The study monitored the eye movements of twenty 5-year-old children while reading an alphabet book to examine the manner in which the letters, words, and pictures were fixated and the relation of attention to print to alphabetic knowledge. Children attended little to the print, took longer to first fixate print than illustrations, and labeled fewer letters than when presented with letters in isolation. After controlling for receptive vocabulary, regressions revealed that children knowing more letters were quicker to look at the featured letter on a page and spent more time looking at the featured letter, the word, and its first letter. Thus, alphabet books along with letter knowledge may facilitate entrance into the partial alphabetic stage of word recognition.

As the basic element of many written languages, the alphabet—its forms, the names of those forms, and the sound units that the forms represent—is considered of prime importance in the development of reading skill. In support of this, several studies have shown that even after accounting for children’s cognitive ability as assessed by nonverbal intelligence, receptive vocabulary, short-term memory, phonological awareness, and/or rapid automatized naming, children’s knowledge of letter names and letter sounds is a strong predictor of reading skill (see, e.g., Burgess & Lonigan, 1998; Evans, Bell, Shaw, Moretti, & Page, 2006; Johnson, Anderson, & Holligan, 1996; Manolitsis, Georgiou, Parrila, & Stephenson, 2007; Parilla, Kirby, & McQuarrie, 2004; Schatschneider, Flechtner, Francis, Carolson, & Forman, 2004; Wagner, Torgesen, & Rashotte, 1994).

Alphabet books as a genre of children’s literature have a long history as a teaching tool to assist with the development of alphabetic knowledge and reading skill, beginning with horn books and primers, which formed instructional material from the 1600s. These displayed the individual letters of the alphabet, often accompanied by a simple rhyme and illustration to pair the visual form of each letter with the sound or phoneme it represents. Since then a large and rich body of alphabet books has been created for children, with new books released each year using the alphabet as the basic organizing principle, each letter displayed and presented in sequence with accompanying pictured words.

Zeece (1996) noted that alphabet books are often the first type of book purchased by parents, and Mason (1980) found that 37 of the 38 children in her sample owned an alphabet book at home. More recently, Levy, Gong, Hessels, Evans, and Jared (2006) conducted a comprehensive survey of the home literacy activities of children (ages 48–83 months) using the Home Literacy Experiences Questionnaire (Evans, Levy, & Jared, 2001) in studying the development of print knowledge and its relation to home literacy experiences. They found that parents read alphabet books with their children an average of three times a month and that children looked at these books on their own an additional three times a month.

The popularity of alphabet books is likely due to the nature of the illustrations within them that can range from simplified line drawings or photographs to elaborate works of art, to their organized and predictable structure that invites play by authors and illustrators and exploration by children, and to the seemingly endless variations...
possible for using the letters of the alphabet to highlight particular themes, such as content about cultures, countries, foods, animals, modes of transportation, and so on. Thus, these books can be attractive, entertaining, and educational in a broad sense. They are also print salient in visually highlighting a featured letter (or letters) on each page, frequently accompanied by printed words selected so as to begin with that letter. Previous research has shown that children rarely look at print when being read illustrated storybooks (Evans & Saint-Aubin, 2005; Evans, Williamson, & Pursoo, 2008; Guo & Feng, 2007; Justice, Skibbe, Canning, & Lankford, 2005; McCann & Miller, 2008; Roy-Charland, Saint-Aubin, & Evans, 2007). However, the special characteristics of alphabet books may encourage emergent readers to explore printed text to a greater extent.

The purpose of the present study was to extend previous eye-tracking research to examine how preschool-age children looked at the visual displays in an alphabet book and to determine the relation between children’s alphabet knowledge and extent and manner to which they fixated print and picture components of the pages. As context for this research, a review of the aforementioned eye-tracking studies and research into alphabet books is presented, along with reference to the broader literature on shared book reading where relevant. This is followed by a brief discussion of the role of alphabetic knowledge in reading and a conceptual framework for how children’s use of alphabet books may intersect with their alphabetic knowledge to advance their early word reading skill.

Young Children’s Attention to Print During Shared Storybook Reading

Two meta-analyses (Bus, van IJzendoorn, & Pellegrini, 1995; Scarborough & Dobrich, 1994) have concluded that shared reading with children contributes approximately 8% of the variance in later reading skill. The mechanism by which this occurs is not well understood, but one hypothesis has been that during shared book reading, children simultaneously see the print and hear the corresponding words, facilitating the development of their knowledge of concepts of print, beginning sounds and letters in words, and sight words. However, the validity of this hypothesis recently has been cast into doubt by studies of children’s visual attention during shared book reading.

In 2005, two independently conducted studies published by Evans and Saint-Aubin and by Justice et al. using eye trackers showed that prereaders rarely look at print when being read storybooks. In the first study reported by Evans and Saint-Aubin (2005), five 4- to 5-year-old children seated on their parent’s lap were read five short books by their parent. Parents were asked to read the books, displayed on a computer monitor, as they normally would. One book had a clear line of text at the top and bottom of each page with one word in larger, bold font. In a second, each page of text began with an enlarged decorated letter. The third embedded text within speech bubbles in the illustrations. Each of these books had attractive colored illustrations, prompting the inclusion of two additional books with simple and sparse monocolor illustrations. Children spent on average between 175 and 669 ms fixating the text per page versus between 7,235 and 18,065 ms fixating the illustrations, with longer text prompting longer looking at the illustrations ($r = .88$) but not more inspection of the print ($r = .10$). The nature of the print display and complexity of the illustrations had no effect. A second study with 10 children within the Evans and Saint-Aubin (2005) report, a third with 30 children (Evans, Saint-Aubin, & Roy-Charland, 2006), and a fourth with 30 children by Roy-Charland et al. (2007) replicated these findings, and additionally showed that children appear to examine the illustrations in concert with the text, fixating key terminology of the text illustrated within the pictures (Evans, Saint-Aubin, et al., 2006).

Similarly, Justice et al. (2005) examined the extent to which 10 children aged 50–69 months, who knew an average of 20 letter names, looked at the print versus pictures in two books. One was described as print salient with the narrative text in large print and contextualized print embedded in the illustrations. The other had longer narrative text displayed in smaller print separately from the pictures. For 3 min of reading time, Justice et al. found on average that while proportionally more of the children’s fixations were in the print zones for the print-salient book (6% vs. 2.5%), children fixated the print less than 5 s for the print-salient book and 3 s for the other book, regardless of their alphabetic knowledge. Most recently, McCann and Miller (2008) similarly observed that when read a story, the fifteen 3- to 6-year-olds they tested overwhelmingly looked at the illustrations an average of 169 s versus 12 s toward the print.

Young children’s near neglect of print during shared book reading is not limited to books using the Roman alphabet as shown by Guo and Feng (2007), who assessed the eye movements of 18
Chinese-speaking preschoolers when read books with text written in Chinese characters. They further showed that whether the book was read verbatim or interactively with the storyteller adding questions and comments, the amount of looking at the print was equally rare. However, children with higher character knowledge spent a higher proportion of time fixating print, and those with high character knowledge who could also read some words were more likely to move from print to print and from illustration to print in their eye fixations than those with low character knowledge, suggesting some reading-like behavior.

Finally, Evans et al. (2008) indexed the gaze patterns of 76 children aged 3, 4, and 5 toward pages with print versus pages with pictures by videotaping shared book reading. Two books were specially created for the study, with selected words in the text made salient by printing those words in larger, unusual, and colored fonts, or surrounding the words with decorative colored borders and backgrounds. In addition, in counterbalanced conditions, the adult reader pointed or did not point to each word of the books as she read. After each book had been read, the children indicated which objects and words printed on cards had been in the book, half of the items being foils and half being reproduced from the illustrations and from the words highlighted in the text. All three age groups rarely looked at the pages with the print—less than 4% of the time—but attention to print increased with age and was predicted by children's print knowledge after accounting for children's receptive vocabulary and visual memory. Similarly, while children at all ages were beyond chance in recognizing targets from the illustrations, recognition of the targets from the print increased from chance with age and was predicted by children's print knowledge. At all three ages pointing to the text enhanced looking toward the page with print but increased recognition of the print targets only among the older children.

Taken together, this research suggests that for children, storybook reading is primarily a listening activity in which the pictures are read in concert, at least to some degree, with the text heard and that this response is only minimally, if at all, influenced by the design characteristics of the storybook. Rather, children's attention to the print appears to rest on the knowledge that they bring to this activity, in that children who have a knowledge of the characters and forms of written language look at the print and recall aspects of the print to a greater extent, and thus may benefit from to a greater degree from this form of print exposure.

**Alphabet Books**

The research monitoring eye movements, such as the vast majority of research on shared book reading (see reviews by Blok, 1999; Bus et al., 1995; Fletcher & Reese, 2005; Scarborough & Dobrich, 1994) has centered around storybooks. However as noted above, alphabet books are commonly viewed by children and read to them by adults. Alphabet books may be defined as picture books with a uniform format that presents the letters of the alphabet in sequence from A to Z (Harris & Hodges, 1981). At face value, alphabet books would appear to be particularly suited to facilitate literacy development. For one, the format of alphabet books is highly predictable, typically with each page consisting of a letter to name or “read” and an illustration (or illustrations) to name, sometimes the two being linked (at least in the English language) with a phrase such as “F is for fish.” This predictable text invites the child’s participation and the illustration, if easily named, acts as a rebus to complete the sentence.

Second, the design of these books typically highlights one letter per page in an enlarged bold or colored font that might draw the child’s attention to the individual letters. As such, many alphabet books may be thought of in this regard as being print salient. In combination with naming an accompanying illustration or hearing a reading partner do so, the prominence of the letter on the page along with an accompanying object beginning with that letter’s sound might also help the child learn letter–sound correspondence. In fact, alphabet books have been frequently recommended by educators because of their potential to focus children’s attention on print (Fountas & Pinnell, 1996, 1998; McGee & Richgels, 1990; Tompkins, 2001).

Third, by including a printed word beginning with the featured letter accompanying an illustrated object for a given letter, alphabet books may encourage children to attend to the first letter of the word. Thus, rather than relying entirely on context or word shape to recognize printed words, children may begin to apply the alphabetic principle in associating a given letter with the spoken and printed start of a word. In other words, the features of alphabet books in combination with children’s developing knowledge of letter names, letter sounds, and phonological awareness may help to
move children from what has been described as a logographic (Frith, 1985) or prealphabetic (Ehri, 1998) phase of word recognition (i.e., recognition of words on the basis of their physical context and some salient aspect of the word’s appearance) to a phonetic cue (Ehri & Wilce, 1985) or partial alphabetic (Ehri, 1998) phase (i.e., recognition of words by attending to letters—most often at the beginning of words—and combining that with their knowledge of letter sounds to decode).

There is only a limited amount of published research focusing on alphabet books in shared book reading and on their effectiveness in the acquisition and consolidation of alphabetic knowledge. None could be located on how young children interact with these books on their own. In observational studies, Smolkin and Yaden (1992) and Yaden, Smolkin, and MacGillivray (1993) recorded the interaction of six preschoolers with their parents reading nine books over 1 month. They observed that while print referencing behaviors were rare by both parent and child during shared book reading, interactions entailing an alphabet book contained more questions and comments about the print from the children. Stadler and McEvoy (2003) compared book reading interactions of normally developing and language-impaired children and their mothers when reading a storybook and an alphabet book. They, too, found that parents’ comments on the sounds of the letters or behaviors that pointed the child’s attention to the letters were more common with the alphabet book but only for the normally developing children. Moreover, in both groups and with both books, comments about the letters were rare. Rather, with the alphabet books, parent comments were predominantly like those with the storybook, commenting on the meaning of the pictures and creating a story even though no story was there. These findings are easily interpretable given a recent report (Audet, Evans, Williamson, & Reynolds, 2008) showing that the top goals parents of children in junior kindergarten through Grade 3 reported for shared book reading were enjoyment and fostering the interpersonal relationship with their child.

Bus and van IJzendoorn (1988) also found that parents were more likely to name letters, to try to make children recognize sounds in words, and to connect letters to words when reading an alphabet book than a storybook. Importantly, however, mothers of children who focused more on these sorts of instructional comments had children with concurrently higher levels of emergent literacy (for similar differentiation between high and low print awareness children in how parents contextualize story information, see also Hayden & Fagan, 1987).

Finally, a few studies have examined the effect of different kinds of alphabet books. A study by Bradley and Jones (2007) showed that preschool and kindergarten teachers asked to read three different alphabet books to their class were less likely to comment on the letters in an alphabet book in which the letters formed the characters of the story than when reading more conventional alphabet books showing the letters and corresponding illustrations. In a study by Murray, Stahl, and Ivey (1996), this same alphabet book was less effective in fostering phonological awareness than conventional alphabet books. Unfortunately, each condition was placed in a different classroom with no control for classroom curriculum. However, the two studies together suggest that traditional alphabet books might hold special benefit when read by adults.

**The Present Study**

In summary, alphabet books are a unique genre that elicits more print-focused comments in both parent and child. However, the research is scant, the print-focused comments of children within these studies are infrequent, and the methodology of examining verbal behavior is an indirect and likely incomplete window into what children attend. Moreover, the effectiveness of alphabet books in eliciting parents’ and children’s attention to the various print elements within them may be at least partly a function of their design characteristics. For this reason, we reviewed a number of alphabet books for the current study and selected one having features recommended by Criscoe (1988) as optimal for alphabetic learning: one single letter in large font per page, a single familiar illustrated object to accompany it, clear illustrations, and a single word to label that object. The book also had a panda bear wearing red pants that appeared in various poses on each page (for sample pages on which eye fixations are superimposed, see Figure 1). With these optimal book features, in this study we sought to determine to what extent children, when reading the book on their own, would attend to the various visual elements of the book and the relation of children’s alphabetic knowledge and naming of the letters to various indices of visual attention. Through this we hoped to gain some insight into the manner by which alphabet books, when read by the child, might contribute to their literacy development.
Method

Participants

Twenty francophone children (9 boys and 11 girls) in a bilingual (English, French) community, aged 59–71 months, and their parents took part in the study. All children attended senior kindergarten in a French school. The children’s families were composed of 15 two-parent families, 4 single-mother families, and 1 shared-custody family. The majority of families (69%) had an annual income higher than $60,000 in Canadian currency (38% higher than $100,000). All parents in the sample reported having a high school degree, with the majority (100% of mothers and 85% of fathers) having completed some postsecondary education. All families reported owning at least 20–35 children’s books, and the majority of parents (70%) reported owning at least 75 children’s books. Furthermore, the majority of parents (80%) reported that an adult in their household read to the child who was taking part in the study at least 5 days a week. Finally, on average, parents in this sample reported using alphabet books with their children about three times a month. Thus, children in our study can be characterized as largely coming from homes with substantial book experiences.

Materials

Home Literacy Experiences Questionnaire. A French translation of the Home Literacy Experiences Questionnaire (Evans et al., 2001, as reported in Levy et al., 2006) was sent to the parents and completed before the experimental session. This questionnaire was used to gather general information about the household and about reading activities and materials with which the children were engaged in their homes. The parent the most familiar with the reading activities was asked to answer the questionnaire.

Alphabet book. For the experimentation session, Pandi et les Lettres (Pandi and the Letters; Taro, 1984) was used. Including the title page, the book had 27 pages with the letters appearing separately in alphabetical order. This book was chosen because each page presented a featured uppercase letter always in the top left corner, a word printed in uppercase that began with the letter, a simple and clear illustration of the word, and Pandi the main character (Figure 1). Furthermore, the page elements were large and occupied distinct locations on the page with no spatial overlapping among them.

Test measures. Two standardized measures were administered to assess receptive vocabulary and letter name knowledge. In addition, a reading skill test was administered to assess children’s ability to read the specific words presented in the alphabet book.

First, the Échelle de Vocabulaire en Images Peabody (ÉVIP; Dunn, Thériault-Whalen, & Dunn, 1993), which is the French version of the Peabody Picture Vocabulary Test, was administered. This

Figure 1. Sample screen of eye movements for data pages for two children knowing more than 22 uppercase letters (left panel) and two children knowing fewer than six uppercase letters (right panel). The circles superimposed on the picture represent the fixations of the child. The diameter of circles representing fixations is proportional to fixation durations.
scale assessed children’s receptive vocabulary by asking them to point the correct pictorial representation of a word out of four possible choices. Split-half reliability for the age groups tested in the current study varies between .77 and .88, and test–retest reliability varies between .66 and .74. The median of the concurrent validity coefficients with other vocabulary measures is .71.

Second, the letter-naming scale from the Échelles de Compétences en Lecture (Desrochers, 2008) was administered to assess alphabetic knowledge. Children were asked to name the 26 uppercase letters of the alphabet presented in a random order, three or four letters per page. The experimenter pointed to the letters from the top of the page. The 26 lowercase letters were then presented to the child. Uppercase letters were assessed first because all text within the alphabet book used in this study was printed in uppercase. For kindergarteners, the alpha coefficient and the test–retest reliability are both .93. Concurrent validity coefficients with oral reading of simple words, grapheme sounding, and upper- and lowercase letter matching vary between .47 and .76.

Third, children were administered a word identification test to assess their ability to read the 26 target words presented in the alphabet book. Each word was printed in uppercase letters as it appeared in the book in Arial with a font size of 26. The words were presented one at a time in a random order. The children were encouraged to guess a word if they did not know it. Out of the 520 trials (26 words × 20 children), the target word was correctly identified on only 14 occasions. Thus, our sample consisted of children who could not read the words appearing in the books.

Apparatus

Eye movements were measured with an SR Research Ltd. EyeLink II system (SR Research Ltd., 5516 Osgood Main Street, Ottawa, ON, Canada, K0A 2W0). This system has a high accuracy (< 0.5°) and high sampling rate (500 Hz). The EyeLink headband has three cameras, allowing simultaneous tracking of both eyes and head position for head-motion compensation. By default, only the pupil (without corneal reflection) of the child’s eye with the most accurate calibration was tracked. In the present investigation, the configurable acceleration and velocity thresholds were set to detect saccades of 0.5° or greater.

Stimulus displays were presented on two monitors, one for the participant and the other for the experimenter. The experimenter’s monitor was used to provide feedback in real time about the participants’ gaze position. This feedback was given in the form of a gaze cursor measuring 1° in diameter. This allowed the experimenter to evaluate the system accuracy and to initiate a recalibration if necessary.

Procedure

Each child was tested in one session lasting approximately 1 hr. One educator from the after-school center located within the school and two research assistants were present. There was an initial period of familiarization of about 10 min during which the equipment was presented to the child and the task explained. In addition, the child was asked to play a game in which he or she had to follow the experimenter’s hand with his or her eyes, without moving the head, as practice for the eyetracker calibration task.

After the familiarization period, the child was seated on the educator’s lap, the headband was installed, and calibration was initiated. A 3-point calibration procedure was used. For the system to be calibrated, the child had to successively fixate on three small faces of a well-known cartoon character appearing at the center top, bottom left, and bottom right of the screen. This was performed twice, and the mean deviation between both measures had to be 1° or smaller for the calibration to be considered successful. In addition, after each page, a blank screen appeared, and the child had to fixate on a small face of a cartoon character at the center of the screen to allow the system to perform a drift correction, if required. This procedure ensured that eye movement recording accuracy was equal throughout all pages. The initial 3-point calibration procedure took less than 5 min. In addition, to ensure the highest accuracy in eye movement data through all pages, the book was divided in two equal parts, and a full calibration procedure was conducted before presenting the 13th page. Out of 520 presented pages (26 pages × 20 children), only 33 pages could not be used in the analyses because of technical problems such as a decalibration of the equipment. Those 33 pages were equally distributed across all pages.

In the first part of the experiment, the child was asked to read the alphabet book presented page by page on a computer screen. A research assistant clicked on the mouse when, if ever, the child named the letter presented on the page. Children were told that they were free to change the page when they wanted to by asking the research assistant to advance the pages.
After the book reading task, vocabulary was assessed with the EVIP, and reading skills were assessed with the letter-naming scales and the word identification test. Each child was tested in this specific order.

Eye Movement Variables

The eye movement data were scored with the Eye Link Data Viewer program, which presents the alphabet book pages as they were presented to the children with the children’s eye fixations superimposed on them. On each page, there were five zones of interest: (a) the illustration, (b) Pandi the main character, (c) the featured uppercase letter, (d) the word, and (e) the first letter of the word. Unlike Evans and Saint-Aubin (2005), each zone of interest was defined as the object itself, excluding the space surrounding it. In other words, if a fixation was made close to the object but not on the object itself, or close to the text but not on the text, it was considered as being outside the zone. This strict criterion was implemented because of some of the objects’ proximity on the pages. For example, as shown in Figure 1, on some pages the featured letter was very close to the word. Consequently, it would be impossible to attribute without ambiguity a fixation that was between the featured letter and the word to either of those two zones. The three main eye movement indices of interest were (a) the number of saccades landing on each zone, (b) the amount of time spent in each zone, and (c) the latency to the first fixation (if ever) on the target zone.

Results

Four series of analyses were computed on the eye movement data. The first series investigated the amount of time children spent fixating each zone, what zone they first fixated, and the latency from the page presentation to the first fixation on each zone. These analyses included comparisons of the different zones. The results of these analyses addressed whether children’s attention is substantially shifted from the illustrations to the large featured letter and printed word. The second series of analyses described children’s naming of the letters in the books in relation to the letter-naming test and in relation to their eye movements. The data would show whether letter identification in an alphabet book might be easier and provide a window into children’s conception of reading an alphabet book or its predictable format—that is, that a given letter to be named is the leader on the page, determining to some degree the identity of the object illustrated. The third series of analyses investigated the amount of time spent on the zones associated with text (i.e., featured letter, word, and first letter of the word) as a function of the children’s ability to identify the particular featured letter on that page. These analyses addressed whether children would explore featured letters they could not name to a greater or lesser extent than unknown letters. Finally, in the fourth series, the relation between overall letter knowledge of the children and their inspection of the zones associated with text was analyzed to determine how children’s alphabetic skill intersects with alphabet books to move them from a prealphabetic stage of literacy development to partial alphabetic stage with attention to the first letter.

Fixation and Latency Times for the Five Zones

First, the order in which children fixated the various zones of each page (featured letter, illustration, panda bear, first or other letter in the word) was examined. Out of 488 pages presented to the children for which eye movement data are available (20 participants × 26 pages minus 33 pages for which eye movement data are not available), children fixated the illustration first on 84.4% of the pages, followed by the panda bear as a distant second (9.9% of the time.) Text zones were still farther behind at 4.1% for the featured letter, 1.2% for the word, and 0.4% for the first letter of the word. These trends were analyzed with a chi-square test. Because there were 26 pages per child, the mean probability of fixating each zone was first computed for each child and each zone. Those probabilities were then added for the 20 children of the sample and served as the observed frequency in each zone. The expected frequency for each zone was N/5, representing a null hypothesis that first fixation was uniformly distributed across zones. Results revealed a significant difference across zones, $\chi^2(4, N = 20) = 52.53, p < .0001$. Similarly, it might be noted that on 23.2% of the 488 pages the featured letter was never fixated, and on 82.5% and 51.1% of them the first letter of the word or the word itself were never fixated. In contrast, the illustration and the panda bear were never fixated on only 0.7% and 8.3% of the pages, respectively. A repeated measures analysis of variance (ANOVA) with zone as a factor revealed that the probability
of avoiding a zone varies significantly across the five zones of interest, \( F(4, 76) = 164.99\), \( MSE = 137.26\), \( p < .0001\). Post hoc comparisons (Tukey's honestly significant difference [HSD]) revealed significant differences between zones except for one contrast. The probability of fixating the first letter of the word was smallest, followed by that of the word itself, then that of the featured letter, and lastly that of the bear, which did not statistically differ from the probability of fixating the illustration (i.e., first letter of the word < word < featured letter < bear = illustration). In summary, across all children and all pages, all three text zones were least often first fixated and had the lowest probability of ever being fixated.

Second, as a different way of examining the data, the latency to first fixation on each of the zones was calculated for the 488 pages. As shown in Table 1, the latency data perfectly mirrored the first fixation data presented previously. On average, children quickly looked at the illustration within about 1 s, followed by the repeating illustration of the panda bear in 3 s. It took on average roughly 10 s to fixate the first letter of the word naming the pictured object when these fixations occurred and 9 s to fixate the word. With respect to the featured letter, it took over 6 s to fixate it. On average, 18.19 (SD = 6.79) other fixations preceded this. Because 3 children never fixated the word’s first letter, the repeated measure ANOVA is based on 17 of the 20 children. There was a main effect of zone, \( F(4, 64) = 44.96\), \( MSE = 5,509,916\), \( p < .0001\). Post hoc comparisons (Tukey’s HSD) revealed that children looked as rapidly at the illustration as at the panda bear, and both were looked at faster than the featured letter, which was looked at faster than the word or its first letter (illustration = bear < featured letter < word = first letter of the word). Thus, not only did children less often look at the text zones but when they did, it took them longer to do so.

Finally, for each child the amount of time spent on each of the zones was computed and averaged across pages. This measure allows a direct comparison with previous shared book reading studies in which children’s eye movements were also monitored. As shown in Table 1, children spent most of their time on the illustrations: the illustration of the word for 5.69 s and the panda bear for 2.41 s. With respect to the print elements, children spent about 1 s on the word, 1.31 s on the featured letter, and about .5 s on the first letter of the word. Once again, because three children never fixated the first letter of the word, the repeated measure ANOVA with zone as the factor was based on 17 of the 20 children. The effect of zone was significant, \( F(4, 64) = 42.45\), \( MSE = 1,738,841\), \( p < .0001\). Post hoc comparisons (Tukey’s HSD) revealed that kindergarteners fixated the illustration of the word for a significantly longer amount of time than anything else and that the panda bear was fixated longer than the printed word and its first letter (illustration > bear > word = first letter of the word), but not longer than the featured letter. Finally, the featured letter was not fixated for a significantly longer amount of time than the word or its first letter. These analyses again show that the accompanying illustrations in this highly print-salient book took priority, consuming proportionately more of the child’s attention across all fixations. However, fixation durations on the large featured letters were not lower than those of the equally sized panda bear.

**Table 1**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Latency</th>
<th>Time spent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M )</td>
<td>( SD )</td>
</tr>
<tr>
<td>Featured letter</td>
<td>5482</td>
<td>1848</td>
</tr>
<tr>
<td>First letter of the word</td>
<td>9879</td>
<td>4736</td>
</tr>
<tr>
<td>Word</td>
<td>8924</td>
<td>2902</td>
</tr>
<tr>
<td>Illustration</td>
<td>1015</td>
<td>208</td>
</tr>
<tr>
<td>Pandi, the main character</td>
<td>2790</td>
<td>811</td>
</tr>
</tbody>
</table>

**Note:** The data in the table are based on 17 of the 20 children because 3 of them never fixated the first letter of the word. Those 3 children were able to identify only one, two, and four uppercase letters.

**Eye Movements in Relation to Naming the Featured Letter When Reading the Book**

The children identified an average of 12.5 uppercase letters in the letter-naming task. As would be expected given the nondirected nature of the book reading, they named fewer letters (7.4) out loud in this task, \( F(1, 19) = 10.80\), \( MSE = 23.604\), \( p < .01\). Of interest was examining the correspondence between letters named in isolation when tested on the letter-naming task and letters named in context when reading the alphabet book as a test of the book aiding letter naming, and whether children looked sooner toward the featured letters in the book when they named them. If so, this would suggest that in these instances children adopted a more mature book reading approach of starting with the featured letter and giving more importance to it.

With respect to the correspondence, we computed correlations between the number of letters...
named during the alphabet book reading task and the number of letters correctly identified in the letter-naming task. As would be expected, there was a significant correlation, $r = .69, p < .001$. We then examined whether children named in the book all the letters that they could name when tested in isolation and, more critically, whether they named letters in the book that they could not name when tested. Out of the 520 trials across 20 children in the test of letter names, children correctly named the letters on 249 of the 520 trials. The letters for 132 of these 249 trials (53%) were also named in the alphabet book. Out of the 520 trials during the alphabet book reading task, the letter was named on 148 trials, 16 (11%) of them being letters they had not been able to identify on the letter-naming task. Thus, on average, children did not “read” out loud all the letters that they knew but at the same time were able to “read” some letters in the book that they could not identify on a letter name test.

To examine the oculomotor behavior of children when naming letters in the book, we first calculated various indices between the first fixation on the letter and the point at which the letter was named. It should be noted that 7 children never named any letters during their exploration of the alphabet book. Consequently, the data reported in the current paragraph are based on 13 children. From the time children first fixated a letter they then named to the time they actually named it, children took an average of 7.3 s ($SD = 3.5$). In this interval they fixated the letter on average 3.9 times ($SD = 2.1$) for a total duration of 1,111 ms ($SD = 621$). However, once the letter was named, children only fixated it on average 1.1 additional times ($SD = 1.8$), for a total duration of 216 ms ($SD = 474$). The lag between the first fixation on the featured letter and the moment it is named suggests that children may have taken advantage of the illustration to decipher the letter. In addition, results suggest that once named, the featured letter was of little further interest.

The next series of analyses was aimed at investigating whether the letters named out loud were processed in the same way as the other known letters that were not named in the reading activity. To address this issue, only children who both named letters in the book that they knew on the letter-naming test and knew letters on the letter-naming test that they did not name when reading the book were selected. With those criteria, data were available for 11 children. Children took on average, 4,059 ms ($SD = 1,869$) before fixating the letter when they subsequently named it versus 6,388 ms ($SD = 3,153$) when they did not. This difference in latency between the onset of the page and the first fixation on known letters that were named versus unnamed was marginally significant, $F(1, 10) = 4.63, MSE = 6,441,335, p = .057$. Similarly, children made significantly fewer fixations on the page before fixating a letter they subsequently named out loud ($M = 11.5, SD = 5.8$) than when they did not name it ($M = 21.6, SD = 10.8$), $F(1, 10) = 8.14, MSE = 67.72, p < .05$.

It could be argued that these differences were due to a difference in overall page presentation duration. Children could have been faster at “reading” the page when they named the known letter than when they did not, producing shorter latencies, as well as shorter fixation durations, on all elements of the page. To prevent such bias, Evans and Saint-Aubin (2005; see also Roy-Charland et al., 2007) used proportions instead of raw scores. Thus, we computed the proportion of latency duration for each child and each page by dividing the sum of all fixation durations between the onset of the page and the first fixation on the letter by the sum of all fixation durations on the page. Similarly, the proportion of saccades before the first fixation on the letter was computed for each child and each page. The results with these data mirrored those with raw scores. Thus, the data show that when children read the letter out loud, they did so earlier in the period of time that they were looking at that page.

**Eye Movements as a Function of Knowing the Featured Letter**

For the next analyses, fixation durations and number of fixations in each of the three text zones (featured letter, word, and first letter of the word) were examined for each page in relation to the child’s knowledge of the letter featured on the page. To allow direct comparisons with previous eye-movement studies and to control for variations from page to page and from child to child in the length of time each page was looked at, proportions of fixation durations and of saccades were computed as described previously. Summary data were created for each child for these three indices, separately for pages with letters known and unknown by the child.

Whether a letter was known or not was determined using both the letter-naming task and the alphabet book reading. A letter was considered known if the child correctly identified it during the letter-naming task or while reading the alphabet.
book. Then for each child, the 26 pages of the alphabet book were divided into two categories: pages featuring a known versus unknown letter.

The median number of uppercase letters known by the children in the sample was 13 but there was substantial variability. While variability was important for later analyses correlating the total number of letters known by children with their eye movement patterns, the extremes of the distribution constituted a challenge for analyses relating oculomotor behavior to whether the letter displayed on a page was known or unknown: Children who knew very many or very few letters would have very few observations in one of the two categories. In fact, data for 1 of the 20 children could not be used here because he knew all 26 letters. To obtain an accurate picture, two sets of analyses were conducted. The first was based on 19 children for whom there were both known and unknown letters. The second was based on a subsample of 10 children with a balanced number of known and unknown letters. This subsample was created by removing children in the lowest and in the highest quartiles, this being 5 children knowing less than three letters and 5 children (including the child described previously) knowing more than 22 letters.

Another potential problem to consider was that some letters may not have been represented in one of the two categories given previous research showing that some letters are mastered earlier or more easily than others (Evans, Bell, et al., 2006; Treiman & Kessler, 2003; Worden & Boettcher, 1990). However frequency counts revealed that all letters were known by at least 25% of the children and none was known by all of them. Consequently, overall each letter was represented in both the known and the unknown categories.

Finally to check that the current distribution of mastery among the 26 letters was typical of children, we correlated the proportion of these francophone children knowing each of the 26 upper case letters with the corresponding proportions for anglophone children in a previous Canadian study by Evans, Bell, et al. (2006); in three reported in Treiman, Tincoff, Rodriguez, Mouzaki, and Francis (1998) for data from California, Houston, and Detroit; and in one reported by Worden and Boettcher (1990). Despite the fact that some letters are more frequently used in one of the two languages and despite variations between the studies in how letter name knowledge was assessed, correlations are high and remarkably similar, being .71 with data in Evans, Bell, et al.; .67, .71, and .75 with the three samples in Treiman et al.; and .67 with the data in Worden and Boettcher.

Table 2 presents the means and standard deviations for the sample of 19 children and for the subsample of 10 children having letter knowledge clustered about the median. It reveals almost identical results from both samples and shows that the pattern of eye movement on textual elements does not seem to be influenced by children’s knowledge of the featured letter. These observations were confirmed by a series of repeated measure ANOVAs contrasting all eye movement variables for pages with a known letter versus those with an unknown letter. For the total sample composed of 19 children, none of the ANOVAs was significant (all Fs < 1.43). For the subset composed of children with median letter knowledge, there was a single significant ANOVA: Children were faster to fixate the featured letter when they knew it, $F(1, 8) = 7.00, \text{MSE} = .003, p < .05$. However, if the Bonferroni correction is applied to take into account the fact that seven ANOVAs were conducted, this effect is no longer significant. Thus, knowing the particular featured letter on a page did not affect visual attention to the print.

### Table 2

| Average Proportion of Saccades to and Fixation Duration on Featured Letter, First Letter of the Word, Word as a Whole, and Latency Between Page Onset and Fixating (If Ever) the Featured Letter by Known and Unknown Letters for Total Sample and Subsample With a Median Letter Name Knowledge |
|----------|---------|---------|----------|---------|---------|---------|---------|---------|
| Sample (N = 17) | Subsample (n = 10) | Known letter | Unknown letter | Known letter | Unknown letter | M | SD | M | SD | M | SD | M | SD | Word |
| Saccade | .069 | .032 | .071 | .051 | .079 | .022 | .076 | .031 |
| Fixation | .077 | .037 | .078 | .052 | .088 | .026 | .088 | .040 |
| First letter | .006 | .004 | .006 | .006 | .006 | .005 | .004 | .005 |
| Fixation | .008 | .010 | .007 | .017 | .008 | .008 | .005 | .006 |
| Word | .029 | .020 | .025 | .018 | .028 | .021 | .025 | .019 |
| Fixation | .033 | .022 | .027 | .023 | .029 | .020 | .026 | .022 |
| Latency | .339 | .146 | .364 | .102 | .307 | .108 | .358 | .108 |
letter-naming test or in the alphabet book, on their eye-movement pattern irrespective of their specific knowledge of the presented letter. Here, data from all 20 children were used. We first tested whether children’s letter knowledge influenced the time they spent looking at a page. Did children who knew more letters spend more time on the pages? To address this issue, we computed for each child, the average page presentation duration, which was under each child’s control, for the 26 pages. The correlation between letter knowledge and page presentation duration was not significant, \( r = .12, ns \). Thus, the total amount of time children spend on the pages is not a function of their alphabetic knowledge. We then turned to the main analyses by correlating the number of uppercase letters known with the proportion of saccades to each of the three text zones (featured letter, word, and first letter of the word), the proportional fixation durations on each of the three text zones, as well as the proportional latency before fixating (if ever) the featured letter. As can be seen in Figure 2, all correlations are substantial, significant, and in the expected direction. Children who were able to name more letters looked more at all three print zones.

Despite the clear correlations between letter knowledge and eye movements on textual elements, it is worth noting that uppercase letter knowledge was also significantly correlated with the receptive vocabulary raw score, \( r = .63, p < .01 \). Consequently, it could be argued that letter knowledge was confounded with general ability and/or receptive vocabulary. Thus, to evaluate whether letter knowledge accounted for the pattern of eye movements over and above any contribution from vocabulary and unmeasured cognitive variables associated with it, a series of hierarchical regression analyses were computed. For each analysis, the ÉVIP raw score was entered at Step 1, and letter knowledge was added at Step 2. Regression analyses were run for the proportion of saccades to and the proportion of durations on each of the three text zones, and a seventh regression was run for the proportional latency for fixating (if ever) the featured letter. All seven regression analyses are presented in Table 3.

Results revealed that together, both vocabulary and letter knowledge accounted for between 23% and 56% of the variance in the seven dependent variables. Receptive vocabulary was significantly related to the proportion of saccades to and fixation durations on the word and on its first letter but was not related to any of the three measures for the featured letter. More importantly, after controlling for vocabulary, letter knowledge explained a significant amount of additional variance (between 13% and 26%) in the proportion of saccades to and fixation durations on the word itself and on its first letter. It also accounted for an additional 45% variance in the proportional latency before fixating the featured letter. In contrast, saccades to and fixations on the featured letter were not predicted by letter knowledge. In summary, while alphabetic knowledge did not predict how often or how much children looked at the featured letter, it did predict how quickly they turned their attention to it, and in addition it predicted how often and how long they looked at the printed word and the first letter of the printed word. Thus, children with higher alphabetic knowledge were more likely to attend to the more detailed print information of the word and most notably, of the first letter of the word.

**Discussion**

This study presented children aged 59–71 months with a simple clear alphabet book having on each page a single large uppercase letter, one prominent word in uppercase, a single corresponding object, and the same bear, and asked them to read it. These children were able to name on average 13 letters on an uppercase letter name test, a score intermediate between the 8 and 17 letters named on average by junior and senior kindergarten participants studied by Cormier (2006). Correlations computed between the frequency with which each letter of the alphabet was named in this study of francophone children and the data presented in studies of anglophone children (Evans, Bell, et al., 2006; Treiman et al., 1998; Worden & Boettcher, 1990) ranged from .67 to .75, and similar letters were best known (e.g., A, B, O, and X) and least known (e.g., V, Q, G, and U) in all of these studies.

As discussed by Evans, Bell, et al. (2006) and Treiman and Kessler (2003), there are various reasons why some letters are better known than others. Regardless, the preceding correlations and sets of best and least known letters testify that the current sample is comparable in letter knowledge to participants involved in other North American studies, reducing concerns about the present results being francophone sample-specific findings.

**Attention to Print**

Data from the eye-tracker showed that children more often first looked at the illustration of the word than at the large uppercase featured letter, at
the word, or at the first letter of the word constituting the three text zones. Similarly the latency to the first fixation of the illustration of the word was shorter than for any of the three text zones, and the total duration of all fixations on the illustration of the word was longer than for any of the three text

\[ y' = -0.0117x + 0.5843 \]

\[ R^2 = 0.5355 \]

![Proportion of Latency Time Before Fixating the Letter](image)

**Average Proportion of Landing**

- **Featured Letter**
  \[ y' = 0.0018x + 0.0408 \]
  \[ R^2 = 0.2523 \]

- **First letter of the Word**
  \[ y' = 0.0003x + 0.0006 \]
  \[ R^2 = 0.4898 \]

- **Word**
  \[ y' = 0.0017x + 0.0068 \]
  \[ R^2 = 0.4829 \]

**Proportional Fixation Time**

- **Featured Letter**
  \[ y' = 0.0019x + 0.045 \]
  \[ R^2 = 0.2071 \]

- **First letter of the Word**
  \[ y' = 0.0004x + 0.0006 \]
  \[ R^2 = 0.4634 \]

- **Word**
  \[ y' = 0.002x + 0.006 \]
  \[ R^2 = 0.4571 \]

**Figure 2.** Scatter plots of proportion of saccades and fixation durations on each text zone as well as proportional latency before fixating the uppercase letter (if ever) as a function of uppercase letter knowledge.
zones. Finally, children more quickly fixated, and fixated for longer, on the picture of the panda bear than any of the other text zones, despite the fact that this bear reappeared on each page. While it would be expected that children would attend little to the printed word given that they were nonreaders, we were surprised that the featured letter per se did not elicit greater attention than what was observed here, given that it was very prominent and of near equal size to the two illustrations on the page.

Overall, the current results fit nicely with previous shared book reading studies in which children’s eye movement were monitored. These revealed that, generally speaking, children spent less than 1 s or about 7% of their viewing time on text of storybooks containing several words (Evans & Saint-Aubin, 2005; Justice et al., 2005). Similarly, when senior kindergarteners to second graders were read a storybook that exceeded their reading skills, they spent between 4% and 9% of their viewing time, respectively, for a total of 22% of their viewing time. The larger percentage of time fixating print here may have been due partly to the design of the book in which just four items appeared on each page—a letter, a word, an object, and the bear—each being less of a distraction to the other than many published alphabet books with complicated illustrations associated with each letter. In addition, placing the child in the role of reader to an adult, rather than listener as an adult read, may have increased attention to print. As such, further research is warranted to investigate the potential effects of design characteristics and participant role on children’s attention.

### Children’s Reading of the Letters

Although our main focus was to examine children’s eye movements and not to listen to the children read, it was the case that when asked to read the book, children readily complied and named out loud an average of seven letters as they looked through its pages. An average of 7 s passed between their first fixation on the letter and when they named it, and in that interval four fixations on the letter occurred. Some letters (11%) that children were not able to name on the letter-naming test

---

### Table 3

Hierarchical Regression Analyses Predicting Eye Movement on Each Text Zone With Vocabulary Entered at Step 1 and Letter Knowledge Added at Step 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Saccades</th>
<th></th>
<th></th>
<th>Fixation durations</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>ΔR²</td>
<td>R²</td>
<td>Beta</td>
<td>ΔR²</td>
<td>R²</td>
</tr>
<tr>
<td>Featured letter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. ÉVIP</td>
<td>.437</td>
<td>.19†</td>
<td>.19†</td>
<td>.411</td>
<td>.17</td>
<td>.17</td>
</tr>
<tr>
<td>2. Letter knowledge</td>
<td>.376</td>
<td>.09</td>
<td>.28</td>
<td>.325</td>
<td>.06</td>
<td>.23</td>
</tr>
<tr>
<td>First letter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. ÉVIP</td>
<td>.524</td>
<td>.27*</td>
<td>.27*</td>
<td>.453</td>
<td>.21*</td>
<td>.21*</td>
</tr>
<tr>
<td>2. Letter knowledge</td>
<td>.617</td>
<td>.23*</td>
<td>.50**</td>
<td>.659</td>
<td>.26**</td>
<td>.47**</td>
</tr>
<tr>
<td>Word</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. ÉVIP</td>
<td>.630</td>
<td>.40**</td>
<td>.40**</td>
<td>.626</td>
<td>.39**</td>
<td>.39**</td>
</tr>
<tr>
<td>2. Letter knowledge</td>
<td>.494</td>
<td>.15*</td>
<td>.54**</td>
<td>.466</td>
<td>.13*</td>
<td>.52**</td>
</tr>
<tr>
<td>Latency to featured letter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. ÉVIP</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–.334</td>
<td>.11</td>
<td>.11</td>
</tr>
<tr>
<td>2. Letter knowledge</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–.868</td>
<td>.45**</td>
<td>.56**</td>
</tr>
</tbody>
</table>

Note. In order to save space, the Échelle de Vocabulaire en Images Peabody (ÉVIP) beta weights at Step 2 are not presented in the table.†p < .06, *p < .05, **p < .01.
were among those named out loud when looking at the book. This may reflect measurement error in the alphabet naming test. However, it may be that in those seconds before naming a letter, information gained from the context in which the letter appeared (i.e., the accompanying illustration that the child might name and associate with a letter, its appearance on one of the first or last pages of the book, or its position in a known sequence of letters) may have assisted children to retrieve the letter’s name. Previous studies have examined only shared reading of alphabet books in which the adult did the reading. The results from the present study tell us that even children reading an alphabet book on their own may contribute to or help consolidate their letter knowledge, and provides insight into how this happens.

Moreover, comparisons of children’s eye movement for letters they knew and subsequently named versus letters they also knew but did not name showed that children took less long to first fixate named letters, and engaged in fewer fixations on other items on the page. It may be the case that children more quickly named letters they knew best. A study comparing eye movements on a standard letter-naming test with those using an alphabet book would address this point. However, the findings here regarding fixations and fixation times when naming a letter mirror the text order of “B is for banana” and not the reverse. Thus, while reading the letters out loud was not automatic, the results suggest that the children had to some extent internalized the format of reading alphabet books in which the letter is the leader on the page, determining what picture is illustrated. Sulzby (1985) has described how for primary-grade children, beginning reading of books is “emergent reading” in which children initially attend almost exclusively to the illustrations and recreate the story told to them for the book or construct a story based on its pictures. Later, she noted, they pay attention to the print and gradually become better able to utilize and integrate the three aspects of processing involved in conventional reading: comprehension, sight word recognition, and decoding. The present results suggest that alphabet books, in their predictable structure of a letter per page, with the letter determining the illustration, may act as a stepping-stone for children to pay greater attention to print in books, and begin to engage in conventional reading.

Nonetheless, it is worth returning to our initial point regarding children’s limited fixations on the print. Children, on average, correctly named about twice as many letters on the letter-naming task than what they named in the book. Thus, while children who knew more letters named more letters in the alphabet book, their reading performance with the book was not commensurate with their alphabetic knowledge. Rather, as shown by the eye movement data, reading an alphabet book for these young children was largely a matter of reading the pictures with longer and more frequent fixations and speedier first fixations to the illustration of the word and the panda bear.

**The Effect of Letter Knowledge**

An equally important set of findings was that in general, children’s inspection of the text elements in the alphabet book was influenced by their overall letter knowledge and not by whether they knew the particular letter on the page. Children with higher letter knowledge did not spend longer on each page than children with lesser letter knowledge but they did attend more quickly, more often, and for longer on the text elements. In other words, they redistributed their viewing time on the page elements as opposed to fixating illustrations for the same amount of time as children with lesser letter knowledge and adding on the top of that more inspection of the text elements. These findings may be interpreted in accordance with notions of self-efficacy determining behavior (Bandura, 1986), and subsequent demonstrations that children with a low sense of self-efficacy for academic tasks tend to give up on academic tasks more easily and engage in alternative activities (see reviews by Pajares, 1996; Zimmerman, 2000). Children with greater letter knowledge would feel more competent to deal with the print in alphabet books, leading them to attend to it in anticipation that the featured letter or parts of the written word might be recognized.

Moreover, letter knowledge contributed to the prediction of eye movements on text elements over and above receptive vocabulary, which correlated with attention to words but not the featured letters. The association between vocabulary and attention to the single printed word but disassociation with attention to the featured letter may reflect children with higher intelligence or more shared reading experience having more well-developed understanding that reading a book entails looking at the printed word and/or attempting to link the word with its corresponding pictured object, prompting them to look at the word. In contrast, letter name knowledge reflects a specific type of print-specific knowledge, necessary for attempting to read the
featured letter and/or word, albeit on a less than consistent basis. Perhaps most importantly, however, the hierarchical regressions showed that letter knowledge made a stronger contribution to attention to the word and first letter of the word than to the featured letters. Its lesser contribution to the featured letter may be because both children with good letter knowledge and those with poor letter knowledge spent relatively little time on featured letters but for different reasons: For one group the featured letters could be read or processed quickly, whereas for the other the featured letters were of little interest.

Regardless, the contribution of letter knowledge to attention to the word and to its first letter adds to our understanding of why letter knowledge contributes to reading development in this early period. Previous research has shown that children’s knowledge of letter names provides important clues to their knowledge of letter sounds (Evans, Bell, et al., 2006; McBride-Chang, 1999; Treiman, 1994; Treiman et al., 1998) in that letters containing their sound within their name are more readily learned. The present research shows first that pre-readers do not just acquire letter name knowledge but use it, in that this knowledge appears to influence the way they look at print-salient alphabet books, attending more at the printed words pictured in them. Second, it shows that they look specifically more at the first letter of these words, this letter being an important first alphabetic cue to the word’s identification. In concert with their alphabetic knowledge and the accompanying picture, attention to the beginning of words pictured in alphabet books may reinforce or expand their knowledge of letter sounds, and facilitate their entrance into the partial alphabetic phase of reading and development of word recognition skill.

Limitations

As in any study, some limitations of the present study should be noted. First, children in this study were asked to read this book to an adult, which at this age is less frequent that being read to by adults or in collaboration with adults. Nonetheless, previous surveys and naturalistic observations have shown that children frequently do look at books, including alphabet books, on their own (e.g., Levy et al., 2006). In fact this activity is often encouraged in preschool and primary grade classrooms during free reading and play time. Hence, both perspectives—studying adults reading to children and children reading on their own or to an adult—are necessary to understand the potential contribution of alphabet books to children’s literacy development.

Second, despite the fact that the book used in this study exemplified the recommended qualities of alphabet books, these may not be characteristic of many alphabet books. In particular, the design of this book was such that there were just four elements per page, mostly distinct or separated from each other, displayed prominently on a plain background. It remains to be seen to what extent the current results generalize to the diverse range of alphabet books currently available for children, many of which have complex illustrations and smaller text and letters that may make for even less attention to the print. It is also acknowledged that there may be other alphabet books with design features that might amplify children’s attention to print such as letters embedded within similarly shaped pictured objects (e.g., an f in a fish or an s in a snake), or textured letters for children to trace.

Finally, the data were collected at a single point in time at the first exposure to this particular book. This may not be a limitation because with every book there is a first encounter, the nature of which is valuable to understand. However, given that children often repeatedly interact with the same book, their behavior may change over time. It is likely that their alphabetic knowledge would also concurrently change over the same period in the course of other literacy instruction and experiences, making it difficult to disentangle the effects of repeated reading from the effects of curricular activities, for example, on increased letter knowledge.

Main Conclusions

In summary, the present study clearly established, once again, that young children predominantly attend to the illustrations rather than to the print. These results were found when children were asked to read to an adult an alphabet book having a clear, simple layout and just four visual elements. Each page had a single word in uppercase and a single letter as large as one of the two illustrations on the page (panda bear) and half as large as the illustration of the word associated with that letter. Thus, it can clearly be regarded as a print-salient book. However, just because it is an alphabet book, predominantly displays the alphabet, or appears print salient to an adult, the alphabet is not what children primarily attended to within it.

At the same time, however, the results appear to suggest that this particular alphabet book elicited
more attention to the text in the form of a single printed word on each page than has been found in previous eye-tracking studies. In particular, Roy-Charland et al. (2007) showed that kindergarteners of the same age, who were asked to read a storybook with simple text, spent less time on all of the words in total on each page than here with a single word on each page. Here, kindergarten children’s attention to the print in the alphabet book was in part a function of their own letter knowledge. Children with more alphabetic knowledge paid more attention to the print, even after controlling for their receptive vocabulary and unmeasured maturational variables associated with it. Thus, for children with greater letter knowledge who cannot yet read the individual words for the objects pictured, simple alphabet books appear to present them with the seemingly reachable challenge of reading the book in a more conventional sense and appear to have the potential to increase and consolidate alphabetic knowledge even when children look at these books on their own. However, for children with less alphabetic knowledge, even the featured letters are more likely to go largely unobserved, and alphabet books are more likely to be books in which the child largely inspects portrayals of familiar and unfamiliar scenes and objects. Thus, when read by children themselves, for alphabet books to potentially be a useful tool for consolidating alphabetic knowledge and leading them to attend to the printed word, teachers and parents need to provide them with previous opportunities to acquire familiarity with letter forms and names. Otherwise, they are picture books that carry other benefits in this independent activity, but likely not learning to read.


References


