachers implemented shared book reading four times per week (the high-dose condition) or two times per week (the low-dose condition). Irrespective of dose assignment, teachers attended PD that explicitly trained them how to use a print-referencing style during shared book reading. Business-as-usual teachers participated in the same amount of training on an unrelated topic. After the training, all teachers were given 30 trade storybooks and were instructed to read following identical schedules over a 30-week period of classroom-based reading. Growth curve analysis showed that while teachers in the print-referencing conditions demonstrated significantly more use of print referencing over a 30-week period of implementation, their frequency of references to print across time points was highly variable. Specifically, there were fluctuations in the frequency with which teachers referenced print across the reading sessions, leading to the speculation that specific features of the targeted books influenced teachers references to print. Accordingly, the potential impact of the storybook text motivates the current study. This is an important area of study since most intervention research does not consider how specific materials influence teachers' instructional approaches. Although our particular focus is on the print-related features of storybooks, this study underscores the importance of examining the specific materials used in literacy interventions and how teacher implementation subsequently impacts children's literacy learning.

Print-related features of storybooks

A large body of work on children's literature concerns the aesthetic value of the design features of children's storybooks (Elster, 1994; Mason, Peterman & Kerr, 1989; Price, van Kleeck & Huberty, 2009; Smolkin, Yaden, Brown, & Hofius, 1992). To date, the available research on print referencing has largely emphasised adult reading behaviours, namely adult use of specific techniques that heighten children's talk about and visual attention to print (e.g., Girolametto et al., 2007; Justice & Ezell, 2004; Justice et al., 2009). There has been very little attention regarding how specific features of storybooks evoke or influence teachers' attention to print within the texts.

The extant literature suggests, however, that storybook features impact adults' reading behaviours. For example, Mason et al. (1989) examined teachers' reading behaviours across three different genres: narrative storybook, informational book and short picture-phrase book. In this study, when teachers read a narrative storybook to their kindergarten students, they primarily focused on prediction and interpretation of the text. In contrast, more attention was given to print and word recognition in a shared reading using a picture-phrase book. In a different study, 65 parent–child dyads were observed in shared book reading contexts using both narrative and informational texts (Price et al., 2009). Data demonstrated that book genre influenced the amount of talk and the level of language abstraction. Specifically, the information text prompted parents to use higher-level language as compared to the narrative text. In this study, in neither case did parents discuss print or book conventions.

The preceding findings demonstrated the need to carefully consider a book's narrative 'style' as well as visual aspects of text. There are many different narrative styles and elements that can be used in a storybook. In this study, we define narrative as the elements of the story that contain the sequence of events conveyed through words, sentences and writing style. During a read aloud, teachers may choose to focus their comments and questions based on any of these aspects. As stated by Elster (1998), 'picture content and style, text–picture relationships, story language, and story content differ from book to book, ways of reading, responding to, and talking about different books may also vary' (p. 44). For the purposes of this study, we chose to focus on two features of the text in particular: the linguistic richness of the story content and the overall print salience.

Linguistic richness of texts

As defined in this study, the linguistic richness of texts refers to the characteristics of the language within a storybook, which we quantify as the total number of words and the mean length of sentences (MLS) (Van Kleeck, 2003). Total number of words refers to how many words are contained within the storyline of a text. Children's storybooks can vary a great deal on this feature. For example, in the 30-week intervention used in the current study, one book, *There's a Dragon at my School* (Tyler & Hawthorn, 1997) had 136 total words (TW). In contrast, another one of the target books, *More, More, More Said the Baby* (Williams, 1990) had a total of 348 words. We hypothesised that a high number of words per page could potentially influence the teachers' reading style by extending the length of the shared reading. The longer reading time may have induced teachers to limit their comments and questions to maintain the preschoolers' attention to the task. Also, a high number of words may shift the teachers' focus to vocabulary and elements of the story to increase story comprehension.

MLS refers to the average length of sentences throughout the storybook. Some of the storybooks in this study contained primarily simple sentences, such as *We're Going on a Bear Hunt* (Rosen & Oxenbury, 1989); this book averages three words per sentence. Another storybook in the study had longer and more complex sentences. For instance, *Growing Vegetable Soup* (Ehlert, 1987) averaged 32 words per sentence. We hypothesised that books with longer and more complex sentences may induce teachers to use comments and questions to clarify the book's complex features.

The extant literature has not typically focused on how the linguistic features of books influence adult reading behaviours. Although there is some literature that suggests that a book's linguistic features (i.e., 'linguistic richness') impact children's early reading behaviours. Otto (1993) introduced simple beginning-reader texts and traditional storybooks to a classroom and found that students who only had experiences with beginning readers did not incorporate complex language into their pretend readings. Similarly, Walker (1991) found that children's pretend readings were influenced by the narrative structure of the texts. Therefore, we might speculate that if text features influence how children pretend to read a text, they may also influence how teachers read a text to their students. Given our interest in aspects of texts that influence print referencing, we speculate that texts with less-complex language – that is, fewer TW and less-complex sentences – may evoke a greater attention on the part of the teacher to features of print. To date, the influence of such text features on teachers' print referencing during a shared read aloud has not been studied.

Furthermore, and of critical relevance to this study, there are a few studies that have discussed the importance of the storybook itself in adult–child book reading. Pellegrini, Brody and Sigel (1985) noted that parents may not use high-level questioning because they often read storybooks containing simple plots. Similarly, Dickinson and Keebler (1989) examined teachers' beliefs about text difficulty and found that teachers changed their reading behaviour based on how difficult they perceived the text to be. Therefore, the level of linguistic richness may influence adults' use of print referencing; measures of linguistic richness, such as total number of words and MLS, may serve as proxies for plot complexity and text difficulty and are thus used in this research.

Print salience

Teachers' references to print may also be influenced by the print salience of the storybook. For our purposes, we refer to print salience as representing the extent to which print is emphasised as a compelling part of the book design, as supported by interesting fonts or font changes, environmental print and word bubbles (Zucker et al., 2009). Researchers have found that when teachers read storybooks that include a high level of print salience, they more frequently make references to these features of the text as compared to books with a low level of print salience. For instance, Zucker et al. (2009) examined whether print salience was associated with the frequency of teachers' print references when reading texts that varied in print salience (high and low salience). These researchers coded six texts using a Print Salience Metric (PSM), which systematically assesses print-salient design features in texts. Results found that teachers' frequency of print referencing was significantly higher when they read texts with a high PSM score. Our current study aimed to investigate this relation even further by examining that aspects of print salience may influence teachers' use of print referencing: environmental print or interesting font changes.

Environmental print refers to the presence of labels, word bubbles and print in the illustrations of a storybook. Storybooks can contain a high amount of environmental print as is the case for *Growing Vegetable Soup* (Ehlert, 1987), which contains 99 instances of labelling, or a low amount of environmental print, such as *In the Small, Small Pond* (Fleming, 1993) that contains no instances of print in illustrations. Some studies suggest that environmental print can influence children's attention to print, and therefore, we can speculate that it might also have impacts on teachers' reading behaviours. For instance, Smolkin, Conlon and Yaden (1988) found that children are more interested in print that is embedded in the illustrations of books than isolated print. Furthermore, eye-gaze studies have shown that children focus more attention to print that is embedded in illustrations than narrative text (Justice & Lankford, 2002). More importantly, Smolkin et al. (1992) found that storybooks containing three-dimensional letters, speech balloons and picture labels evoked more discussion about print by preschool-age children. Finally, Elster (1998) found that print in pictures was more likely to be included in children's pretend readings.

Interesting font changes refers to changes in font size, colour or shape throughout the storybook. Storybooks may have a high amount of interesting font and font changes, as does *Miss Bindergarten Gets Ready for Kindergarten* (Slate, 1996; 79 different font changes), and others have very few or none (e.g., *Growing Vegetable Soup* (Ehlert, 1987; no interesting font or font changes). Little research has been conducted on font changes within children's storybooks and teachers' references to print. Nonetheless, we propose that presence of interesting font changes may increase teachers' focus on print, as the presence of

large print can make it easier for the teacher to discuss individual letters and fonts that represent the word (i.e., writing the word 'angry' with jagged lines).

Although the linguistic richness and print salience of storybooks are potentially important when discussing teachers' reading style during read alouds, they are not isolated aspects of storybooks; therefore, there may be an interaction among these two elements (i.e., linguistic richness and print salience) in understanding teachers' use of print referencing. For instance, if a storybook contains a high amount of print salience and is not linguistically rich, teachers may frequently reference print; conversely, if there is a low amount of print salience within a linguistically rich text, teachers may rarely reference print. Therefore, this study addresses two research questions. First, to what extent does the linguistic richness and print salience of children's storybooks relate to teachers' use of print referencing? Second, to what extent is there an interplay between storybooks' linguistic richness and print salience when predicting teachers' use of print referencing? In regard to question one, we expect the linguistic richness of children's storybooks to be inversely related to teachers' use of print referencing, whereas the print salience of texts will be positively related to teachers' use of print referencing. In regards to question two, we expect that books that are linguistically rich and have low print salience will elicit low levels of print referencing, whereas books that are not linguistically rich and have high print salience will elicit high levels of print referencing.

Method

This study involved a subset of teachers participating in a larger study of classroom-based storybook reading practices. For the purposes of this study, we included those teachers who were assigned to use print referencing when reading either in a high-dose print referencing (HDPR; reading occurred four times per week) or a low-dose print referencing (LDPR; reading occurred two times per week). Teachers in both conditions (high- and low-dose implementations) participated in identical PD focusing on print-referencing techniques and how to implement these techniques during shared book reading. While teachers differed in the amount of reading per week, each teacher sent in one sample of their reading per an identical, biweekly schedule. There were no significant differences in the average use of print referencing for teachers in the HDPR and LDPR groups; therefore, they are grouped together in this study (see Piasta et al., 2010). Each teacher, regardless of condition, received the same set of 30 books that were to be read in a specific order assigned by the project over the academic year.

Data, including direct and indirect measures, and all PD and the 30-week book reading program, were collected from two cohorts of teachers located in two different sites (Midwest and Mid-Atlantic). Cohort 1 participated during the 2005–2006 academic year and cohort 2 participated during the 2006–2007 academic year. More information about the larger project can be found in Justice et al. (2009), Justice, McGinty, Piasta, Kaderavek & Fan (2010) and Piasta et al. (2010).

Participants

A total of 57 teachers, representing both the HDPR ($n = 31$) and LDPR ($n = 26$) conditions, participated across sites and cohorts. One teacher, not included in that total, discontinued participation mid-year. A large percentage of the teachers were female (95%, $n = 54$) and they were predominately white, non-Hispanic (67%, $n = 38$). About 26% of teachers were

African American (n = 15), 5% were multi-racial (n = 3) and 2% were Hispanic/Latino (n = 1). In terms of teachers' education, there was some variability. Twelve percent of teachers (n = 7) reported that their highest degree was a high school diploma, 25% (n = 14) had an associate's degree, 39% (n = 22) had a bachelor's degree and 25% (n = 14) had master's or other advanced degrees. The teachers had an average of 15 years' (SD = 10.03, range = 1–40 years) overall teaching experience, and 11 years' (SD = 8.08; range = 0–38 years) experience with preschool teaching. Certification to teach preschool (72%, n = 41) and/or kindergarten (44%, n = 25) was held by most of the teachers.

The teachers' classrooms were targeted-enrolment programmes that served children at risk of low academic achievement due to socioeconomic status. Across sites, the teachers taught in 25 Head Start classrooms, 27 Title I or state-subsidised classrooms and five private preschool centres that accepted vouchers. To characterise these classrooms, we present descriptive information for a random sample of children from each classroom (2–13 children per class, n = 366). Average age at the beginning of the academic year was 52 months (SD = 4.59; range = 41–66 months). The students were 51% female (n = 185) and the majority of students were white, non-Hispanic (41%, n = 151). Of the remaining students, 37% (n = 136) were African American, 9% (n = 33) were Hispanic/Latino, 8% (n = 28) were multi-racial and 2% (n = 8) were of other races/ethnicities (3% unreported). English was the primary language spoken in the students' homes (87%, with 9% unreported). Fifty-six percent of children's families (14% unreported) were at or below the average household income of $20,000–$30,000 per year. Highest level of education obtained by the students' mothers varied considerably: 1% (n = 4) had an advanced degree; 6% (n = 23) held a 4-year degree; 7% (n = 25) had a 2-year degree; 14% (n = 52) had technical training beyond high school; 45% (n = 165) had a high school diploma and 15% (n = 53) had not obtained a high school diploma (10% unreported).

Procedures

All of the teachers participated in a 30-week book reading intervention. The teachers were given identical sets of 30 high-quality children's storybooks and instructed to read the books as a part of their shared book reading. All books provided to teachers (one per week) presented an interesting storyline, compelling illustrations and age-appropriate content. However, the books varied substantially with respect to linguistic richness as well as print salience. Each teacher was instructed to read one book per week according to the same preset weekly schedule. Teachers in the high-dose groups (HDPR) read each book four times per week, while teachers in the low-dose group (LDPR) read two times per week.

Teachers were encouraged to use the print-referencing style they were taught during PD. Information about children's print knowledge gains as a result of shared book reading using a print-referencing style was presented to teachers to illustrate how print referencing could facilitate children's attention to print. The manual *Calling Attention to Print* (Justice & Sofka, 2005) along with videos of teachers using a print-referencing style was used to instruct teachers on how to implement verbal and nonverbal (e.g., identify letters, track print with finger) references to print during whole-group shared read alouds. The dimensions of print referencing, including print meaning (e.g., print carries a message), book and print organisation (e.g., print directionality, top and bottom of page), letters (e.g., upper and lower case, letter–sound relationships) and words (e.g., long words vs short words, word identification), were explained in detail, including practical examples of each (for more information on the PD design and fidelity, see Piasta et al., 2010). For continued and

ongoing support, the storybooks used in the HDPR and LDPR conditions included inserts explaining two print-referencing targets per storybook as well as ways to incorporate the targets into their book reading. Teachers were given the general guideline of addressing each target twice during the book reading session; however, they were encouraged to follow the natural flow of the read aloud and be responsive to student interest, which in turn allowed there to be considerable naturalistic variability in the frequency of teachers' print-referencing behaviours.

Materials and measures

A total of 13 different storybooks were used in this study. The teachers were given 30 storybooks in total, as we have noted, and were instructed to send in biweekly videos of classroom-based readings; in total, they were asked to submit tapes of 15 storybooks according to identical predetermined schedules. However, two of the original books chosen were out of print for the second year of the study and the titles were replaced; therefore, these books were not used in the analyses.

Coding of storybooks. For the present study, each text was coded for two features of linguistic richness (total number of words and MLS) and for two features of print salience (environmental print and interesting font changes). The linguistic richness measures were calculated using the Systematic Analysis of Language Transcripts (SALT) computer program (Miller & Iglesias, 2006). This program calculates basic linguistic measures on written transcripts.

The print salience of texts was calculated using the PSM (Zucker et al., 2009). Definitions of print-salient features (Justice & Lankford, 2002; Smolkin et al., 1988) were used to calculate the quantity of print-salient features in each book. The PSM contains a listing of a range of print-salient features observed in illustrations (i.e., labels, environmental print, visible sound, visible speech, letters in isolation) and narrative text (i.e., change in font style, formatting, size, orientation, font colour). A PSM score is obtained by identifying each instance of these features within a text and then dividing it by the number of pages in the book. For our purposes, we calculated an overall PSM score (total print features per text) as well as two different scores to separate print features representing environment print versus font changes in text. All coding was completed by research staff who had completed training on the PSM tool to reliability of 80% agreement with master codes. Additionally, 20% of the book reading sessions were randomly selected and double-coded to assess reliability; an intra-class correlation coefficient of .98 showed there to be high reliability among PSM coders. A list of the storybooks coded for this study appears in Appendix A and characteristics of each text analysed appear in Table 1.

Coding of teachers' print referencing. The dependent measure used in this study was teachers' use of references to print during whole-group shared readings, as coded from videos submitted by teachers every 2 weeks over the academic year. Videos were coded for print referencing using the Fidelity Coding Checklist (FCC; Justice, Sofka, Sutton & Zucker, 2006). The FCC is a systematic observation tool that uses a hierarchical coding system to analyse teachers' extratextual utterances. Coding was completed by research staff that had completed training and obtained reliability of 80% agreement against master coded videos. Additionally, 10% of the videos were randomly selected and double-coded for reliability and an intra-class correlation coefficient of .96 demonstrated high reliability among coders.

Table 1. Descriptives for storybooks based on study variables.

Title	Print ref (*SD*)	Total words	MLS	Environ print	Font changes	PSM
'More, More, More' Said the Baby	32.55 (21.53)	166	6.44	0.00	0.21	0.21
We're Going on a Bear Hunt	34.42 (25.41)	248	9.19	0.00	0.47	0.47
In the Small, Small Pond	29.82 (26.70)	358	10.53	0.00	0.79	0.79
There's a Dragon at My School	24.67 (30.22)	489	20.38	0.73	0.07	0.80
The Dandelion Seed	33.11 (22.30)	349	15.17	0.00	1.31	1.31
Hey, Little Ant!	32.73 (23.84)	422	3.27	0.50	0.82	1.32
My Backpack	44.06 (30.93)	90	18	0.45	0.93	1.38
Rumble in the Jungle	38.55 (31.64)	320	3.90	0.58	1.17	1.75
The Noisy Airplane Ride	24.46 (36.62)	391	6.52	1.82	.11	1.93
The Way I Feel	37.08 (20.65)	325	11.21	0.00	2.18	2.18
Growing Vegetable Soup	34.39 (21.65)	64	32	3.30	0.00	3.30
Miss Bindergarten Gets Ready for Kindergarten	39.90 (13.95)	335	7.44	1.56	2.32	3.88
I Stink!	46.22 (26.71)	200	5.41	0.23	4.87	5.10

Note: Print ref represents the average number of print references per book, Environ print represents environmental print, MLS represents mean length of sentence, PSM represents print Salience Metric. Full citations for storybooks are located in Appendix A.

The FCC is designed to capture teachers' explicit references to print across four distinct categories: (1) *Print Meaning*, or that print carries meaning (e.g., print function, environmental print, metalinguistic concept of reading), (2) *Book and Print Organisation*, or print organisation and conventions (e.g., page order, author, top and bottom of the page, title, print direction, genre, structural features and manipulation of the book), (3) *Letters*, or print units that can be differentiated and named (e.g., upper- and lower-case letters, names of letters, metalinguistic concept of letter) and (4) *Words*, or letters can be combined into words (e.g., word identification, short vs long words, letters vs words, concept of word in print). All teachers' explicit references to any of the four FCC domains are coded to obtain an overall frequency count that encompasses all four of the print-referencing categories. Once the raw score for each teacher was obtained, for purposes of analyses, the scores were aggregated to find the average number of print references by all teachers for each book. Further information on the use of the FCC in the larger study is available in Zucker et al. (2009). For a summary of FCC categories, see Appendix B, and for a summary of the aggregated FCC frequency scores per book, see Table 1.

Analyses

Correlational analyses were conducted to address the study's first question, which concerned the extent to which the linguistic complexity and print salience of children's storybooks is related to teachers' use of print referencing. Two multiple regression analyses were conducted in order to investigate the second question, which concerned the extent to which the relation between PSM and print referencing is moderated by linguistic complexity of texts. In doing so, the first multiple regression included PSM, TW and a continuous interaction term (PSM $\times$ TW) as the independent variables and print referencing (based on FCC) as the dependent variable. Then, a second multiple regression was conducted with PSM, MLS and a continuous interaction term (PSM $\times$ MLS) as the independent variables and print referencing (based on FCC) as the dependent variable.

Table 2. Descriptive statistics across storybooks.

Variable name	*M*	*SD*	Skewness ratio	Kurtosis ratio
Avg num print reference	34.77	6.25	0.07	–0.58
Total words	285.15	127.30	–0.40	–0.95
Mean length of sentence	11.50	7.80	1.32	1.09
Environmental print	0.71	0.94	1.62	1.77
Font changes	1.17	1.29	1.72	2.52
PSM	1.88	1.37	1.01	0.09

Note: Avg num print reference represents the average number of print references per book as measured by the FCC across all teachers; PSM represents print salience metric.

Results

Descriptive statistics for all variables appear in Table 2. For the purposes of analyses, the FCC scores for each teacher were aggregated to find the average number of print references made per book; the other variables included TW, MLS, environmental print, font changes and PSM (which is the simple addition of environmental print and font changes). The FCC category of Letters had, on average, the highest amount of adult references ($M = 14.88$, $SD = 8.18$, Range = 2.83–30.18), the category of Words was the next most frequently referenced ($M = 10.76$, $SD = 6.27$, Range = 2.84–21.06), whereas Book and Print Organisation ($M = 7.61$, $SD = 2.83$, Range = 3.36–11.10) and Print Meaning ($M = 1.52$, $SD = 0.74$, Range = 0.88–3.59) were referenced the least. This should be interpreted carefully given that the FCC is a hierarchical coding scheme, however, in that we always coded the 'highest level unit' of a reference (e.g., letters and words superseded the other categories). Descriptive analysis of the data showed that the print-referencing variable was negatively skewed and the PSM variable was positively skewed, which we reference later as a possible limitation of the study.

Relationship among print referencing, linguistic richness and print salience

To address the first research question regarding the extent to which the linguistic richness and print salience of children's storybooks relates to teachers' use of print referencing, correlational analyses were conducted (see Table 3), in order to examine the univariate relations among the study variables. Results demonstrated that one measure of linguistic richness (TW) was significantly and positively related to teachers' use of print referencing, whereas the other measure of linguistic richness (MLS) was significantly and negatively related to teachers' use of print referencing. Such findings suggest that teachers use a higher level of print referencing when reading books that contain more words but less-complex sentence structures. Consequently, findings suggest that teachers' print referencing is associated with the linguistic richness of the books they are reading.

An additional finding represented in the correlational analysis is that PSM was significantly and positively correlated with teachers' use of print referencing, suggesting that teachers reference print more often when reading books that contain higher levels of print salience. In order to explore this relation further, we also investigated the correlations between the separate PSM constructs (environmental print and font changes) and teachers' use of print referencing. Interestingly, although the font changes variable was significantly and highly correlated with print referencing, environmental print was not significantly correlated with teachers' use of print referencing.

Table 3. Intercorrelations among study variables.

Variable name	2.	3.	4.	5.	6.
1. Avg num of print reference	0.50**	–0.31**	0.02	0.71**	0.66**
2. Total words	—	–0.34**	–0.47**	0.19**	–0.13*
3. Mean length of sentence		—	0.08*	–0.27**	–0.20**
4. Environmental print			—	–0.21**	0.46**
5. Font changes				—	0.78**
6. PSM					—

Note: Avg num of print reference represents the average number of print references per book as measured by the FCC across all teachers; PSM represents print salience metric.
*$p < .05$; **$p < .01$.

Table 4. Summary of regression analysis for the prediction of print referencing for PSM and total words.

	b (SE(b))	*F(1,330) (sig)*	pr_j	sr_j
Constant	22.84 (0.43)	2827.92 (<0.01)	—	—
PSM	2.92 (0.21)	200.03 (<0.01)	0.48	0.25
Total words	0.03 (0.00)	354.54 (<0.01)	0.59	0.33
Total words * PSM	0.00 (0.00)	0.02 (0.89)	0.01	0.00

Note: pr_j represents partial correlations for the j^{th} variable in the model; sr_j represents semi-partial correlation; PSM represents print salience metric.

Predictors of print referencing

This study's second question sought to determine the extent to which print salience and teachers' use of print referencing is moderated by the linguistic richness of a storybook (TW and MLS), so as to investigate the potential interplay between different text characteristics and print referencing. Investigations of correlations and tolerance values for this set of analyses revealed that multicollinearity was not an issue. Additionally, residual assumptions and diagnostics were investigated and no problems were identified.

First, a model that included an interaction term, total words interaction (TWI) between TW and PSM was examined; findings indicated that this set of variables was a positive predictor of teachers' print referencing, $R^2 = .79$, R^2adj = .79, $F(3,680) = 838.98$, $p < .0001$. The standard error of estimate for this model is 2.65 references to print, and the total proportion of variance explained by this model is $R^2 = .79$, indicating that nearly 79% of the variability in teachers' print referencing is accounted for by the model. One degree freedom F-tests, parameter estimates, standard errors and partial and semi-partial correlations for each independent variable are presented in Table 4. The slope for the interaction term was not found to be statistically significant. However, PSM was found to be a significant predictor, $F(1,683) = 200.03$, $p < .0001$, as was TW, $F(1,683) = 354.54$, $p < .0001$.

Next, a model that included an interaction term, mean length of sentence interaction (MLSI) between PSM and MLS was investigated; again, findings indicated that these variables served as a positive predictor of teachers' print referencing, $R^2 = .48$, R^2adj = .48, $F(3,680) = 208.20$, $p < .0001$. The standard error of estimate for this model is 4.14 references to print and the total proportion of variance explained by this model is $R^2 = .48$, indicating that 48% of the variability in teachers' use of print referencing is accounted for by the model. One degree freedom *F*-tests, parameter estimates, standard errors and partial and semi-partial correlations for each independent variable are presented in Table 5. The slope for the interaction term was statistically significant, $F(1,683) = 13.96$, $p < .001$, and investigations for

Table 5. Summary of regression analysis for the prediction of print referencing for PSM and mean length of sentence.

	b (SE(b))	*F(1,330) (sig)*	pr_j	sr_j
Constant	31.84 (0.42)	5690.54 (<0.01)	—	—
PSM	2.98 (0.17)	298.50 (<0.01)	0.55	0.48
Mean length of sentence	–0.04 (0.03)	1.41 (0.24)	–0.05	–0.03
Mean length of sentence * PSM	–0.07 (0.02)	13.96 (<0.01)	–0.14	–0.10

Note: pr_j represents partial correlations for the j^{th} variable in the model; sr_j represents semi-partial correlation; PSM represents print salience metric.

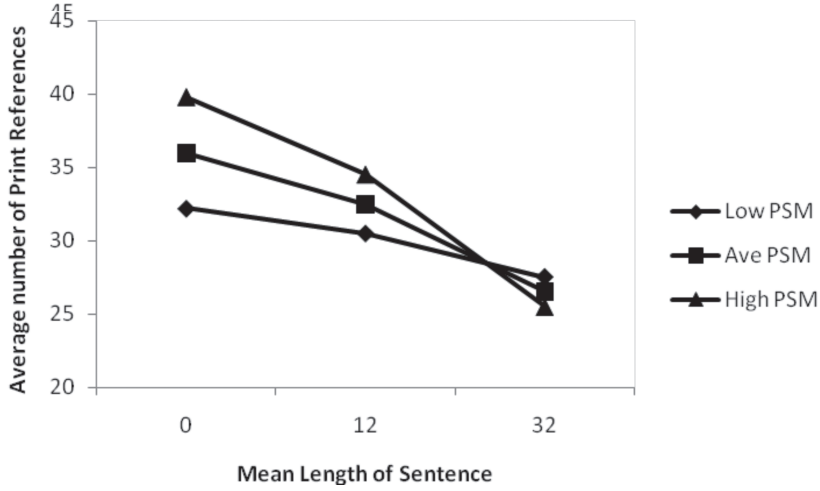

Figure 1. Interaction between PSM and mean length of sentence used in relevant storybooks. This figure shows the interaction between the PSM score and the mean length of sentence used in the storybooks used in the current study.

the interaction reveal that for books with low, average and high PSM, as MLS increases, number of print references decreases (see Figure 1). Estimated slopes for books with low, moderate and high PSM are negative (–.15, –.30 and –.45, respectively). Therefore, the line depicting teachers' print referencing with books with low, moderate and high PSM scores is sloped downwards as MLS per book increases. To further understand this relationship, we investigated the simple effects relationships for MLS on print referencing, for low, moderate and high PSM scores using MODPROBE (Hayes & Matthes, 2008). We found that the effects of MLS on print referencing were statistically significant for books with moderate (i.e., a mean score of 1.88) and high (i.e., a mean score of 3.31) PSM scores ($t = –7.50$, $p < .001$ and $t = –6.49$, $p < .001$, respectively), but not significant for those with books with very low PSM scores (i.e., a mean score of 0.30). These findings suggest that the inverse relationship between MLS and print referencing is significant for books with moderate and high PSM scores, but not for those with very low PSM scores.

Discussion

In general, much attention has been given to how teachers conduct whole-group read alouds within preschool settings, but very little focus has been directed towards

understanding how the features of the storybooks used may be influential to teachers' reading behaviours. The present work is an initial effort to systematically explore how specific features of storybooks read to children may be associated with the reading behaviours of teachers. Specifically, the current study examined the relationship between the linguistic richness and the print salience of storybooks and teachers' use of print references. The results of this study showed that teachers' references to print are related to certain features of the texts, a finding that suggests that interventions employing storybooks should include attention to the books used, as these may have influence on teachers' use or lack of use of specific reading techniques.

In regards to the first research question, which considered the linguistic richness and print salience of storybooks and their relation to teachers' use of print referencing, study results showed that the average number of teacher print references per book was positively related to the storybook features of font changes and the overall PSM score. In other words, as the print salience of books increased, so did teachers' references to print. This confirms our hypothesis in which we surmised that the overall print salience of storybooks would be systematically related to teachers' use of print referencing. The findings provide further confirmation and extension of recent work by Zucker et al. (2009), which showed that preschool teachers referenced print more often when reading books containing a high level of print salience. The present work, however, contained a much larger sample of preschool teachers and a much larger array of storybooks; therefore, the present findings coupled with prior work provide solid confirmation that the print salience of storybooks is influential to how teachers read these in their classrooms, particularly with respect to the amount of attention they pay to print. Importantly, teachers' print referencing is positively associated with children's learning about print (e.g., Justice & Ezell, 2002); therefore, this finding is one that has practical implications.

An interesting extension to the prior work on print salience and its influence on teachers' references to print is our finding that environmental print embedded within texts has far less influence (if any at all) on teachers' reading behaviours than font changes. This finding is somewhat surprising based on prior eye-gaze studies that show that children look at print in the illustrations more often than the narrative text (Evans & Saint-Aubin, 2005; Justice & Lankford, 2002); likewise, work by Smolkin et al. (1988, 1992) showed that not only are children often more interested in the print in illustrations but that children comment on the print in illustrations more often as related to narrative text. It is therefore slightly unexpected to note that, with respect to interesting print features of storybooks, teachers' behaviours seem to be more readily affected by changes in narrative font, whereas children's behaviours seem to be more affected by features of the illustrations (i.e., print embedded within illustrations). This does have intuitive appeal, as during storybook reading interactions teachers are likely to be attending to the text (as the reader) and children are likely to be attending to the illustrations (as the observer).

There was some evidence to support our hypothesis where we expected linguistically rich texts to be inversely related to teachers' use of print referencing. The moderately negative relation between MLS and teachers' reference to print further confirms our hypothesis that more linguistic rich texts may elicit fewer teacher references to print. Furthermore, the negative relationships between linguistic richness (TW) and print salience (environmental print and PSM) suggest an inverse relation. There was also a negative relationship between linguistic richness (MLS) and print salience (font changes and

PSM). This relation was investigated further by the regression and will be discussed with those results.

Of additional interest in this study was considering how the linguistic richness of storybooks may have been associated with teachers' references to print, to include its possible interplay with print salience. Regarding the latter, study findings showed there to be an interaction between print salience (PSM) and the complexity of sentences within texts. Specifically, storybooks with low linguistic richness (i.e., low MLS) and high print salience (i.e., high PSM score) were found to elicit more references to print by teachers, whereas storybooks with high linguistic richness (i.e., high MLS) and low print salience (i.e., low PSM score) appeared to evoke fewer references to print by the teacher. This supports our hypotheses in which we proposed that books that are linguistically rich and have low print salience will elicit low levels of print referencing, whereas books that are not linguistically rich and have high print salience will elicit high levels of print referencing. Findings converge with prior work by Mason et al. (1989), which showed that teachers' instructional focus varied as a function of the genre of the text being read by teachers. Specifically, in Mason et al., teachers were observed to read narrative, informational and picture-phrase texts; while teachers focused on prediction and interpretation when reading the narrative storybook, they focused more on print during the picture-phrase storybook. The present study suggests that even within a genre (as all books read in this study were picture-based storybooks), the stylistic elements of books exhibit an interplay that is influential to how teachers read books with children.

Implications and limitations

These results are important, as they show that the print salience of storybooks (particularly the amount of interesting font changes contained within) is influential to teachers' attention to print when reading. Results confirm that print salience is related to teachers' references to print. As shown by Zucker et al. (2009), these results further confirm that the print salience of a storybook is related to teachers' references to print. These books were chosen as a part of a larger book reading intervention; in addition how to manipulate book reading to increase children's gains is an important research topic. Based on these results, researchers should not choose books as an afterthought; rather book selection should be careful and deliberate in order to include storybooks that may increase the fidelity of the intervention. Nonetheless, we must also point out a key limitation of this study, which is that all teachers were taught to use a print-referencing style. It may be that teachers who are not trained to explicitly consider the print-salient features of children's storybooks would overlook them, and the present results would not be replicated. Do note, however, that a previous study by Piasta et al. (2010) that assessed teachers' print referencing for both trained and untrained teachers suggested that features of print within children's storybooks affected the reading behaviours of even untrained teachers.

Moreover, these results are not only important for intervention-based book selection, but for classroom teachers' book selection as well. Research has shown that conducting a read aloud and just reading the text is not an effective way to increase children's language and literacy skills (Scarborough & Dobrich, 1994). The read-aloud activity needs to be designed in a way that targets comprehension, vocabulary or print concepts. According to these results, book selection may play a role in how effectively the read aloud targets these concepts. Thus, when teachers plan a read aloud to focus on print-related skills, they should

select a book with a high level of print salience to ensure that their comments and questions flow naturally throughout the storybook reading.

This study also emphasises the need to include a well-balanced presentation of book genres during shared book reading sessions. A language- and literacy-rich preschool programme needs to facilitate a broad range of language and literacy skills and different kinds of books with varying linguistic levels and text features appear to be conducive to different instructional emphasis. In the best scenario, teachers expose children to a balanced 'diet' of storybook styles and linguistic levels (Teale & Sulzby, 1987). Different text books allow teachers to emphasise different literacy domains (Duke, 2000).

Specifically, this study demonstrates how a book with less-complex language and font changes may be the most appropriate book for facilitating children's print-related early literacy skills. On the other hand, when teachers read more complex texts our data suggest that there may be a 'trade-off' in that teachers decrease their emphasis on print. It may be that in this case the teacher concentrated on elaborating aspects of the story or clarifying unfamiliar vocabulary. Focusing on high-level abstract language is important because an adult's use of high-level language facilitates children's use of high-level abstract language (Van Kleeck, Vander Woude & Hammett, 2006; Zucker et al., 2009).

There are a few limitations worth noting. First, the majority of the participants in the sample were female, Caucasian, preschool teachers with some training in early childhood education who had self-selected into the study. All of the teachers worked in schools or centres serving at-risk students. Because these factors may hinder generalisability, replication with other populations is certainly necessary. Second, skewness and kurtosis were an issue for four out of six variables. It is possible that this may have impacted our results by indicating a violation of the assumption of normality. The excessive kurtosis may affect our procedures based on variances, while the excessive skew may bias our tests on the means. However, these values may validly represent the qualities of children's texts. Therefore, the extent to which these issues deter from our findings is unclear. Nonetheless, to further investigate the nuanced impact of a book's features, future research should include texts representing a full range of genres, formats and styles. Third, this study did not examine children's behaviours or the influence of these on teachers' reading behaviours. A more comprehensive picture of the relations of text to adult–child shared reading would include children's behaviours as well; thus, this is a fruitful avenue for future research.

Conclusion

In sum, the goals of the present study aimed to examine what features of storybooks related to teachers' use of print referencing, a research-based intervention technique. Findings show that print salience relates to teachers' use of print referencing and that print salience also predicted teachers' use of print referencing. Based on these findings, the importance of book selection for both researchers and classroom teachers is stressed.

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Appendix A

Citations for storybooks used

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Anthony, J. (1997). *The dandelion seed*. Nevada City, CA: Dawn Publications.
Bunting, E. (2005). *My backpack.* Honesdale, PA: Boyds Mills Press.
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Williams, V. B. (1990). *'More, more, more', said the baby*. New York: Greenwillow Books.

Appendix B

FCC categories and examples

FCC categories	Print targets	Examples
1. Words	Word identification	'This word is "the"'.
	Short versus long words	'Cat is a little word'.
	Letters versus words	'This word says, D-O-G'.
	Concept of word in print	'Show me one word'.
2. Letters	Upper- and lower-case letters	'This is capital D'.
	Names of letters	'What is this letter?'
	Metalinguistic concept of letter	'There is an S in snake'.
3. Book and print organisation	Page order	'Which page do I read?'
	Author	'The author is…'
	Top and bottom of the page	'This is the top of the page'.
	Title of book	'This is the title of the book'.
	Print direction	'I read from left to right'.
	Genre	'This is a kind of book that has poetry'.
	Structural features and manipulation of book	
4. Print meaning	Print function	'Spot is talking here'.
	Environmental print	'The box says "Corn Flakes"'.
	Metalinguistic concept of reading	'Why do we read books?'

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