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An Online Survey of Picture Book Reading Practices with Children Between the Ages of 0 and 30 Months

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ABSTRACT

There is a great deal of variability in how families read and interact with picture books. To understand why reading practices may (or may not) relate to language outcomes, a necessary step to understand what occurs in the home. The goal of this work is to better understand the frequency and nature of picture book reading at home with children between the ages of 0 and 30 months in the United States. In an online survey, 282 caregivers answered questions about their picture book reading habits. Book reading was overall very common. Over 90% of families reported reading at least weekly to their child and nearly 70% reported reading daily, with caregivers of older children reporting reading slightly more frequently than caregivers of younger children. Caregivers also reported reading picture book text as well as a range of extra-textual activities. These textual and extra-textual behaviors varied across families and varied with child age and language skills. This study provides insight into how much, and what kind of linguistic input children encounter during picture book reading, and how this input may vary with age.

There are deep debates about the processes that drive language development. One debate focuses on the role of language input, and the extent to which learning and generalization over patterns in the language input accounts for trajectories of language development. To gain traction in these debates about the role of the input, a necessary first step is to understand and describe the input itself. With that information we can begin to ask and answer questions about what knowledge potentially can or cannot be learned from the environment.

One type of input that is frequently studied in the field of language development is picture book reading. In correlational studies, reading to young children is positively associated with language outcomes (Arterberry et al., 2007; Demir-Lira et al., 2019; Farrant & Zubrick, 2012; Fletcher & Reese, 2005; Karousou & Economacou, 2023; Karrass & Braungart-Rieker, 2005; Leseman & De Jong, 1998; Ninio, 1983; Payne et al., 1994; Sénéchal & LeFevre, 2002) and future reading skills (Bus et al., 1995; Deckner et al., 2006; Dickinson & Tabors, 1991; Lonigan et al., 2000; Scarborough et al., 1991; Shahaeian et al., 2018). For these reasons, encouraging caregivers to read to children is seen a potential avenue for encouraging language development (Dickinson et al., 2012).

Despite widespread recommendations that caregivers read to young children, there is less certainty about the reasons and mechanisms by which reading to children comes to be associated with positive language outcomes. In fact, researchers have noted for decades that the links between book reading and language outcomes may be more complicated than they initially seem, with variable or small effect sizes and many confounding variables (c.f., Lonigan, 1994; Roberts et al., 2005; Scarborough & Dobrich, 1994). These debates are renewed with recent meta-analyses of shared reading interventions

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that suggest that the effect sizes of the influence of shared book reading on children's language skills are small and highly dependent on the type of intervention and control group (Noble et al., 2019). Likewise, more recent interventions do successfully promote more book reading in homes but find little effect on child language outcomes (Lingwood et al., 2020; Noble et al., 2020).

Despite correlational studies suggesting relationships between book reading and language outcomes, similar findings are only tenuously recreated within the lab. One means toward gaining insight into this discrepancy may be to gain a better understanding of what occurs in homes and other naturalistic settings when caregivers read to young children. There are remaining questions of what kind, and how much, linguistic input is generated during picture book reading, and how that input itself changes over the course of development. This information is relevant to understanding what may underlie the relationship between book reading and language outcomes or if there is a causal relationship at all.

Hypotheses about why book reading is associated with positive language outcomes typically propose that book reading provides input that is systematically different from other contexts of child-directed speech. The language produced during picture book reading may contain more unique words (Crain-Thoreson et al., 2001; Dawson et al., 2021; Demir-Lira et al., 2019; Hoff-Ginsberg, 1991; Salo et al., 2016; Weizman & Snow, 2001) and complex sentences (Crain-Thoreson et al., 2001; Demir-Lira et al., 2019; Hoff-Ginsberg, 1991; Noble et al., 2018; Salo et al., 2016), likely owing to the lexical diversity and syntactic complexity of the picture book text (Stoops et al., 2023; Weizman & Snow, 2001; see also Cameron-Faulkner & Noble, 2013; Hayes & Ahrens, 1988; Montag et al., 2015; Montag, 2019; Massaro, 2017 for comparisons of child-directed speech and picture book text itself). The language generated during picture book reading may also contain more caregiver-child conversation turns (Clemens & Kegel, 2021; Gilkerson et al., 2017; Sosa, 2016), more caregiver questions (Salo et al., 2016) and promote more child speech (Clemens & Kegel, 2021; Salo et al., 2016; Sosa et al., 2016) than other contexts. These broad differences between the language produced by children and caregivers during picture book reading and other contexts are thought to underlie some of the benefits associated with picture book reading.

We aim to understand how much of picture book reading language children encounter, what the characteristics of this language might be (i.e., the text reading and extra-text conversation that is taking place), and how might those characteristics vary with child age or other features of individual families.

Frequency of book reading

The present work builds on previous work that details some features of home book reading practices that caregivers engage in when reading to children. In the United States, caregivers report reading regularly to their infants soon after birth and reading frequency increases over the first two years of life (Deckner et al., 2006; Karrass & Braungart-Rieker, 2005; Young et al., 1998). At the youngest ages, 0 to 5 months, over 50% of caregivers in a nationally representative sample reported reading to their infants at least once a week and by 6–11 months that percent increased to over 75%, with over 25% of caregivers reporting that they read to their children daily (Young et al., 1998). By the second year of life, in nationally representative samples, over 90% of caregivers report reading to children at least weekly and about half of caregivers report reading to their children near daily or daily (Bradley et al., 2001; Raikes et al., 2006; Yarosz & Barnett, 2001; Young et al., 1998). There is variability in reading frequency associated with family demographics (Bradley et al., 2001; Raikes et al., 2006; Yarosz & Barnett, 2001), but picture book reading is broadly frequent across American homes.

The present work builds upon the existing literature in two ways. First, periodic updates to surveys of reading reveal how reading habits might change over time. Particularly with the influx of programs aimed to encourage book reading at home (e.g., Reach Out and Read, Dolly Parton's Imagination Library, and many other national, local, and private initiatives), as well as investigations into the effectiveness of these programs (Moore & Wade, 2003; Sharif et al., 2002; Zuckerman, 2009), tracking shifts in reading habits over time may be important to understand the role that reading and reading

interventions might play at the individual and population level. Second, shared book reading in homes is often not simply reading book text aloud, but rather encompasses a range of other linguistic and social practices (see next section). As we come to better understand the range of activities that take place during shared book reading, these activities may be necessary for contextualizing frequencies of book reading. Larger surveys that probe broader aspects of picture book reading in homes may complement lab- or home-based observations of reading practices to yield a more complete understanding of picture book reading habits.

Book text and extra-text speech

Beyond reading frequency, shared book reading is a multifaceted activity where caregivers not only read the text of the book but take part in a large range of extra-text speech and other behaviors. Caregivers read the text of the book, or at least parts of the text, out loud during picture book reading interactions (Cline & Edwards, 2017; Crain-Thoreson et al., 2001; Demir-Lira et al., 2019; Noble et al., 2018; Stoops et al., 2023). Caregivers also engage in a range of extra-textual behaviors. Caregivers often point to and label objects in the pictures, ask children questions about the text or pictures and engage in a range of conversation, including prompts for information, responding to a child's question, rephrasing text, expanding on text, or defining vocabulary words (Deckner et al., 2006; Demir-Lira et al., 2019; Fletcher et al., 2008; Hudson Kam & Matthewson, 2017; Murphy, 1978; Ninio, 1980, 1983; Nino & Bruner, 1978; see; Fletcher & Reese, 2005 for a review). This extra-text conversation also seems to be dependent on aspects of the book being read, including genre, text, illustrations, and book familiarity (Chaparro-Moreno et al., 2017; Greenhoot et al., 2014; Muhinyi et al., 2020; Nyhout & O'Neill, 2013; Price et al., 2009; Read et al., 2023; Stoops et al., 2023; van Kleeck et al., 1997). Across households, book reading is not only characterized by reading the book text, but also a range of other activities, interactions, and conversation that occur alongside the book text itself.

Change in language input with age

Many aspects of children's language input changes over time. For example, child age or linguistic ability affects how much caregivers speak (Bergelson et al., 2019; Dailey & Bergelson, 2023) and other aspects of the lexical or sentence complexity of caregiver speech (Hayes & Ahrens, 1988; Huttenlocher et al., 2010; Phillips, 1973; Snow, 1972). With respect to shared book reading, there is evidence that extra-text conversation seems to depend on the age of the child (DeLoache & DeMendoza, 1987; Muhinyi et al., 2020; Sénéchal et al., 1995; Stoops et al., 2023). The language generated during book reading may change along with the age and language skills of the child, which would be an important aspect of the potential contribution of book reading to a child's language environment.

Understanding age-related effects in shared book reading habits may allow us to capture important developmental cascades in picture book reading. Developmental cascades are ways in which current states of development, in the same domain or across domains, have consequences for future development (Masten et al., 2005; Oakes, 2023; Smith, 2013). A classic example is that motor milestones have consequences for other aspects of child development. For example, the development of sufficient hand-eye coordination seems to be necessary for various types of object exploration and knowledge building (van den Berg & Gredeback, 2021). Likewise, advancing through motor milestones (sitting, crawling, walking) has implications for how children experience their environments. Changes in posture and motor skills allow children to access aspects of visual information in the environment that was previously inaccessible (Kretch et al., 2014; Smith et al., 2018) and elicits different profiles of speech (Iverson, 2021; Karasik et al., 2017) and social or physical interaction (Walle & Campos, 2014) from caregivers. In these examples, changes in one domain (motor development) have implications for development in other domains.

Much like developmental cascades in other domains, child age and language skills may elicit qualitatively different types of interactions from caregivers during shared book reading. Caregivers

often tune their speech to the linguistic abilities of the child, both by broadly increasing the lexical or syntactic complexity of speech with child age or linguistic ability (Hayes & Ahrens, 1988; Huttenlocher et al., 2010; Phillips, 1973; Snow, 1972) as well as in specific contexts, choosing individual lexical items based on whether or not they believe the child knows that label (Leung et al., 2021; Masur, 1997). In addition to caregiver choices, children themselves also play an active role in shaping their linguistic input. Prelinguistic children obviously cannot ask questions or participate in conversations as older children do, but children also shape their environments in more subtle ways. For example, infants and children may actively seek disambiguating information given their current state of knowledge through either explicit questions (Chouinard et al., 2007), gaze (Hembacher et al., 2020; Vaish et al., 2011), toy choice during play (Schulz & Bonawitz, 2007), or when asked which novel objects they would like an experimenter to label (Zettersten & Saffran, 2021). Rather than passively experiencing their environments, children may actively seek out information from caregivers. Variability in language produced during shared book reading may arise both from caregiver beliefs about a child's language skills and from how children's own language skills shape the input they receive from caregivers.

Taken together, the existing literature suggests that book reading is a common activity across many American and other households and that it is a multifaceted activity that may generate different profiles language input within and across households, and by child age. There are several unanswered questions that would aid our ability to propose and test hypotheses about possible relationships between book reading and language outcomes. Specifically, we need more information about what occurs in homes when caregivers read to young children. Given the clear heterogeneity of reading practices in which caregivers engage, more detailed questionnaires, from a larger number of families may shed light on the broader distribution of reading practices across families. Gaining this information will be informative of the practices that underlie naturalistic home reading and provide important data upon which we can develop hypotheses for the mechanisms by which home book reading may, or may not, affect language outcomes.

The primary goal of the current study is to explore picture book reading environments that children in the United States experience at home. The present study used an online survey of caregivers of children under the age of 30 months. Studies of shared book reading often focus on children on the cusp of learning to read (Fletcher & Reese, 2005; Mol & Bus, 2011), despite high rates of reading reported in even the first year of life (Karrass & Braungart-Rieker, 2005; Young et al., 1998). To understand how shared book reading may contribute to vocabulary, syntax, and other language development, it may be important to understand shared book reading habits in a larger age range of children, starting at birth. Surveying families with younger children also allows us to see how home reading habits change alongside changes in children's own language skills, as indexed by caregiver-reported vocabulary inventories, which are reliable for this age range. The youngest children in the sample are pre-lingual while some of the oldest children may easily converse with caregivers in full sentences. This range represents a first step toward understanding age- and language skill-related changes in reading behavior in a cross-sectional sample.

We conducted the survey using Amazon's Mechanical Turk. While the sample is not perfectly representative of the American population, it does better represent the American population than typical lab samples (Buhrmester et al., 2011; for up-to-date pool characteristics, see http://www.mturk-tracker.com). Previous researchers have been able to successfully collect surveys from caregivers online (Kiefner-Burmeister et al., 2014; Sweeny et al., 2015), so online studies may be a means to survey a more representative sample of the population than in laboratory-based investigations. We discuss challenges associated with online data collection and our exclusion criteria to ensure a valid sample of caregivers.

The survey consisted of demographic questions, questions about general home reading practices, more specific questions about reading practices (e.g., proportion of the time the caregiver reads the text vs. talks about the pictures), and specific questions about reading behaviors on the prior day and questions about acquiring new books within the last month. We also included a vocabulary inventories survey for caregivers of children over the age of 10 months. The survey

also contained questions unrelated to language development and picture book reading (e.g., motor development; media habits) to obscure the purpose of the survey and ensure more truthful responses.

We present key findings from the surveys that may be of broad interest to researchers who are interested in picture book reading. Data and code are available at https://osf.io/xv7kf. First, we present rates of picture book reading by age, which we find is generally consistent with previous work. Second, we describe the reported frequency of more detailed information about home picture books reading, including various behaviors during picture books reading (e.g., reading the text, asking questions about the pictures). Given our large sample and age range (0–30 months of age) we report how these behaviors vary with child age and vocabulary inventory. Third, we report information about "yesterday's reading habits," to probe specific questions about a specific reading episode. Fourth, we report how other family reading habits relate to picture book reading practices.

Methods

Participants

A total of 450 caregivers completed the online survey using Amazon Mechanical Turk. Participants resided in the United States and were indicated by the platform to be parents. There were 150 caregivers in each of three age groups: 0 to 9 months, 10 to 16 months, and 17 to 30 months. Caregivers with more than one child were asked to complete the survey with one child in mind. The survey took approximately 10–20 minutes to complete. The two older groups completed an additional 10-minute vocabulary inventory questionnaire. Caregivers of the youngest age group (0 to 9 months) received $3.00 for completing the study and the caregivers of the two older groups received $5.00. Data was collected between January 23rd and March 3rd in 2020, prior to lockdowns associated with the COVID-19 pandemic in the United States. This study was approved by and carried out in accordance with the University of Illinois IRB.

Materials

The survey questions appear in Appendix A.

Demographic Questions: Caregivers answered basic questions about their child and household, including information about other children in the home and other languages spoken in the home.

Repeat "Catch" Questions: Caregivers were asked about the child's age (in months) at the beginning of the survey and the child's birthday at the end, to ensure the ages matched. After collecting 20 surveys per group, we realized we needed to include an additional "Catch" question asked both at the beginning and at the end of the survey. Caregivers of children 0–9 months and 10–16 months were asked the age at which their child rolled over from their tummy to back, and caregivers of children 17–30 months were asked the age at which their child began to walk.

Non-Book related questions

Questions were included to obscure the purpose of the study. These questions included questions about media use (use of electronic devices and television watching) and more general parenting questions from questions from Hembacher et al. (2020).

Reading practices questions

These questions assessed reading practices, including specific questions about frequency, duration, and nature of picture book reading. These questions were followed by questions about "yesterday's" reading habits, and questions about how families may have acquired new books in the last month.

Vocabulary inventories

Caregivers of children 10–16 months of age completed the MacArthur-Bates Words and Gestures receptive vocabulary inventory and caregivers of children 16–30 months of age completed the MacArthur-Bates Words and Sentences productive vocabulary inventory (Fenson et al., 2007).

Author Recognition Test (ART)

The ART is an indirect measure of print exposure (Stanovich & West, 1989) which we used to assess the caregiver's own reading habits. Participants see a list of real and fake author names and must identify the real authors without false alarming to the foil names. The ART correlates well with other self-report measures of print exposure (Acheson et al., 2008; Mol & Bus, 2011; Stanovich & West, 1989). The list of authors we used came from an updated version of the task used by Acheson et al. (2008) and Moore and Gordon (2015).

Exclusion criteria

One concern when collecting data from participants online is ensuring the authenticity of the data. Due to the nature of our data (surveying caregivers of children in a specific age range) we found that simple accuracy or attention checks were not sufficient to identify invalid participants. We developed and implemented exclusion criteria to remove participants we suspected either did not have children or did not have children in the target age range.

First, participants were excluded if they reported that the age of their child was outside of the target age range of the survey. For example, a caregiver taking the survey for caregivers of 0–9-month-old children reporting a child who was 20 months of age. The surveys contained slightly different sets of questions for each age group to ensure all questions were age-appropriate, so rather than re-classify these surveys, we excluded them.

Second, we employed two different "catch" questions. For all age groups, caregivers were asked the age of their child at the beginning of the survey and their child's birthday at the end of the survey. Caregivers whose responses differed by more than 2 months were removed from the analysis. We also excluded participants who did not answer the repeated "catch" question about motor development identically both times.

Third, we leveraged the vocabulary section of for the MCDI-Words & Gestures and MCDI-Words & Sentences to create a novel way to identify errors in responses for the two older age groups. Using the WordBank repository of MCDI scores (Frank et al., 2017), we determined which words on the vocabulary inventories children would be likely to learn earlier or later. It would be extremely unlikely that a child would know more later-learned words than earlier-learned words. Using WordBank, we determined the 50 earliest-learned words and the 50 latest-learned words on each of the MCDI inventories. For each participant, we subtracted the number of later-learned words that caregivers reported that children knew from the number of earlier-learned words. A negative number would suggest that the child knew more of the normatively later-learned words, which is very unlikely; this occurred infrequently across the entire WordBank sample, 0.53% for the MCDI Words and Gestures form and 0.09% for Words and Sentences. Instead, we assumed it was more likely that the participant was clicking through the survey without paying attention to the questions and excluded these participants.

Using these exclusion criteria, we excluded 34.7% of responses from the 0–9 month age group, 44% from 10–16 month age group, and 33.3% from 17–30 month age group. A total of 282 participants were included in the final dataset. Table 1 shows exclusion criteria and rates of exclusion. Participants who met multiple exclusion criteria are listed separately by the number of exclusion criteria met; numbers in each column sum to the number of participants excluded. While this exclusion rate is

Table 1. Criteria and associated rates of study exclusion.

	0–9 months	10–16 months	17–30 months	Overall
Total collected	150	150	150	450
Exclusions:				
Single Exclusion				
Wrong Age Group	12 (8.0%)	15 (10.0%)	2 (1.3%)	29 (6.4%)
Repeat Question Mismatch	18 (12.0%)	8 (5.3%)	18 (12.0%)	44 (9.8%)
Age and Birthday Mismatch	3 (2.0%)	4 (2.7%)	3 (2.0%)	10 (2.2%)
CDI Difference Negative	NA	9 (6.0%)	5 (3.3%)	14 (3.1%)
2 Exclusions	14 (9.3%)	20 (13.3%)	16 (10.7%)	50 (11.1%)
3 Exclusions	5 (3.3%)	8 (5.3%)	6 (4.0%)	19 (4.2%)
4 Exclusions	NA	2 (1.3%)	0 (0.0%)	2 (1.3%)
Total Excluded	52 (34.7%)	66 (44.0%)	50 (33.3%)	168 (37.3%)
Total Included	98 (65.3%)	84 (56.0%)	100 (66.7%)	282 (62.7%)

higher than a typical in-person study, it is consistent with exclusion rates for online studies (Thomas & Clifford, 2017).

Results

Demographics

The demographic information for the sample is reported in Table 2. The age for each child was calculated based on the birthdate provided by the caregiver. The primary language spoken at home was English for 99% of the sample. In 14.9% of families, another language in addition to English was spoken. Relative to laboratory samples, we found that in this online sample, fathers were more likely to provide data (over one third of respondents were fathers). We also found greater variability in family income and caregiver education than in many laboratory samples, but our sample was still predominantly white (79%).

Overall reading frequency & practices

Picture book reading was overall very common. Figure 1 and Table 3 shows the frequency of reading by age. Across all age groups, 92% of caregivers reported reading to their at least weekly, and 67% at least daily. Reading frequency also numerically increased with child age, though not as dramatically as in other work (Bradley et al., 2001; Raikes et al., 2006; Yarosz & Barnett, 2001; Young et al., 1998). Existing studies report that about 50% of caregivers of children under 6 months read at least weekly (versus 91% in our sample) and 25% daily (versus 58% in our sample). Our findings are more consistent with rates of reading in the second year of life, with both our sample and previous work reporting that about 90% of caregivers read at least weekly and 70–80% read multiple times per week (versus 87% in our sample) (Bradley et al., 2001; Raikes et al., 2006; Yarosz & Barnett, 2001; Young et al., 1998). Even at a very young age, a substantial proportion of children seem to experience book reading with some consistency.

Unlike previous work (e.g., Raikes et al., 2006; Yarosz & Barnett, 2001) we do not see effects of caregiver education on reading frequency. Chi Squared Tests of Independence do not show any difference in reading frequency by education overall or within age groups. We instead find substantial variation across families within each education level (see Appendix B for a table). In addition to within-group variability, the modal level of education was a bachelor's degree, accounting for over half of our sample, so we had limited variability in caregiver education in our sample.

The frequency with which caregivers and children read together is only one aspect of shared book reading in homes. We aimed to gather additional information about the nature of the activities and

Table 2. Demographics.

	0–9 months (*N* = 98)	10–16 months (*N* = 84)	17–30 months (*N* = 100)	Overall (*N* = 282)
Age in Months				
M (SD)	5.6 (2.3)	12.8 (1.6)	24.1 (3.3)	14.3 (8.2)
Sex				
Female	0.51 (50)	0.51 (43)	0.55 (55)	0.52 (148)
Male	0.48 (47)	0.49 (41)	0.45 (45)	0.47 (133)
Other	0.01 (1)	0 (0)	0 (0)	0.00 (1)
Caregiver				
Mother	0.56 (55)	0.61 (51)	0.66 (66)	0.61 (172)
Father	0.43 (42)	0.37 (31)	0.34 (34)	0.38 (107)
Other	0.01 (1)	0.02 (2)	0 (0)	0.01 (3)
Race				
White	0.80 (78)	0.81 (68)	0.77 (77)	0.79 (223)
African American or Black	0.07 (7)	0.07 (6)	0.06 (6)	0.07 (19)
Asian or Pacific Islander	0.01 (1)	0.02 (2)	0.05 (5)	0.03 (8)
Hispanic or Latino	0.03 (3)	0.02 (2)	0.02 (2)	0.02 (7)
Other	0 (0)	0 (0)	0.02 (2)	0.01 (2)
2+	0.09 (9)	0.07 (6)	0.08 (8)	0.08 (23)
Education				
Less than High School Diploma	0.01 (1)	0 (0)	0.01 (1)	0.01 (2)
High School Diploma	0.09 (9)	0.11 (9)	0.05 (5)	0.08 (23)
Associate degree	0.09 (9)	0.16 (13)	0.08 (8)	0.11 (30)
Some College	0.12 (12)	0.14 (12)	0.21 (21)	0.16 (45)
Bachelor's Degree	0.56 (55)	0.44 (37)	0.54 (54)	0.52 (146)
Post-Graduate Degree	0.12 (12)	0.16 (13)	0.11 (11)	0.12 (35)
Household Income				
Less than $10,000	0.02 (2)	0 (0)	0 (0)	0.01 (2)
$10,0001–$25,000	0.05 (5)	0.08 (7)	0.04 (4)	0.06 (16)
$25,001 - $50,000	0.23 (23)	0.25 (21)	0.16 (16)	0.21 (59)
$50,001 - $75,000	0.28 (27)	0.24 (20)	0.28 (28)	0.27 (75)
$75,001 - $100,000	0.29 (28)	0.25 (21)	0.23 (23)	0.26 (72)
$100,001 - $200,000	0.11 (11)	0.17 (14)	0.26 (26)	0.18 (51)
More than $200,000	0.02 (2)	0.01 (1)	0.03 (3)	0.02 (6)
Other Children in Home				
Yes	0.57 (56)	0.68 (57)	0.58 (58)	0.60 (170)
Number of Picture Books in the Home				
M (SD)	53.6 (95.5) range: 1–500	49.8 (114.5) Range: 0–1,000	60.5 (66.8) Range: 2–300	54.9 (92.8)

conversation that takes place during book reading, and how those activities vary with child age and language skill. While we aimed to develop a survey that would assess specific aspects of book reading habits that have been previously described in the prior literature, many of the analyses we present have descriptive or exploratory motivations as well. We urge caution in interpreting p-values given the potential exploratory nature of these analyses. In data tables, we indicate statistical significance at the 0.05 level as well as the 0.01 and 0.001 level to aid a more conservative interpretation of our inferential statistics.

To better understand picture book reading episodes, caregivers were asked questions about reading practices and behaviors during book reading using a 1–7 scale. These caregiver responses to these questions about reading habits are broken down by child age and presented in Table 4. Table 4 also shows the correlations between reported book reading behaviors and the child's age. For the older two group, we also show the correlation between the reported book reading behavior and the child's MCDI Words and Gestures (10–16 months) or Words and Sentences (17–30 month) score. It is impossible to use these correlations to draw causal conclusions about book reading behaviors that might promote language outcomes. A positive correlation could indicate that a behavior that facilitates word learning and language development, or a positive correlation could indicate that the behavior itself indexes a child's own language skill, as in a developmental cascades framework. For example, asking questions during book reading may promote language skills, or caregivers may be more likely to direct questions

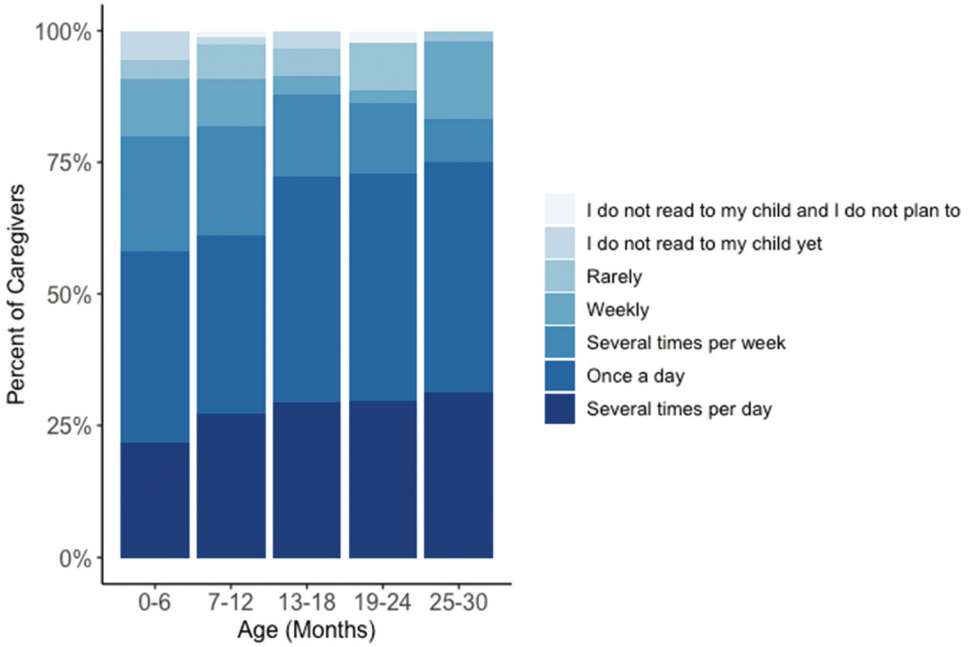

Figure 1. Reading frequency by child age (6 month bins).

Table 3. Overall reading frequency and practices.

	0–6 months	7–12 months	13–18 months	19–24 months	25–30 months	Total
How often do you read to your child?	Proportion (N)	Proportion (N)	Proportion (N)	Proportion (N)	Proportion (N)	Proportion (N)
I do not read to my child and I do not plan to	0.00 (0)	0.01 (1)	0.00 (0)	0.02 (1)	0.00 (0)	0.01 (2)
I do not read to my child yet	0.05 (3)	0.01 (1)	0.03 (2)	0.00 (0)	0.00 (0)	0.02 (6)
Rarely	0.04 (2)	0.06 (5)	0.05 (3)	0.09 (4)	0.02 (1)	0.05 (15)
Weekly	0.11 (6)	0.09 (7)	0.03 (2)	0.02 (1)	0.15 (7)	0.08 (23)
Several times per week	0.22 (12)	0.21 (16)	0.16 (9)	0.14 (6)	0.08 (4)	0.17 (47)
Once a day	0.36 (20)	0.34 (26)	0.43 (25)	0.43 (19)	0.44 (21)	0.39 (111)
Several times per day	0.22 (12)	0.27 (21)	0.29 (17)	0.30 (13)	0.31 (15)	0.28 (78)

to children with larger productive vocabularies. For this reason, correlations should be interpreted as being descriptive only.

Consistent with past findings, across age groups, picture book reading is associated with both reading the text of the book, and other more interactive or conversational behaviors. Book reading in homes spans a range of behaviors in which caregivers engage with the book text as well as extra-textual labeling, questions, and conversation.

The age range of children sampled allows us to look at how different behaviors change with age. First, in Question 1, we notice an unexpected correlation, that caregivers of younger children report starting to read to their children at a younger age. We suspect this correlation reflects either memory biases, response biases, or truncation of range effects, rather than a meaningful relationship. Next, we see that caregivers of older children reported increased interactivity (versus quiet listening; Question 4) when reading and were more likely to ask their child questions (Question 7). This finding makes sense, because caregivers may be more likely to engage a child in conversation if a child has sufficient language skills to engage in such an interaction. Finally, we see inconsistent relationships

Table 4. Summary data of surveyed practices during book reading and correlations with age and vocabulary inventories.

	0–9 months (*N* = 98)	10–16 months (*N* = 84)	17–30 months (*N* = 100)	Age (*N*=282)	Words and gestures (*N* = 84)	Words and sentences (*N* = 100)
	M (SD)	M (SD)	M (SD)	Correlation (r)	Correlation (r)	Correlation (r)
1. If you read to your child, how old was your child (in months) when you began reading?	2.69 (3.52)	5.11 (4.00)	5.07 (5.49)	**0.21*** **	−0.02	**−0.20***
2. How long (in minutes) do you typically spend reading a book in a single sitting?[#]	16.4 (9.05)	16.8 (10.33)	15.5 (10.33)	0.01	**0.29****	0.03
3. When you read to your child, how often do you read the text on the page (1), versus make up your own story or talk about the pictures (7)?	3.13 (1.82)	3.55 (1.73)	2.83 (1.36)	−0.09	**0.28****	−0.07
4. When you read to your child to what extent does your child quietly listen to the story (1), or is reading an interactive activity (7)?	3.69 (1.73)	4.35 (1.56)	4.38 (1.34)	**0.21*** **	0.09	**0.21***
5. When you read to your child how often do you read the text that appears on the page?	5.52 (1.57)	5.31 (1.56)	5.22 (1.62)	−0.07	0.03	0.16
6. When you read to your child how often do you name objects or actions in the pictures?	5.12 (1.60)	5.30 (1.39)	5.48 (1.23)	0.11	**0.27***	**0.20***
7. When you read to your child how often do you ask your child questions about the objects or events in the story or in the pictures?	3.53 (1.68)	4.29 (1.87)	4.71 (1.30)	**0.34*** **	**0.45*** **	**0.26****
8. When you read to your child how often do you read a book your child has never heard (1), or repeat books your child has already heard (7)?	3.68 (1.26)	3.76 (1.31)	3.62 (1.14)	−0.01	0.03	0.05
9. How much does your child enjoy being read to?	5.19 (1.33)	5.52 (1.39)	5.63 (1.09)	**0.16****	**0.38*** **	0.17

[#]Responses 120+ minutes (4 responses) were eliminated as they likely reflected unrealistic responses or typos.
*p < .05.
**p < .01.
***p < .001.

between parental report of reading habits and age and child language skill. It is not clear if these results reflect true effects of age or language skill, e.g., caregivers really are more likely to make up a story (versus read the text; question 3) for children with higher vocabulary scores, but only for children 10–16 month of age, not 17–30 months of age. Alternately, these interpretations could be complicated by any number of factors, including imperfect measures of vocabulary, a lack of variance, or a lack of power.

Other age effects were either absent, or non-linear. For example, we see no effect of age on whether the book was novel or familiar to the child (question 8). Similarly, we see numeric but non-significant effects of age on reading text (decreasing with age; Question 5) or naming objects and actions (increasing with age; Question 6). However, when we asked about the balance of reading text or extra-text discussion (such as making up a story or talking about pictures; Question 3) the oldest group and youngest group reported most text reading (an independent samples t-test shows that the difference between 10–16 months and 17–30 months is statistically significant, $t(182) = 3.14$, $p = .002$, $d = 0.46$). This finding is consistent with work that finds that picture book reading may consist of less extra-text conversation with children old enough (or with sufficient language skills) to understand and appreciate a more complex story (Stoops et al., 2023). This non-linear age effects may reflect how caregiver behavior may change with child age (or language skills) in systematic but complex ways. Caregivers may be more likely to engage older children in conversation because they are linguistically capable of responding, but at the same time may be less likely to engage because older children are more capable of understanding the content of the story. Both motivations may be true simultaneously, or for different kinds of books (e.g., Stoops et al., 2023).

We see another potential example of a non-linear effect of age in caregiver reports of the time spent during book reading (Question 2). As shown in Figure 2, we see a decrease in reading time starting at around 14 months of age until about 22 months of age. Independent samples t-tests show that the reported reading durations a the two lowest bins (18–21 months; 9.78 minutes) are significantly lower than the two bins on either side (compared to 16.68 minutes at 14–17 months, $t(66) = 3.08$, $p < .01$, $d = 0.97$; compared to 18.13 minutes at 22–25 months, $t(48) = 2.63$, $p = .011$, $d = 0.86$). While unexpected, this dip in reading duration seems to be robust to binning the data differently by month (see Appendix C). One speculative explanation is the anecdotal report from many caregivers that children seem single-mindedly interested in walking once they reach that physical milestone and temporarily lose interest in stationary activities such as book reading. We return to the idea that other aspects of child development, including motor development, may affect picture book reading and associated implications for developmental cascades, in the general discussion.

This work highlights variability in caregiver behavior, across families and child ages.

Some but not all measures of interactivity during book reading were associated with MCDI score. Given the complex relationships between age and various book reading behaviors, it is these correlations may or may not reflect a causal relationship; caregiver behavior changes with child age and language skill in sometimes non-obvious ways. However, the aim of this work was not to understand which book reading behaviors predict language outcomes, but rather the frequencies and types of behaviors that accompany book reading episodes. Understanding the relationships between picture book reading and language outcomes may require gaining a better understanding of more specific picture book reading behaviors, and how these behaviors are themselves part of complex developmental system.

Next, we can investigate how survey responses correlate with each other. These correlations allow us to see how reading habits might be associated with each other across families. We posed multiple questions that investigate some aspect of interactivity or extra-textual conversation, and we can see whether caregivers gave similar responses to these questions about interactivity. In Table 5, Questions 3–7 (highlighted) are all questions that assess some aspect of interactivity or conversation. Questions 3 and 4 ask caregivers to place quiet reading versus interactive reading on a scale, while Questions 5–7

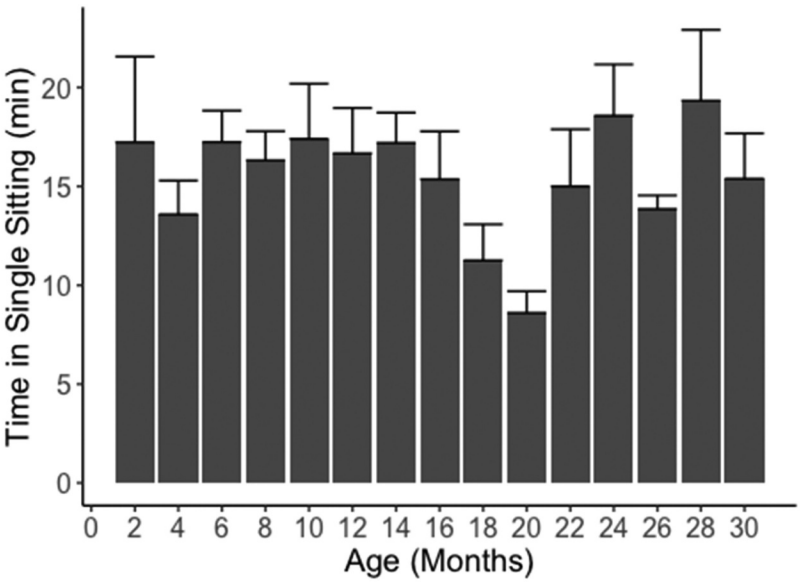

Figure 2. Reading time by age (2-month age bins). Error bars refer to standard errors.

Table 5. Correlation table of responses to reading habit survey questions.

	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Question 2: Length of single sitting	1							
Question 3: read text (1) vs. talk (7)	0.03	1						
Question 4: Listen quietly (1) vs. Interactive (7)	0.04	0.28***	1					
Question 5: Read the text on the page	−0.05	−0.31***	0.02	1				
Question 6: Name actions or objects	0	0.11	0.18**	0.27***	1			
Question 7: Ask Questions	0.06	0.24***	0.25***	0.02	0.30***	1		
Question 8: New book (1) vs. repeat (7)	0.14*	0.20***	0.11*	0.12	0.11	0.23***	1	
Question 9: Child Enjoyment	0.08	0.01	0.13*	0.26***	0.30***	0.28***	0.14*	1

*$p < .05$.
**$p < .01$.
***$p < .001$.

ask about frequencies of different behaviors. We had asked these two types of questions to attempt to dissociate what we thought might be profiles of reading "text readers" vs. "talkers" from frequencies of different actions, which may assess subtly different aspects of family habits or beliefs. Reponses generally correlated well with each other such that more "interactive" behavior on one question is associated with more "interactive" behavior on another question. A notable exception is Question 5, which asks caregivers how frequently they read the book text as it appears on the page. This question is negatively associated with Question 3, the scale-version of this question (caregivers who report reading the text more frequently are less likely to report talking *versus* reading text) but positively associated with naming objects or actions (Question 6). One potential explanation is that various aspects of extra text conversation seem to occur above and beyond reading the text so assessing *frequency of text reading* (Question 5) is not necessarily indicative of other behaviors (labeling or question asking may happen above and beyond text reading) but *relative text reading* (Question 3), may capture a unique aspect of how caregivers reflect on their reading practices.

We can also assess how different behaviors might relate to each other. For example, we see that reading books a child has already heard (Question 8) is associated with both longer reading sessions and many aspects of extra textual talk. This finding replicates existing findings from observational studies (Fletcher & Finch, 2015; Goodsitt et al., 1988) with our survey methodology. Likewise, existing work suggests more caregiver and child talk for book types or genres that children enjoy more (Robertson & Reese, 2017; Strouse & Ganea, 2017), and the correlations we see between child enjoyment of shared book reading and higher rates of different measures of interactivity may be consistent with these findings. We see converging evidence across observational and survey methodologies for aspects of books that influence caregiver-child interaction.

Yesterday's reading habits

We were concerned that social desirability effects associated with reflecting on general reading habits, or a hypothetical reading episode might affect how participants responded to our survey questions. To address this potential concern, we asked questions about reading habits a second way, which allowed us to assess similarities and differences in responses based on how the question was asked. To this end, we asked caregivers if their child was read to yesterday, and questions about what activities took place during yesterday's book reading. We wondered whether caregivers may respond to questions about a recent, concrete reading episode differently than they respond to questions about general habits. Asking questions about a concrete reading episode also allowed us to ask specific questions about that episode (e.g., Was the book new to the child?).

Consistent with the high rates of reading reported in caregivers' overall reading habits, reported rates of reading "yesterday" was high. Most caregivers reported that their child was read to yesterday, 73% in the youngest group, 80% in the middle group, and 83% in the oldest group.

We also asked caregivers specific details about the book reading episode. Most caregivers reported reading multiple books the day before. Caregivers reported that generally some or all of the books the child had heard before: 0–9 months (61% heard before, 26% some new, some heard before, 13% all new), 10–16 months (69% heard before, 21% some new, some heard before, 10% all new), 17–30 months (73% heard before, 19% some new, some heard before, 7% all new). We also found considerable variability in the proportion of the book that was completed. As reported in Table 6, about two thirds of families read the entire book and many families completed a smaller proportion of the book. This finding may not be surprising to caregivers of young children, but given an implicit assumption in the literature that caregivers generally complete the whole book and studies of naturalistic reading that are consistent with this assumption (e.g., Stoops et al., 2023) this finding adds potentially important information to our understanding of naturalistic picture book reading in homes. Caregivers may in fact frequently not read the whole book, so estimates of linguistic input may consider that children and caregivers frequently read or discuss only a portion of a book.

Caregivers also answered questions about the book reading session that aligned with the questions they had previously answered about general book reading habits, reported in Table 7, which allowed us to compare responses to a "typical" reading episode to a more concrete (yesterday's) episode. Reports of specific practices during yesterday's reading were similar to rates in Table 4, with a few notable differences.

Table 6. Proportion of book read by age of child.

About what proportion of the text in the book did you read?	0–9 months	10–16 months	17–30 months
Less than a quarter	0%	7.5%	6.0%
About a quarter	5.6%	4.5%	3.6%
About a half	9.7%	11.9%	13.3%
Almost the whole book	16.7%	16.4%	13.3%
The whole book	68.1%	59.7%	63.9%

Table 7. Reading Practices from the previous day.

	0–9 months (*N* = 72)	10–16 months (*N* = 67)	17–30 months (*N* = 83)	Age (*N* = 222)	Words and gestures (*N* = 67)	Words and sentences (*N* = 83)
	M(SD)	**M(SD)**	**M(SD)**	**Correlation (r)**	**Correlation (r)**	**Correlation (r)**
1. If yes, how many books did you or someone else read to your child?	2.20 (2.03) Range: 1–15	1.83 (1.51) Range: 1–11	2.24 (1.72) Range: 1–10	0.04	**0.31****	0.10
2. Of the time you spent reading, how much time was spent reading the text on the page (1), or making up a story or talk about the pictures (7)?	3.03 (1.82)	3.33 (2.00)	2.42 (1.40)	**−0.14***	0.15	0.01
3. Did your child quietly listen to the story (1), or was reading a more interactive activity (7)?	3.79 (1.78)	4.24 (1.75)	4.37 (1.77)	**0.17****	−0.004	0.19
4. When you read to your child how often did you read the text that appears on the page?	6.13 (1.27)	5.87 (1.38)	5.87 (1.20)	−0.06	0.04	0.10
5. When you read to your child how often did you name objects or actions in the pictures?	5.13 (1.54)	5.51 (1.40)	5.16 (1.37)	0.02	**0.30***	0.18
6. When you read to your child, how often did you ask your child questions about the objects or events in the story or in the pictures?	2.71 (1.87)	3.66 (1.95)	4.16 (1.75)	**0.37*****	**0.35****	**0.40*****
How much did your child enjoy being read to?	5.82 (1.28)	6.01 (1.22)	6.07 (1.06)	0.11	0.21	0.03

*p < .05.
**p < .01.
***p < .001.

Table 8. Picture books information.

	0–9 months	10–16 months	17–30 months	Overall
	M(SD)	**M(SD)**	**M(SD)**	**M (SD)**
In the last month, did you check out picture books from the library?	23.5%	26.2%	33.0%	27.7%
In the last month, did you purchase any picture books?	46.9%	46.4%	52.0%	48.6%
In the last month, did you receive any picture books as a gift?	45.9%	34.5%	44.0%	41.8%

We see a great deal of alignment between responses to a typical or yesterday's reading habits. Caregivers once again reported that they both read the book text and engaged in various extra-text conversational behaviors. We also see clear effects of both age and vocabulary such that with older children caregivers report more interactive storytelling, more frequently naming objects and actions in the pictures, and more frequently asking questions. Caregivers also report that their children generally enjoyed book reading.

We also see slight differences in caregiver reports across the two sets of questions. We see a similar non-linear age effect in the extent to which caregivers report that they read the text versus make up a story, with caregivers reporting reading the text most to the oldest children, followed by the youngest children (typical habits: Question 3; yesterday's habits: Question 2). However, the correlations between reading the text versus making up a story and age or vocabulary score varies across the two question types. When asked about typical habits, we see a positive relationship between the Word and Gestures (10–16 month) vocabulary score and more interactivity (making up a story or talking about pictures), while when asking about yesterday's habits we see only a negative relationship with age (more interactivity with younger children). Because we see a non-linear effect in group means in both typical and yesterday's habits, the different correlations may reflect chance variability, with values being just on one side or the other of statistical significance in the two data sets perhaps due to quirks of the age distributions in the two samples, the slightly higher rates of reading yesterday in the older groups, or another reason.

Perhaps a clearer difference in caregiver responses to typical versus yesterday's reading habits is that caregivers report more extra-textual talk and behaviors when asked about typical reading habits, as shown though paired samples t-tests. On the 1–7 scale, when assessing typical habits, caregivers reported more interactivity versus silently listening at 17–30 months (typical habits: Question 3; yesterday's habits: Question 2; *Of the time you spent reading, how much time was spent reading the text on the page (1), or making up a story or talk about the pictures (7)?*; Typical vs. Yesterday by age: 0–9 months, 3.00 vs. 3.02; 10–16 months, 3.48 vs. 3.33, 17–30 months, 2.67 vs 2.42, $t(82) = 1.99$, $p < .05$, $d = 0.22$), less frequently reading the text (typical habits: Question 5; yesterday's habits: Question 4; *When you read to your child how often did you read the text that appears on the page?;* Typical vs. Yesterday by age: 0–9 months, 5.81 vs. 6.13, $t(71) = 1.75$, $p = .08$, $d = 0.21$; 10–16 months, 5.42 vs. 5.86, $t(66) = 2.74$, $p < .01$, $d = 0.33$; 17–30 months, 5.52 vs. 5.87 $t(80) = 2.72$, $p < .01$, $d = 0.30$) and more frequently asking questions (typical habits: Question 7; yesterday's habits: Question 6; *When you read to your child, how often did you ask your child questions about the objects or events in the story or in the pictures?;* Typical vs. Yesterday by age: 0–9 months, 5.46 vs. 5.13, $t(71) = 2.14$, $p < .05$, $d = 0.25$; 10–16 months, 5.40 vs. 5.51, $t(66) = 0.65$, $p = .5$; 17–30 months, 5.51 vs. 5.16, $t(82) = 2.81$, $p < .01$, $d = 0.31$). Note that the means for typical reading habits do not exactly match those of Table 4 because these are paired-samples analyses and thus limited to caregivers who reported that they did read to their child the day before. While these relationships could be coincidental, they may also reflect differences in how book reading as assessed. Consistent with our initial rationale for asking both types of questions, perhaps caregivers believed that more interactivity and extra-textual interaction is the more socially desirable reading style, so caregivers report more of that style when asked about typical or hypothetical reading episodes.

Despite some differences across questions about typical versus yesterday's reading habits, we see remarkable consistency across the two question types with respect to what we can conclude about typical habits during shared book reading at home. This consistency is reassuring when trying to

develop an accurate and valid assessment of reading habits. Caregivers report frequently reading book text as well as engaging in a range of extra-textual behaviors, and a picture emerges of complex ways in which a child's age or language skills elicit different behavior from caregivers.

Picture book reading and family reading habits

Caregivers generally make decisions on behalf of young children with respect to picture book reading frequency and practices, so we investigated aspects of other home or caregiver reading practices that might predict picture book reading practices.

Caregiver Author Recognition Test (ART)

The average score (out of a possible 62) was 14.8 (SD = 12.2; range = −6–54). ART scores correlated positively with the number of picture books in the home ($r = 0.40$, $p < .001$) and negatively with the age (in months) at which caregivers started reading to their child, such that caregivers with higher ART scores began reading to their child at younger ages ($r = -0.30$, $p < .001$). As shown in Figure 3, we found a relationship between ART scores and frequency of reading to children. Caregivers with higher ART scores tended to read more frequently to their children, though there was considerable variability across families.

Acquisition of books

We asked how families acquire books (library, purchase, gift) and whether these book acquisition habits predicted aspects of picture book reading. We were particularly curious in how families acquired new books given previous work that shows that purchasing books or visiting a library are activities that are affected by picture book interventions (Moore & Wade, 2003). Likewise, given finding that caregivers and children may interact with new versus familiar books differently (Fletcher & Finch, 2015; Goodsitt et al., 1988) and effects of book familiarity on word learning (Horst et al., 2011) we wondered whether frequently acquiring

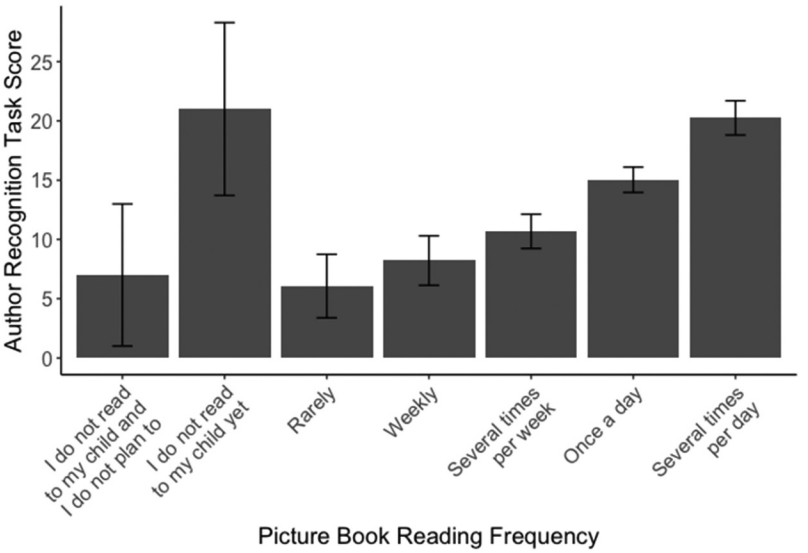

Figure 3. Picture book frequency by caregiver score on the author recognition task.

new books, especially by avid library users, would be a proxy for reading a greater proportion of new books.

Overall, it was common for families to acquire new books. The data is presented in Table 7. Between a quarter and a third of families reported checking out picture books from the library, suggesting that libraries are valuable community resources that families indeed use to acquire picture books. Rates of purchasing books or receiving books as a gift were high as well, with over 40% of families reporting that they acquired books by these means. Across all families, 72.3% of families reported acquiring new books in some manner (library, purchase, gift) in the last month. Picture books are common items across households and acquiring new books is a common occurrence.

Acquisition of new books generally was not predicted by other family or child characteristics, nor did it predict picture book reading habits. Despite numerical differences (Table 8), logistic regression showed no effect of age (in months) on the frequencies with which families took part in any of the three activities. We also found no effect of existing numbers of books in the home on any of these three book acquisition activities. We found a non-linear effect of caregiver education on library use only (Less than Bachelor's degree: 16.0%, Bachelor's degree 35.6%, Post-graduate degree 27.9%) but logistic regression predicting library use showed that the only significant difference was between caregivers with Less than a Bachelor's degree versus those with a Bachelor's degree ($b = -1.07, z = -3.30, p < .001$). We found no effect of caregiver education on any of the other picture book acquisition practices. We also found that none of these book acquisition practices predicted the frequencies with which caregivers read to children. These results provide additional information about the everyday role that picture books play in children's lives, even if the modes and frequencies of acquiring new books may not be predictive of other reading practices.

Discussion

We describe an online survey of caregivers of children between the ages of 0–30 months in which we asked them to describe the frequency of, and various characteristics of picture book reading habits at home. We find that picture book reading is overall frequent, even at the youngest ages, with about 25% of caregivers reading to children multiple times a day, about 65% reading daily and about 90% reading at least weekly. When caregivers read, they generally read the book text and talk about the story and pictures, and we find complicated relationships between child age, language skills, and various aspects of home book reading behaviors.

This work helps provide a snapshot of what goes on in homes during book reading. Surveys, like this one, are an important part of a converging set of methods, including lab-based studies and other naturalistic observations, that describe the social and linguistic contexts that accompany picture book reading in homes. We acknowledge that there are many comparisons presented here, so readers who wish to be more conservative may want to be cautious about overinterpreting some of the weaker correlations. That said, we believe that these studies provide important information for understanding practices associated with shared book reading, that ultimately are important to answer in order to understand why book reading may be positively associated with language outcomes, and how it may be adapted into successful interventions.

We see a great deal of consistency, as well as some notable differences, between the survey results presented here and other investigations of home picture book reading habits. First, the overall rates of picture book reading in homes is comparable to rates reported in other surveys. We report rates similar to those of Raikes et al. (2006), a study of lower-income families, Bradley et al. (2001) a comparison of higher and lower-income families, and Young et al. (1998) and Yarosz and Barnett (2001), both nationally representative samples. One notable exception is that we find higher rates of reading in families with children under 12 months of age relative to existing survey data (Young et al., 1998). This inconsistency may reflect a difference in our methodology or our population or could reflect changes in home reading habits over the last 25 years.

Another inconsistency we see with the existing survey data is that we fail to detect an effect of caregiver education on reading habits. Rather than an effect of education, we see an effect of caregivers' own reading habits affecting picture book reading habits, consistent with previous findings (Chen et al., 2023; DeBaryshe, 1995; Weigel et al., 2006). This relationship emphasizes how interconnected picture book reading habits are with other family and caregiver characteristics, adding to the challenge of teasing apart the effects of picture book reading from other aspects of the child's environment.

Our survey also complements findings from observational or naturalistic studies of picture book reading. Both surveys and observational recordings find that picture book reading is characterized both by the reading of the book text and extra-textual conversation, including labeling of pictures, caregivers or children asking questions about the pictures or plot, or other aspects of discussion regarding the pictures and story (Cline & Edwards, 2017; Demir-Lira et al., 2019; Fletcher & Reese, 2005; Leseman & De Jong, 1998; van Kleeck et al., 1997). One notable departure from observational studies is that families in our survey often reported partial reading of books (Table 5) whereas in observational studies families often complete the entire book. In fact, Stoops et al. (2023) found that in a sample of 12 families reading a set of novel books at home families almost uniformly all read all the book text each time they read a book. This finding is very much at odds with the present survey and may reflect differences between how caregivers and children interact with novel versus familiar books, or may reflect that families may not behave as they typically do when they know their interaction is being recorded. "Typical" or "naturalistic" reading likely encompasses a very large range of behavior including reading episodes where families read an entire book, and episodes in which families only read a portion of a book.

Another departure from observational studies of shared book reading is that we were not able to explicitly investigate the contribution of book type to reading habits. There is clear evidence that caregiver and child behavior during shared book reading depends on features of the book being read (for a review see Read et al., 2023), including book genre (Anderson et al., 2004; Leech & Rowe, 2014; Muhinyi et al., 2020; Price et al., 2009; Stoops et al., 2023) and familiarity (Fletcher & Finch, 2015; Goodsitt et al., 1988). Though we asked caregivers for information about book titles they read, we asked caregivers to list multiple titles, so it was impossible to link specific titles to survey responses. We found that caregivers often gave responses such as "Alphabet books" or "Dr. Seuss books" that would not allow us to identify specific titles. Given that book type is a substantial predictor of reading habits, we would suggest future surveys phrase questions in a way that explicitly asks caregivers to associate survey responses with specific book titles. These explicit questions will allow researchers to link reading habits to specific titles, genres or other features of interest.

Our sample consisting of caregivers of a wide range of child ages (0–30 months) allowed us to examine reading habits by child age and vocabulary size. A key finding from our work is the complicated relationship between child age, reading behaviors, and language skills. For example, caregivers report that book reading is more interactive, and they ask children more questions when children are older, or have larger vocabularies. This make sense, because older children are more capable conversation partners, and are better able to verbally respond to caregivers or ask questions of their own.

We also find more complicated relationships between age and reading practices. Caregivers of older children report that reading is more interactive, but that they also spend more time reading the book text, versus talking about the pictures. A child's age, language skills, or other skills affect their behavior and caregiver behavior in a variety of different ways. For example, consistent with these findings, Stoops et al. (2023) found that during picture book reading with children between the ages of 27–37 months, dyads with older children took fewer conversational turns. The authors speculate that perhaps older children, with their more advanced language skills, could better comprehend the story and preferred to listen to the plot. Age may have a complicated effect on conversation, which becomes particularly evident with a larger age range, as in the present study. We interpret our age effects as reflecting developmental cascades that may be affecting caregiver behavior in multiple ways. Older

children are better able to converse with caregivers, which promotes sophisticated language from caregivers. However, older children are also better able to comprehend stories, promoting more sustained listening. It may be impossible to draw straightforward, linear, conclusions about child age and book reading behavior, because developmental change can have a range of behavioral consequences.

We also see a striking non-linear age effect, that families with children between the ages of 14–22 months spend less time reading in a single sitting than those with either older or younger children (Figure 2). We offered a highly speculative explanation, that children may lose interest in stationary activities such as book reading in the months after they begin walking. Despite this interpretation being largely based in anecdote, this interpretation is consistent with findings that consider developmental cascades of motor milestones. In the two months after infants begin walking (onset ~12 months of age), the frequency of crawling bouts plummet, and the frequency of walking bouts increase to a level far greater than the frequency of crawling bouts prior to walking (Schneider & Iverson, 2022). For example, 13-month walkers walk to distant objects 3 times more often than crawlers crawl to distant objects (Karasik et al., 2011). If walkers, especially new walkers, are spending more time locomoting than they had been, it is not outrageous for that time to be taken from stationary activities. Again, we have no direct empirical support for this interpretation, but given well-established differences in which walking versus crawling children interact with the world, and are interacted with by caregivers (Adolph & Tamis-LeMonda, 2014; Campos et al., 2000; Schneider & Iverson, 2022; Walle & Campos, 2014), it may sensibly follow that an additional aspect of these developmental cascades is temporarily spending less time in seated activities, like shared book reading.

Developmental cascades are well-described in other domains and describe situations in which children's motor, linguistic, or other abilities affect how children experience or interact with their environment (e.g., Bradshaw et al., 2022; Karasik et al., 2017; Kretch et al., 2014; Oakes, 2023; Schneider & Iverson, 2022; Thelen & Smith, 1994). A child's own abilities affect subsequent learning opportunities in predictable ways, and many of these approaches note how children themselves shape the environment from which they learn. The relevance here is that reading to a newborn versus a two-year-old is different not only because the children vary in what they might understand or learn from the episode, but because these children elicit different behavior from caregivers through their own knowledge and behavior.

The potential challenge associated with the presence of these developmental cascades is that drawing causal relationships between picture book reading and language outcomes becomes far more complicated. There is a persistent confound in associations between caregiver language or caregiver-child interaction and language outcomes: a child's own language, or other skills, affect caregiver and child behavior during the book reading episode. Certain caregiver behaviors may promote downstream language skills or may themselves index existing language skills. This confound presents a challenge when interpreting correlational work, including longitudinal work.

The present work aimed to better understand home book reading as it typically appears in English-speaking American homes. We investigated the overall frequency of book reading by child age, and various other child and family characteristics, as well as the nature of more specific caregiver and child behaviors that characterize picture book reading in homes. In conjunction with other surveys and naturalistic observations of picture book reading, we hope that this work can help answer questions about the "facts on the ground" of picture book reading, and aid in developing hypotheses about the mechanisms by which book reading may affect language outcomes based on the actuality of picture book reading in typical homes.

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Appendix

Appendix A

Child information

(1) What is your child's age (in months)?
(2) What is your child's sex?
(3) Catch Question: 0-9, 10-16 Months: How old was your child (in months) when they were able to roll over from their tummy to their back? 17-30 Months: How old was your child (in months) when they started to walk?
(4) Are there any other children who live in your home?
(5) If yes, please enter the birthday (MM/DD/YYYY) and the sex of the children:
(6) What is the primary language spoken in your home?
(7) Are there any other languages spoken in your home?

If yes, please list each spoken language in the boxes below:
If yes, about what percent of the time a language other than English spoken?
Media Use Questions

(1) How often does your child play with toys?
(2) How often does your child use an electronic device (computer, smartphones, Tablet PCs, etc.)
(3) What is the average number of hours per day your child uses an electronic device?
(4) How often does your child watch TV?
(5) What is the average number of hours per day your child watches TV?

(#6-8, age 17-30 months only)

(1) Have you played language games with your child such as "I Spy," or rhyming games?
(2) How often do you point out signs and words such as restaurant names and street signs to your child (for example, McDonalds, Main Street, Walmart, etc.)?
(3) How often does your child draw?

Book reading questions

(1) How often do you read to your child?
(2) How many children's picture books do you have in your home right now, including library books?
(3) If you read to your child, how old was your child (in months) when you began reading to him or her?
(4) Does your child have a favorite book?

If yes, what is the name of that book?

(1) How long (in minutes) do you typically spend reading a book in a single sitting?
(2) When you read to your child, how often do you read the text on the page, versus make up your own story or talking about the pictures? (1-7 scale)
(3) When you read to your child to what extent does your child quietly listen to the story, or is reading an interactive activity? (1-7 scale)
(4) When you read to your child, how often do you read the text that appears on the page? (1-7 scale)
(5) When you read to your child how often do you name objects or actions in the pictures? (1-7 scale)
(6) When you read to your child how often do you ask your child questions about the objects or events in the story or in the pictures? (1-7 scale)
(7) When you read to your child how often do you read a book your child has never heard, or repeat books your child has already heard? (1-7 scale)
(8) How much does your child enjoy being read to? (1-7 scale)

yesterday's book reading

(1) Did you or someone else read a picture book to your child yesterday?
(2) If yes, how many books did you or someone else read to your child?
(3) What were the titles of these books (as many as you can name)?
(4) Had your child already heard the book or books before?

(5) Of the time you spent reading, how much time was spent reading the text on the page, or make up a story or talk about the pictures? (1-7 scale)
(6) Did your child quietly listen to the story, or was reading a more interactive activity? (1-7 scale)
(7) Did you ever read the text on the page? (1-7 scale)
(8) Did you ever name objects or actions in the pictures? (1-7 scale)
(9) Did your child ask questions about the objects or events in the story or in the pictures? (1-7 scale)
(10) How much did your child enjoy being read to? (1-7 scale)
(11) About what proportion of all the text in the book did you read?

Book reading in the last month
1. Did you check out picture books from the library?
If yes, about how many times did you borrow picture books from the library?
About how many picture books did you borrow in a typical single visit?
2. Did you recently purchase any picture books?
If yes, how many picture books have you purchased?
3. Did you receive any new picture books as a gift?
If yes, how many picture books have you received as a gift?
Early Parenting Attitudes (Hembacher, deMayo, et al., 2020)

(1) Children should be comforted when they are feeling negative.
(2) It's important for parents to help children learn to deal with their emotions.
(3) Parents should pay attention to what their child likes and dislikes.
(4) A child who has close bonds with his or her parents will have healthier relationships later on in life.
(5) Children who receive too much attention from their parents become spoiled.
(6) Giving too much affection toward the child, such as hugging and kissing, makes a child weak.
(7) Children and parents do not have to be emotionally close as long as children are kept safe.
(8) A child should calm themselves when they are upset instead of the parent.
(9) It is good to let children explore and experiment.
(10) Parents can help babies learn language by talking to them.
(11) Preparing young children to succeed in school by teaching them things in advance is important (for example, shapes and numbers).
(12) Babies can learn a lot just by playing.
(13) Young children cannot understand rules.
(14) Children don't need to learn about numbers and math until they go to school.
(15) Reading books to children is not helpful if they have not yet learned to speak.
(16) Babies can't learn about the world until they learn to speak.
(17) It is very important that children learn to respect adults, such as parents and teachers.
(18) It is very important for young children to do as they are told (for example, waiting when they are told to wait).
(19) Children should be grateful to their parents.
(20) It is okay if young children boss around their caregivers.
(21) It is okay if children see adults as equals.
(22) Young children should be allowed to make their own decisions.
(23) Parents do not need to worry if their child misbehaves a lot.

(#24-28, age 10-16 and 17-30 months only)

(1) How often do you share facts or observations about your present surroundings with your child (for example, did you know butter comes from cows? while shopping at the grocery store)?
(2) How often does your child play with educational apps (for example, apps designed to teach numbers, colors, shapes, etc.) on a tablet or mobile device?
(3) How often do you talk sternly to your child when he/she did something you don't want?
(4) How often do you give your child time out or other punishments for acting out?
(5) How often does your child help or try to help with chores or tasks (for example, cleaning up his/her toys)?

VOCABULARY INVENTORY

MCDI Words and Gestures (10-16 months) or Words and Sentences (17-30 months)

Catch Question Repeat: 0-9, 10-16 Months: How old was your child (in months) when they were able to roll over from their tummy to their back? 17-30 Months: How old was your child (in months) when they started to walk?

Author RECOGNITION TASK

Caregiver and family information

(1) I am my child's (Select: Mother, Father, Other)
(2) What is your child's race/ethnicity? (Select all that apply)
(3) How many other books (excluding your child's picture books) are currently in your home?
(4) How many smart home devices are currently in your home?
(5) How often do you read for pleasure?
(6) What is the highest level of education you have attained? (Select from options)
(7) What is the highest level of education your child's other parent (if applicable) has attained? (Select from options)
(8) What is your estimated annual family income? (Select from options)
(9) What is your child's birthdate? (MM/DD/YYYY)

Appendix B

Reading frequency by parent's education level

How often do you read to your child?	0–9 months proportion (N)	10–16 months proportion (N)	17–30 months proportion (N)	Overall
Less than Bachelor's degree	*N* = 31	*N* = 34	*N* = 35	*N* = 100
I do not read to my child and I do not plan to				0
I do not read to my child yet	0.03 (1)			1
Rarely	0.03 (1)	0.06 (2)	0.03 (1)	4
Weekly	0.13 (4)	0.15 (5)	0.11 (4)	13
Several times per week	0.29 (9)	0.06 (2)	0.11 (4)	15
Once a day	0.36 (11)	0.50 (17)	0.43 (15)	43
Several times per day	0.16 (5)	0.24 (8)	0.31 (11)	24
Bachelor's Degree	*N* = 55	*N* = 37	*N* = 54	*N* = 146
I do not read to my child and I do not plan to	0.02 (1)		0.02 (1)	2
I do not read to my child yet	0.05 (3)	0.05 (2)		5
Rarely	0.07 (4)	0.08 (3)	0.07 (4)	11
Weekly	0.09 (5)		0.07 (4)	9
Several times per week	0.25 (14)	0.16 (6)	0.13 (7)	27
Once a day	0.25 (14)	0.43 (16)	0.37 (20)	50
Several times per day	0.25 (14)	0.27 (10)	0.33 (18)	42
Post-Graduate Degree	*N* = 12	*N* = 13	*N* = 11	*N* = 36
I do not read to my child and I do not plan to				0
I do not read to my child yet				0
Rarely				0
Weekly		0.08 (1)		1
Several times per week	0.08 (1)	0.23 (3)	0.09 (1)	5
Once a day	0.42 (5)	0.46 (6)	0.64 (7)	18
Several times per day	0.50 (6)	0.23 (3)	0.27 (3)	12

Appendix C

Equivalent plots to Figure 2 showing time spent reading in a single session by child age. These plots show age binned by different numbers of months. The top row shows months binned by one and two months (two months is shown in Figure 2) and the bottom row shows months binned by three and four months. The dip in reading time is evident regardless of how age in months is binned.