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A print book preference: Caregivers report higher child enjoyment and more adult–child interactions when reading print than electronic books

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ABSTRACT

Prior research has indicated that parents of young children prefer their children read print over electronic books. In this study we addressed whether this preference is associated with differences in child enjoyment and engagement or joint caregiver–child interactions during reading. Caregivers of children ages 1–4 years reported their children not only read traditional books more than electronic books, but enjoyed them more and paid more attention to them. Caregivers also reported participating in more adult–child interactions when reading print than electronic books. This research is important because it indicates that caregivers and children may not tend to engage with electronic formats in optimal ways. The result may be a cycle of lower-quality interaction and lower-quality learning with electronic books.

1. Introduction

Young children's media environment is rapidly changing: Children are now using touchscreen devices for a variety of media experiences, including watching videos, playing games, and reading books. By 2013, 72% of US children 8 years and younger had used a touchscreen device [1]. In 2015, parents of UK children under 12 reported that their most frequently used device for going on line was the tablet; the same survey revealed that 75% of 3- and 4-year-olds had access to a tablet in their home [2].

Although touchscreen device usage has become common among children, reading digital books has remained relatively infrequent. In the 2013 US survey, only 30% of children had used a touchscreen device for reading [1]. Reading was the least common activity on multipurpose digital devices; playing games and watching videos were much more common. In another report, children ages 2–10 spent on average 29 min per day reading print books compared to just 5 min reading digital books [3].

When asked about their child's lack of electronic book use, many parents reported that they prefer print. In 2013, 81% of US parents of children ages 0–17 who had read both print and electronic books said print books were better for reading with children [4]. In another US survey, 48% of parents of the youngest group surveyed (6–8 years) reported that they preferred their child read print over electronic books and just 3% preferred electronic [5]. In Australia and the UK, the percentage of parents who preferred print was even higher (72% and 67% respectively) [6,7].

One reason parents may hold this preference for print could be pediatric guidelines that state children ages 2–5 should spend less than 1 h per day with screens and screen time for children under age 2 should be discouraged [8–10]. No such limits are put on print media, implying that in general it is better for children than screen media.

Common reasons parents report for preferring print include that they do not want their child to spend time with screens, that print is better for children's reading skills and e-books are difficult to share, or that they prefer the physical feel of print books [3,4,11]. However, despite the preference for and higher usage of print over electronic books, e-book use is on the rise. Overdrive, a popular e-book service, reported children's e-book borrowing increased 30% from 2015 to 2016 [12]. Access to devices on which electronic books can be played is growing sharply [2,13], so it is reasonable to expect increased usage in the coming years.

The increased acceptance of new electronic media is at least partially based on the argument that touchscreen devices are better than older media devices because they have features that support learning, such as reacting to the child, being tailorable to the individual, and providing content that can increase in

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complexity [14]. In addition, young children appear to be highly engaged with media. In studies with preschoolers, researchers reported that children engaged more with electronic books [15,16] and spent more time with them [17] than with print. In our own research with toddlers we have identified a similar pattern [18]. However, one parent-report survey indicated that parents' view of their children's engagement and preferences are more mixed [19]. For example, some parents thought that print helped their children focus, whereas others believed that their children would not concentrate on print because it did not have extra content to explore.

Of concern is that parents may believe that enhancements offered in electronic books can take the place of adult–child interaction during co-reading. In one survey, approximately 30% of parents who did not read e-books and over 50% of parents who did read e-books agreed that features in e-books could enable children to read alone [11]. However leaving children to read alone may not be the best approach to promote learning.

Decades of research have shown that parent–child talk during reading promotes a variety of language skills [20,21]. Successful reading interventions incorporate extensive parent–child interactions beyond the words printed on the page [22]. Common strategies used with younger children include those that engage attention such as labeling pictures, asking questions, pointing, and giving children physical control to turn book pages [23,24]. In turn, these interactions promote more child talk during reading [25,26]. With older children, successful interventions have stressed promoting child talk by stopping to ask questions and encouraging children to make predictions and tell parts of the story back [27]. If parents believe that electronic books are enhanced in ways that support learning, they may feel these strategies are not needed and leave children to read on their own [e.g., [11]].

Recent experimental work supports the idea that parents offer less talk about the story when reading electronic than print books [15,28,29]. In three studies, researchers asked parents to read print or electronic books with their preschoolers while their behavior was observed. All three reported a relative reduction in content-related talk with the electronic books and a relative increase in behaviorally-focused talk (e.g., where to tap). All three also reported some evidence of lower comprehension of the electronic books, suggesting that perhaps the lower amounts of content-related talk disrupted children's ability to understand the stories.

However, high-quality adult–child interactions are effective with electronic books, for example when teachers are specifically encouraged to use them [30]. Similarly, when parents were trained to provide high-quality talk during video stories, preschoolers had higher comprehension and vocabulary learning from the stories [31]. Thus there is a need to identify current parent practices so that areas for potential intervention can be identified.

Recently, we piloted a questionnaire on children's media use with parents of toddlers who participated in a study in our research lab [32]. Consistent with the experimental studies, we found that parents were reporting using many more of the reading behaviors associated with effective reading interventions when reading print than electronic books at home with their children. In the current study we collected data from a much larger sample to further explore these findings. Our goals included: (1) confirming the preference for print over electronic co-reading in a sample of Canadian caregivers, as evidenced by caregivers' reading practices. We expected to replicate parents' preference for print. In addition, we also directly asked caregivers (2) whether their children also hold a preference for print, as evidenced by enjoyment and attention. From research done with children, we expected they might enjoy and attend more to digital formats. We were also interested in (3) whether caregivers who do read e-books tend to support them with high-quality parent–child interactions as they do with print books. From experimental research and our pilot survey, we expected they may not. Finally, as many surveys have not looked at changes in preference and behavior over the early childhood years, we asked (4) whether differences in how print and electronic books are used occur across ages. Due to pediatric guidelines, we expected that we may see a stronger preference for print in caregivers of children two and under.

2. Material and methods

2.1. Participants

Our final sample included surveys from 555 caregivers of children ages 1–4 years ($M = 2.75$ years of age, $SD = 1.22$ years) from a large metropolitan area in Canada, consisting of two subsamples. Subsample 1 ($M = 2.78$ years of age, $SD = 1.26$) was comprised of 450 caregivers who participated as part of other research studies at our university location or the local Science Centre. This subsample was, for the most part, well-educated and middle- to upper-class, and included the pilot participants previously reported [32]. More detail is provided in Table 1.

Subsample 2 ($n = 105$; $M = 2.59$ years of age, $SD = 1.02$) was specifically recruited to include a wider range of family incomes. Based on Census data we created a list of city wards where: (1) the percentage of population identified as low income was above 20%, or (2) each income bracket below the city median included a greater than average percentage of households. In addition, we included wards identified as Neighborhood Improvement Areas (NIAs) by the city. We created a list of community and child care centres, and libraries located in these wards and distributed our questionnaire through those that agreed to participate.

Returned questionnaires were discarded as incomplete if the caregiver provided answers to only demographic questions. Twenty-eight questionnaires from subsample 1 were discarded due to caregivers not providing their child's age (6), or being incomplete (22). From subsample 2, 7 questionnaires were discarded due to not providing the child's age (3), being incomplete (2), being completed by someone who did not live with the child (1), or because multiple caregivers completed the survey for the same child (1).

2.2. Procedure

Questionnaires were completed online or on paper depending upon the point of recruitment. For subsample 1, caregivers scheduled to visit our lab location were given the option of completing the questionnaire online prior to their visit or on paper during the session. Caregivers who participated on site at the Science Centre completed the questionnaire during the session. For subsample 2, caregivers recruited through libraries were provided with paper copies to complete on site or a flyer with the survey URL. Caregivers recruited through community and child care centres were provided with paper copies of the questionnaire and asked to return the questionnaire back to that location for researchers to pick up.

2.3. Measures

Questionnaires were comprised of three main components, (1) demographics, (2) media usage, and (3) reading behaviors. A complete version of the questionnaire can be found at http://tinyurl.com/zuw8d2x.

Table 1
Demographic characteristics of the sample.

Question asked	Combined sample		Subsample 1		Subsample 2	
	n	%	*n*	%	*n*	%
Gender of caregiver						
Male	90	16.2%	76	19.5%	14	14.1%
Female	398	71.7%	313	80.5%	85	85.9%
Household income						
Less than $25,000[b]				3.8%[a]	9	9.5%
$25,000–$49,999[b]				7.6%[a]	21	22.1%
$50,000–$74,999[b]				9.8%[a]	30	31.6%
$75,000–$99,999				11.4%[a]	13	13.7%
$100,000–$124,999				22.7%[a]	10	10.5%
$125,000–$149,999				10.6%[a]	5	5.3%
$150,000 or higher				34.1%[a]	7	7.4%
Education of caregiver						
Partial high school	8	1.5%	4	0.9%	4	4.0%
High school diploma/GED	28	5.2%	20	4.6%	8	8.0%
College diploma	84	15.7%	64	14.7%	20	20.0%
Bachelor's degree	223	40.2%	180	41.3%	43	43.0%
Master's degree	130	24.3%	110	25.2%	20	20.0%
Ph.D., M.D., J.D.	63	11.8%	58	13.3%	5	5.0%
Gender of child						
Male	259	52.3%	205	52.0%	54	51.4%
Female	236	47.7%	189	48.0%	47	46.5%
Ethnicity of child						
White/Caucasian	272	51.3%	238	55.2%	34	34.3%
Aboriginal/First Nations	3	0.6%	3	0.7%	0	0.0%
Black/African-Canadian	23	4.3%	13	3.0%	10	10.1%
Hispanic	11	2.1%	9	2.0%	2	2.0%
Asian	49	9.3%	38	8.8%	11	11.1%
South Asian	61	11.5%	38	8.8%	23	23.2%
Multiple	92	17.4%	75	17.4%	17	17.2%
Other	19	3.6%	17	3.9%	2	2.0%
Language exposure						
English only	199	36.2%	173	38.9%	26	24.8%
Multiple, English primary	208	37.8%	180	40.4%	28	26.7%
Multiple, English not primary	143	26.0%	92	20.7%	51	48.6%

Note. Percentages are calculated based on number of respondents for each question.
[a] Estimated percentage based on 2 other samples recruited in the same manner.
[b] Income levels below the 2014 metropolitan area median of $75,270 [51].

2.3.1. Demographic questions

The demographic section included questions about ethnicity, education, languages spoken, and in the case of subsample 2, household income. Demographic variables are reported in Table 1.

2.3.2. Media usage

Caregivers were asked to estimate the frequency and duration with which children read print and electronic books and report on their child's enjoyment and attention during reading. Additional questions addressed children's exposure to other digital content including videos and interactive apps and games. Caregivers were asked to report which devices were used for digital media activities. Questions were adapted from two questionnaires previously used by the authors in several other research studies. Initial piloting lead to minor wording updates.

2.3.3. Adult–child interactions

Questions addressing caregiver–child reading behaviors were also adapted from a previously used questionnaire about print books. These questions generally follow the parental behaviors in the framework laid out by Fletcher and Reese [33] and tested experimentally as part of reading interventions such as dialogic reading [e.g., [27]]. These questions were piloted with participants from several other research studies in our lab group. After this initial piloting and literature review one additional question was added regarding page turns, as page turns have been hypothesized to motivate children to maintain involvement in the reading interaction [34]. Our final scale consisted of five questions which included adult and child behaviors typical at both ends of our age range. Caregivers were asked to indicate which of the following typically happened when reading: (1) "I point to the items in the book and label them", (2) "I stop during the reading to discuss the things in the book with my child", (3) "My child 'tells' me the story in familiar books", (4) "My child points to the items in the book and labels them", and (5) "My child turns the pages of the book".

The internal consistency of our scale was measured using the average inter-item correlation because the small number of items in the scale would heavily influence Chronbach's alpha [35]. Optimal scores for the inter-item correlation are in the 0.2–0.4 range, with lower scores expected when a broader construct is measured and higher scores for narrower constructs [35,36]. Average inter-item correlations for our scale were in the optimal range for both print ($r_\varphi = 0.23$) and electronic reading ($r_\varphi = 0.32$).

3. Results

The following comparisons between print and electronic reading are made using only the respondents who reported reading in both formats using Wilcoxon signed rank tests because many variables had skewed distributions. Descriptives for these groups as well as the full sample can be found in Table 2.

3.1. Frequency and duration

Consistent with our hypothesis, our sample reported a strong preference for print as evidenced by their reading behavior. Less

Table 2
Questionnaire responses for print versus electronic books.

Question asked	Full sample	Caregivers reporting any e-book exposure	
	Print ($N = 555$)	Print ($n = 239$)	Electronic ($n = 239$)
Frequency of co-reading[***]			
Several times a day	62.2%	59.7%	6.2%
Once a day	23.2%	26.3%	8.4%
Several times a week	9.2%	9.7%	18.9%
Once a week	3.1%	3.4%	38.8%
I do not read	0.7%	0.8%	27.8%
Hours per week[***]	*Med* = 4.5 *Min* = 0.0 *Max* = 80.0	*Med* = 5.0 *Min* = 0.0 *Max* = 80.0	*Med* = 1.0 *Min* = 0.0 *Max* = 15.5
Frequency of solo reading			
Several times a day			7.9%
Once a day			7.0%
Several times a week			25.4%
Once a week			23.2%
Child does not read solo			36.4%
Level of enjoyment[***]			
1 does not enjoy	0.7%	0.8%	3.9%
2	1.3%	0.4%	6.9%
3	8.0%	8.0%	19.5%
4	15.4%	15.6%	23.8%
5 really enjoys	74.6%	75.1%	45.9%
Child's typical "style"[*]			
Listens intently, pays close attention	68.7%	73.5%	66.2%
Gets distracted easily, glances around room	20.0%	16.7%	19.0%
Listens a few minutes at a time, gets up to play	11.4%	9.8%	14.8%
Caregiver–child interaction total (of 5)[***]	*Med* = 3 *Min* = 0 *Max* = 5	*Med* = 4 *Min* = 0 *Max* = 5	*Med* = 1 *Min* = 0 *Max* = 5
Caregiver points & labels[***]	78.3%	75.7%	34.1%
Stop to discuss[***]	64.3%	65.7%	25.8%
Child tells story back[***]	38.8%	43.9%	14.3%
Child points & labels[***]	72.6%	71.5%	40.1%
Child turns pages[***]	75.0%	71.5%	37.3%

Note. Asterisks represent significant differences between responses to print and electronic reading questions among those who reported any e-book exposure.
[*] $p < 0.05$.
[***] $p < 0.001$.

than one percent of our sample (four caregivers) reported that they did not read print books to their child. In contrast, less than half (43.8%) of caregivers reported their child had any prior experience with electronic books.

In households where both types of books were used, shared reading was more frequent with print than electronic books, $Z = -11.66$, $p < 0.001$, and children spent a greater total amount of time with print, $Z = -11.24$, $p < 0.001$. The greater frequency and duration of time spent with print books held across both subsample 1 and 2 and for each year of age (1, 2, 3 or 4).

3.2. Child affect and attention

Contrary to our prediction that children would engage more with electronic books, parents reported their children showed a preference for print. Among caregivers who reported both types of book use, shared print book reading was more enjoyed by their child, $Z = -7.25$, $p < 0.001$. Among these families, caregivers also reported that their child paid more attention to print than electronic books, $Z = 2.02$, $p = 0.043$.

When analyzed in subgroups, the greater enjoyment of print over electronic books held in both subsample 1 and subsample 2 and in all ages except 2-year-olds (the subgroup with the smallest sample size). The difference in attention was more tenuous and only retained significance in the subgroup with the largest sample size, subsample 1, $Z = 2.09$, $p = 0.037$.

3.3. Caregiver–child interactions

We computed a caregiver-child interaction score by summing caregivers' responses to the five adult–child interaction questions for both book types. Consistent with our prediction, adult–child interaction scores were significantly higher for print than electronic reading, $Z = -10.72$, $p < 0.001$. This difference in behaviors held across both subsamples and all ages. McNemar's tests indicated that the overall effect was comprised of higher scores on all measured behaviors.

3.4. Other electronic media experiences

To address whether the preference shown for print over electronic books was related to a general disengagement with electronic-format books specifically or limited use of electronic media more generally, we also analyzed the time spent with electronic books versus other digital activities. For those reporting participation in each pair of activities, children spent more hours per week watching videos (*Med* = 6, *Min* = 0.5, *Max* = 37.5) than reading electronic books (*Med* = 1, *Min* = 0.5, *Max* = 15.0), $Z = -10.60$, $p < 0.001$ and more hours playing non-reading apps and games (*Med* = 2, *Min* = 0.2, *Max* = 15.5) than reading electronic books (*Med* = 1, *Min* = 0.5, *Max* = 15.5), $Z = -5.52$, $p < 0.001$. Thus, children's lack of electronic book use did not appear to be based on an overall avoidance of digital media.

Table 3
Correlations between age and book-reading variables.

	Print		Electronic	
	r	*p*	*r*	*p*
Frequency of co-reading	$r_s(544) = -.12$	.004	$r_s(225) = -.09$	.186
Hours per week co-reading	$r_s(539) = .09$	.038	$r_s(209) = .15$	.029
Frequency of solo reading	n/a		$r_s(226) = .29$	<.001
Enjoyment	$r_s(549) = .21$	<.001	$r_s(229) = .17$	.011
Attention	$r_s(544) = .28$	<.001	$r_s(214) = .35$	<.001
Caregiver–child interaction total	$r_s(550) = .05$	.253	$r_s(215) = -.16$	.021
Caregiver points & labels	$r_{pb}(550) = .28$	<.001	$r_{pb}(215) = -.31$	<.001
Stop to discuss	$r_{pb}(550) = .14$	.001	$r_{pb}(215) = -.05$	.430
Child tells story back	$r_{pb}(550) = .30$	<.001	$r_{pb}(215) = .19$	.004
Child points & labels	$r_{pb}(550) = -.02$	.723	$r_{pb}(215) = -.14$	<.001
Child turns pages	$r_{pb}(550) = -.23$	<.001	$r_{pb}(215) = -.07$	.327

Note. r_s = Spearman's correlation, r_{pb} = point biserial correlation.

3.5. Age and media

Contrary to our hypothesis, age did not appear to predict parents' preference for print. Age was negatively related to the frequency with which caregivers reported reading print books to their child, $r_s(544) = -0.12$, $p = 0.004$, but had a small positive correlation with the time spent, $r_s(539) = 0.09$, $p = 0.038$. Age was not related to the frequency of shared electronic book reading, $r_s(225) = -0.09$, $p = 0.186$, but had a low positive correlation with the time children spent with electronic books, $r_s(209) = 0.05$, $p = 0.029$.

Despite age not being associated with preference, interesting patterns did occur in the association between age and adult–child interactions during reading. Overall, age was not associated with interaction with print books, $r_x(550) = 0.05$, $p = 0.253$, and negatively associated with interaction with electronic books, $r_s(215) = -0.16$, $p = 0.021$. Details are reported in Table 3.

3.6. Subsample comparisons

Similar preferences for print were reported in both subsamples. There were no differences in enjoyment or parent–child interactions with print or electronic books. The only consistent difference between subsamples was a generally higher level of media usage in subsample 2. Caregivers in subsample 2 reported higher frequencies of reading print books and more time spent with electronic books (Table 4). They also reported that their children spent a greater amount of time watching videos, $Z = -3.50$, $p < 0.001$ (subsample 1: *Med* = 5.5, *Min* = 0.0, *Max* = 25.0, subsample 2: *Med* = 6.8, *Min* = 1.0, *Max* = 37.5), and playing apps and games, $Z = -2.93$, $p = 0.003$ (subsample 1: *Med* = 2.0, *Min* = 0.3, *Max* = 15.0, subsample 2: *Med* = 3.0, *Min* = 0.2, *Max* = 15.5). Additional subsample comparisons are reported in Table 4.

4. Discussion

Across measures, we found evidence that Canadian caregivers of children ages 1–4 did hold a print book preference. They reported more frequent usage of print than electronic books, that their child enjoyed print books more, and that their child paid more attention to them. In addition, caregivers reported more parent–child interaction behaviors when reading print than electronic books. These patterns were consistent across subsamples that differed in income and across ages of children 1–4 years.

Consistent with other research reporting that shared print book reading begins around 7 to 9 months of age [37], almost all of the caregivers in our sample (99%) reported regular print reading. However, less than half (43.8%) reported that their child had ever experienced an electronic book. Even among families where children read e-books, print books were read much more often and for longer durations.

However, contrary to our hypothesis, caregivers reported that their child enjoyed print more than electronic books. Prior literature on this question is limited. When children have been experimentally assigned to read electronic books, there is evidence that they enjoy them as much if not more than print versions [16,18]. Research with older children has suggested that electronic books may incorporate features that serve to *better* engage children [38,39].

It is possible that the apparent contradiction between caregiver and researcher reports of enjoyment results from differences between children's behavior in controlled experiments and their regular lives. Researchers may select electronic books that are highly dissimilar from the ones parents and children choose at home. In addition, research settings tend to have very limited distractions available for children to help them maintain focus on the research activities, which is not reflective of the abundance of choice typically available to children in real-world settings. Finally, with the relative infrequency of e-reading at home, many of the children participating in research studies have no prior experience reading in a digital format. Thus, the pattern of increased engagement when children are assigned to read e-books could be a result of novelty and dissipate quickly with time.

It is also possible that caregivers' report of child enjoyment is biased by their own preference for print books. There is some evidence that parents give different reasons for their own and their children's preferences. In one UK-based survey of parents of children 0–8, parents who believed their children preferred print reported that they did so because they enjoyed turning the pages of the book, liked to own books, and liked to visit the library [19]. However, it is possible that parents' interpretations of their children's behavior are subject to an implicit confirmation bias, or a tendency to interpret events in a way that is consistent with one's beliefs [40].

An additional explanation for the discrepancy between observed child behavior and caregiver report is a self-report bias in which caregivers believe that print books are "better" and thus should be more enjoyable. Based on the common responses parents give in surveys – that too much screen time is bad, and print is better for children's reading skills [3,4,11] – it is clear that many parents have strong beliefs that shape their preference. Pediatric guidelines for limiting screen time provide support for the social desirability of these attitudes.

In addition to higher levels of enjoyment of print books, caregivers also reported their children displayed higher levels of attention. However, this was a small effect and did not persist in subgroup analyses.

Consistent with our prediction, caregivers reported fewer adult–child interactions during reading with electronic than print

Table 4
Subsample comparisons.

Question asked	Subsample 1	Subsample 2
Frequency of co-reading print**		
Several times a day	66.4%	49.5%
Once a day	22.8%	27.2%
Several times a week	8.1%	14.6%
Once a week	2.3%	6.8%
I do not read to my child	0.5%	1.9%
Hours per week print	*Med* = 5.0	*Med* = 4.0
	Min = 0.5	*Min* = 0.5
	Max = 20.0	*Max* = 30.0
Frequency of co-reading electronic		
Several times a day	3.9%	14.9%
Once a day	5.0%	21.3%
Several times a week	18.3%	21.3%
Once a week	41.1%	29.8%
I do not read with my child	31.7%	12.8%
Hours per week electronic**	*Med* = 1.0	*Med* = 2.0
	Min = 0.5	*Min* = 0.5
	Max = 6.0	*Max* = 15.5
Frequency of solo e-book reading**		
Several times a day	5.5%	17.4%
Once a day	7.1%	6.5%
Several times a week	25.8%	23.9%
Once a week	27.5%	6.5%
Child does not read e-books alone	34.1%	45.7%
Devices used for e-books		
Adult e-book reader (e.g., Kindle)	3.2%	2.1%
Child-specific device (e.g., LeapPad)	20.5%	23.4%
Tablet computer (e.g., iPad)*	72.6%	57.4%
Cell phone (e.g., iPhone)	38.9%	46.8%
Computer***	20.0%	44.7%
Level of enjoyment—print		
1 does not enjoy	0.4%	1.9%
2	1.4%	4.8%
3	8.1%	7.7%
4	15.4%	15.4%
5 really enjoys	75.6%	70.2%
Level of enjoyment—electronic		
1 does not enjoy	4.9%	0.0%
2	5.4%	13.0%
3	18.9%	21.7%
4	27.0%	10.9%
5 really enjoys	43.8%	54.3%
Caregiver–child interaction total (of 5)		
Print	*Med* = 4	*Med* = 3
	Min = 0	*Min* = 1
	Max = 5	*Max* = 5
Electronic	*Med* = 1.0	*Med* = 1
	Min = 0	*Min* = 0
	Max = 5	*Max* = 5

Note. Asterisks represent significant differences in responses between subsamples. All contrasts except device usage were computed using Mann–Whitney U tests on ranked data to address unequal sample size and non-normality concerns [52]. Differences in device usage were computed using chi-square tests, which do not rely on assumptions of equal variance [53].
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

books. This included significant differences in all individual behaviors that made up our scale: parent pointing and labeling, stopping to discuss the story, having the child retell parts of the story, child pointing and labeling, and child page turns. Thus, not only did caregivers report a lower usage of electronic books, but when they did use them they did not engage with them as they did with print books. Caregivers may believe that electronic books are built to stand on their own and do not need parent support. As a result, they may engage in low levels of "interrupting" the book, similar to how they refrain from pausing videos to engage the child in topic discussion [31]. Lower levels of parent–child interaction could be reflective of or a cause for reported lower levels of child enjoyment.

Preference for using and interacting with print over electronic books did not appear to be driven by a general lack of digital media in children's lives or access to devices. However, it is possible that caregivers and/or children believe that certain devices are "for" certain activities. In one study, preschoolers had somewhat fixed views of what different devices were for, and chose print books over computers, tablets, and phones as a source for learning something new [41].

Consistent with our hypothesis, the time children spent with electronic books was positively associated with age. In addition, older children used electronic books alone more frequently, and adult–child interactions with electronic books were less frequent with age. In contrast, this decline in adult–child interactions did not occur with age with print reading, making the overall difference in interaction between formats larger at older ages. One specific behavior shown to be important for the development of children's literacy skills [22] diverged between print and electronic reading: older ages were associated with stopping more frequently to talk during print stories, but this trend was not present with electronic books. It appears that simple strategies used with younger children gave way to more complex interactions during print reading as children got older, but fewer supportive behaviors were incorporated during electronic reading.

The print preference appeared in both subsamples, but a general embrace of digital media seemed to be more apparent in subsample 2, as children spent more overall time with e-books, videos, and apps and games than children in subsample 1. This is consistent with other surveys in which lower-income families report that their children spend more time with digital media [3]. There was no reported difference in enjoyment to electronic books across samples and no difference in parent–child interactions. Thus, a general embrace of digital media may have led to more usage but not more enjoyment or support.

One potential limitation of our results includes limited ability to assess the consistency of responses to our questions over time or across individuals. While the main comparisons in this paper rely on repeated-measures comparisons in which a single caregiver is providing a current snapshot of both their print and electronic behaviors, our age and subsample comparisons would benefit from data on how these questions are interpreted differently over time or by different individuals.

4.1. Implications

This research portrays a print book preference—an overall trend toward more usage and engagement with print over electronic formats. It remains to be seen whether the apparent discrepancy between parent reports of children's engagement and experimental observations of children is due to differences between real-world and research settings or differences between caregiver perception and reality. Future studies could address this question by observing children in more naturalistic environments, with stories they have chosen and are familiar with. An additional opportunity for lab-based researchers would be to ask parents to rate their in-lab experiences and compare these to reports of typical behavior at home.

It also remains to be seen whether this preference is justified from an educational standpoint. Research with preschool and older children has shown that when well-designed, electronic books can be good tools for learning, supporting phonological skills, vocabulary, print awareness, word reading, and story comprehension [38,42–47].

However, electronic books are proliferating faster than research into their advantages and disadvantages for children's development. The definition of a "well-designed" book is a moving target.

Labbo and Kuhn suggested that considerate books-those in which digital enhancements drew attention toward the presented educational content-were best for learning [48]. However the enhancements available in e-books are rapidly changing and it is not always easy to tell which will promote versus distract from learning.

In addition, researchers observing parents and preschoolers reading together have reported that parents and children reading electronic books may break up their talk about the story with interspersed discussion of the digital enhancements. This appears to be detrimental to story comprehension [15,28,29]. Less is known about whether electronic books are supportive for learning with toddlers and infants or with non-narrative book formats. However, if electronic books are detrimental to comprehension of content it remains to be seen whether this is due to differences in the format themselves or in the way that adults and children interact with the books.

Beyond interactions during specific reading sessions, children's general experiences with a medium can influence the way they think about and learn from it in subsequent encounters. Parents in North America often talk to their children during reading and link reading with daily life [23]. In cross-cultural research on picture books, North American infants who have more experience labeling and talking about pictures with adults are able to identify real-world versions of pictured objects [49] and learn new words for objects from picture books at younger ages than those in a culture where they do not have similar experiences [50]. Learning from books appears to be an acquired skill, built partially on the types of experiences children have. Thus, low-quality, unsupportive adult–child interactions during electronic reading may lead to lower-quality learning from electronic books and vice versa.

4.2. Conclusions

The current findings indicate that caregivers are not using the same adult-child interactions with electronic and print books. This study echoes experimental research in which parents of preschoolers focus less on content when reading electronic than print books in controlled settings [15,28,29]. One limitation of this study is that low-income families were underrepresented. However, our sample shows the previously displayed pattern of lower-quality interaction with electronic books may be prevalent in more naturalistic settings and across a broader age range and demographic sample than previously reported. The result may be a cycle of lower-quality interaction and lower-quality learning with electronic books.

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