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Significance of Reading Instructions for Language Improvement in Children with Down Syndrome

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ABSTRACT

This paper explores the significance of reading instructions for language improvement in children with Down syndrome (DS). Reading is not only a foundational literacy skill but also a pathway to oral language development in children with DS, who often experience deficits in phonological awareness (PA) and oral language acquisition. The objectives of this review were to: (1) identify the constraints faced by children with DS in their reading and language development, and (2) examine the most effective instructional strategies to improve their reading comprehension and language skills. Secondary data was collected through a literature review of peer-reviewed journal articles and research studies from Macquarie University library and Google Scholar databases. Findings indicate that constraints include poor phonological development, deficits in expressive language, and lack of teacher preparedness. However, targeted phonics-based instruction, silent reading, family-mediated interventions, and vocabulary development strategies have proven effective in enhancing PA, reading comprehension, and oral language outcomes. The paper concludes that while progress has been made in developing evidence-based interventions, further longitudinal and cross-cultural research is required to strengthen literacy practices for children with DS.

Keywords: Down syndrome, Reading instruction, Language development, Phonological awareness.

INTRODUCTION

Reading is a crucial aspect of human communication and as Schnorr (2011) claims reading engagement allows for a wider and more profound understanding of the world we live in (as cited in Cologon, 2013, p. 132). As the writer asserts several elements are significant to the development of reading. These include letter and word recognition, the decoding of unfamiliar words, awareness of letter-sound rules, reading for meaning and reading comprehension skills. It is through a combination of these features that the reading systems are established (Schnorr, 2011 as cited in Cologon, 2013 p. 132). The reading system can be described through dual-route theory of reading (Coltheart, 2006).

Language acquisition and reading can be regarded as two topics that are strongly intertwined in children's development. For the majority of children, the development of speaking skills commences earlier than reading skills and thus, the relationship between language improvement and reading only begins to be reciprocal once reading development starts (Cologon, 2013, p. 133). Nonetheless, Cologon (2013) states that for many children with Down syndrome reading can create a different path to oral language or language development through which children begin to read words as opposed to ascertaining them orally and thus those words start to appear in their expressive vocabulary (p. 133).

It has been suggested that Down Syndrome (DS) is the most prevalent biological cause of intellectual disability; it affects thousands of lives in the United Kingdom (Laws, Brown & Main, 2016). A majority of the children with DS become skilled at reading despite deficiencies in oral language. With regards to reading comprehension, Cain and Oakhill (2006, 2007 as cited in Laws, Brown & Main, 2016) put forward the notion that both printed word recognition and listening comprehension skills can contribute to the success of reading

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comprehension as these abilities occupy complex cognitive-linguistic and meta-linguistic skills. However, because of phonological impairments, there is a chance that readers with DS might depend heavily on visual processing to connect printed words straight to meaning (Laws, Brown & Main, 2016). In addition to these, Cologon, Cupples & Wyver (2011) comment that children with DS primarily are given reading instructions founded on sight-word or whole-word approach which requires training to identify the individual words presented as wholes (p. 111). Although there still exist uncertainties in relation to the link between phonics instruction and its benefits for children with Down syndrome, Cologon, Cupples and Wyver (2011) state that phonics instructions can lead improvements in PA, word reading ability for trained words and significant developments in the capability to read nonwords and words (p. 114).

It is in light of this that this review paper aims to discuss the significance of reading instructions for language improvement in children with Down syndrome. In relation to the topic, the introductory part of this paper provides some background to the research and introduces the two research questions that the discussion is based on. The paper also provides insight into the method utilized in selecting the articles. Subsequently, it will explore the findings from the articles. Finally, the conclusion that arrived from the discussion will be presented.

The Current Review

In this current review paper two research questions were addressed:

1. What constraints are associated with the topic of children with Down syndrome in relation to their reading and language development?

2. What are the most prominent reading instruction strategies that can be used to help children with Down syndrome to improve their reading comprehension?

METHODOLOGY

This study employed a qualitative secondary research design based on a systematic literature review. Data sources included peer-reviewed journal articles accessed through the Macquarie University library and Google Scholar. Keywords used in the search included “Down syndrome,” “reading instruction,” and “language development.”

Data collection process: Articles were screened for relevance, with priority given to studies directly addressing the relationship between reading interventions and language development in children with DS. A total of nine key studies were analyzed.

Analysis methods: Content analysis was employed to extract themes related to (1) constraints in reading and language development, and (2) effective instructional strategies. Findings were synthesized under these thematic areas.

RESULTS AND DISCUSSION

In order to have a better understanding, the results are presented and discussed under the two main research questions that were put forward for the purpose of this review paper.

What constraints are associated with the topic of children with Down syndrome in relation to their reading and language development?

The topic of reading development in relation to children with disabilities, especially children with Down syndrome has been debated for decades. Results obtained by Cossu, Rossini and Marshall (1993) in their research on phonemic awareness (PA) and literacy in children with Down syndrome became controversial. According to the researchers, phonological failure in Down syndrome children has not prevented them from obtaining reading skills compared to the levels of normal children. However, they would have obtained the

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skill faster if they had possessed sufficient PA. The authors state that the manner in which children with Down syndrome learn to read is different in comparison to normal children and thus, it could be assumed that their method of learning does not entail phonetic segmentation ([Cossu et al., 1993]). Morton and Frith (1993) put forward contrasting views stating that Cossu et al. (1993) should not make such claims as their research was based only on one particular group of children. The fact that two groups of researchers claim different views on the similar topic makes it controversial and thus can be deemed as a constraint since alternate approaches on reading development in children with DS have been theorized with more accuracy and representation.

The convergent skills model of reading development (Vellutino, Tumner, Jaccard, & Chen, 2007) illustrates the dissimilarities in the relational contribution of word identification and language understanding to reading comprehension at diverse levels of reading development (as cited in Laws, Brown & Main, 2016). For the initial readers, skills of word identification and phonological abilities are much more significant. Laws, Brown and Main (2016) when referring to the children with DS in the United Kingdom state that while they learn to recognize the words in schools, they find it difficult to complete comprehension tests especially when they are required to respond verbally. The fact that the oral language skills of the readers of DS are generally lower indicates that listening comprehension is considered as one of the major obstacles to reading in children with DS (Laws, Brown & Main, 2016). The language impairments in DS encompass the features of deficiencies in phonology and comprehensive vocabulary knowledge. Most children with DS can also be categorized as having poor comprehension skills and reading accuracy especially between the ages of four and a half to fourteen. In addition, children with DS also have deficiencies in phonological improvement resulting in difficulties in producing speech and insufficient PA (Laws, Brown & Main, 2016).

Cologon (2013) argues that one of the other constraints that children with DS encounter is that there are no teachers who possess satisfactory information about effective literacy instruction to help them (p. 131). As he points out the majority of parents lack information on learning abilities and sometimes incorrect and contradictory information regarding literacy instruction for children with DS. With reference to a research carried out in New South Wales, Australia containing 188 pre-service early childhood teachers, Cologon (2013) claims that teachers lacked both knowledge and confidence in teaching children with disabilities (p. 131). It is being discovered that children with DS also have a distinct drawback in completing tasks that demand them to exercise and remember auditory information. It has been revealed that children with DS encounter this issue more compared to children with other intellectual disabilities (Cupples & Iacono, 2002, p. 550). As Cupples & Iacono (2002) mention, auditory and memory deficiencies can be a clear limitation if reading instruction is centered on improving phonic skills such as phoneme blending (p. 550). In topics concerning language and speech, children with DS show significant weakness in expressive language and their communication skills do not fully develop until later in life (Lemons, King, Davidson, Puranik, Al Otaiba, & Fidler, 2018). For a lot of children with DS, intelligibility is diminished due to difficulty in speech articulation. These delays indicate that reading instruction does not have to include spoken response in order to be understood ([Lemons et al., 2018]).

What are the most prominent reading instruction strategies that can be used to help children with Down syndrome to improve their reading comprehension/language improvement?

In relation to the reading strategies that could be utilized to help children with DS to improve language skills, Cologon, Cupples and Wyver (2011) assert that targeted reading instruction can be enabled to help develop PA, thereby improving reading ability (p. 125). They arrived at this assertion after examining the results of their study on the effects of targeted reading instruction on children with DS. The participants of the study displayed improved development of PA, word comprehension, phonic decoding skills, and short-passage comprehension skills after ten sessions of reading interventions demonstrating that targeted reading instructions are indeed effective (Cologon, Cupples & Wyver, 2011, p. 125). The authors further comment on the results of the study by stating that the outcome of the reading intervention revealed that using targeted instruction to improve PA and phonic decoding skills can lead to language development in children with DS. In addition, evidence of their study (Cologon, Cupples & Wyver, 2011) allowed them to realize that children with DS can gain from the introduction to phonics instruction before being presented with a sight-word vocabulary. After carrying out the study Cologon, Cupples and Wyver (2011) noticed that all the participants

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displayed noteworthy developments in PA which suggested that children with DS can use phonics-based instruction before the introduction of a significant sight-word vocabulary (p. 126). The writers also state that by utilizing effective targeted reading instructions, children with DS have the possibility of improving alphabetic reading skills and higher levels of PA that can subsequently help in the development of their phonic decoding abilities (Cologon, Cupples & Wyver, 2011, p. 126).

The method of silent reading is also considered productive in facilitating better comprehension skills than oral reading for children with DS because prominence is placed on pronunciation rather than the meaning in oral reading (Halladay, 2012 as cited in Cologon, 2013, p. 134). Cologon (2013) declares that activities based on silent reading would be helpful for children with DS and this method could aid in both reading and speech development (p.134). In advocating the method of silent reading Cologon (2013) put forward several strategies that could be utilized in a language development class for children with DS. One prominent strategy would be to encourage students to use non-verbal communication in class by introducing them to sign language and integrate signs for keywords in daily activities. Another strategy would be to use card games in class such as 'memory' with word cards or letters/letter sounds or building sentence with words/letters. Cologon (2013) also mentions that teachers should attempt to build written stories as visual prompts when children want to share their experiences with their parents or when they want to share their home experiences in school (p. 134). In relation to using visual prompts in class, Cologon (2013) states that visual information could be linked to auditory information. Reading instruction aiming phonological and phoneme awareness and phonic decoding skills must connect to support learning. Moreover, learning would be more effective if the teachers could link learning experiences to known concepts. They could do so by linking the words to meaning when focusing on phonological and phoneme awareness as it will help holistic literacy development. Research conducted on children with DS displayed that they have the ability to understand what they read (Cologon, 2013, p. 142). Thus, Cologon (2013) claims that children with DS need continuous help in order to develop their reading and listening comprehension. She also noted that teachers need to carefully reflect on the approach they take when engaging with students in terms of reading comprehension. Engaging through meaningful experiences, teaching question words such as who, what, how, where, when, and why and making links to meaning are a few of the strategies that teachers can employ in class (Cologon, 2013, p. 142).

Cologon (2013) also acknowledges the significant role of PA in developing reading and language skills in children with DS. Referring to several reviews (National Inquiry into the Teaching of Literacy in Australia (DEST, 2005), USA (NICHHD, 2000) and Rose (2006)) claims that including instructions that focuses on helping children to improve PA and phonic decoding skills is necessary for both reading and language development (Cologon, 2013, p. 135). Conveying a similar notion Cupples & Iacono (2002) state that clear instruction on PA can enable children with DS in improving reading and language developments (p. 552).

Cupples and Iacono (2002) assert that children with DS can be taught to read monosyllabic English words with regular spelling-to-sound correspondences by utilizing a structured intervention program which is based on learning to pronounce words as wholes, combine words onsets and rimes (p. 568). Furthermore, they state that instruction in alphabetic reading can improve PA skills in children with DS (Cupples & Iacono, 2002, p. 568).

O'Toole, Lee, Gibbon, van Bysterveldt, Conway and Hart (2018) claim that individualized vocabulary and language targeting should be incorporated into interventions mainly due to the fact that parents of children with DS might need advice in choosing developmentally proper target vocabulary for their children as well as training on how to use them. They mention that the majority of language interventions come from mainstream Western cultures where parents are extremely motivated to help their children with language development. In this case, family members should be included in the interventions and guide them on how to play and interact with their children and should take into consideration how language goals could be based on what is significant to the family (O'[Toole et al., 2018]).

It has been determined that the best method for teaching children with DS new vocabulary is to link a word with a recognizable and imageable object (Lemons, King, Davidson, Puranik, Al Otaiba, Fulmer, & Fidler, 2017). Lemons et al. (2017) state that interventionists should be careful when providing suitable models for

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correct articulation and should not punish students for any articulation errors. In addition instructions should be given to show the meanings of new words by using concrete representation and letting students practice reading in meaningful context as a way to improve their language development (p. 70). Providing visual representation of the verbal information has been considered significant and useful to children with DS as opposed to training them to orally rehearse the information (Jarrold, Baddeley, & Phillips, 1999 as cited in [Lemons et al., 2017]).

Studies published from 2020 onwards provide new insights into reading instruction for children with DS. Næss et al. (2020) conducted a systematic review and meta-analysis and concluded that children with DS benefit significantly from targeted language interventions, particularly when phonological awareness and reading activities are integrated. This study highlights that combining reading-focused instruction with broader language intervention yields stronger improvements than isolated approaches.

Alt, Hogan, and Green (2021) examined reading and listening comprehension in individuals with DS. Their findings emphasize that decoding and vocabulary knowledge are critical predictors of comprehension. The study suggests that reading interventions must incorporate explicit vocabulary teaching and listening comprehension tasks, reinforcing the reciprocal relationship between oral and written language. Morra et al. (2022) reviewed intervention studies and confirmed that phonics-based approaches, phonological awareness activities, and shared reading consistently improve language outcomes in DS populations. Their analysis provides further evidence that multi-component interventions addressing decoding and meaning simultaneously are most effective.

Wood et al. (2022) piloted the ABRACADABRA literacy program, a technology-supported intervention that combines phonics, fluency, and comprehension. The study found promising improvements in early literacy skills among children with DS, demonstrating the potential of digital tools to make literacy interventions more engaging and accessible. Jeremić et al. (2023) explored shared book reading as a language intervention. Their mini-review demonstrates that parent–child shared reading fosters vocabulary growth, comprehension, and social communication skills. They emphasize the role of parents as co-educators and recommend structured training for parents to maximize outcomes.

Foster et al. (2024) investigated retrieval practice in word learning for children with DS. Results showed that incorporating recall activities into vocabulary instruction significantly boosts retention and generalization. This suggests that literacy interventions should go beyond recognition to include active retrieval exercises. Burgoyne et al. (2023) tested the feasibility of the PACT-DS program, a parent-delivered early language intervention. Findings reveal that parent-mediated, book-based language support is not only practical but also effective, highlighting the importance of empowering families to contribute to their child's literacy development. Pagnamenta et al. (2022, 2024) evaluated the Digital Down Syndrome LanguagePlus (DSL+) program, a school-delivered, vocabulary-focused intervention. Their results show that digital multimedia materials integrated into reading instruction significantly enhance vocabulary acquisition and oral language skills, offering scalable solutions for classrooms.

Hustad et al. (2024) reported on a case study using augmentative and alternative communication (AAC) systems to embed decoding instruction. The study demonstrates that children with DS can benefit from literacy-focused AAC features, reinforcing the idea that reading instruction can be integrated with communication support technologies.

Together, these recent studies confirm that reading instruction for children with DS must be multi-faceted, integrating phonics, vocabulary, comprehension, technology, parental involvement, and retrieval-based learning. They also demonstrate the potential of digital and AAC tools to broaden the accessibility and impact of interventions.

CONCLUSION

This review demonstrates that while children with DS face persistent constraints, including deficits in

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phonological awareness, expressive language, and comprehension, along with insufficient teacher preparation, recent research confirms that these challenges can be effectively mitigated through targeted, multi-faceted reading instruction. Classic studies emphasized the role of phonics, vocabulary, and comprehension-focused approaches, while newer evidence reinforces these findings and expands on them by introducing technology-based tools, retrieval-based strategies, and parent-mediated interventions. Shared book reading and vocabulary- focused activities have been shown to strengthen both oral and written language, while digital and AAC- supported programs extend literacy opportunities to diverse learning contexts. Taken together, the evidence indicates that effective reading instruction for children with DS is not a singular method but a layered approach that combines phonological training, visual supports, comprehension strategies, and family involvement. Future progress will depend on refining these practices, ensuring they are culturally adaptable, and embedding them into inclusive educational frameworks.

RECOMMENDATIONS

Practical Implications for Educators: Teacher training should prioritize evidence-based, multi-component literacy instruction for children with DS. These include explicit phonics and vocabulary teaching, comprehension-focused activities, use of visual and retrieval-based strategies, and integration of digital tools.

Policy Suggestions: Educational policies should guarantee access to specialized literacy interventions, technology-based supports, and inclusive resources. Schools should also promote structured opportunities for parent engagement in reading instruction.

Future Research Directions: Longitudinal studies are needed to examine the sustained effects of literacy interventions across different developmental stages. Future research should also investigate the adaptability of interventions in cross-cultural contexts, the integration of AAC features for literacy development, and the long- term impact of digital and family-mediated programs on language and reading outcomes.

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