MIND, BRAIN, AND EDUCATION

Once Upon a Time: Parent–Child Dialogue and Storybook Reading in the Electronic Era

Julia Parish-Morris[1,†], Neha Mahajan[2,†], Kathy Hirsh-Pasek[2], Roberta Michnick Golinkoff[3], and Molly Fuller Collins[4]

ABSTRACT—Early experiences with books predict later reading success, and an interactive shared reading style called "dialogic reading" is especially beneficial to emergent literacy. Electronic console (EC) books, CD-rom books, and e-book apps are designed to teach preschoolers preliteracy skills, but research has yet to systematically explore the impact of these types of books on established predictors of positive literacy outcomes. This research fills that gap with two studies investigating dialogic language and children's story comprehension in a total of 165 parent–child dyads reading battery-operated, touch-sensitive children's electronic console books or traditional books. Results revealed that parent–child dialogic reading and children's story comprehension were both negatively affected by the presence of electronic features. Ways in which e-books may be altered to better serve as educational tools in this new era are discussed.

> Margie even wrote about it that night in her diary. On the page headed May 17, 2155, she wrote, 'Today Tommy found a real book!' It was a very old book. Margie's grandfather once said that when he was a little boy his grandfather told him that there was a time when all stories were printed on paper.
>
> Isaac Asimov, 1951 (Asimov, 1973)

[1]University of Pennsylvania
[2]Temple University
[3]University of Delaware
[4]Vanderbilt University

Address correspondence to Julia Parish-Morris, University of Pennsylvania, Perelman School of Medicine, 3535 Market Street Suite 860, Philadelphia, PA, 19104; e-mail: julia.parish.morris@gmail.com

† JPM and NM contributed equally to this submission.

More than half a century ago, Isaac Asimov imagined a world where all books were digital and printed material was obsolete. Although today's world is far from paperless, the electronic book industry is growing exponentially. For example, from 2009 to 2010, e-book sales increased by an astonishing 164.4% while printed book sales declined slightly over the same period (Association of American Publishers, 2011). However, research into the effects of a new technology on the people who use it often lags behind the evolution of the technology itself. Interestingly for developmental scientists, adults are no longer the exclusive users of electronic books. New e-book apps (software applications designed to run on smartphones, tablet computers, and other mobile devices) aimed toward the preschool set are emerging on a weekly basis (Greenfield, 2012). Researchers invested in early literacy development must therefore explore children's interaction with this new storybook format.

E-books for children did not begin with contemporary apps. Instead, technology has slowly expanded the definition of "children's book." More than 10 years ago, a generation of child-friendly battery-operated EC books (e.g., LeapFrog) was marketed to infants as young as 6 months of age (Figure 1). These books are not the same as the Kindle, Nook, iPad or other more recent digital e-readers—rather, they straddle the line between traditional books and digital books by maintaining the paper book format while being designed for use with a matching cartridge and an electronic console (EC). Putting an EC book and a cartridge into the console results in touch-sensitive pictures that allow children to hear the story read aloud, listen to music, activate sound effects, and play games, some of which are designed to teach preliteracy and other skills. Many EC books come with instructions suggesting that parents read the books with their children, and many also come with headphone jacks, which allow children to operate the consoles independently. EC books are frequently advertised

Fig. 1. PowerTouch Learning System.

as a means of interactive learning that can be used to promote emergent literacy in toddlers and preschoolers. The manufacturers of Electronic Learning Aids, or ELAs, such as talking books have claimed that these products are superior platforms for children's learning due to their interactive nature (Wartella, Caplovitz, & Lee, 2004). The product description from Fisher-Price's PowerTouch console (Fisher-Price, 2003), for example, purports to "put the power of reading at your child's fingertips" and promises that the interactive console will help children "learn reading, phonics, spelling, music, and math skills."

These claims are making an impact. A survey found that 91% of parents believe that educational toys will "advance their child's learning and help accelerate them to the top of the class" (Born to Play, 2007), and two-thirds of parents say that educational toys such as talking books are "very important" to a child's intellectual development (Garrison & Christakis, 2005). In fact, in 2003, three out of four parents in a nationally representative sample said that their children had talking book toys (Rideout, Vandewater, & Wartella, 2003). LeapFrog's talking LeapPad book was the best-selling toy in specialty stores for both 2001 and 2002 (Shuler, 2007). These ELAs have even made their way into the classroom: battery-operated electronic console books manufactured by one company alone are now in over 100,000 U.S. classrooms (LeapFrog Enterprises, 2013). It is incumbent upon the research community to explore parent–child reading interactions in these new contexts and determine the effects of electronic toys on children's development.

Dialogic Reading: A Proven Way to Foster Early Literacy Skills

Positive early shared reading experiences predict better reading and language outcomes (Denton & West, 2002; Hood, Conlon, & Andrews, 2008; Nord, Lennon, Liu, & Chandler, 1999), and children who experience rich verbal and affective interactions during shared book reading are more likely to enjoy and show interest in reading later in childhood (Baker, Mackler, Sonnenschein, & Serpell, 2001). Given the continuing nationwide emphasis on school readiness and the fact that one-third of U.S. elementary students are not reading at grade level (National Center for Education Statistics, 2009) it is crucial to pinpoint specific conditions that foster emergent literacy skills. To this end, a report issued by the National Early Literacy Panel (NELP; Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2009) sought to identify predictors of reading, writing, and spelling performance by examining current research on preschool children, including shared book reading interventions. The present studies expand upon research cited in the NELP report by exploring contemporary trends in shared reading within the framework of one particularly beneficial reading style: dialogic reading (Arnold & Whitehurst, 1994; Zevenbergen & Whitehurst, 2003).

"Dialogic reading" occurs when adults: (1) use techniques (such as questioning or prompting) to encourage a child to actively participate in telling a story; (2) offer children expansions on the story, recast the story if it is unclear to the child, and offer positive commentary about the story; and (3) progressively raise the bar for the child's current independent level of story comprehension and reading skill (Arnold & Whitehurst, 1994; Zevenbergen & Whitehurst, 2003). According to Zevenbergen, Whitehurst, and Zevenbergen (2003), one specific way that parents interact dialogically is through the use of *distancing prompts*: utterances encouraging the child to relate story contents to the child's own emotional experiences ("Would you be happy if you had a big bowl of ice cream like Clifford?"), make inferences about characters or events, and draw parallels between the story and the child's life outside the book (e.g., "Did you ever play in the snow like Peter did?"). Linking children's past or future experiences to the story during shared book reading (talking about "non-immediate" events) correlates with children's print knowledge and other emergent literacy skills (Beals, DeTemple, Tabors, & Snow, 1991). Furthermore, an interactive reading style that draws on children's personal lives and encourages children to help "tell the story" (Zevenbergen & Whitehurst, 2003) may aid story comprehension by grounding it within the child's own experiences (Purdy, 2008).

Numerous intervention studies with diverse populations (e.g., typical, at-risk, bilingual, cross-linguistic) have found that engaging with an adult in dialogic reading resulted in children using more words, speaking in longer sentences,

scoring higher on vocabulary tests, and demonstrating improvement in expressive language skills (Blom-Hoffman, O'Neil-Pirozzi, Volpe, Cutting, & Bissinger, 2006; Chow, McBride-Chang, & Cheung, 2008; Doyle & Bramwell, 2006; Hargrave & Sénéchal, 2000; Huebner, 2000a, 2000b; Huebner & Meltzoff, 2005; Lever & Sénéchal, 2011; Reese, Sparks, & Levya, 2010; Sénéchal, Pagan, Lever, & Ouellette, 2008; Tsybina & Eriks-Brophy, 2010; Eunice Kennedy Shriver Institute, 2010; Wasik & Bond, 2001). Consistent with these findings, a comprehensive meta-analysis revealed that shared dialogic reading might be especially beneficial to the expressive language of young preschoolers (Mol, Bus, de Jong, & Smeets, 2008). The vocabulary benefits of dialogic reading could have a direct effect on later reading ability, as vocabulary size at age 2 has recently been shown to predict fifth grade reading skills (Lee, 2011).

But do alternative book formats (such as EC books) support parent–child dialogic interaction during shared book reading? While there are many electronic reading formats on the market, many share similar features. The most relevant research to date evaluates the effect of interactive computerized CD-ROM stories on multiple language and literacy outcomes, with variable results (Labbo & Kuhn, 2000). One line of research shows that older children are distracted by the options available in interactive CD-ROM stories (de Jong & Bus, 2002) and that story recall suffers (Trushell, Burrell, & Maitland, 2001; Trushell & Maitland, 2005) relative to story recall when reading traditional paper books. Other studies suggest that children reading along with a CD-ROM story have improved oral language skills (kindergarteners: Johnston, 1997); better phonological awareness (5- and 6-year-olds: Segal-Drori, Korat, Shamir, & Klein, 2009; Shamir, Korat, & Barbi, 2008; Woods, Pillinger, & Jackson, 2010; pre-K and kindergartners: Korat, 2009); better understanding of word meaning (kindergartners: Korat & Shamir, 2008); and better print awareness (4-year-olds; Talley, Lancy, & Lee, 1997; Gong & Levy, 2009) than their peers in a control group. However, most research concerning the effects of digital media on emergent literacy skills comes largely from empirical studies with structured curricula (Blanchard & Moore, 2010). Very few of these computer-based interventions can be considered *dialogic*, nor are most conducted with parents, nor do they use a preschool-aged population. The few studies that have examined dialogic situations and parent–child interaction present a mixed picture. Kim and Anderson (2008) found that 3- and 7-year-olds engaged in more complex talk with their parents when reading books in a CD-ROM or video format as compared to a traditional paper book; however, an exploratory study conducted by Fisch, Shulman, Akerman, & Levin (2002) found no significant differences in parent–preschooler interactions when comparing online storybooks to traditional ones.

The present set of studies aims to fill these gaps in the literature by comparing how two well-established predictors of later literacy—parent–child dialogic reading (Study 1; Arnold & Whitehurst, 1994; Zevenbergen & Whitehurst, 2003) and children's story comprehension as measured by story recall (Study 2; Kochanoff, Hirsh-Pasek, Newcombe, & Weinraub, 2003; Snow & Dickinson, 1990)—vary as a function of book format. Although EC books are not the most current iteration of electronic readers, devices such as the iPad and Kindle now offer apps for children whose features are very similar to CD-ROM stories and EC books (e.g., touch-sensitive illustrations, sound effects, word games, narration), suggesting that the present research may be directly informative to these types of programs. These two studies of parent–child language and story comprehension thus have the potential to inform our understanding of how newer apps and programs can be designed to promote preliteracy skills with maximum effectiveness. Our first study examines the quality of parent and child language when reading children's EC books versus traditional books or EC books with the electronic features turned off. Our second study explores the quality of children's story comprehension when reading EC books versus traditional books.

STUDY 1: PARENT–CHILD LANGUAGE DURING SHARED BOOK READING

Does the language used by parents and children differ when reading EC books versus traditional books? Here we evaluate the form and content of parents' and children's dialogue during reading, coding them for features of dialogic interaction. Children's speech was analyzed in addition to parental speech because the relative richness and complexity of child language predicts later reading skills (Dieterich, Assel, Swank, Smith, & Landry, 2006). We pay particular attention to the use of Zevenbergen and Whitehurst's (2003) *distancing prompts* relating the content of the book to aspects of children's lives outside the book (e.g., "Did you ever play in the snow like Peter did?"), because they are an especially rich form of dialogic interaction (Zevenbergen & Whitehurst, 2003). On the basis of pilot data and prior studies of interactive CD-ROM books, we hypothesized that parent–child language would indeed differ according to reading context, with more language characteristic of dialogic reading present when reading traditional books.

Method

Participants

Parents and children were recruited via telephone and mail from the greater Philadelphia area. All dyads were monolingual mid/high-SES English-speakers with normal hearing and language abilities, based on parent self-report. Child participants were 46 three-year-olds (23 boys and 23 girls; mean age: 41.15 months, range: 35.10 months–47.99 months;

SD: 3.60) and 46 five-year-olds (23 boys and 23 girls; mean age: 64.98 months; range: 59.89 months–71.46 months; *SD*: 3.86). Ninety-six percent of adult participants were mothers (mean age: 36; range: 27–44; *SD*: 3.68); 4% were fathers (mean age: 40; range: 36–42; *SD*: 2.83). Ninety-six percent of families reported having EC books in the home and were therefore familiar with the EC book format.

Materials

Materials included five electronic console books from the Fisher-Price PowerTouch Learning System series; Fisher-Price PowerTouch electronic console and story cartridges accompanied these books. The console and cartridges permit a typical page-turning reading experience while providing additional features such as buttons to hear letters, words, music, and other "surprises." Microchip technology in the cartridges allows children to hear text, counting, and music, and to pause the story at any point to engage in word repetition, games, and puzzles. Each cartridge contains over 60 activities aimed at developing competencies such as spelling, vocabulary, telling time, reading comprehension, and problem-solving. The EC books were each individually matched by a researcher to five traditional books on plot structure (e.g., themes such as doing good deeds or learning something new; number of obstacles; parallel scenes; resolution at the end), character similarity (presence of same protagonist(s) and supporting characters; e.g., *Dora's River Adventure* paired with *Dora's New Boots*), number of pages, number of words per page, reading level, and word length. Examples of book characters included Clifford, the Berenstain Bears, and Caillou (see Appendix Table A1 for book list). We chose to offer five book options in each condition because we wanted to ensure that each dyad was able to select a book that they would enjoy reading during the study.

Procedure

The first 36 parent–child dyads were randomly assigned to read either an EC or traditional book together. Twenty control subjects were subsequently recruited to ensure that there was nothing particular about the EC books themselves that could be driving any differences seen. Control dyads were given the spiral-bound EC book, unaccompanied by an electronic console and cartridge. In this condition, the EC books thus contained only the features present in traditional books.

Our decision to use a between-subjects design was based on order effects and cross-contamination observed during within-subjects piloting. Pilot children who were assigned to read EC books first resisted reading traditional books afterward, which would have made it impossible to counterbalance reading order in a within-subjects design. A between-subjects design was thus the best alternative for this first-of-its-kind study. Dyads were assigned a format to read (EC book, traditional book, or control), and then were able to chose one of five books available in the assigned format, were instructed to "Do what you normally do with books," and were videotaped for later transcription and coding.

Coding

Approximately 5 min of parent–child interaction was transcribed and coded in each condition. Coding began when parents read the first word of the book (usually the title) and continued until the book was done or 5 min had elapsed; any upfront time the dyads spent familiarizing themselves with the device was not coded. Coders also ensured that the book was actually being read during this time, and that dyads were not simply exploring the device or talking about other things. Given that 96% of parents and children were familiar with both platforms, we felt that a 5-min reading sample should be sufficient to get an accurate idea of how dyads read together on that platform. Parents and children reading EC books often took more than 5 min because children wanted to activate every possible sound effect on each page before moving to the next page [EC: mean transcription = 5.00 min; traditional: mean transcription = 4.45 min; $t(70) = -3.98$, $p < .001$; see Table 1 for descriptive information on total book reading duration]. The variable of interest was the proportion of each type of utterance per minute, thus exploring the *density* of different utterance types. An "utterance" was defined as each phrase uttered by the parent or child, not including reading the text. To ensure that the difference in transcribed times did not affect our final results, each type of utterance per minute was multiplied by total number of minutes read and raw averages were examined in addition to proportions. Results of our analyses did not change, except as discussed below.

Extra-textual parental utterances were coded for *form* (question or comment) as well as content, using the Villanova Preschool Project (VPP) maternal utterance coding system (Blewitt, 2008). Content codes included *behavior-related* utterances ("Stop pressing the buttons and listen to the story"; "I just wanna make it go"; see Appendix Table A2 for examples) versus *story-related* utterances ("Look, Clifford jumped into the soup!"), with a subcategory of *distancing prompts* (going beyond the here-and-now; "Remember when we went to the doctor like Caillou?"; Zevenbergen et al., 2003). Both initiations and responses were coded. Coders were blinded to study hypotheses, and 25% of transcripts were recoded for reliability; coders agreed 79% of the time (using point-by-point agreement), and using the second coder's coding did not alter the results.

Results

Parent Language

A repeated measures analysis of variance (ANOVA) with utterance type (*story-related*, *distancing*, and *behavior-related*) as a repeated measure and condition (electronic, traditional,

and control), age group, and book as between-group factors revealed no main effect of age, $F(1, 64) = 1.99$, $p = .164$, or book, $F(4, 64) = 1.44$, $p = .232$, nor any interactions with age or book, so data were collapsed across these variables for further analyses. We found a main effect of utterance type, $F(1, 89) = 365.53$, $p < .001$, and an interaction between utterance type and condition, $F(2, 89) = 3.79$, $p < .03$. See Table 2 for mean values.

Planned independent samples *t*-tests revealed that parents reading traditional books made more *story-related* utterances [$t(70) = 4.79$, $p < .001$, Cohen's $d = 1.13$] and more *distancing prompts* [$t(70) = 4.11$, $p < .001$, Cohen's $d = 0.97$] than parents reading EC books; whereas parents reading EC books made more *behavior-related* utterances than parents reading traditional books [$t(70) = 6.39$, $p < .001$, Cohen's $d = 1.51$; Table 2]. There was no difference in the proportion of questions or comments by book type [$t(70) = -.720$, $p = .474$]. There were also no differences in *story-related* utterances [$t(54) = -1.361$, $p = .179$], *behavior-related* utterances [$t(54) = 1.277$, $p = .207$], or *distancing prompts* [$t(54) = .821$, $p = .415$] between parents reading traditional books and EC books with the electronics turned off, indicating that nothing intrinsic to the EC books besides their electronic components was causing these effects. Given the lack of differences between traditional books and the control condition, we compare EC books to traditional books for the remainder of our analyses.

To address the issue of shorter overall reading times with traditional books (some dyads read for fewer than 5 min), we divided the raw number of each type of utterance made by the total minutes spent reading in each individual dyad. Although dyads reading EC books read for significantly longer than those reading traditional books (and thus heard more *story-related* and *behavior-related* speech), children reading traditional books and children reading EC books with their parents still heard an equivalent amount of the most compelling type of dialogic speech—utterances that go beyond the textual story through the use of *distancing prompts*.

Child Language

A repeated measures ANOVA with utterance type (*story-related*, *distancing*, and *behavior-related*) as a repeated measure and condition (electronic, traditional, and control) and age group as between-group factors revealed no main effect of age [$F(1, 68) = .079$, $p = .780$], nor any interactions with age, so data were collapsed across age for further analyses. We

Table 1
Duration of Time Spent Reading by Condition

Condition	*Number of participants (N)*	*Mean reading duration*	*SD*	*Range*
Traditional book	36	7.26 min	4.32	2.38 min–20.10 min
Electronic book	36	14.12 min	6.04	5.27 min–30.67 min
Control	20	7.23 min	3.32	3.25 min–14.00 min

Note. There was no difference in reading duration by age group [age 3: mean = 9.43 min; age 5: mean = 10.20 min; $t(87) = -.614$, $p = .541$].

Table 2
Parental Language When Reading EC Books, Traditional Books, and EC Books Without a Console (control)

Measure	*Age*	*Utterance type*	*Mean EC*	*SD*	*Mean traditional*	*SD*	*Mean control*	*SD*
Raw total of each utterance type	Age 3	Behavior-related	15.11	7.55	4.50	4.57	3.50	4.28
		Story-related	23.17	8.39	18.61	10.21	38.60	21.43
		Distancing prompts	7.67	3.40	8.28	5.69	13.30	10.24
	Age 5	Behavior-related	14.72	8.36	2.33	2.83	2.90	2.96
		Story-related	20.06	16.32	19.83	12.20	31.60	18.75
		Distancing prompts	4.72	4.40	8.33	6.42	12.30	10.41
Average (rate per minute) of each utterance type	Age 3	Behavior-related	3.06	1.57	1.06	1.03	0.71	0.85
		Story-related	4.64	1.67	4.58	2.56	7.92	3.99
		Distancing prompts	1.53	0.68	2.04	1.39	2.65	1.93
	Age 5	Behavior-related	2.90	1.64	0.51	0.64	0.59	0.59
		Story-related	3.93	3.24	4.17	2.35	6.37	3.69
		Distancing prompts	0.94	0.88	1.77	1.25	2.48	2.07
Proportion of each utterance type	Age 3	Behavior-related	0.35	0.14	0.18	0.16	0.07	0.08
		Story-related	0.57	0.12	0.73	0.22	0.85	0.12
		Distancing prompts	0.20	0.10	0.34	0.20	0.29	0.15
	Age 5	Behavior-related	0.42	0.21	0.10	0.12	0.10	0.17
		Story-related	0.50	0.22	0.76	0.18	0.79	0.16
		Distancing prompts	0.14	0.13	0.33	0.22	0.29	0.15

found a main effect of utterance type, $F(2, 69) = 8.17$, $p < .001$, and an interaction between utterance type and condition, $F(2, 69) = 17.72$, $p < .001$. See Table 3 for mean values.

There was no difference in the proportion of *story-related* utterances by book type ($p > .05$). According to planned independent samples *t*-tests, children made significantly more *distancing* utterances ($t(70) = 5.09$, $d = 1.20$) when reading traditional books than EC books, and significantly more *behavior-related* utterances ($t(70) = 3.61$, $d = 0.85$) per minute when reading EC books (Table 3). The possibility remains however, that differences in child language were attributable to differences in parental talk. Perhaps parents' increased dialogic speech when reading traditional books elicited similarly dialogic speech from their children. When partial correlations were performed to control for the effects of parental language, the proportion of *distancing* utterances made by children was still significantly correlated with book type (partial $r = .33$). Thus, it appears that children's language is less rich when reading EC storybooks, and the effect does not occur solely because parents speak less dialogically (use fewer story-related utterances and more behavior-related utterances) when reading EC books.

Discussion

These results suggest that traditional books foster dialogical and content-focused reading in parents and children while battery-operated EC books encourage more behavior-focused language. We used pairs of electronic and traditional books that were matched on a variety of key features, including pages, words, words per page, main characters, and overall plot structure, in order to minimize potential differences between conditions. To address the possibility that some unrecognized aspect of EC books (such as simplicity or picture salience) accounted for the differences in parent–child language, we also conducted a control study wherein dyads read an EC book with the electronics turned off, and found no difference from traditional book reading. This suggests that when the "electronic" is taken out of EC books, rates of story-related utterances and distancing prompts return to traditional levels. Altered parent language did not account for differences in child language when reading EC versus traditional books, and significant dialogic language interactions remained in the traditional condition even after accounting for total time spent reading.

STUDY 2: STORY COMPREHENSION

Study 1 established that important aspects of dialogic reading (*story-related utterances* and *distancing prompts*) are diminished when parents and children read EC books as compared to traditional books together, but does this affect children's story comprehension? Perhaps understanding EC storybooks is less dependent on parent–child interaction because other "interactive" features of EC books make up for the reduction in dialogic reading. On the other hand, the behavior-focused nature of parent–child verbal interaction around EC books might interfere with children's understanding of the story by interrupting continuity of thinking or by preempting more high-quality talk, or at least failing to support it. This might place children at a disadvantage when trying to comprehend EC storybooks.

To address this question, we administered a battery of comprehension tasks containing subtests of varying difficulty to determine whether story comprehension—an important preliteracy skill (Kochanoff et al., 2003; Snow & Dickinson, 1990)—varied by book format. Based on prior research on story comprehension in the context of interactive CD-ROM books (de Jong & Bus, 2002; Trushell & Maitland, 2005; Trushell et al., 2001), we hypothesized that children's performance on the tasks would be negatively impacted when reading EC relative to traditional books.

Method

Participants

A new group of 40 three-year-olds (20 boys and 20 girls; mean age: 42.14 months, range: 36.06 months–46.82 months; *SD*: 3.24) and 33 five-year-olds (20 boys and 13 girls; mean age: 65.60 months, range: 59.52 months–72.10 months; *SD*: 3.64) and their parents were recruited. Ninety-six percent of adult participants were mothers (mean age: 37; range: 24–49; *SD*: 4.14); 4% were fathers (mean age: 40; range: 35–43; *SD*: 4.62). All families were monolingual, mid/high-SES English-speakers with normal hearing and language abilities, as determined by parent self-report, and were recruited via telephone and mail from the greater Philadelphia area. Eighty-nine percent of families reported having EC books in the home and thus were familiar with the EC book format.

Procedure

Parent–child dyads were randomly assigned to read either a traditional or an EC book (an EC or traditional version of The Berenstain Bears or an EC or traditional version of Dora the Explorer). The protocol followed was identical to that of Study 1. After reading, parents left the room to fill out a questionnaire while an experimenter engaged children in a comprehension test administered in four consecutive sections: Forced-choice character identification (children were shown four sets of two pictures each and asked, "Can you point to the one that was in the story?") and forced-choice event identification (children were shown four sets of two pictures and asked, "Can you point to which one *happened* in the story?"). Targets and foils were all taken from books in the same series. Foils were matched to the targets on the number and gender of characters pictured. Forced-choice content questions (e.g., "Did Dora and Boots climb Tall Mountain or

Table 3
Child Language When Reading EC Books and Traditional Books

Measure	*Age*	*Utterance type*	*Mean EC*	*SD*	*Mean traditional*	*SD*
Raw total of each utterance type	Age 3	Behavior-related	1.61	1.50	.89	1.57
		Story-related	3.94	2.73	2.50	2.15
		Distancing prompts	1.61	1.19	2.72	1.93
	Age 5	Behavior-related	1.89	2.08	.67	1.41
		Story-related	3.56	4.33	3.00	2.70
		Distancing prompts	1.00	1.19	3.28	4.28
Average (rate per minute) of each utterance type	Age 3	Behavior-related	.50	.52	.30	.48
		Story-related	.92	.60	.78	.64
		Distancing prompts	.40	.33	.87	.61
	Age 5	Behavior-related	.52	.43	.20	.38
		Story-related	.80	.94	.77	.60
		Distancing prompts	.26	.33	1.11	1.09
Proportion of each utterance type	Age 3	Behavior-related	.18	.12	.08	.12
		Story-related	.37	.17	.28	.21
		Distancing prompts	.17	.13	.41	.29
	Age 5	Behavior-related	.30	.24	.10	.18
		Story-related	.31	.20	.27	.18
		Distancing prompts	.10	.11	.39	.29

Short Mountain?") followed the identification tasks. The content questions were designed to determine whether children paid sufficient attention to the story to grasp details such as whether the Berenstain Bear family *drove* to Grizzly-land or *walked*. Finally, a chronology task required children to remember the story sequence well enough to temporally order four pictures from the book. Four pictures were laid in front of the child in random order. The experimenter asked, "Which one came first? Which one came second?" etc. and picked up each picture after children indicated their choice. Four control questions (e.g., "Did you just read a book or did you just brush your teeth?") preceded the forced-choice content questions to ensure that children understood the task.

Results and Discussion

Five-year-olds in both conditions demonstrated ceiling effects in all tasks, suggesting that they comprehended stories equally well in the traditional and the electronic book formats. This interesting finding may be due to two more years of experience with traditional book reading, more robust story understanding, or comprehension tasks that were simply too easy for children in this age group. For the purposes of Study 2, all further analyses are based on 3-year-old data only.

Three-year-olds in both conditions (EC and traditional) correctly answered an equivalent proportion of control questions, ($t(38) = -.20$, $p =$ n.s.). A MANOVA revealed differences in task performance by book type. Planned independent samples t tests showed that children in both conditions identified characters and events from the story equally well, $ps > .05$, suggesting that this kind of information can be readily extracted from a story even when children spend time touching pictures and hearing more behavior-oriented language (as in the case of EC books; Study 1).

Differences in comprehension by book type emerged on items requiring children to recall story content and sequence story events. Three-year-olds reading traditional books correctly answered significantly more content questions than did those in the EC condition and more closely approximated the correct chronological order of events in a story (Table 4). The results of the content question and chronological order analyses suggest that while children reading EC books performed similarly to children reading traditional books in character and event identification tasks (superficial information), they had a harder time understanding higher level aspects of story structure and story details (deeper story structure). Importantly, this information can only be gleaned if the child follows a story's narrative thread.

GENERAL DISCUSSION

Numerous studies have documented that dialogic reading with traditional books is important for children's emergent literacy skills (Doyle & Bramwell, 2006; Hargrave & Sénéchal,

Table 4
Means and Independent Samples t-Test Results for Content Questions and Chronological Placement Comprehension Tasks

Measure	*Mean EC*	*SD*	*Mean traditional*	*SD*	*t-Value*	*p*
Content questions	.69	.19	.84	.19	2.66	<.05
Chronological placement	4.30	.24	2.80	.27	−2.17	<.05

Note. Content questions are shown as the proportion answered correctly out of eight. Chronological placement responses are reported as accuracy scores. Accuracy was calculated by subtracting the actual placement of an event from the placement the child indicated, and then summing the absolute values of the differences.

2000; Huebner, 2000a, 2000b; Huebner & Meltzoff, 2005). Yet, despite the fact that electronic children's books have been shown to be associated with fewer behaviors characteristic of dialogic reading in the present study, their availability is on the rise. Children's book purveyors such as Kindle and iPad offer an exciting opportunity for researchers and practitioners to revisit old questions about the conditions that elicit dialogic reading. Importantly, they also afford the opportunity to ask *new* questions about how electronic features affect parental language, children's language, and story comprehension. The advent of e-books also demands research into whether the new features available in these books can encourage the development of emergent literacy skills. Our studies addressed two major issues in pursuit of this goal: We explored the effect of book format on the dialogic content of language used by parents and children during shared storybook reading and on children's story comprehension.

In Study 1, we showed that parent–child interactions with 3- and 5-year-olds during story time differ substantially depending on the type of book being read. Traditional books (or EC books with the electronic features turned off) foster dialogical and content-focused reading in parents and children. Battery-operated EC books, on the other hand, encourage more behavior-focused language. Parents asked more story-related questions and used more distancing prompts when reading without electronic features; conversely, both parents and children used more behavior-related speech when reading with electronic features. In Study 2, we show that story comprehension in 3-year-olds differed significantly by book type. While children excelled at recalling characters and events regardless of book type, children who read traditional books were significantly better at remembering the content and sequence of events in a story than those who read books with electronic features.

Rich and diverse dialogic interactions offer children the opportunity to expand their language capabilities and tie storybook content to their own experiences. Our results suggest that the types of interactions associated with better reading outcomes are more prevalent when parents and children read traditional books together than when they read EC books. When reading EC books, parents spend much of their time talking about the child's behavior instead of relating the story to the child's life. Prior research suggests that parental use of intrusive directives has a detrimental impact on children's language (Masur, Flynn, & Eichorst, 2005), and the behavior-related talk in the EC condition may crowd out more beneficial dialogic interaction. Indeed, one of our most interesting findings is that even though parents and children spent more time with the EC book, children still did not hear more of the most potent type of dialogic language (distancing prompts) than in the shorter, traditional book reading session. This suggests that if parents have only 10 min per day to read with their child, they can provide the richest and most condensed dialogic input by reading a traditional book together.

Parent–child dialogic reading may not be absolutely necessary for all types of learning in all age groups, however. Our findings suggest that despite fewer behaviors characteristic of a dialogic reading style and more behavior-related utterances, 5-year-olds comprehended the narrative structure and text-based details of EC books, and 3-year-olds were able to identify characters and events introduced via the electronic storybook format. However, a significant body of research in story grammar suggests that to comprehend a story, children must understand components like setting, characters, problem, and resolution (Dimino, Taylor, & Gersten, 1995; Marshall, 1983; Rumelhart, 1980) and attend to the sequence in which story events unfold (Beck & McKeown, 1981; Boulineau, Fore, Hagan-Burke, & Burke, 2004). The present research suggests that 3-year-olds can do this when reading traditional books with their parents, but that the ability is diminished in the context of EC books.

One explanation for the comprehension discrepancy between 3- and 5-year-olds is directly related to a component of dialogic reading—the use of distancing prompts when reading traditional books. These utterances enable 3-year-olds to relate story content to their own experiences and engage in *inferencing*, a crucial skill needed for later reading comprehension (Van Kleeck, 2008). Once children have a "hook" on which to hang the story and its details, they have personalized it in a way that may promote comprehension (Purdy, 2008). Distancing prompts were used more frequently during traditional book reading, which may explain why 3-year-olds were better at recalling the structure and details of stories from these books. This explanation is consistent with the possibility that younger children need the experience of contingent verbal responses—known to be important for language development (Tamis-LeMonda, Bornstein, & Baumwell, 2001)—to comprehend a story.

Given the relative fragility of story comprehension in 3-year-olds, it is also possible that distracting games and sound effects disrupted the flow of the EC book and thus had a negative impact on story comprehension (Trushell & Maitland, 2005). This interference effect has been reported in toddler studies of word learning from picture books with manipulative features (Tare, Chiong, Ganea, & DeLoache, 2010) as well as music during infant learning from a television task (Barr, Shuck, Salerno, Atkinson, & Linebarger, 2010). In the case of the EC books reported here, when a child touches a picture in the book, it immediately makes a sound effect and the story stops. Such mid-sentence pausing and redirection might plausibly interfere with children's memory processes, making it harder for children to form a coherent representation of the story. Based on findings from prior literature and the present research, we suggest altering EC book formats so that they do not stop the story completely when children touch a

picture. Similarly, sound effects and games should be relevant to the actual story if they are included at all, and distancing prompts designed to facilitate parent–child dialogic reading might be included in e-reading apps. Research has shown that e-books specifically geared toward educational purposes, rather than commercial or entertainment purposes, had more positive effects on literacy-related outcomes (Korat & Or, 2010). However, despite corroborating evidence showing that interruptions, mid-sentence pauses, and other distractions are detrimental to reading comprehension, many recent e-reading products nonetheless include these features (e.g., Scholastic's Storia app).

As a caveat, there are limitations to the current studies. Our sample consisted only of upper-middle SES families whose children had no language delays or other developmental issues. It is possible that research with different populations might yield different results. We also did not control for the relative familiarity of the books, and parents and children only read the book one time through. It may be the case that electronic features prove beneficial when parents and children are already familiar with the characters and overall plot structure of a book; at this point, the electronic features may not detract from understanding in the same way and may instead help bolster vocabulary and other skills.

It is also important to recognize that there may be significant benefits associated with reading electronic books that are not apparent when viewed through the traditional reading lens (Oakley & Jay, 2008). For one, the novelty of EC books might captivate young children's attention and draw them toward print when they might otherwise have little literary experience, as in low-income households where shared reading is less common (Raikes et al., 2006). Even *mere print exposure* has been linked to better reading and academic performance in children (Mol & Bus, 2011; Sénéchal & LeFevre, 2002). Similarly, parents and children interacted for longer when reading EC books than traditional books together in the present research, which could be beneficial in light of studies showing that both quality and sheer quantity of shared book-reading experiences play important roles in children's emerging literacy development (Kassow, 2006). Second, electronic books could act as an entertaining supplement to traditional book reading, rather than as a replacement. For example, parents and children could read an EC book without the console (or a traditional book) first to gain the benefits of a dialogic reading experience. Then, the electronic console (or iPad app) could be introduced and children allowed to explore the features of the book at their leisure. Indeed, studies have shown that despite the fact that children communicate less when using e-books, they demonstrate greater persistence when using this format (Moody, Justice, & Cabell, 2010), suggesting its utility as a leisure-time supplement. Finally, electronic books might also hold special promise as supplemental intervention materials for children who are at risk of developing particular types of reading problems (Verhallen, Bus, & De Jong, 2006). Research suggests, for example, that talking books can increase phonological awareness in 5- to 6-year-old boys who underachieve in literacy (Littleton, Wood, & Chera, 2006). Future research should explore whether being exposed to the names and sound effects that accompany pictures in electronic books might improve vocabulary skills and phonics in preschoolers. As a caveat to this suggestion, it is possible that outcomes in at-risk populations might be worse if EC books are used as *substitutes* for traditional shared reading, which a large literature demonstrates is beneficial for children at risk for reading difficulties (Linebarger, Kosanic, Greenwood, & Doku, 2004; Swanson et al., 2011). Furthermore, potential benefits of electronic reading might be greater if publishers and e-book manufacturers took note of the features that seem to actively hinder children's emerging literacy development (e.g., buttons that interrupt reading the text).

The studies reported here explored whether contemporary tools like EC books support dialogic language interactions and emergent literacy skills in preschoolers. Results suggest that behaviors characteristic of a dialogic reading style—a style of storybook reading shown to be predictive of improved later literacy skills—is diminished in the case of EC books. Furthermore, aspects of story comprehension related to story details and narrative structure are diminished in 3-year-olds who read EC versus traditional books with their parents. Suggestions are made for ways to foster an effective reading experience in these new formats, as electronic books for children become increasingly prevalent.

REFERENCES

Arnold, D. S., & Whitehurst, G. J. (1994). Accelerating language development through picture book reading: A summary of dialogic reading and its effect. In D. Dickinson (Ed.), *Bridges to literacy: Approaches to supporting child and family literacy* (pp. 103–128). Cambridge, MA: Blackwell.

Asimov, I. (1973). *The best of Isaac Asimov*. New York, NY: Doubleday.

Association of American Publishers. (2011). AAP publishers report strong growth in year-to-year, year-end book sales. Publishers.org press release, February 16, 2011. Retrieved August 1, 2011, from: http://www.publishers.org/press/24/.

Baker, L., Mackler, K., Sonnenschein, S., & Serpell, R. (2001). Parents' interactions with their first grade children during storybook reading and relations with subsequent home reading activity and reading achievement. *Journal of School Psychology*, *38*, 1–24.

Barr, R., Shuck, L., Salerno, K., Atkinson, E., & Linebarger, D. L. (2010). Music interferes with learning from television during infancy. *Infant & Child Development*, *19*, 313–331.

Beals, D. E., DeTemple, J. M., Tabors, P. O., & Snow, C. E. (1991, April). *Reading, reporting, and repast: Three R's for co-constructing language and literacy skills*. Paper presented at the biennial meeting of the Society for Research in Child Development, Seattle, WA.

Beck, I. L., & McKeown, M. G. (1981). Developing questions that promote comprehension: the story map. *Language Arts*, *58*, 913–918.

Blanchard, J., & Moore, T. (2010). *The digital world of young children: Impact on emergent literacy*. New York, NY: Pearson Foundation.

Blewitt, P. (2008). *Villanova preschool project maternal utterances coding system*. Unpublished manuscript, Villanova University.

Blom-Hoffman, J., O'Neil-Pirozzi, T., Volpe, R., Cutting, J., & Bissinger, E. (2006). Instructing parents to use dialogic reading strategies with preschool children: Impact of a video-based training program on caregiver reading behaviors and children's related verbalizations. *Journal of Applied School Psychology*, *23*(1), 117–131.

Born to Play. (2007). Retrieved August 1, 2011, from http://www.responsesource.com/news/35876/educational-toys-at-top-of-parent-s-christmas-wish-list?hilite=

Boulineau, T., Fore, C., Hagan-Burke, S., & Burke, M. D. (2004). Use of story-mapping to increase the story-grammar text comprehension of elementary students with learning disabilities. *Learning Disability Quarterly*, *27*(2), 105–121.

Chow, B. W., McBride-Chang, C., & Cheung, H. (2008). Dialogic reading and morphology training in Chinese children: Effects on language and literacy. *Developmental Psychology*, *44*, 233–244.

Denton, K., & West, G. (2002). *Children's reading and mathematics achievement in kindergarten and first grade*. Washington, DC: U.S. Department of Education.

Dieterich, S. E., Assel, M. A., Swank, P., Smith, K. E., & Landry, S. H. (2006). The impact of early maternal verbal scaffolding and child language abilities on later decoding and reading comprehension skills. *Journal of School Psychology*, *43*, 481–494.

Dimino, J. A., Taylor, R. M., & Gersten, R. M. (1995). Synthesis of the research on story grammar as a means to increase comprehension. *Reading and Writing Quarterly: Overcoming Learning Difficulties*, *11*(1), 53–72.

Doyle, B. G., & Bramwell, W. (2006). Promoting emergent literacy and social-emotional learning through dialogic reading. *The Reading Teacher*, *59*, 554–564.

Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH, DHHS. (2010). *Developing early literacy: Report of the national early literacy panel (NA)*. Washington, DC: U.S. Government Printing Office.

Fisch, S. M., Shulman, J. S., Akerman, A., & Levin, G. A. (2002). Reading between the pixels: Parent-child interaction while reading online storybooks. *Early Education and Development*, *13*, 435–451.

Fisher-Price. (2003). *Power touch learning system*. Commercially available battery-operated electronic console book system acquired for research in 2003.

Garrison, M., & Christakis, D. (2005). *A teacher in the living room?* Menlo Park, CA: The Henry J. Kaiser Family Foundation.

Gong, Z., & Levy, B. A. (2009). Four year old children's acquisition of print knowledge during electronic storybook reading. *Reading and Writing*, *22*, 889–905.

Greenfield, J. (2012, September 6). Children's Digital Continues to Surge as Overall E-Book Growth Slows in May. *Digital Book World*. Retrieved from: http://www.digitalbookworld.com/2012/childrens-digital-continues-to-surge-as-overall-e-book-growth-slows-in-may/

Hargrave, A. C., & Sénéchal, M. (2000). A book reading intervention with preschool children who have limited vocabularies: The benefits of regular reading and dialogic reading. *Early Childhood Research Quarterly*, *15*(1), 75–90.

Hood, M., Conlon, E., & Andrews, G. (2008). Preschool home literacy practices and children's literacy development: A longitudinal analysis. *Journal of Educational Psychology*, *100*, 252–271.

Huebner, C. E. (2000a). Promoting toddlers' language development: A randomized-controlled trial of a community-based intervention. *Journal of Applied Developmental Psychology*, *21*, 513–535.

Huebner, C. E. (2000b). Community-based support for preschool readiness among children in poverty. *Journal of Education for Students Placed At Risk*, *5*, 291–314.

Huebner, C. E., & Meltzoff, A. N. (2005). Intervention to change parent-child reading style: A comparison of instructional methods. *Journal of Applied Developmental Psychology*, *26*, 296–313.

Johnston, C. B. (1997). Interactive storybook software: Effects on verbal development in young children. *Early Child Development and Care*, *132*, 33–44.

de Jong, M. T., & Bus, A. G. (2002). Quality of book-reading matters for emergent readers: An experiment with the same book in a regular or electronic format. *Journal of Educational Psychology*, *94*, 145–155.

Kassow, D. Z. (2006). Parent-child shared book reading: Quality versus quantity of reading interactions between parents and young children. *Talaris Research Institute*, *1*(1), 1–9.

Kim, J. E., & Anderson, J. (2008). Mother-child shared reading with print and digital texts. *Journal of Early Childhood Literacy*, *8*, 213–245.

Kochanoff, A. T., Hirsh-Pasek, K., Newcombe, N., & Weinraub, M. (2003). *A Summary report of the Temple University Forum on Preschool Assessment*. Philadelphia, PA: Temple University, Department of Psychology.

Korat, O. (2009). The effects of CD-ROM storybook reading on Israeli children's early literacy as a function of age group and repeated reading. *Education and Information Technologies*, *14*, 39–53.

Korat, O., & Or, T. (2010). How new technology influences parent-child interaction: The case of e-book reading. *First Language*, *30*(2), 139–154.

Korat, O., & Shamir, A. (2008). The educational electronic book as a tool for supporting children's emergent literacy in low versus middle SES groups. *Computers and Education*, *50*, 110–124.

Labbo, L. D., & Kuhn, M. R. (2000). Weaving chains of affect and cognition: A young child's understanding of CD-ROM talking books. *Journal of Literacy Research*, *32*, 187–210.

LeapFrog Enterprises, Inc. (2013). Retrieved February 14, 2013, from http://www.leapfroginvestor.com/phoenix.zhtml?c=131670&p=irol-irhome

Lee, J. (2011). Size matters: Early vocabulary as a predictor of language and literacy competence. *Applied Psycholinguistics*, *32*, 69–92.

Lever, R., & Sénéchal, M. (2011). Discussing stories: On how a dialogic reading intervention improves kindergartners' oral narrative construction. *Journal of Experimental Child Psychology*, *108*, 1–24.

Linebarger, D. L., Kosanic, A. Z., Greenwood, C. R., & Doku, N. S. (2004). Effects of viewing the television program *Between the lions* on the emergent literacy skills of young children. *Journal of Educational Psychology*, *96*, 297–308.

Littleton, K., Wood, C., & Chera, P. (2006). Interactions with talking books: phonological awareness affects boys' use of talking books. *Journal of Computer Assisted Learning*, *22*, 382–390.

Marshall, N. (1983). Using story grammar to assess reading comprehension. *Reading Teacher*, *36*, 616–620.

Masur, E. F., Flynn, V., & Eichorst, D. L. (2005). Maternal responsive and directive behaviours and utterances as predictors of children's lexical development. *Journal of Child Language*, *32*(1), 63–91.

Mol, S. E., & Bus, A. G. (2011). To read or not to read: A meta-analysis of print exposure from infancy to early adulthood. *Psychological Bulletin*, *137*, 267–296.

Mol, S. E., Bus, A. G., de Jong, M. T., & Smeets, D. J. H. (2008). Added value of dialogic parent-child book readings: A meta-analysis. *Early Education and Development*, *19*(1), 7–26.

Moody, A., Justice, L., & Cabell, S. (2010). Electronic versus traditional storybooks: relative influence on preschool children's engagement and communication. *Journal of Early Childhood Literacy*, *10*, 294–313.

National Center for Education Statistics (NCES). (2009). *The nation's report card: Reading 2009* (NCES 2010-458). Washington, DC: Institute of Education Sciences, U.S. Department of Education.

Nord, C. W., Lennon, J., Liu, B., & Chandler, K. (1999). *Home literacy activities and signs of emerging literacy*. Washington, DC: U.S. Department of Education.

Oakley, G., & Jay, J. (2008). "Making time" for reading: Factors that influence the success of multimedia reading in the home. *The Reading Teacher*, *62*, 246–255.

Purdy, J. (2008). Inviting conversation: Meaningful talk about texts for English language learners. *Literacy*, *42*(1), 44–51.

Raikes, H., Luze, G., Brooks-Gunn, J., Raikes, H. A., Pan, B. A., Tamis-LeMonda, C. S., ... Rodriguez, E. T. (2006). Mother-child bookreading in low-income families: Correlates and outcomes during the first three years of life. *Child Development*, *77*, 924–953.

Reese, E., Sparks, A., & Levya, D. (2010). A review of parent interventions for preschool children's language and emergent literacy. *Journal of Early Childhood Literacy*, *10*(1), 97–117.

Rideout, V., Vandewater, E., & Wartella, E. (2003). *Zero to six: Electronic media in the lives of infants, toddlers and preschoolers*. Menlo Park, CA: The Henry J. Kaiser Family Foundation.

Rumelhart, D. E. (1980). On evaluating story grammars. *Cognitive Science*, *4*, 313–316.

Segal-Drori, O., Korat, O., Shamir, A., & Klein, P. S. (2009). Reading electronic and printed books with and without adult instruction: Effects on emergent reading. *Reading and Writing*, *23*, 913–930.

Sénéchal, M., & LeFevre, J. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*, *73*, 445–460.

Sénéchal, M., Pagan, S., Lever, R., & Ouellette, G. (2008). Relations among the frequency of shared reading and 4-year-old children's vocabulary, morphological and syntax comprehension. *Early Education and Development*, *19*(1), 27–44.

Shamir, A., Korat, O., & Barbi, N. (2008). The effects of CD-ROM storybook reading on low SES kindergartners' emergent literacy as a function of learning context. *Computers and Education*, *51*, 354–367.

Shuler, C. (2007). *D is for digital*. New York, NY: Joan Ganz Cooney Center.

Snow, C. E., & Dickinson, D. K. (1990). Social sources of narrative skills at home and at school. *First Language*, *10*, 87–103.

Swanson, E., Vaughn, S., Wanzek, J., Petscher, Y., Heckert, J., Cavanaugh, C., ... Tackett, K. (2011). A synthesis of read-aloud interventions on early reading outcomes among preschool through third graders at risk for reading difficulties. *Journal of Learning Disabilities*, *44*, 258–275.

Talley, S., Lancy, D. F., & Lee, T. R. (1997). Children, storybooks, and computers. *Reading Horizons*, *38*(2), 117–128.

Tamis-LeMonda, C. S., Bornstein, M. H., & Baumwell, L. (2001). Maternal responsiveness and children's achievement of language milestones. *Child Development*, *72*, 748–767.

Tare, M., Chiong, C., Ganea, P., & DeLoache, J. (2010). Less is more: How manipulative features affect children's learning from picture books. *Journal of Applied Developmental Psychology*, *31*, 395–400.

Trushell, J., & Maitland, A. (2005). Primary pupils recall of interactive storybooks on CD-ROM: Inconsiderate interactive features and forgetting. *British Journal of Educational Technology*, *36*, 57–66.

Trushell, J., Burrell, C., & Maitland, A. (2001). Year 5 pupils reading an 'interactive storybook' on CD-ROM: Losing the plot? *British Journal of Educational Technology*, *32*, 389–401.

Tsybina, I., & Eriks-Brophy, A. (2010). Bilingual dialogic book-reading intervention for preschoolers with slow expressive vocabulary development. *Journal of Communication Disorders*, *43*, 538–556.

Van Kleeck, A. (2008). Providing preschool foundations for later reading comprehension: The importance of and ideas for targeting inferencing in storybook-sharing interventions. *Psychology in the Schools*, *45*, 627–643.

Verhallen, M. J., Bus, A. G., & de Jong, M. T. (2006). The promise of multimedia stories for kindergarten children at risk. *Journal of Educational Psychology*, *98*, 410–419.

Wartella, E., Caplovitz, A. G., & Lee, J. H. (2004). From Baby Einstein to Leapfrog, from Doom to the Sims, from instant messaging to Internet chat rooms: Public interest in the role of interactive media in children's lives. *Social Policy Report*, *18*(4), 1–19.

Wasik, B. A., & Bond, M. A. (2001). Beyond the pages of a book: Interactive book reading and language development in preschool classrooms. *Journal of Educational Psychology*, *93*, 243–250.

Woods, C., Pillinger, C., & Jackson, E. (2010). Understanding the nature and impact of young readers' literacy interactions with talking books and during adult reading support. *Computers and Education*, *54*(1), 190–198.

Zevenbergen, A. A., & Whitehurst, G. J. (2003). Dialogic reading: A shared picture book reading intervention for preschoolers. In A. van Kleeck, S. A. Stahl, & E. B. Bauer (Eds.), *On reading books to children: Parents and teachers* (pp. 177–200). Hillsdale, NJ: Lawrence Erlbaum.

Zevenbergen, A. A., Whitehurst, G. J., & Zevenbergen, J. A. (2003). Effects of a shared-reading intervention on the inclusion of evaluative devices in narratives of children from low-income families. *Journal of Applied Developmental Psychology*, *24*, 1–15.

APPENDIX

Table A1
Comparison Information on the Different Pairs of Books Used in Studies 1 and 2

Book format	*Title*	*Author/Illustrator*	*Pages*	*Words*	*Words/ Page*	*Similarities in plot structure*	*Frequency selected (%)*
EC book	*The Berenstain Bears Go to Grizzlyland*	Dinsmore/Kurtz	24	368	15.3	Same 4 protagonists; faced with doing a task or good deed	8.3
Traditional book	*The Berenstain Bears Clean House*	Stan/Jan Berenstain	32	485	15.1		5.6
EC book	*Franklin Goes to School*	Forman/Shelleau	24	356	16	Same protagonist and peers; first-day worries and events at school; all is resolved	16.7
Traditional book	*Franklin's First Day at School*	Bourgeois/Clark	12	142	12		11.1
EC book	*The Story of Clifford*	Bridwell	20	206	10.3	Same 2 protagonists; story of Clifford's size; similar scenes	19.4
Traditional book	*Clifford's Puppy Days*	Bridwell	31	323	10.4		25.0
EC book	*Caillou & Gilbert*	Dinsmore/Sevigny	24	285	11.8	Same protagonist; Caillou has problem; learns something new	16.7
Traditional book	*A Visit to the Doctor*	Sanschagrin/Tipeo	24	376	15		33.3
EC book	*Dora's River Adventure*	van Dam/Hall	24	293	12.2	Same protagonists; overcoming obstacles en route to picnic atop mountain	38.9
Traditional book	*Traditional: Dora's New Boots*	Inches/Saunders	22	440	20		25.0

Table A2
Examples of the Three Different Types of Utterances for Parents and Children

Behavior-related	*Story-related*	*Distancing prompts*
C: Can we turn the page?	P: That must be Boots.	P: How do *you* cough?
P: Here, don't lean on it.	P: What do Mama and Papa promise them?	P: Just like *I'm* rubbing *your* back. (Rubs child's back while reading)
P: Do you wanna play a game or do you wanna hear the story?	P: What's Calliou doing?	P: Berenstain Bears go to Grizzlyland—that makes you think of what?
P: Do you like that sound?	C: I think that is a ride.	P: Do you do all of those things at school?
P: Touch the puppy and it will play a song.	C: He licked him.	P: He gave him a bath, just like our cats, right?
C: What's this what's the noise?	C: There's Beaver, Fox, Raccoon.	P: What do you say when you have to do that at the doctor's?