

When Children Are Not Read to at Home: The Million Word Gap

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ABSTRACT: *Objective:* In the United States, there are numerous ongoing efforts to remedy the Word Gap: massive differences in *heard vocabulary* for poor versus advantaged children during the first 5 years of life. One potentially important resource for vocabulary exposure is children's book reading sessions, which are more lexically diverse than standard caregiver-child conversations and have demonstrated significant correlational and causal influences on children's vocabulary development. Yet, nationally representative data suggest that around 25% of caregivers never read with their children. *Method:* This study uses data from 60 commonly read children's books to estimate the number of words that children are exposed to during book reading sessions. We estimated the total cumulative word exposure for children who are read to at varying frequencies corresponding to nationally representative benchmarks across the first 5 years of life. *Results:* Parents who read 1 picture book with their children every day provide their children with exposure to an estimated 78,000 words each a year. Cumulatively, over the 5 years before kindergarten entry, we estimate that children from literacy-rich homes hear a cumulative 1.4 million more words during storybook reading than children who are never read to. *Conclusion:* Home-based shared book reading represents an important resource for closing the Word Gap.

(*J Dev Behav Pediatr* 40:383–386, 2019) **Index terms:** Word Gap, reading, vocabulary, literacy, cognitive development, child development.

A major source of vocabulary development during early childhood is children's interactions with others, especially their primary caregivers.^{1–3} Unfortunately, there are profound differences in vocabulary development among children from different socioeconomic backgrounds,⁴ and these appear to reflect, in part, differences in the total number of words children are directly exposed to during interactions with others. This "Word Gap" manifests itself very early in life⁴ and is an important contributor to the gap in reading achievement that differentiates advantaged and disadvantaged children and youth.

There are numerous ongoing efforts to remedy this Word Gap, which are focused on increasing the frequency of caregivers' conversations with their children.⁵ However, another potentially crucial activity through which caregivers can expose young children to words is shared storybook reading. Within the shared reading

context, both adult and child are jointly focused on the text, following along with the narrative storyline and exploring the illustrations. Joint attention refers to instances when an adult and child have coordinated attention toward a third object, and periods of joint attention are especially conducive to young children's acquisition of new words.⁶ This characteristic makes adult-child shared book reading an ideal context for vocabulary development.⁷ Another reason adult-child shared book reading may serve as an especially important context for vocabulary development is that children's books are "lexical reservoirs," containing a relatively high volume of rare words compared with conversations.⁸ Furthermore, in comparison with adult-child conversations, adult-child shared book reading provides children with a particularly concentrated dosage of word exposure,⁹ as storybooks contain more unique words than adult talk directed at children during conversations.

In the present article, we assert that adult-child storybook reading may be an especially important contributor to the Word Gap. This is because evidence shows there to be a significant variability in how often young children are read to in the home. Based on analyses of 5 biennial samples of the National Longitudinal Survey of Youth from 1986 to 1994, Bradley et al.¹⁰ found that fewer than one-half of low-income families reported reading regularly to their children, with 40% of parents reportedly never reading to their children. More recently, Khan et al.¹¹ examined parent-reported shared reading with their children using data from the Early

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Childhood Longitudinal Study Birth Cohort. Based on a nationally representative sample of 8900 children aged 4 years, this study found that about one-fourth of children were reportedly never read to (23%), about one-fourth were read to seldom (once or twice weekly), and the remainder were read to 3 or more times per week. In this report, we seek to understand how this variability in home-reading frequency may contribute to the Word Gap; specifically, we estimated the Word Gap that emerges from never being read to, seldom being read to, and often being read to over a 5-year period, from birth to 5 years of age.

METHODS

Methods for this study included determining how many words children hear during a typical reading session, identifying general patterns of home-reading frequency for children from birth to 5 years of age, and calculating the expected differences in word exposure in the first 5 years as a function of these general patterns.

Identifying Number of Words

To determine children's exposure to words during typical book reading sessions, we first sought to identify the books that children might typically read. To do so, we partnered with a large metropolitan library. The library identified the 100 most circulated children's books in their system for both board books (targeting infants and toddlers) and picture books (targeting preschoolers). For the present purposes, we inferred that these books are representative of the characteristics of books to which children are frequently exposed. From among the 200 titles provided, we randomly selected 30 books from each of these lists; these were transcribed verbatim to calculate descriptive statistics for the word types and tokens. On average, board books contained an average of 140 words (median = 118, SD = 91.9, range: 11–326), whereas picture books contained an average of 228 words (median = 206, SD = 96.9, range: 64–470). The titles, authors, and resulting transcription metrics are presented in the Appendix (<http://links.lww.com/JDBP/A204>).

Identifying General Patterns of Home-Reading Frequency

To identify common patterns in home-reading frequency for infants to preschoolers, we used data available from a nationally representative study, The Early Childhood Longitudinal Study Birth Cohort (ECLS-B).¹² In this study, caregivers reported the frequency of at-home reading with their preschool-aged children pursuant to 4 response categories: 23% of caregivers reported never reading to their child, 26% reported reading once or twice a week, 33% reported reading 3 to 6 times per week, and 39% reported reading to their child every day. Although these data nominally identify the frequency of home-reading sessions, it is not clear how many books are

read within a typical reading session. Thus, we decided to conservatively estimate that a book-reading session involved reading only 1 book.

To estimate the total number of reading sessions a child would experience per year, we used the same categories as the ECLS-B. For the 23% of caregivers who reported never reading to their child, we considered that these children might be read to incidentally and reported this as reading 1 book every other month (mathematically, represented as 0.11 readings per week). Furthermore, we acknowledge that some children are reared in very literacy-rich environments at home, being read to multiple times across the day. Therefore, in addition to the 4 established benchmarks, we also included a fifth category of reading frequency, representing a child who is read 5 books per day. Our final analysis thus included 5 categories: Never (0.1 book readings per week), once or twice a week (1.5 book readings per week), 4 book readings per week, 7 book readings per week, or 35 book readings per week (5 books read per day). These numbers were held consistent across the child's first 5 years (i.e., we assumed that a parent who read to their child once or twice per week when they were 4 years old also read to them at the same frequency when they were 1 year old).

Calculating Word Exposure

We calculated the expected number of words children would hear during book reading for each of their first 5 years as a function of varying frequencies of home reading using word-exposure estimates from the transcribed books. Before conducting these analyses, we first examined the distributions of numbers of words included in the 2 samples of books. Each showed some skew (skew = 0.87 and 2.04 for the board books and picture books, respectively). One outlier was removed from the board books list (containing 617 words, when the next closest was 326 words), and 2 outliers were removed from the picture books list (2157 and 761 words, when the next closest was 470 words). From this trimmed distribution, we calculated the median of each book type (129 and 214 for the board books and picture books, respectively). To calculate the words read annually, we first estimated the number of words per week, multiplying the median by the numbers identified in the previous section, and multiplied the resulting product by 52 (weeks per year).

To calculate a cumulative estimate across the first 5 years, the board book median was used to represent the number of words in a typical book reading session for a child's first 3 years (through the child's third birthday), and the picture book median was used for the child's next 2 years (from the third to the fifth birthday).

RESULTS

Results of analyses for annual word exposure, separated by board books and picture books, are presented in

Table 1. Expected Cumulative Number of Words to Which Children are Exposed Annually by the Type of Book and the Number of Readings per Week

Factor	Board Books	Picture Books
Multiple books per day	234,780	389,480
Daily	46,956	77,896
3–5 times	26,832	44,512
1–2 times	10,062	16,692
Never	738	1224

Never is mathematically represented as 0.11 times per week, 1 to 2 is represented by 1.5 books per week, 3 to 5 is represented as 4 books per week, daily is represented as 7 books per week, and multiple books per day is represented as 35 books per week.

Table 1. Children who are almost never read to are expected to be exposed to 738 words per year when reading board books and to 1178 words per year when reading picture books. This is far less when compared to the in board books and 77,896 words in picture books that a child is estimated to hear each year if read to once per day.

Next, we sought to estimate the cumulative effects of these variations in home-reading practices. The results of this calculation are presented in Table 2. Here, we demonstrate that the cumulative exposure over time quickly stacks, with children who are never read to having been exposed to only 4662 words through book reading by kindergarten entry compared with 296,660 words if read 1 book each day and 1.5 million words if read multiple books per day.

We next quantified the *gap* between the practice of being read to daily and all other categories by subtracting the results of each book reading frequency from those of daily exposure. Children who are read 5 books per day are exposed to a cumulative 1.18 million additional words compared with children who are read only 1 book per day. Children reading 3 to 5 books per week are cumulatively exposed to 127,140 fewer words, those reading 1 to 3 books per week are exposed to 233,090 fewer words, and those who only incidentally read with an adult are exposed to an estimated 291,198 fewer words compared with those reading 1 book per day. Finally, a child raised in a literacy-rich environment, read to an average of 5 books per day, will arrive at kindergarten having heard more than 1.4 million more words during book reading than their peers who were never or seldom read to.

DISCUSSION

The results of this study suggest that adult-child shared book reading during the first 5 years of life can be included in efforts to eradicate the Word Gap. Adult-child shared reading provides a context for joint engagement, which serves as a conduit for vocabulary development, and offers a richer lexical reservoir compared with adult-child conversations.⁸ Nationally representative data from a variety of sources suggest that as many as 40% of children are never read to by their parents.^{10,11} Such children are missing an opportunity for an important resource of word exposure, likely contributing to the Word Gap. In this study, we estimated that children who are never read to are exposed to nearly 300,000 words fewer than children who are read to once day per day from birth to 5 years of age. We also estimated the difference in word exposure for children who are never or infrequently read to and children who are read to multiple times each day, which corresponded to a difference in the cumulative word exposure of well over 1,000,000 words. Given that there are consistent, significant correlations between the number of words to which children are exposed and their vocabulary trajectories during early childhood,^{1,4,13} this Word Gap of more than 1,000,000 words is striking.

Experimental and correlational evidence reporting positive relations between home-reading frequency and children's vocabulary development coalesce well with the present findings.^{7,14} Whereas the mechanisms by which adult-child home reading affects children's vocabulary growth are likely multifaceted, it is likely that adult-child shared reading activities provide children with exposure to a rich and dense reservoir of words. One year of daily read-alouds at home for a 4-year-old would provide a child with exposure to 75,000 more words than if these readings did not occur. Reading regularly with young children provides an optimal avenue for addressing the Word Gap.

In a recent commentary on efforts to address the Word Gap, Rowe and Zuckerman¹⁵ noted concerns about the dominant focus on *quantity* of talk by adults with children. The commenters argued that the focus on adults' quantity of talk oversimplifies the nuanced aspects of adult-child interactions that support children's vocabulary development, such that children's vocabulary growth is not stimulated simply by talking with children

Table 2. Expected Cumulative Word Exposure From Birth Through the Child's Fifth Birthday

Book Reading Frequency	0–1 Year	1–2 Year	2–3 Year	3–4 Year	4–5 Year
Multiple books per day	234,780	469,560	704,340	1,093,820	1,483,300
Daily	46,956	93,912	140,868	218,764	296,660
3–5 times per week	26,832	53,664	80,496	125,008	169,520
1–2 times per week	10,062	20,124	30,186	46,878	63,570
Never	738	1476	2214	3438	4662

Never is mathematically represented as 0.11 times per week, 1 to 2 is represented by 1.5 books per week, 3 to 5 is represented as 4 books per week, daily is represented as 7 books per week, and multiple books per day is represented as 35 books per week.

but rather by responsive, contingent, and emotionally supportive conversations. In this regard, adult-child shared storybook reading can provide an exemplary solution to efforts to address the Word Gap because it provides a warm, enjoyable context in which the adult and child can talk about the storyline and illustrations. To this end, we also point out that the scope of the Word Gap as estimated in the present study is very large, yet we were very conservative in these estimates. First, we included only those words that caregivers would read on the page, which does not include any discussion of the book or pictures that parents may engage in. Second, nearly half (13) of the randomly selected picture books were authored/illustrated by Mo Willems, currently a very popular author. However, his books tend to have relatively low word counts (e.g., *My Friend is Sad*, 177 words) because his texts use comic-style word balloons, which eliminate orienting text such as “then Piggie said.” Third, we removed 1 outlier from each list, which contained a very large number of words but which may still be representative of the types of books children are reading at home. Finally, for children in the “multiple times” group, we estimated exposure of 5 books per day (35 readings per week). However, this may be a low estimate of the actual reading behavior.

Whereas these are only estimates, they provide a reason for concern as well as an opportunity. Policies seeking to close the Word Gap should emphasize home-based adult-child book reading as part of this push. Given that about one-half of caregivers report rarely or never reading to their children, this presents a tremendous opportunity to improve the quality and quantity of language that children hear before kindergarten entry.

One of the most widely adopted initiatives to encourage caregivers to read is the Reach Out and Read (ROR) program, a pediatrician-delivered intervention designed to heighten caregivers’ knowledge of the importance of reading with their children from birth forward.¹⁶ The current work highlights the importance of ROR not just for children’s later reading success but also as an important method to decrease the Word Gap (one of the primary goals of ROR) and provides some evidence for just how many words ROR or similar programs help students to hear before entering kindergarten. However, along with this work, there is also a need for research that seeks to address the additional barriers that caregivers may face to the implementation of regular reading. ROR helps parents understand the importance of reading, but many parents do not read to their children at home because of other barriers, such as pressures on their time or discomfort with the activity. Provision of supports to parents to overcome these

barriers, such as the provision of encouraging text messages and rewards, can potentially increase the frequency with which parents read to their young children within the context of early reading interventions.¹⁷

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