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The Interactive Role of Shared Reading and Child Participation in Cognitive Development

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Abstract

Shared reading is a form of reading with children that includes interactive and engaging elements including the use of questions, gestures, and conversation. Both human and electronic readers can engage in shared reading with children. Techniques used by human readers and features used with moderation in electronic readers like e-books and conversational assistants (CAs) are positively correlated with cognitive development outcomes including increased vocabulary and language development as well as improved story comprehension skills. Additionally, child participation is a key factor in achieving the benefits of shared reading with either human or electronic readers. With these findings in mind, this literature review suggests that future research should focus on the strengths and weaknesses of human and electronic readers to better develop intervention programs designed to target specific cognitive development outcomes.

Shared reading enhances a child's cognitive development in multiple domains (Câmara-Costa et al., 2021; Clemens & Kegel, 2021; Demir-Lira et al., 2019; Dowdall et al., 2020; Muhinyi & Rowe, 2019; Savva et al., 2021; Torr, 2019; Weisleder et al., 2018). Shared read-

ing is a dialog-based method of reading with a child. It includes a variety of interactions between the reader and child including reading out loud and discussing the definition of new words and the meaning of pictures (Torr, 2019). Shared reading also includes the reader asking open-ended questions, gesturing to elements of the book, and relating a part or general principle of the book to the child's life (Muhinyi & Rowe, 2019; Dowdall et al., 2020). These practices create opportunities for dialog with children that include more advanced language skills than other activities children and adults engage in like mealtimes or dramatic play. Parents create these opportunities as they elicit vocal responses, even from non-verbal infants, and engage in these various dialog-based reading strategies that are part of shared reading (Clemens & Kegel, 2021; Dowdall et al., 2020; Savva et al., 2021). Shared reading is a powerful tool for parents as they support a child in their cognitive development.

Although some parents may feel more equipped for shared reading than other parents, shared reading provides benefits for children starting in infancy regardless of their parents' characteristics. Specifically, research has found benefits for children as young as 9 months

old (Clemens & Kegel, 2021; Savva et al., 2021), showing the highest impact on language development in younger children of preschool age or below (Dowdall et al., 2020). Resources for shared reading are limited for people in a low socioeconomic status (SES), but research shows shared reading has the same benefits for families from all SESs (Dowdall et al., 2020; Savva et al., 2021; Weisleder et al., 2018). Parents can feel added confidence knowing that adults of various SESs and nationalities (Dowdall et al., 2020; Saava et al., 2021; Weisleder et al., 2018), as well as education levels can engage in effective shared reading with their children despite the possible lack of resources (Dowdall et al., 2020). The dialog-based principles that make up shared reading are beneficial to children's language and literacy development regardless of parental abilities or age of the child.

Shared reading can be done between a child and a human or human substitute, such as an electronic book (Savva et al., 2021; Xu et al., 2021). Recent technological developments have made electronic books, or e-books, along with conversational agents (CAs) like Google Assistant and Alexa more accessible to children. E-books and CAs created with the ability to engage in shared reading have any of a variety or combination of features including narration, language development games, the ability to adapt the language used depending on the child's language level, human avatars, highlighting abilities, and animations (Savva et

al., 2021; Xu et al., 2021). Some e-books mimic physical book characteristics by having pages that are animated to look like they are turning (Savva et al., 2021). These features help electronic sources create a shared reading environment despite the lack of another human's presence with the child.

Although many factors influence a child's cognitive development, shared reading with both human and electronic readers can have a large impacts on a child's language development and story comprehension because each type of reader encourages the child to verbally interact with the reader in both similar and unique ways. This literature review discusses the different and effective ways humans and electronic readers engage children in shared reading to contribute to increases in cognitive outcomes; this review then discusses the role children's involvement plays in the development of these outcomes.

Types of Shared Readers

Shared reading currently exists with two types of readers: human and electronic. One key aspect of shared reading is dialog between the child and reader that originates while reading the book. The ways shared reading can be done within each type of reader creates different kinds of dialog and levels of cognitive development benefits for children. Human and electronic readers engage children in both similar and different

ways during shared reading to produce developmental outcomes.

Human Readers

Human readers help increase a child's language development through various methods of conversation during shared reading. Gesturing and labeling parts of the pictures in a book is one way human readers can involve a child during shared reading (Muhinyi & Rowe, 2019). Another effective method human readers use to engage a child in dialog is asking the child questions about the book (Eggleston et al., 2021; Muhinyi & Rowe, 2019; Saava et al., 2021). Human readers also create conversation opportunities that foster positive developmental growth by connecting parts of the book to the child's life (Eggleston et al., 2021; Muhinyi & Rowe, 2019; Saava et al., 2021). Parents or other human readers can connect images like pets to the child's own pet, or they can teach the definition of the word angry by connecting the word to an experience where the child felt angry. These basic shared reading methods employed by human readers to engage a child in conversation during story time benefit a child's cognitive development.

These interactive elements of shared reading employed by human readers create opportunities for cognitive development for the participating child. Gesturing and labeling parts of the pictures in a book have been shown to improve a child's vocabulary development (Muhinyi

& Rowe, 2019). Perhaps this benefit originates from a child hearing a word while a human reader gestures to the word on the page, helping them learn new words when reading. Asking questions is another method that benefits language development, and studies show there are benefits from this technique even for infants who cannot talk yet (Muhinyi & Rowe, 2019). A third way human readers create enriching opportunities that benefit cognitive development during shared reading is by connecting parts of the book to the child's life, which leads to increases in story comprehension and language development (Eggleston et al., 2021; Muhinyi & Rowe, 2019; Saava et al., 2021). One of the ways human readers accomplish these cognitive benefits is through engaging the child in meaningful conversations during reading (Dowdall et al., 2020). As children are given opportunities to connect the story to their own life, they are more capable of comprehending the story as a whole. Overall, human readers employ several methods that can create developmentally enriching opportunities for children during shared reading.

Electronic Readers

Electronic readers also engage children in several ways that can increase the child's language development. There are two types of electronic readers that will be discussed here: e-books and CAs.

E-books: Features and Outcomes

E-books have many features that can help a child's cognitive development. These e-books engage chil-

dren in conversation in ways similar to human readers by having features that highlight words on the screen (O'Toole & Kannass, 2018) and ask questions (Saava et al., 2021). By using these tools to draw the child's attention to specific parts of the e-book, electronic features help the child engage with the book. Some e-books can also have human avatars, games, and hotspots, which are places the child can touch the screen to learn more about a word or access other features of the e-book, which can encourage the child's participation with the story (Saava et al., 2021). With all of these features, it is important to note that e-books' hinder the realization of cognitive benefits that can come from shared reading when there are too many features present at once (Saava et al., 2021) or the features themselves are too distracting (Dore et al., 2018). Moderating the distraction of excessive electronic features with e-books can foster an environment where positive cognitive development can occur.

One domain of cognitive development that is enhanced through shared reading with e-books is a child's language development. Specifically, children experience an increase in expressive vocabulary, which increases more when engaging with e-books than human readers (O'Toole & Kannass, 2018; Saava et al., 2021). Expressive language is considered one of the hardest forms of language to develop and includes a child's ability to fully define a word (Saava et al., 2021). This better expressive vocabulary development from e-books may

be attributed to the e-book's features that allow a child to see an unfamiliar word, select that word, and learn its definition. E-books may provide definitions that are different from the wording human readers would use with the child. In this way, e-books may introduce children to more new vocabulary and language structures than they are normally exposed to during shared reading with human readers. Additionally, e-books may contribute to increased expressive language because they can repeat definitions as many times as the child would like, whereas human readers may skip over a repeated request for a definition. Whatever the reason, research shows that children generally develop more expressive vocabulary when reading with e-books than with human readers (O'Toole & Kannass, 2018; Saava et al., 2021).

In addition to language development, another element of cognitive development that e-books may contribute to is a child's ability to comprehend the story. Currently, research is conflicted on the relationship between story comprehension skills and e-book readers when compared to the story comprehension skills of children who read with human readers (Dore et al., 2018; Saava et al., 2021; Xu et al., 2021). Several studies show there is little to no significant difference between the story comprehension skills resulting from reading with human versus electronic readers (O'Toole & Kannass, 2018; Saava et al., 2021, Xu et al., 2021). A contrasting study shows a child's story comprehension

is less when reading with an electronic reader compared to a human reader (Dore et al., 2018). Perhaps this decrease in story comprehension with e-books compared to human readers may result from e-books having too many features; these excess features may distract the child from engaging with the story. When these features are reduced in number, children may have better levels of story comprehension (Saava et al., 2021). Regardless of the differences in research, the studies generally show some level of increased story comprehension with either type of reader (Dore et al., 2018; O'Toole & Kannass, 2018; Saava et al., 2021; Xu et al., 2021). Overall, e-books have the potential to provide enriching language and story comprehension capabilities for children when created with balanced and engaging features.

CAs: Features and Outcomes

Another technological advancement in recent years that has the capacity to create a shared reading environment with children is the development of CAs like Alexa or Google Assistant, which lack a visual component such as not having a screen or a physical body, but have auditory components like a narrator that asks questions (Xu et al., 2021). Due to the recent development of CAs, there is limited research on the topic of CAs and shared reading. Despite this limited research, some important findings from a recent study are worth noting. CAs have many of the same features of e-books including games, narration, and the ability

to ask questions (Xu et al., 2021). In some cases, CAs can also adjust their language to adapt to the child's language level (Xu et al., 2021). However, with the lack of a human body or representation of a body in avatar form, CAs lack the ability to gesture or highlight parts of the book to children (Xu et al., 2021). Despite not having a physical presence to gesture with, children seem to have the same language development benefits and story comprehension skills during shared reading with CAs as they do with human readers (Xu et al., 2021). Although CAs do not have a physical presence like human readers do, both CAs and human readers share auditory features. Perhaps these auditory elements shared in both human readers and CAs play a central role in the positive benefits for cognitive development, suggesting that conversational elements may be more beneficial to these outcomes than other elements like physical gesturing since CAs have positive outcomes with only auditory features. When considering these auditory features, it is important to note that human readers tend to elicit more advanced responses to their questions from children than CAs, which may have implications for the strengths of using a human reader in shared reading (Xu et al., 2021). More research should be done in this area to better understand what elements of shared reading are benefitting certain developmental outcomes in children. Human readers, e-books, and CAs provide many opportunities

to engage children in shared reading, which increases their language development.

Child Participation

One of the key elements to the success of shared reading that is consistent across both human and electronic readers is the child's participation with the reader. Children can be active participants as they engage in conversation and attend to the book, providing specific cognitive outcomes. The child's interest encourages increased participation in shared reading and can act as a mediator between the quality of shared reading and their cognitive development.

Conversations

A child's interaction with either humans or electronic readers is essential for the realization of positive cognitive outcomes including increased vocabulary, language skills, and story comprehension. One way that readers can involve a child in shared reading is through creating conversations that elicit verbal participation from the child (Dowdall et al., 2020; Eggleston et al., 2021). This verbal engagement from the child helps create conversation patterns between the reader and child such as asking, answering, and further discussing questions; these conversation patterns can begin even with infants whose readers respond to the infant's babbling with an answer to a question or by asking the infant another question (Clemens & Kegel, 2021; Muhinyi & Rowe, 2019; Savva et al., 2021). Through the

encouragement of verbal interaction in conversations during shared reading, human and electronic readers help children participate in the story in ways that benefit their conversation skills and language development.

As children actively participate in conversations during shared reading, they experience increases in multiple domains of their cognitive development. Shared reading has been shown to use the highest forms of language interaction between adult and child than any other form of parent-child interaction during a normal day, which benefits language development (Clemens & Kegel, 2021; Torr, 2019). Perhaps as a result of hearing more advanced language, shared reading gives children the opportunity to develop increased language skills and use more advanced language. Other domains of cognitive development that are impacted by a child's verbal participation during shared reading include correlations with future language comprehension levels (Clemens & Kegel, 2021; Demir-Lira et al., 2019) as well as increased story comprehension (Dore et al., 2018; Saava et al., 2021). As children actively converse with their readers, they are practicing language skills and interacting with elements of the story, which may help them understand new language and the story better. Another developmental outcome from a child's verbal participation during shared reading for both nonverbal infants and verbal children is developing increased expressive language (Dowdall et al., 2020; Muhinyi & Rowe, 2019; Savva et al., 2021). As children engage in

conversations with their reader during shared reading, they can develop stronger communication patterns, increased language skills, and more expressive vocabulary.

Attention

Another way children can actively participate in shared reading is through their attention to the book. A child's attention to the story can help them understand and process the story better (Dore et al., 2018; O'Toole & Kannass, 2018). Studies on e-books show that children seem to be more engaged with and pay more attention to e-books; researchers speculate that this greater attention to e-books may be due to the novelty of electronics to young children when compared with a printed book (Dore et al., 2018; Eggleston et al., 2021; O'Toole & Kannass, 2018). Perhaps as a child has more exposure to electronic tools, this difference in attention to e-books more than to human readers will decrease. Despite this current difference, children can actively attend to books with either type of reader.

As children actively attend to the book during shared reading, they can experience developmental outcomes in relation to their cognitive development. One research study shows that a child's attention to the book helps them better understand the vocabulary with human readers and experience increased story comprehension with certain types of electronic readers (O'Toole & Kannass, 2018). Research also shows that a child's

ability to actively engage themselves during shared reading has large impacts on their language development in general (Clemens & Kegel, 2021). Both types of readers have the potential to help children attend to the book, helping them develop increased language skills and story comprehension. Children's active participation through attention to the book during shared reading is key in receiving these benefits to cognitive development.

Interest

A child's interest promotes greater participation in shared reading and thus acts as a mediator between the quality of shared reading and their developmental outcomes. As children show increased interest during shared reading, they tend to participate more actively through verbal interaction (Deckner et al., 2006; Malin et al., 2014) and attention to the book (Malin et al., 2014). Increased interest is correlated with developmental outcomes, specifically increased expressive and receptive language. Receptive language is a person's ability to comprehend language. One research study shows that a child's interest can act as a mediator in the positive relationship between the quality of shared reading and a child's expressive and receptive language (Malin et al., 2014; Muhinyi & Rowe, 2019). Children can help create positive outcomes during

shared reading as they express interest and actively participate.

The mediating role of interest and the role of active participation during shared reading emphasize a key principle that children's participation matters in their cognitive development. Although electronic and human readers have different approaches, they both employ methods that encourage children to engage in various ways during shared reading. The similar and unique strategies employed by both human and electronic readers to increase a child's participation and interest can lead to benefits to the child's cognitive development because of the positive relationship between a child's participation and their cognitive development during shared reading.

Future Research

Looking forward, more research should be done comparing story comprehension skills across human and electronic readers because of current conflicts in the research. Knowing which reader has a greater impact on story comprehension can aid in the future development of literacy intervention programs. Caregivers and teachers would be better informed on the benefits of both human and electronic readers and could make more informed decisions about which form of shared reading is best for each child depending on their literary and general cognitive development needs. Similar to this area of research, more research should be

done with CAs and their effects on cognitive development in comparison to human and even e-book readers. This research is important as many households today have CAs (Xu et al., 2021) and children will likely have increased exposure to their features. Knowing the benefits or disadvantages of CAs compared to other electronic or human readers will allow parents to understand which reading method, or combination of methods, is best for their child at home. Applying the current and future research implications about shared reading, child participation, and cognitive development will help create a more developmentally enriching environment for children during their years of language development.

Conclusion

Human and electronic readers have features that can effectively engage a child during shared reading that improves their cognitive development (Clemens & Kegel, 2021; Dore et al., 2018; Dowdall et al., 2020; Muhinyi & Rowe, 2019; Savva et al., 2021; Xu et al., 2021). Each reader has similar and unique features that impact the child's language development and story comprehension, with research showing strengths for both types of readers. Human and electronic readers provide features that create an environment where children learn new words (Câmara-Costa, 2021; Dowdall et al., 2020; Saava et al., 2021) and engage in conversa-

tions with high levels of language interaction (Clemens & Kegel, 2021; Xu et al., 2021). Increased vocabulary and language skills are important benefits to a child's cognitive development. When analyzing similarities and differences in developmental outcomes between human and electronic readers, researchers have found that both types can improve a child's story comprehension through the use of shared reading techniques; however, the research is mixed on which type of reader has a greater impact on story comprehension (Dore et al., 2018; O'Toole & Kannass, 2018; Saava et al., 2021, Xu et al., 2021). Other areas of cognitive development that benefit from shared reading include expressive language (Saava et al., 2021) and receptive language, which, along with other cognitive benefits, are dependent on a child's level of active participation and inter-

est during shared reading (Dowdall et al., 2020; Muhinyi & Rowe, 2019).

Looking forward, researchers should further study the effects of the type of reader on story comprehension as the current research conflicts in this area. Additional research should also be focused on the features of CAs and how they impact a child's cognitive development. These areas of research can help create better education and intervention programs that can more effectively target specific developmental outcomes using specific types of readers. Both electronic and human readers can create shared reading environments that benefit a child's cognitive development in unique, but important ways.

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