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## **MODULE 27: Understanding dyslexia**

Dyslexia is a learning disability which affects our ability to fluently read and write. Dyslexia is surprisingly common, and affects around one in ten people in the general population. However, for such a common problem, some people have misconceptions about those with dyslexia and, indeed, dyslexia sufferers do not always get the help they need.

The aim of this module is to clarify what dyslexia is, the causes and effects, and the impact dyslexia can have on lives.

27.1 Defining dyslexia

27.2 Causes of dyslexia

27.3 Effects of dyslexia

27.4 Related concerns and issues

27.5 Severity of condition

### **27.1 Defining Dyslexia**

A child may be highly intelligent, and yet struggle to read and write. He finds reading a challenge, even when the text should not be that difficult. As a result, he may misbehave and become disruptive in class in an attempt to disguise his difficulties from his peers. Chastised for being lazy and a bad influence, he begins to suffer from self-confidence issues. He decides not to push himself to achieve academically and rebels against doing schoolwork despite being capable.

Do you recognize this child?

We now know that children such as these are not lazy, disruptive, or unintelligent. They are suffering from a condition known as dyslexia.



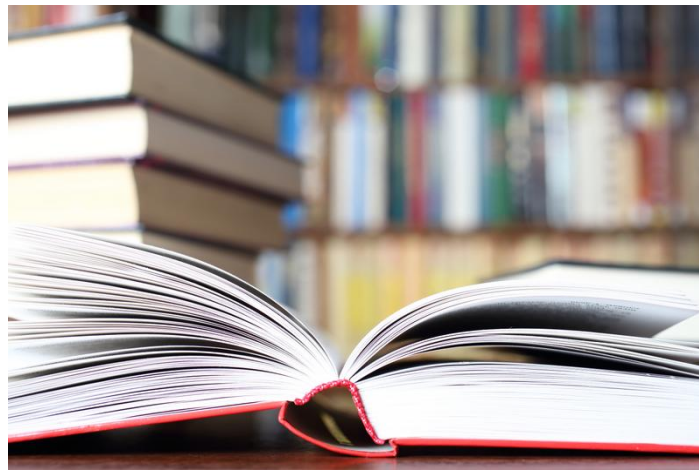
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### **27.1.1 Defining Dyslexia - A Definition**

The British Dyslexia Association defines dyslexia as:

"Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling".



While factually correct, this definition does not give an accurate account of the far-reaching effects of dyslexia or what it feels like to be a dyslexic person. These are both aspects we will look at in further detail elsewhere in this module.

To define something is to know its characteristics and features, which is why we will begin our study of dyslexia with these two aspects.

### **27.1.2 Defining Dyslexia - What is Dyslexia?**

Dyslexia is characterized by having difficulty with language skills. This can mean finding it difficult to recognize written words, to spell, to listen and take notes at the same time, or to do arithmetic. Any one of these traits can make reading and writing incredibly frustrating for the person with dyslexia.

Dyslexia is described as a condition that has a neurological basis, rather than having an ophthalmological, physical, or psychological cause. This means the problem is not with the eyes seeing incorrectly and sending the wrong information to the brain, but with the brain as



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it processes the messages that the eyes send to it. Think of this as a garbled radio message. The radio station transmits the correct signal, but your receiver is not tuned in correctly.

Something similar can also happen with sound. In this case, the dyslexic child struggles to recognize that spoken words are made up of several smaller building blocks or syllables. It is this structural analysis of words that is crucial in our ability to spell. Without this skill, reading, writing and spelling are adversely affected.

In addition, some people with dyslexia have short-term memory issues, and difficulty organizing their thoughts. This makes fluent self-expression, either verbal or written, a problem for many.

### **27.1.3 Defining Dyslexia - Dyslexia is a Syndrome**

A syndrome is not one problem, but consists of several elements. Some people with dyslexia may have a problem in one area, whereas others may have a problem in several areas. If it helps, you may think of a syndrome in terms of a home. Some homes are small and have one room, while others have multiple bedrooms with many amenities. In the same way, a dyslexic person may have one problem, such as difficulty organizing his thoughts, while another may struggle to identify syllables in words, in addition to having difficulty with spelling and reading.

Typical problematic areas include:

- Difficulty recognizing letter shapes on the page
- Inability to link letter shapes to the sounds associated with them when reading
- Inability to connect the letters in a word together rather than seeing them as individual letters (i.e. to read them as a word)
- Letters transpose themselves (For example, a “d” becomes a “b”)
- The text appears to move around and does not stay still
- Inability to see all the words on the page e.g. only partial awareness of the text
- Difficulty concentrating on two tasks at once e.g. listening and writing at the same time
- Difficulty hearing the syllables within a word
- Difficulty transposing the sounds associated with speech into the written word on the page
- Inability to recall what has gone before (difficulty organizing thoughts or ideas)
- Inability to detect different tones (tone deaf)
- Inability to remember what has just gone before (especially debilitating when doing math)



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- Gaps in his “internal dictionary”, and is unable to recall words automatically

Some or all of these elements may be combined to create that individual’s dyslexia characteristics, and gives you some idea of the complexity of the condition.

As a Dyslexia Therapist you need to assess each person individually, work out their strengths and weaknesses in learning, and implement a personalized strategy to accommodate their particular problem areas.

### **27.1.4 Defining Dyslexia - Dyslexia has a Spectrum**

Dyslexia is not a black-and-white condition, but rather all shades of grey in between. It is not a case of either you have it or you do not. Some people may have a mild case of dyslexia and have trouble with spelling. Other people are severely affected and may fall behind in their coursework, despite being highly intelligent.

It may surprise you to learn that nearly 6% of the U.S. population have a mild form of dyslexia, which affects their ability to spell. An additional 4% have a more significant problem, with the associated difficulty in reading and writing mentioned earlier. Another slightly puzzling aspect for scientists is the higher occurrence of dyslexia in males than in females. Although the exact figures are not known, this gender bias towards boys is somewhere between 3:1 and 5:1.

### **27.1.5 Defining Dyslexia - What Dyslexia is Not**

One problem you may encounter as a Dyslexia Therapist is self-confidence and self-worth issues in people with dyslexia. Many dyslexic children, who have not been diagnosed early, can be falsely labeled as disruptive or lazy. This is often because in order to distract from their academic difficulties and remain popular with their classmates, they may become disruptive in class, or blend in and do nothing.

Just as it is important to understand what dyslexia is, it helps to be clear on what dyslexia is NOT.

- NOT a lack of motivation or laziness
- NOT due to inadequate teaching
- NOT due to eyesight problems
- Does NOT indicate lack of intelligence



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- Does NOT depend on social background or race

Remember, the majority of individuals with dyslexia actually have higher than average levels of intelligence. It is just that they struggle to express it. There are many famous high-achievers who have dyslexia including Albert Einstein, Thomas Edison, Alexander Graham Bell, Leonardo da Vinci, Pablo Picasso, Andy Warhol, Erin Brockovich, John Lennon, George Washington, Woodrow Wilson, Muhammad Ali, William Hewlett (from Hewlett-Packard), Robert Woodruff (an early president of Coca-Cola company), and Henry Ford...the list goes on. You get the idea!

### **27.2 Causes of Dyslexia**

A dyslexic person struggles to interpret words or sounds because the brain has difficulty processing the information and making sense of it. Looking at this in a simple way, the equivalent might be someone reading a foreign language. The marks are there on the page, the eyes see them, and transfer the data via the optic nerve, but the brain is unable to decode them.

#### **27.2.1 Causes of Dyslexia - A Genetic Condition**

There are multiple theories about why the brain fails to make sense of the messages it receives. Most scientists agree that dyslexia is a genetic condition. It tends to run in families. If you have dyslexia, there is a high likelihood that your child may inherit the condition. Also, if one identical twin has dyslexia, the other one will also have it.

Research is focused on six genes, of which four are known to affect the migration of neurons in the brain of the fetus. In basic terms this is a bit like programming your TV. If you do not match the right channel number with the right wavelength, you are not going to watch the program you were hoping to see.

#### **27.2.2 Causes of Dyslexia - The Brain Bit (1 of 2)**

You may be familiar with the frequent complaint from people with dyslexia. They complain that the text jumps around on the page and they are not able to focus on the words.

Surely this indicates a problem with eyesight?



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No.

The eyes are doing their job just fine. They create the correct image, which is transferred from the retina via the optic nerve to the brain. However, whereas the “correctly tuned” brain (or properly programmed TV remote) interprets the signal correctly, the dyslexic brain gets jumbled as it is not tuned in.

### **27.2.3 Causes of Dyslexia - The Brain Bit (2 of 2)**

To understand what is happening, let us take a closer look at the brain. The brain is divided into two hemispheres, or halves. The left side is responsible for processing language and concepts, while the right side majors in spatial awareness and physical activity.

The brain has a specific place to process speech and word analysis. This is called Broca’s area. It is located in the inferior frontal gyrus located in the front part of the left brain. In a non-dyslexic person, messages from the optic nerve go straight to the Broca’s area to be decoded and made sense of.

However, in a dyslexic person the message from the optic nerve gets misdirected to the right hemisphere, rather than the left. Not only does the message physically go on a longer trip (hence the delay in processing information some dyslexic people experience), but it goes to an area that is not fully equipped to perform the task successfully.

The result is a delay in processing, and difficulty in making sense of the message.

### 1.2.4 Causes of Dyslexia - Auditory Dyslexia

A similar problem can happen with sound. Messages picked up by the auditory nerve get misdirected. The auditory dyslexic may only understand about two-thirds of the information they hear. They are also more likely to be tone deaf, i.e. unable to distinguish between two closely related notes or sounds.

This has an impact on speech and reading, because speech is also a function of hearing. The person with dyslexia may not be able to separate the syllables within a spoken word.



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This may cause the mind to skip over several syllables in an attempt to catch up. All of which leads to difficulties understanding speech and transferring what has been heard into writing.

### **27.2.5 Causes of Dyslexia -Theories about Dyslexia**

Time to introduce the Phonological Deficit Theory of Dyslexia.

This is the theory many of the remedial programs for dyslexia are based upon. It holds that the dyslexic individual has a disconnect between reading (or hearing) groups of letters and understanding the sounds they make. This makes transferring speech to writing difficult, thereby impacting the areas of spelling and reading.

However, this theory does not explain all aspects of dyslexia, and other theories tend to come and go. Those with the most credence are the *Double Deficit Theory* and the *Magnocellular Theory*.

- **Double Deficit Theory:** In essence, a dyslexic person having difficulty processing information has two issues; identifying speech sounds (the phonographic element as mentioned above), and lack of rapid processing (or rapid automatized naming). Think of the latter as having a slow internet connection – the information is there, but it takes a long time to arrive.
- **Magnocellular Theory:** This theory suggests that it is not just the visual pathways which are disturbed, but also the hearing and tactile pathways. The Magnocellular Theory remains divided as some people are in agreement with it, and some are not. The general consensus is that while some evidence does support this theory, some of the research is flawed and therefore not reliable.

### **27.3 Effects of Dyslexia**

In Module 1.1 we briefly mentioned some of the effects that dyslexia can have on an individual. Now it is time to take a more in-depth look at the very real problems a dyslexic person encounters in their daily life. In this section, some technical words and phrases are repeated, so to help make things clear from the start, let us explain those words right away:



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**PHONICS** - Phonics is a method commonly used to teach children to read. It links letters, or groups of letters, to the sounds they make. For example, learning the letter combination, “-tion” is pronounced “-shun”, or that the letter “l” is pronounced “eye” are examples of phonics.

**AUTOMATIZATION** - This is the process where something that is seen regularly is recognized automatically without the need to think about it. This speeds up reading because the brain does not need to work out how each word sounds from scratch every time.

**VISUAL PROCESSING** - This refers to the ability to see something with the eyes and make sense of it. Thus, you look at a tree and know it is a tree because you have seen similar tall plants with green, leafy branches before.

**SHORT TERM MEMORY** - The short term memory is the brains equivalent of a post-it note to itself. It stores limited amounts of information (usually around seven items) for around 10 – 15 seconds. Examples of this are holding onto a number while doing mental arithmetic or a translator remembering words in order to translate them into a different language.

### **27.3.1 The Effects of Dyslexia – Processing Phonics**

We are now equipped to look at, and understand the effects of dyslexia.

#### Processing Phonics

We learn to read by recognizing that a word is made up of phonological components, and depending on what letters those component parts contain, link them to specific sounds.

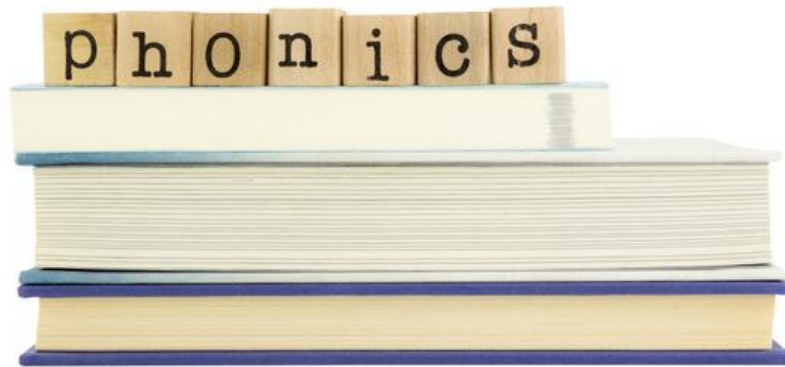




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A person with dyslexia has a problem making the connection between component parts (or syllables) and the sounds they represent. The dyslexic person may become mentally confused trying to pronounce those sounds. Think of this as an error in the dyslexic person's internal dictionary, so when he searches for the phonic associated with a word, he looks up the wrong one.

### **27.3.2 The Effects of Dyslexia – Short Term Memory Glitches**

The memory struggles to recall the list of different phonic sounds. The dyslexic person may take awhile to find the correct phonics to link to a syllable. By the time he works out the next phonic in the word, he has forgotten what the first one was.

This also has an impact on written work because the person with dyslexia experiences memory lapses while writing down information. This means he may repeat or omit information by accident. Unfortunately, when he is in a high pressure situation, such as an exam, this problem is exacerbated which leads to missing words and disjointed arguments.

### **27.3.3 The Effects of Dyslexia – Poor Automatization**

As if all this was not hard enough, the dyslexic brain struggles with automatization. This is especially noticeable when trying to multi-task.



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Writing a story is a form of multi-tasking because there are two processes going on: (1) assembling the words in a cohesive story and (2) remembering punctuation and grammar. A dyslexic person does not have the luxury of reducing the strain on his thinking by doing things automatically. He has to deeply concentrate and focus on one thing which pushes the other out of his mind.

Another example is the dyslexic child who has to listen to the teacher and take notes. This is very hard to do. It is the mental equivalent of patting your head while rubbing your tummy simultaneously.

### **27.3.4 The Effects of Dyslexia – Visual Processing**

Remember how those images of text are sent via the optic nerve and distributed to parts of the brain not usually associated with processing language? This can lead to problems for the person with dyslexia. In an attempt to make sense of the images, the brain may move things around visually, hide part of the letters, or even full words. The reader tries to correct this by staring harder and concentrating, which leads to eye-strain and headaches.



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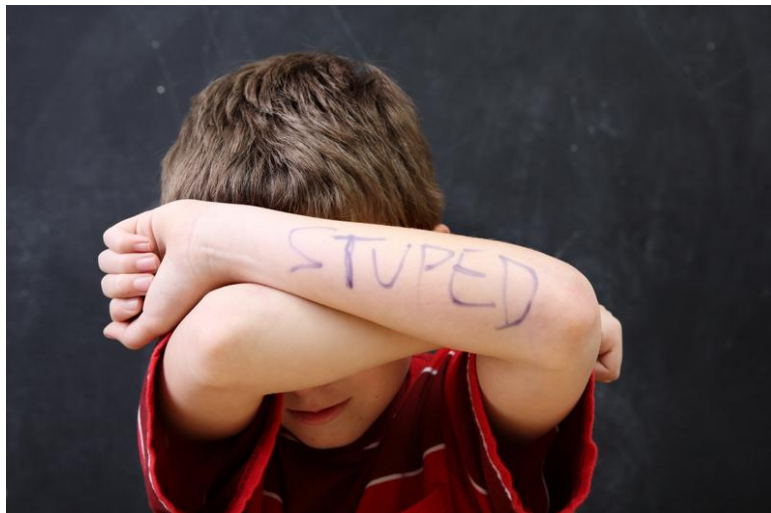


## **27.4 Related concerns and issues**

Dyslexia is defined as a disorder which prevents fluent reading and writing according to the definition by the British Dyslexia Association:

“Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling.”

However, the effects are much more widespread than this definition would indicate. From poor time management to lack of self-confidence, there are other issues which may arise as a direct result of a person suffering from dyslexia.



### **27.4.1 Related concerns and issues - Speech Problems**



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The problem of making sense of phonics is a difficult one. Especially when talking to each other depends on stringing syllables together to make words. Young children, typically 3 – 7 years old, may struggle with speech, and may need a referral to a speech therapist.



### **27.4.2 Related concerns and issues - Glue Ear**



There is an increased likelihood of children suffering from glue ear if they have dyslexia.

Glue ear is when the middle ear becomes filled with fluid. This has a muffling effect on hearing: much like putting your fingers in your ears. Of course, poor hearing is the last thing a child needs who is having difficulty understanding phonics. This is a most unwelcome complication.



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### **27.4.3 Related concerns and issues - Health Issues**

The reason is not understood, but children with dyslexia are more prone to illness, especially those affecting the immune system. Thus, they are more likely to suffer from conditions such as asthma or eczema.



### **27.4.4 Related concerns and issues - Powers of Expression**

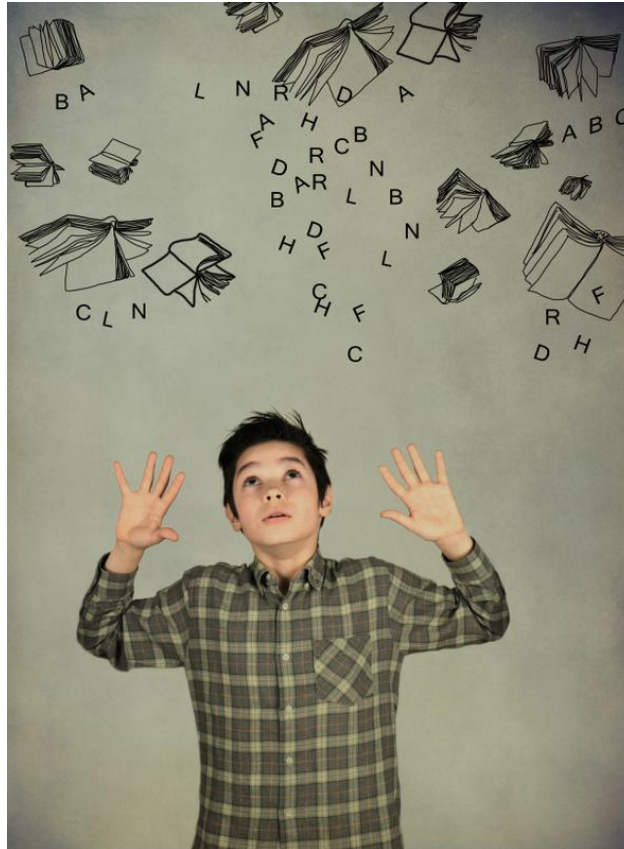
Individuals with dyslexia often struggle to clearly express themselves. This is because of a combination of:

- Lack of logical structure to their argument (because of short term memory issues)
- Poor word retrieval from the “memory banks”
- Delay in hearing the spoken word
- Mispronunciation (those pesky phonics again)
- Spoonerisms (This is a tendency to switch sounds around, for example instead of saying “fish and chips” the dyslexic person might say “fips and chish”)



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**27.4.5 Related concerns and issues - Numeracy**



60% of people with dyslexia struggle with math. This is due to:

- Inaccurate copying of numbers on the page
- Failure to remember numbers when doing sums





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- Forgetting basic multiplication tables

### 1.4.6 Related concerns and issues - Developmental Problems

Dyslexic individuals seem to be over-represented among those with certain developmental difficulties. These include dyspraxia, attention deficit disorder, and hyperactivity disorder. At the lower end of the spectrum, they often appear to be somewhat uncoordinated and clumsy. They may also become easily distracted or lack the flexibility needed when switching between activities.



### **27.4.7 Related concerns and issues - Social and Emotional Impact**

The person with dyslexia that struggles to read may appear slow or dull-witted to his classmates. Among the ill-informed, this could lead to bullying behavior or taunting. This can have a significant emotional impact on the child at an age, but especially detrimental when they are eager to fit in and be accepted among their peers.



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In addition, the act of concentrating causes mental and physical fatigue. Also, the struggle to master the written word can lead to feelings of stress or even panic. This is especially true if the child is put under pressure to come up with an answer. This can lead to feelings of frustration, poor self-worth and lack of self-confidence.

### **27.4.8 Related concerns and issues - Time Management**

People suffering from dyslexia often have a poor sense of the passage of time. This lack of awareness means they can be poor time keepers and disorganized time managers.





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### **27.4.9 Related concerns and issues - Underachievement**

One consequence of dyslexia is the sense of frustration that a child (or indeed an adult) with dyslexia may experience. They see their classmates making progress with reading skills while they are not.

Despite being intelligent, they fall behind and fail to meet achievement goals appropriate for their age group. They may feel humiliated as they struggle to read aloud in front of the class. These children often have above average intelligence. If they are fortunate enough to be in an environment where there is no bullying or taunting, they still may recognize their own short-comings, and judge themselves harshly. This downward spiral can lead to a negative mindset in which the child believes they are not as capable as others, and therefore underachievement is inevitable.

By taking this course, this is something you can help change. By equipping yourself to become a Dyslexia Therapist, you will be able to help a young person or an adult with dyslexia reach their full potential.



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### **27.5 Related concerns and issues - Severity of condition**

Dyslexic individuals and the degree to which dyslexia affects them, is also individual. This is because dyslexia is a syndrome with a spectrum of severity. This means that there is an almost infinite variation of possibilities within the dyslexia condition.

At the low end of the spectrum is the child with poor spelling. He repeatedly fails spelling tests, but more or less keeps up in class. He does well at school and goes on to college, although his teachers frequently complain about his poor handwriting.

At the high end of the spectrum is the child who becomes distressed during reading class. This child is normally well-behaved and shows every indication of being highly intelligent. When asked to write his name, he becomes highly agitated and will try almost anything to avoid the task.

#### **27.5.1 Severity of Condition - The Spectrum of Dyslexia ( 1 of 3)**

Assigning a number indicating the level of dyslexia a person is suffering from is of limited benefit. However, it does help us understand and identify how extensive the problem is so we can make appropriate allowances. For example, the child with severe dyslexia (Rated 7, 8 or 9) should be given extra time during examinations to allow for their difficulty in organizing their thoughts.

In practical terms the spectrum is divided into a numerical scale ranging from zero to ten. It is divided up as follows:

0 - 1	No or minimal dyslexia
2 - 4	Mild dyslexia
5 - 6	Moderate dyslexia
7 - 9	Severe dyslexia
10	Totally dyslexic

#### **27.5.2 Severity of Condition - The Spectrum of Dyslexia (2 of 3)**



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For an indication of what this means in practical terms for a person with dyslexia, see below:

Level of Severity	Expected Performance
1, 2	Some blips in understanding of the written or spoken word
3, 4, 5	Difficulty with spelling and punctuation. May slip behind their schoolmate's or coworkers achievements
6, 7	Marked difficulty with spelling and reading. Requires considerable effort to complete work
8, 9	Takes 2 to 3 times longer than others to complete an assignment. Academic learning is extremely challenging

### **27.5.3 Severity of Condition - The Spectrum of Dyslexia ( 3 of 3)**

Another element to this complex condition is the person's age. Not all people with dyslexia are diagnosed at a young age. The child who does well enough in his studies to get by, but is actually capable of much more, can be challenging to diagnose as having dyslexia. It is important for anyone working with children to be alert for signs which may indicate dyslexia. In brief, these are:

- Early problems understanding phonic sounds
- Reading slowly
- Skipping words when reading
- Skipping words when writing
- Repeatedly losing their place when reading
- Poor ability to skim written information to gather the details
- Easily distracted when reading
- Written text appears to move or run together on the page
- An irritating glare from whiteboards or paper
- Poor spelling despite effort
- Mixing up words with similar letters (such as with/where, their/ that)
- Wide difference in self-expression ability between written and verbal methods (with verbal methods usually being better)

However, it is how disabling the signs are, rather than the number of problems, which determines the degree of severity of the condition.



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