



Willamette Valley Dyslexia Center  
Presented by Lynn Brown, M. ED

# THE DYSLEXIC BRAIN AND UNIVERSAL SCREENING


Session 3:

- How the dyslexic brain differs
- Universal screening options

"Dyslexia is persistent: A student who fails to read adequately in first grade has a 90% probability of reading poorly in fourth grade and a 75% probability of reading poorly in high school."

-Gabrieli, 2009

<https://www.wvdyslexiacenter.com>



## SESSION 3: The Dyslexia Brain & Universal Screening

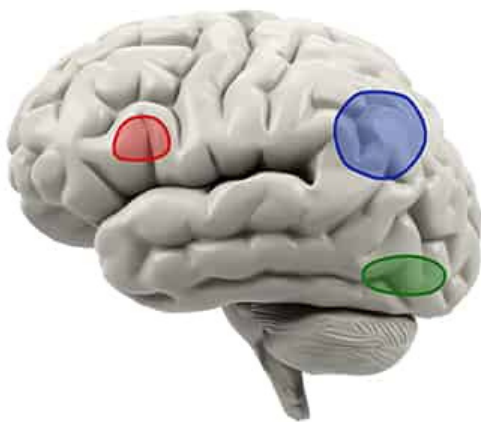
### The Dyslexic Brain

We know from many studies, including but not limited to, Dr. Shaywitz, that Dyslexic brains have structural and functional variations from "reading" brains.

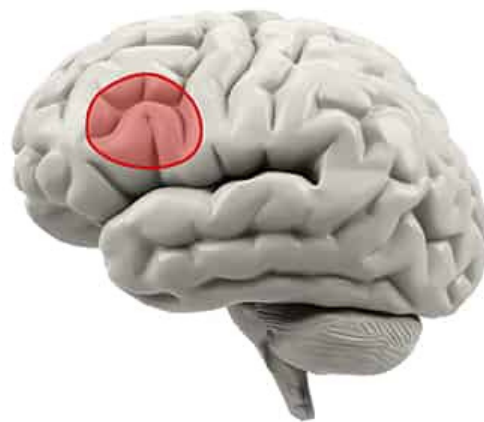
fMRI studies have shown us that multiple areas of the brain are activated when performing skills of literacy, from oral language tasks to reading tasks to writing tasks. The image below helps break down how our brain "reads"...

### Typical Brain / Dyslexic Brain comparison

Typical



Dyslexic



● Broca's area, Inferior frontal gyrus  
(articulation/word analysis)

● Parieto-temporal  
(word analysis)

● Occipito-temporal  
(word form)

● Broca's area, Inferior frontal gyrus  
(articulation/word analysis)

These are your cliff notes on the structural and functional differences between a reading brain and a dyslexic brain!

We know from multiple studies that Dyslexia is a BRAIN difference or a neuro-divergence. Dyslexia is a disruption in the speech-processing areas of the brain.

The **Frontal Lobe/Broca's area** is where language begins. This part of our brain handles speech production, (literally the little voice in your head). It is where we begin to connect SOUNDS to symbols. This part of the brain makes grammatical usage and language comprehension possible for our native language.

Dyslexic brains have overdeveloped speech areas of their brain, compared to reading brains. As we connect speech SOUNDS to symbols, we begin to activate the connection to the **Parieto-Temporal Lobe**.

When a typical person reads the **Parietal-Temporal Lobe** is used briefly by beginning readers when we learn to read, and is NOT being used by struggling readers until they are provided with instruction that opens the pathway. This lobe is responsible for phonological awareness and the decoding component of reading. Allowing for discriminating sounds -or- connecting an image to a sound. This can be the literal shape of the word (in many fonts) or a picture, or an object associated with the word, allowing for reading comprehension and eventually, fluent use of the word.

This area is very weak in dyslexic brains. Dyslexic brains struggle to make letter-sound connections compared to a "reading" brain. When these areas of the brain connect the letters c, a, and t to the word cat, then the word can be read aloud.

**The Occipital Lobe** serves as a "reading integrator", a conductor of sorts, linking the different parts of the brain together to execute the action of fluent reading.

As a person hears a sound that connects to a symbol, and later a word with a symbol, this begins to create an orthographic map and leads to reading fluency. So a "reading" brain may only need a few repetitions of BROCA (sound) to PARIETO (image) when a dyslexic brain is NOT activating PARIETO (images) there is no connection to be made. Making literacy acquisition unlikely and sometimes even impossible for a struggling reader.

A dyslexic child needs very explicit instruction of sound to symbol connection to "wake up" the Parieto-Lobe allowing them to start working towards reading fluency, and a well developed orthographic map.

The power of the methodology or the lesson plan is the multi-sensory approach that allows for sound and visual symbols to be accessed simultaneously. (I know it's an extreme example, but think of the story of Helen Keller. It wasn't until "water" was signed in her hand at the exact moment of touching the water, that she was able to make the connection! Then the lightbulb went off!)

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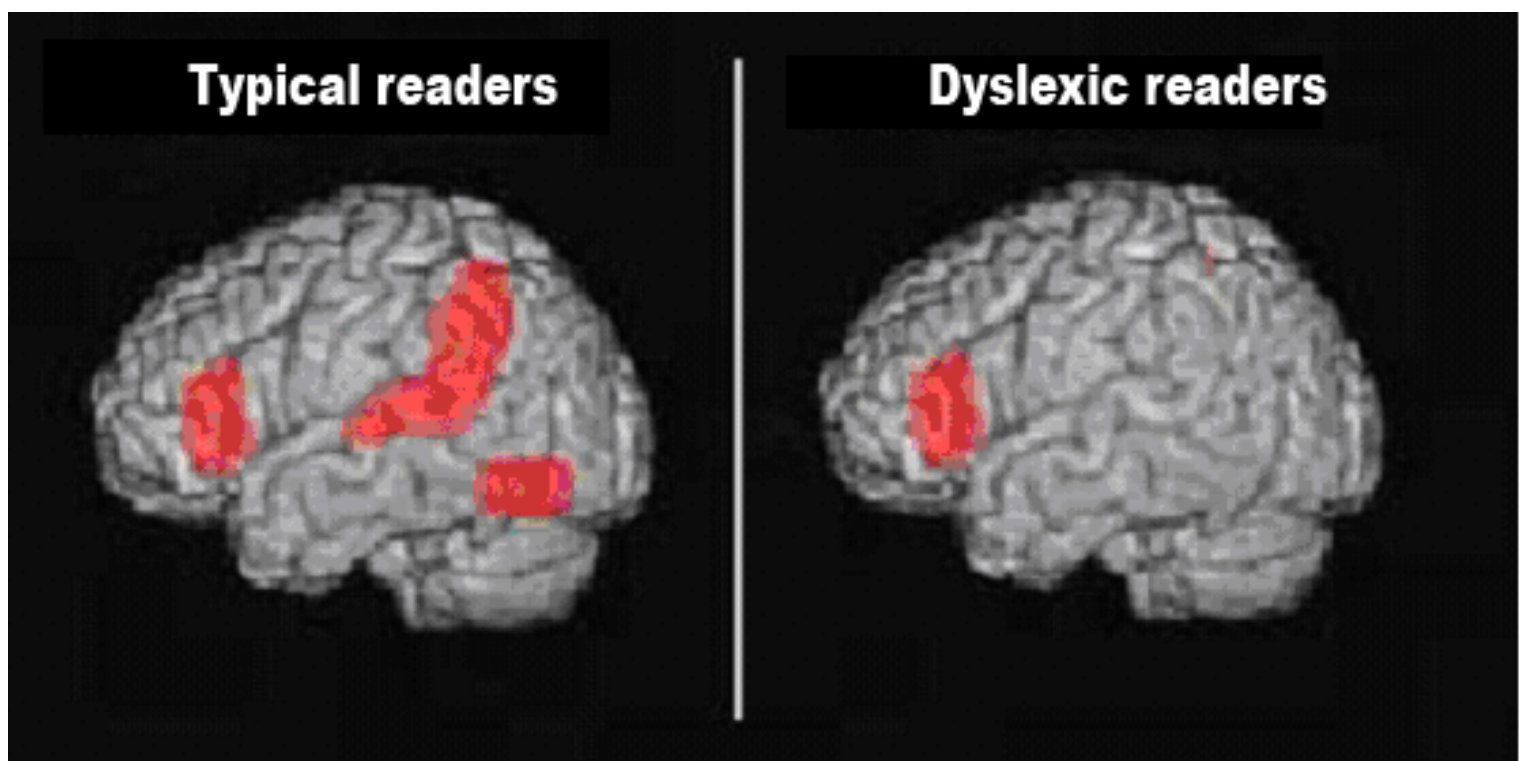
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## **In Summary of Shaywitz fMRI studies in 1998 & 2002:**

"...Dyslexic readers in this study showed less activation in a brain region linking print skills to the brain's language areas, in comparison to typical readers.

"A dyslexic brain is overusing the Broca's area (same lobe connected by neural pathways). This is why dyslexic readers struggle with fluency. Letter sound connections are often difficult, and words are not understood as individual phonemes, but rather as a whole, welded, sound.

Every word presented essentially becomes a sight word, (a visual memory, not reading fluency) and when it is surrounded by different words, it may look "different" in a variety of sentences, even on the same page.

We can also surmise that is why those with dyslexia struggle with writing tasks. We are asking them to form shapes to represent sounds that their brain is not recognizing.

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**"Children don't catch up once children fall behind, they are likely to stay behind and the gap is likely to widen."**

C. Juel (1994). Harvard Graduate School of Education

## DYSLEXIA PERSISTS OVER TIME

"Dyslexia occurs at all levels of intelligence and is a persistent problem that does not represent a transient developmental lag." (American Academy of Pediatrics, 2011).

"Dyslexia is persistent: A student who fails to read adequately in first grade has a 90% probability of reading poorly in fourth grade and a 75% probability of reading poorly in high school." (Gabrieli, 2009).

### **Consider these Statistics:**

The United States currently has one of the lowest literacy rates in the developed world.

34% of fourth graders cannot read

68% are below proficient

68% of eighth graders test below grade level in reading and 48% of adults are not proficient readers.

Eide, D. (2011). Uncovering the logic of English

How is it that up to 70% of our population has a deficit in reading?

Even if you were among those who learned to read proficiently, you probably still have unanswered questions and frustrations with the English language.

Let's be real, the biggest difference between the literate and the illiterate is that the literate blame the problems on English, and the illiterate blame themselves.

The main problem is that we can never know what we weren't taught.

Success in reading is not connected to IQ score, nor is it a problem of poverty alone.

Adult illiteracy is connected to almost every socioeconomic issue in the US 50% of chronically unemployed and 60% of inmates are illiterate (Eide, 2011).

85% of all juveniles in the court system are illiterate (Eide, 2011).

Researchers have demonstrated that virtually ALL children can learn to read English when taught correctly.

With as little as 8 weeks of intensive phonics training, the brains of struggling students begin to develop, and previously inactive areas of the brain begin to function like those of "readers".

The Science of Reading can be built into Tier 1 instruction, then the instruction can be intensified to facilitate the learning needs of Tier 2 & 3 kiddos, and we will dive into that in the second half of this course.



Universal Screening - Imagine a world where responsible and responsive teaching addressed these reading needs before they became social issues.

If ALL kids were screened for the "holes" that are known to be barriers to literacy success, then evaluations would be far less necessary. Evaluations could be reserved for the kids struggling most and guide the most intensive support.

DSM has provided criteria for a Dyslexia diagnostic. It is also the basis for school-based eligibility for Specific Learning Disability. This section will specifically talk about the variants of evaluations. We will talk about school-based support and IEPs at the end of the course.

As was mentioned in previous sections, Dyslexia has diagnosis criteria in the DSM-5. The DSM gives us the generic term "Specific Learning Disability (SLD)". The DSM considers SLD to be a type of Neurodevelopmental Disorder that impedes the ability to learn or use specific academic skills (e.g., reading, writing, or arithmetic), which are the foundation for other academic learning. The learning difficulties are 'unexpected' in comparison to other aspects of development which seem to be fine. DSM also includes reading, math, and writing under the term of Specific Learning Disability. Dyslexia becomes an integrative diagnosis.

**THE DSM has 4 criterion points including:**

- Criterion A persistence of difficulty for at least 6 months.
- Criterion B measurement of those characteristics (the affected academic skills are substantially and quantifiably below those expected for age AND cause impairment in academic activities).

- Criterion C is related to the age of onset, and this varies among individuals.
- Criterion D specifies which disorders (Intellectual Disabilities, uncorrected auditory or visual acuity problems, other mental or neurological disorders) or adverse conditions (psychosocial adversity, lack of proficiency in the language of instruction, inadequate instruction) must be ruled out before a diagnosis of SLD can be confirmed.

DSM omitted an IQ qualifier in the fifth edition, as we know that IQ is not a factor in one's ability to achieve reading and writing skills.

The gist of clinical definitions and school-based criteria for Dyslexia are related to an unexpected gap in the application of literacy skills when compared to other areas of development.

A clinical practitioner can make a diagnosis. This is typically a neuropsychologist or a speech pathologist. Doctors do not typically have the resources to test for dyslexia, and eye doctors are not the appropriate experts for this diagnosis.

It is the school's job to determine the educational impact of a disability. Many kids attend public school with a clinical diagnosis of a disability but are also able to attend to their education quite well. While others need some or significant accommodation or modification to access a typical education.

Different professions will give different diagnoses. A Speech Pathologist will most likely call it a phonological disorder (this has an insurance billing code).

A clinical neuropsychologist will call it Dyslexia, or a Learning Disability. They may even diagnose a different condition, and add Dyslexia as a "rider", or secondary consideration.

A school-based psychologist or a concerned IEP team will call it a Learning Disability.

No matter what we call it, systematic, multi-sensory PHONICS instruction is the most efficient way to correct these difficulties!

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### Elements of a Dyslexia Evaluation

A Psychological Evaluation typically includes:

- IQ Testing (specifically looking for lower than average scores in Auditory Processing).
- Broad Range Academics
- A Neuropsych evaluation may also look at ADHD scales, Autism scales, etc. (Based on parent expressed concerns).

If the testing specialist is familiar with Dyslexia they would also do a CTOPP-2 to measure phonological processing.

Speech Pathologists (SLPs) can also make a diagnosis of a Phonological Disorder. They will typically administer assessments like:

- CTOPP-2 (auditory processing)
- CELF (language processing)
- Other profession-specific articulation, and language tests to make a diagnosis.

Since Dyslexia is not a billable code, the evaluation will most likely be billed under a different code, and a diagnosis will emphasize a primary diagnosis, with Dyslexia as a rider or secondary.

When sorting through an evaluation and diagnostic criterion, we know that while a large portion of the population struggles to read, there are a lot of factors that contribute to this; including visual processing problems, slow learning profiles or other intellectual disabilities, or developmental delays.

What is more typical for a person with Dyslexia is to have an average or above average IQ with deficits in Phonological Awareness (rhyme, alliteration, differentiating individual letter sounds in words), Verbal Memory (or auditory working memory), using novel verbal info and repeating it, and verbal processing speed.

When reviewing results from an evaluation, be sure to look at the scores in areas of phonological processing, rapid automatic naming, auditory working memory, and orthographic processing in comparison to other areas of intelligence and achievement.

**Phonological Processing:** The use of the sounds of one's language (i.e., phonemes) to process spoken and written language (Wagner & Torgesen, 1987).

**Rapid Automatic Naming:** Rapid automatized naming (RAN) is the ability to quickly name aloud a series of familiar items.

**Auditory Working Memory:** Is a virtual 'workspace' in our mind. It's where we temporarily store sounds we hear as we try to make sense of them. This working memory is crucial in so many daily tasks like solving problems, learning, following instructions, and more.

**Orthographic Processing:** The ability to visually recognize and remember written words and parts of words. It includes the ability to immediately recognize letter sequences and patterns and to spell phonetically irregular words.

But, what if an evaluation is hard to get?

There may be a barrier of cost, time, or location, or the barrier could be social and the people advocating for the child are being dismissed.

At the school level -

It is possible to identify potential reading problems in young children even before the problems turn into reading failure.

Screenings should be used with all children in a school, beginning in kindergarten, to locate those students who are "at risk" for reading difficulty.

Preventative intervention should begin immediately, even if dyslexia is suspected. How the child responds to supplementary instruction will help determine if special education services are justified and necessary.

While an RTI process should not hold up a special education evaluation, acting quickly with intervention based on screening is responsible and ethical.

**Universal screening** is a critical first step in identifying students who are at risk for experiencing reading difficulties and who might need more instruction.

When we act with DECISION we are proceeding with DETERMINATION! (Decision originally comes from the Latin word "decidere" meaning determine).

I don't know about you but I am determined to change history through literacy!

## Universal Dyslexia Screening

Warning signs:

- Speech Delays
- Difficulty Rhyming
- Mispronounced Words
- Struggles with word retrieval
- Trouble following multi-step instructions.
- Difficult time learning letters, colors, and days of the week.
- Struggles with sequencing events.

Grade	Measure
Kindergarten	Phonemic awareness measures (especially) measures of phoneme segmentation)
Grade 1	Fluent word recognition Nonword (pseudo word reading) Oral reading fluency (connected text)
Grade 2	Fluent word recognition Oral reading fluency

We know that Dyslexia is highly related to phonemic awareness skills and measured through a phonological processing test, like PAST or Heggerty.

We also know that these phonological deficits are often overlooked, and Dyslexia is not picked up as a concern until decoding and fluency skills are suffering.

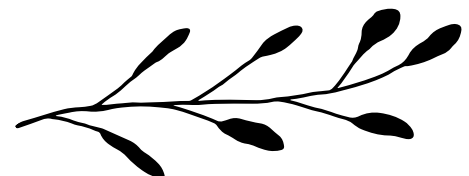
All kids should be given a Universal Screening, a phonological processing test.

After Kinder, it is also appropriate to include a Phonics Screening tool, like CORE, to guide instruction within the boundaries of the lesson plan. Using a phonological screening tool, PAST, in collaboration with a phonics screening tool, CORE, will paint a very comprehensive picture of a student's struggles at the Decoding level.

Simply giving a DRA or fluency test, looking at rate and comprehension is not going to allow you to know anything more about a student, except that they are struggling to read. And then, you are still left wondering how to support that student.

Using the proper screening tools you will then uncover the deficits preventing fluency of decoding.

Language Comprehension is the by-product of all the vocabulary taught in content areas throughout the day.



So now you want to know what to test, how to test, and when to do it. This chart is a section of the IDA's recommended testing by grade level.

Grade	Measure
Kindergarten	Phonemic awareness measures (especially measures of phoneme segmentation)
Grade 1	Fluent word recognition Nonword (pseudo word reading) Oral reading fluency (connected text)
Grade 2	Fluent word recognition Oral reading fluency

Kinder testing is oral, looking at phonological skills - rhyme, alliteration, segmenting, and blending. (You say a word, and they give the sounds)

1st grade -Learners are beginning to connect alphabetic principle to phonics skills. testing at this point includes word attack, and fluency skills within various phonics concepts like CVC, CCVC, etc.

Once a skill has been mastered it does not need to be tested anymore. If a skill is deficient, interventions should be implemented, and continue following a sequence and tested through mastery.

If you are screening an entire class or grade level, you will see a deviation in skills, and kids will form natural groups based on how they score. This drives your instruction, your centers, your interventions, and your homework choices.

I have attached the PAST screening tool to this presentation. It is easily available online, and it is FREE.



All of that is to say:

## UNIVERSAL SCREENING IS SIMPLY A PHONOLOGICAL PROCESSING TEST.

Phonics Screeners should be introduced later, after the skills have been introduced.

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### Accommodations are key!

- Extended time
- Tests read aloud
- Audiobooks
- No spelling tests
- Peer note taker
- Avoid open ended questions
- Sentence frames
- Separate place for testing
- Change response mode
- Outline of lessons provided
- Graphic Organizers
- Use cues to denote importance
- Turn paper vertically for math
- Assignment substitutions

