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The parent advantage in fostering children's e-book comprehension

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ABSTRACT

One potential advantage of e-books is that unlike traditional books, preschoolers can read independent of an adult by using the audio narration feature. However, little research has investigated whether children comprehend a story's content after using an e-book with audio narration. The current study compares preschoolers' comprehension of an e-book in three conditions: (1) parent reading, in which parents read the e-book to their children, (2) independent with audio, in which children see the e-book independently with audio narration, and (3) independent without audio, in which children see the e-book independently but do not have audio narration available. Our results suggest that children comprehend some content from e-books using audio narration, indicating that using e-books independently may be a worthwhile activity for preliterate children while caregivers are otherwise occupied. However, results also show that children recall the most information about the e-book after reading with a parent.

1. Introduction

Picture a parent and child cuddled up in bed reading a book together. This image reflects a common tradition among families with young children of shared storybook reading. Ninety-one percent of parents with children under age 6 report reading books aloud at home (Scholastic Inc. & YouGov, 2015). However, many aspects of family life are evolving in the digital age. One recent observational study found that 40 out of 55 caregivers used a mobile device during a meal with their child at a fast food restaurant (Radesky et al., 2014). Furthermore, parents are often passing these devices to their children, with one survey of 810 U.S. parents showing that most parents at least occasionally allow their child to use their smart mobile device, most often when in the car. This device use by parents and children is likely taking the place of time that families would otherwise be interacting with each other. Will shared bedtime reading also be supplanted by technology?

Technology has made significant changes to book reading as tablets and e-readers have risen in popularity. In 2014, a nationally representative survey of over 1500 U.S. parents found that 62% of 2- to 10-year-olds had access to either a tablet or a dedicated e-reader for electronic reading at home, and parents reported that about half of those children were regularly engaged in electronic reading (Rideout, 2014). Similarly, a survey of over 1000 U.K. parents found that almost three-quarters of 3- to 4-year-olds have access to a touchscreen device at home, and parents reported that children use touch screens at least once a week (Formby, 2014). Even children with emergent literacy skills who cannot yet decode traditional written text are using this new technology for reading. The report showed that younger children (2- to 4-year-olds) use e-reading devices at similar rates as older children (Rideout, 2014), with children beginning to use e-books at an average of 5 years of age (Gilmore, 2015).

Although some of this e-book use with young children includes shared reading with a parent, one potential advantage of e-books is that children with emergent literacy skills who cannot yet decode traditional written text can interact with a book independent of an adult, using the audio narration feature available on many apps and devices. Indeed, many companies promote e-books' potential for independent reading, advertising their large selections of "read-to-me" books, which can be used either with or without the audio narration that reads a book's text to a listening child. This feature appears to be widely used. In a survey of 462 U.S. parents of 2- to 6-year-olds who have an iPad at home, more than 60% reported that their children use audio narration often/always when they read e-books alone, and an additional 28% reported that children some-

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times do (Vaala & Takeuchi, 2012). Furthermore, children are likely to have opportunities to read independently: over 70% of parents reported sometimes or often giving their child an e-book to read alone if they were busy doing something else (Vaala & Takeuchi, 2012). Similar data from a survey of over 1500 parents of children under 8 in the U.K. showed that 68% of parents report that their child at least sometimes uses digital media so that the parent can get things done (Kucirkova & Littleton, 2016). Almost half of the parents also reported that their children read an e-book on their own at least once a week (Kucirkova & Littleton, 2016). Little published research has explored whether children comprehend a story's content after engaging with an e-book using audio narration or whether comprehension would be greater after reading with a parent.

Most research investigating children's engagement with e-books compares the effects of reading an e-book versus a traditional book. For example, Parish-Morris, Mahajan, Hirsh-Pasek, Golinkoff, and Collins (2013) had preschoolers and their parents read either an e-book (LeapFrog electronic console book) or a traditional book. Five-year-olds did well regardless of which book they were read. Three-year-olds could identify basic story characters and events from both e-books and traditional books. However, those who were read the e-book did more poorly than those who were read the traditional book on story content questions (e.g., "Did Dora and Boots climb Tall Mountain or Short Mountain?") and on a task requiring children to sequence story events. Krcmar and Cingel (2014) reported similar findings: preschoolers' comprehension was significantly better after reading a traditional book than after reading an e-book (see also de Jong & Bus, 2002; Ross, Pye, & Randell, 2016). However, other studies show few differences in comprehension between the two mediums (e.g., De Jong & Bus, 2004; Lauricella, Barr, & Calvert, 2014). Similarly, Willoughby, Evans, and Nowak (2015) found that e-books have a similar effect to traditional books on emergent literacy skills. That is, children who received training with an alphabet print book and an alphabet e-book gained a similar amount in alphabetic knowledge. Furthermore, some studies suggest that while enhanced or interactive e-books may be distracting and reduce comprehension, basic e-books do not reduce comprehension relative to traditional books (Chiong, Ree, Takeuchi, & Erickson, 2012; Hassinger-Das et al., 2017). E-books can also have positive effects, such as more child-initiated discourse and greater responsiveness to maternal talk (Korat & Or, 2010). Notably, much of this research has been conducted in U.S. contexts, and further research is needed to extend these findings to international settings.

How might children's understanding of an e-book using audionarration compare to reading with a parent? Research suggests that parents' behavior beyond simply reading the words on the page contributes to children's comprehension during shared book reading (Whitehurst et al., 1988). During shared book reading, parents may engage in 'dialogic reading' practices, including strategies to encourage a child to actively engage with the book's content. For example, parents offer praise, explanations, and corrections, build on the child's interests, and scaffold children's level of understanding by slowly increasing the complexity of the extratextual talk (Arnold & Whitehurst, 1994; Whitehurst et al., 1988; Zevenbergen & Whitehurst, 2003). Studies with children from a variety of ages and diverse backgrounds have found that dialogic reading is effective for supporting children's language and literacy development (e.g., Fielding-Barnsley & Purdie, 2003; Wasik & Bond, 2001; Zevenbergen & Whitehurst, 2003). For example, one study found that preschoolers learned more words from a book when adults read to them using dialogic reading practices compared to a more text-based reading approach (Hargrave & Sénéchal, 2000).

Dialogic reading strategies align with research in the learning sciences that identify four ideal properties that foster optimal learning (Hirsh-Pasek et al., 2015). Although the term *learning* typically refers to a changed knowledge state, story comprehension is an important early educational activity, and storybook reading promotes later literacy and academic skills. Principles from the learning sciences may also apply to and foster story comprehension during e-book reading (National Early Literacy Panel, 2009). We use this learning sciences approach as a theoretical framework to guide this study. The first property is that children learn best when they are active rather than passive. During dialogic reading, adults encourage children to ask questions and make predictions about the story, promoting a "minds-on" approach in which the child has to mentally manipulate ideas and engage prior knowledge. Second, children learn best when they are engaged rather than distracted. Dialogic reading encourages engagement when parents help focus children's attention by pointing out different aspects of the story. Parents may also adapt their reading speed and tone to increase their child's attention if necessary. Third, children learn best in meaningful contexts. When parents connect something in the story to their children's lives – for example, noting that the train in the book is like the one they saw on vacation last week – they encourage children to link the book's content to experiences they have had. These "distancing prompts" are related to children's story comprehension (Hassinger-Das et al., 2017).

Finally, children learn best from social interaction, which is the core of dialogic reading. Shared book-reading is inherently social: simply having an adult present may encourage children to pay more attention and even process the content of the story in a deeper way. When adults respond to children's queries and comments, and when they modulate the complexity of questions and explanations to the child's cognitive level, children profit (Blewitt, Rump, Shealy, & Cook, 2009). These examples suggest that shared book reading might engender a more active, engaged, meaningful, and socially interactive context, which could lead to better comprehension and learning than when a child independently listens to an audio e-book.

Shared e-book reading is an example of joint media engagement, in which parents and children engage with media together (Takeuchi et al., 2011). Some studies have suggested that children benefit more from educational media when a parent or another adult engages with them (Lauricella et al., 2016). Findings from educational television viewing support the importance of parental engagement. Strouse, O'Doherty, and Troseth (2013) trained parents to use dialogic questioning techniques during videos. Children of questioning parents learned more vocabulary than children whose parents did not receive the training (Strouse et al., 2013). Strouse et al. (2013) also showed another group of children a video that included an actress engaging in dialogic questioning. Although children learned compared to a control group, they did not learn as much as when a parent used the dialogic techniques. In another study, Strouse and Troseth (2014) found that when parents watching a video with their child made connections between objects in the video and their real life counterparts, children were more likely to demonstrate transfer of the new words from the video to reality. This type of joint media engagement with e-books may also promote comprehension and learning relative to children's use of e-books independently.

On the other hand, e-books may be exciting and engaging for children, leading to more attention and perhaps even better comprehension than when reading with a parent. Indeed, one study found that children's visual attention to a computer storybook was higher than visual attention to a traditional book (Lauricella et al., 2014), and another found that children's "persistence" was higher for an e-book, based on indicators such as points to the book, turning pages, positive commenting, and asking questions (Moody, Justice, & Cabell, 2010). A more recent study comparing reading an e-book with audio narration to reading a traditional book with an