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Review Article

Dyslexia misperceptions: Ten things to know

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Abstract

The phonological processing model of reading defines reading as sounding out words. From this perspective, dyslexia is a deficit as the ability to sound out words or to process phonological data. However, this model does not account for important data. The psycholinguist model of reading accounts for this data. Here reading is defined as creating meaning with print. From this perspective, dyslexia is a deficit in the use or coordination of strategies used to create meaning with print. From this perspective, dyslexia is not a brain disorder. Students with dyslexia need a balanced approach to reading instruction using a variety of research-based strategies. Interventions should be based on classroom instruction and include six types of activities: (a) writing, (b) word work, (c) cloze and maze, (d) fluency activities, (e) comprehension activities, and (f) self-selected reading practice.

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Introduction

There are many misperceptions related dyslexia that are based on folklore and common thinking but not on research. Over time, these come to be believed as truth when in fact, they are not. This article describes ten things you should know about dyslexia.

The Reading Process: Two Theoretical Models

Students with dyslexia make up 3% to 5% of all students (Ziegler & Goswami, 2005). To understand dyslexia and the appropriate kinds of instruction and intervention, you must first understand the reading process. Two common theoretical models of reading are described below. Each provides different views of the reading process and dyslexia.

A Phonological Processing Model of Reading

The phonological processing model defines reading as simply sounding out words (Shaywitz & Shaywitz, 2008). According to this model, reading occurs when the reader puts sounds to symbols on the page, then puts the sound-symbols together to create words, and finally put the words together to produce a form of speech-in-the-head that is listened to during the act of reading. Information is said to flow one-way, from page up to the cortex (see Figure 1). This is called a bottom-up view of reading.

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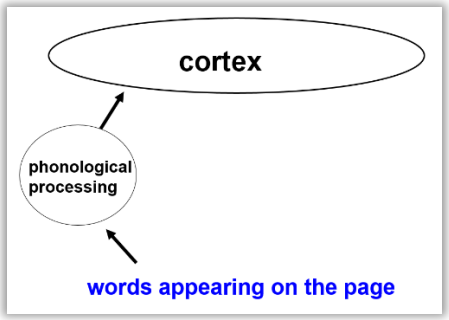

Figure 1.
The phonological Processing Model of Reading

According to this model, proficient readers are those who can sound out words automatically and fluently so that the speech-in-the-head is uninterrupted. People with dyslexia have sounding-out-words deficits. What these students need (according to this model) is more sounding-out-words instruction along with lots of sounding-out-words practice (Gaskins, 2011). The goal of this type of instruction is to create good sounder-outers. The thinking is that if students were good sounder-outers, all their reading problems would vanish. However, what usually happens is that students get marginally better at sounding out words in isolation in the short term with little transfer of these skills to the reading of authentic texts (Weaver, 2009). Moreover, students' ability to create meaning with connected, meaningful text does not improve significantly (Lipson & Wixson, 2009).

Limitations of The Phonological Processing Model

The phonological processing model is limited because it does not account for five kinds of data:
First, during the act of reading, almost 10 times more information is flowing down from the cortex to the thalamus than is flowing up from the page to the thalamus, and to the cortex (Strauss, 2011). This tells us that information contained in the cortex is being used along with text clues to create meaning.

Second, proficient readers do not look at all the words on the page (Paulson, 2005). Eye movement research shows that during the process of reading, our eyes fixate on only approximately 60% of the words on the page. Of these fixated words, our eyes usually stop on only one or two letters. Since we can perceive only those things upon which our eyes fixate, it is clear, that our brain fills in the blanks to create meaning during the reading process. This tells us that readers are using more than the words and letters on the page to create meaning.

Third, proficient readers use minimal letter clue during reading, relying more on syntactic and semantic clues (see below) to recognize words (Ruddell & Unrau, 2013).

Fourth, during reading eye movement is directed by information in the cortex more so than information on the page (Rayner, Liversedge, White, & Vergilino-Perez, 2003). In other words, higher level thinking processes drive or mediate lower level word recognition processes.

Finally, miscue analysis research shows that proficient readers often insert words that are not in the text but are semantically or syntactically correct (Paulson, 2005). Again, this tells us that information other than what is on the page is being used to construct meaning.

A Neurocognitive Model of Reading

The neurocognitive model defines reading as creating meaning with print (Johnson, 2016). According to this model, the knowledge stored in our cortex is used along with the information on the page to create meaning with print. Information here flows two ways: from the page to the thalamus to the cortex as well as from the cortex to the thalamus to the page. In other words, what is in the head interacts with what is on the page to create meaning. This is called an interactive view of reading (see Figure 2).

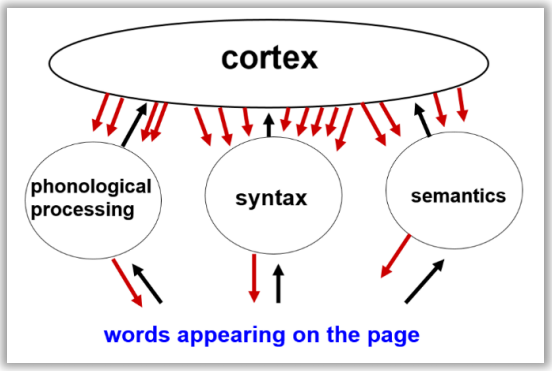

Figure 2.
The Neurocognitive Model of Reading

During the process of reading, information contained in the cortex is used to constantly reach out and predict the meanings of words. Cueing systems provide the brain clues (or cues the brain) as to what the words on the page might be. While the phonological processing model posits only a single cueing system (phonological), the neurocognitive model recognizes three cueing systems working together to recognize words: semantic, syntactic, and phonological.

The semantic cueing system uses context and background knowledge to recognize words. The syntactic cueing system uses grammar, word order, and sentence structure to recognize words. The phonological cueing system uses letter-sounds to recognize words. Of the three cueing systems, this is the least efficient in terms of speed, efficiency, and the amount of processing space utilized in short term memory.

According to the neurocognitive model, a proficient reader is one who can orchestrate a variety of strategies to construct meaning during the process of reading (Weaver, 2009). These strategies include using knowledge and contextual clues to predict and infer, monitoring comprehension, and employing fix-it strategies when comprehension breaks down. From this perspective, a student with dyslexia is one who is ineffective in the use or coordination of strategies. Interventions for these students should focus on teaching and developing meaning-making strategies along with activities that enhance all three cueing systems used to recognize words. These should all occur within a meaning-making context to the greatest extent possible.

Ten Things You Should Know About Dyslexia

Below are ten common things you should know about dyslexia.

Dyslexia Is Not A Brain Disorder

There is no reliable evidence to show that the brains of students with dyslexia are qualitatively different from the brains of other students (Strauss, 2014). The brain imaging research that purports to demonstrate "dysfunction" or "abnormalities" is fraught with methodological concerns (Elliot & Grigorenka, 2014). These concerns are usually related to small sample size, the type of subjects used in studies, using single-word reading tasks, the use of the phonological model to define and understand reading, the types of data collected, the over-interpretation of the data, and the kinds of generalizations made based on the data.

This is not to say that there are not differences when comparing the brain images of students with dyslexia to other students. However, many of the differences can be explained by differences in instruction and experience. These differences largely disappear with the right kinds of instruction and experience.

Dyslexia Is Not Related To Visual Problems

Eye and visual problems do not cause dyslexia (ILA, 2016). As well, there is no scientific evidence to show that vision therapy of any kind has any positive effect with students with dyslexia.

Dyslexia Is Not Related To Letter Reversal

Reversing letters is common in the early stages of learning to read and write. However, students with dyslexia do not jumble up words or reverse letters to any greater degree than beginning readers or readers of similar ability (Hudson, High, & Al Otaiba, 2007; ILA 2016).

Students With Dyslexia Often Have Difficulties Analyzing And Processing Phonological Data (Elliott & Grigorenko, 2014)**.** This is why instruction and interventions must address all three cueing systems instead of just the phonological cueing system.

Spelling Instruction Does Little to Help Students With Dyslexia

Spelling proficiency is related to visual memory capacity. Proficient spellers are able to store and retrieve letter patterns from their long-term memory effectively. Since students with dyslexia often have trouble processing phonological data, it follows that this would result in spelling difficulties (Hudson, High, & Al Otabia, 2007). Thus said, spelling has little to do with one's ability to create meaning with print (Goodman, 2003). And, drill and practice on weekly spelling lists does little to help students become better spellers or readers.

More Phonics Is Not the Answer

Students with dyslexia often receive is a steady diet of phonics instruction. As described above, phonics-based instruction can lead to increased scores on phonics-based measures; however, there is little persistence, and there is little transfer of these skills to authentic reading conditions (Elliot & Grigorenka, 2014; ILA, 2016). As well, there is little evidence to demonstrate that this kind of instruction has any have long-term effect on students' ability to create meaning with print (Allington, 2012).

This is not to say that phonics instruction is not necessary. Phonics instruction in some form is one important part of most reading interventions; however, it should be part of a balanced literacy program that includes practice reading real books, a focus on higher order reading skills, and word work that develops all three cueing systems (phonological, semantic, and syntactic).

There Are No Magical Programs

Despite the research-based claims made by various commercial programs, there are no one-size-fits-all programs that will "cure" dyslexia (Allington, 2012, ILA, 2016). Instead, there are a variety of research-based strategies that should be used and applied as needed.

Students with Dyslexia Do Not Need Dramatically Different Kinds of Instruction (Allington, 2012; Wharton-McDonald, 2011). Students with dyslexia need interventions that provide more intense versions of the kinds of research-based instruction they are currently receiving in a general education setting (see below). When an intervention is substantially different from classroom instruction, it creates a splintered curriculum. Here struggling readers are presented with different types of instruction and learn different sorts of skills in different places throughout the day. This makes it harder to develop their reading skills; not easier. Struggling readers need consistency in order to reinforce developing skills. This is not to say that there are not differences in instruction between students with and without dyslexia, but the differences are in emphasis and intensity, not in kind (see below).

Students with Dyslexia Need More Intense Instruction

Intensity here refers to (a) more time, (b) more time-on-task, (c) more time engaged in authentic literacy activities, and (d) smaller instructional groups (Allington, 2012; Wharton-McDonald, 2011). Intense, supplemental instruction (or an intervention) can occur within or outside of a general education classroom setting.

Students with Dyslexia Need Expert Reading Teachers (Elliot & Grigorenka, 2014; Gabriel, 2018; Wharton-McDonald, 2011). High-quality reading instruction and interventions cannot occur in the absence of high-quality, knowledgeable reading teachers.

Conclusion

Dyslexia is not a brain disorder. The International Literacy Association (ILA) says, "… *there is no empirical basis for the use of the term dyslexic to distinguish a group of children who are different from others experiencing difficulty in acquiring literacy*" (2016, page 8). Accordingly, dyslexia is merely a designation for those on the lowest end of the reading continuum. A more appropriate term might be severe reading difficulties.

Instruction for Students with Severe Reading Difficulties

Students with severe reading difficulties need reading instruction that has the same kind of research-based strategies as other students. This would include daily reading practice using books that students have chosen, authentic writing experiences, and social interaction around good books. There would be a variety of activities to develop all three cueing systems and expand students' word knowledge. Finally, short bits of direct and explicit instruction would be included related to word identification strategies and comprehension skills.

Interventions for Students with Severe Reading Difficulties

Specialized reading interventions for severely struggling readers should build on, not replace, the reading instruction above. Interventions should be based on a reading diagnostic that identified students' strengths as well as deficit areas (word identification, fluency, and/or comprehension). Based on each student's unique needs, the intervention should

include variations and combinations of the following kinds of activities: (a) writing to develop the syntactic cueing system; (b) word work to develop the phonological cueing system; (c) maze and cloze activities to develop the semantic cueing system; (d) a variety of repeated reading activities to develop reading fluency; (e) cognitive-based activities for comprehension; and (f) self-selected reading to develop vocabulary, comprehension, fluency, conceptual knowledge, familiarity with sentence and text structures, and reading stamina.

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