

Literacy Development

Ros Lugg

Key Questions



- Why do some learners struggle, but others don't?
- How can we stop learners falling through the gaps?
- What can we do to meet the needs of *all* our learners?

A key model developed by the USA National Reading Panel in 2000

Describes the progression of skills as reading develops.

- Sequential
- Cumulative

The 5 Big Ideas in Beginning Reading



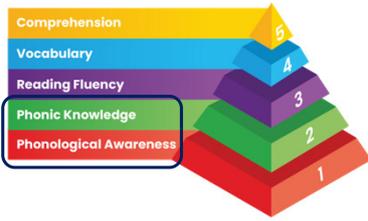
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The 5 Big Ideas in Beginning Reading



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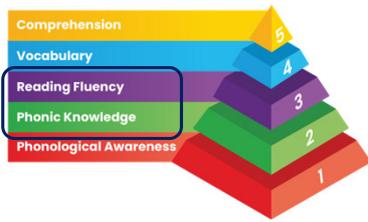
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The 5 Big Ideas in Beginning Reading



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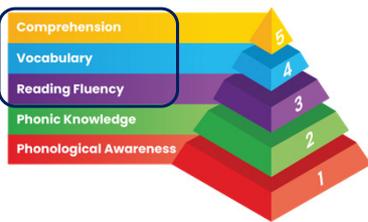
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- Cumulative



The 5 Big Ideas in Beginning Reading



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So why do some learners struggle?

"She's got a reading problem."

"She's got a spelling problem."

Don't look at the symptom – identify the cause!



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Processing and perceptual skills – the Big Five

Motor
Development 

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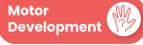
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Handwriting Research

Children not only learn to read more quickly when they first learn to write by hand, but they also remain better able to generate ideas and retain information.



Processing and perceptual skills – the Big Five



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Sequencing

Literally putting things in order:

Letters in a word

Words in a sentence

Ideas in a story

Stages in a plan

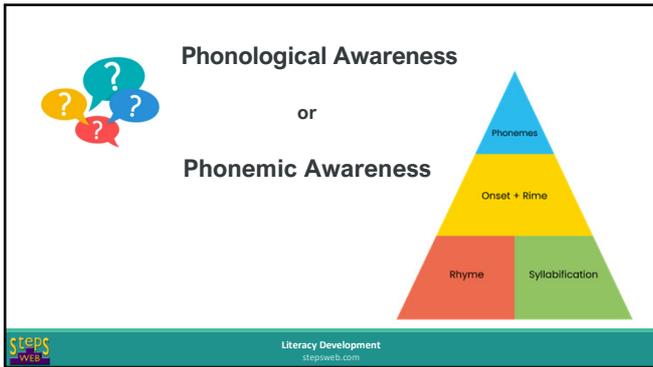


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Processing and perceptual skills – the Big Five



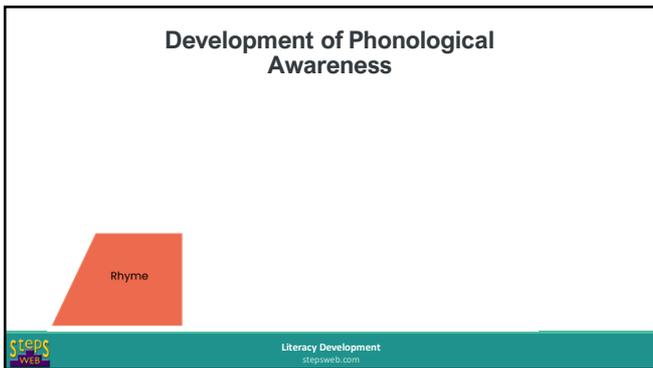
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Phonological Awareness
or
Phonemic Awareness

Phonemes
Onset + Rime
Rhyme Syllabification

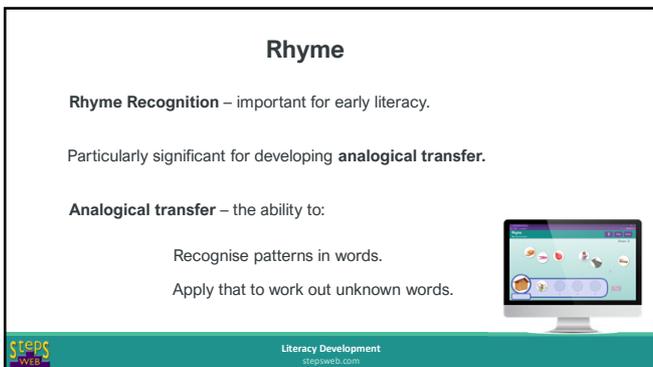
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Development of Phonological Awareness

Rhyme

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Rhyme

Rhyme Recognition – important for early literacy.

Particularly significant for developing **analogical transfer**.

Analogical transfer – the ability to:

- Recognise patterns in words.
- Apply that to work out unknown words.



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Predictors of Reading Success

USA Study – 1960s



Research Question: What are the key predictors of reading success or failure at age 3-5 years?

Looked at a number of aspects, including:

- Intelligence**
- Speech/language abilities**
- Attention span**
- Motor skills**
- Phonological processing**

Findings:

Phonological awareness is the key predictor of reading success for this age-group.

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Predictors of Reading Success

Bryant & Bradley (1983)



Research Question: Which aspects of phonological awareness are the most significant?

Tested 400 4-5 year-old pre-readers on a range of phonological skills.

Tested them on reading and spelling 4 years later (aged 8-9)

Findings:

Rhyme recognition is the key predictor of reading success for this age-group.

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Later studies

More recent research studies have identified phonemic awareness as being a crucial predictor.

However, this was at age 6 when children had already received phonological and literacy teaching.

Key point: Phonemic awareness is not a natural stage of phonological awareness. It is a result of correct literacy teaching.



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Important Quote

“The majority of preschoolers can segment words into syllables. Very few can readily segment them into phonemes.

The more sophisticated stage of phoneme segmentation is not reached until the child has received formal instruction in letter-sound knowledge.”

Predicting reading and spelling difficulties (Snowling & Backhouse, 1996)



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Rhyme

Students hear the target picture word and then select pictures which rhyme with that word. They can click on pictures to hear them.



Development of Phonological Awareness

Rhyme

Syllabification



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Syllabification

Auditory Syllabification – the ability to break spoken words into 'chunks'.

rember

Syllabification Rules – how to break written words into syllables.



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Auditory Syllabification



= The ability to hear the beats (syllables) in a word.

Easy way to teach it:

Hold your hand under your chin and say the word.

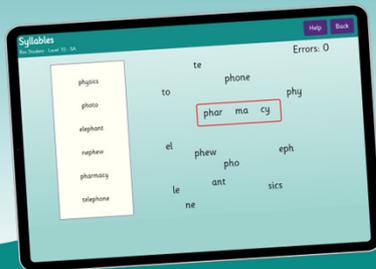
The number of times your chin touches your hand is the number of syllables.

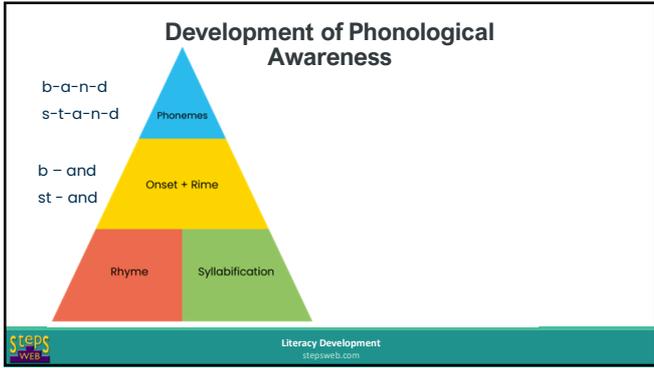


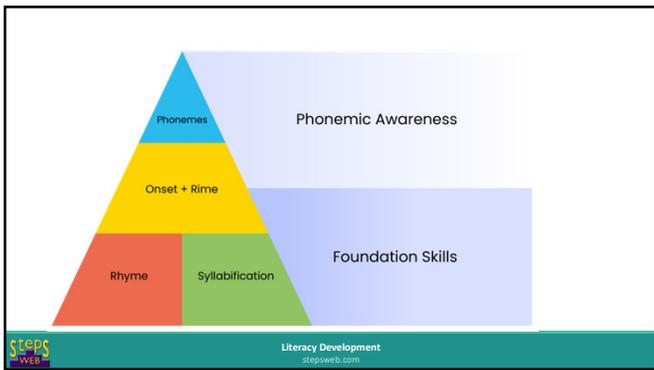
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Syllables

Students join syllables together to form words.







Rhyme or Rime?

<p>f - eet</p> <p>m - eet</p> <p>sh - eet</p> <p>tw - eet</p> <p>str - eet</p>		<p>bed head said</p> <p>bed led red</p>
--	--	---

rhyme = sound pattern

rime = spelling pattern

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Development of syllabification

sentences → words
 words → syllables
 words or syllables → phonemes

onset str ing rime



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Development of syllabification

sentences → words
 words → syllables
words → onset + rime
 words or syllables → phonemes

onset str ing rime



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Onset + Rime

 cat  hat  rat

Breaking words into two 'chunks' is significantly easier than breaking it into individual phonemes (sounds).

string

Anything between 2 and 6!



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Individual phonemes: s - t - r - i - ng
(sounds)

Onset + Rime: str - ing



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Onset + Rime

Breaking words into **onset + rime** is a natural stage of phonological awareness. Breaking words into **phonemes** only occurs as a result of literacy teaching.

The **onset + rime** stage is linked with later **orthographic mapping**.



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Sound Chunks

Students hear the onset and rime of a word (beginning and end chunks). They mentally blend these and click on the correct picture.



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Individual phonemes

Not a natural stage in the development of phonological awareness.

Dyslexic learners in particular will struggle with this activity.



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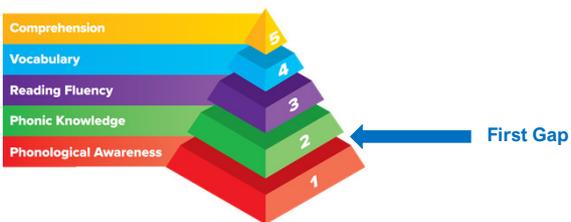
Word Ladder

Students are given a word and asked to change it into another word by swapping sounds.



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So where are the gaps?



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Processing and perceptual skills – the Big Five

Motor Development 

Sequencing 

Phonological Awareness 

Visual Perception 

Visual perception

- Visual Discrimination
- Visual Memory
- Visual-Spatial Relationships
- Visual Sequential Memory
- Visual Closure
- Visual Figure-Ground



Visual perception – aspects related to literacy

- **Visual Discrimination**
- **Visual Memory**
- Visual-Spatial Relationships
- **Visual Sequential Memory**
- Visual Closure
- **Visual Figure-Ground**



Visual discrimination

The ability to notice and identify visual detail.

b / d confusion - *is the word 'big' or 'dig'?*



Visual memory

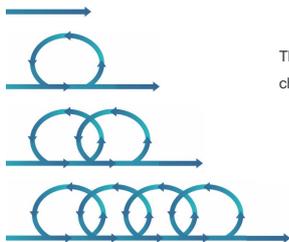
An average reader needs only 4-10 exposures to a word to fix it into long-term memory.

A dyslexic learner may need 500 – 1300 exposures!

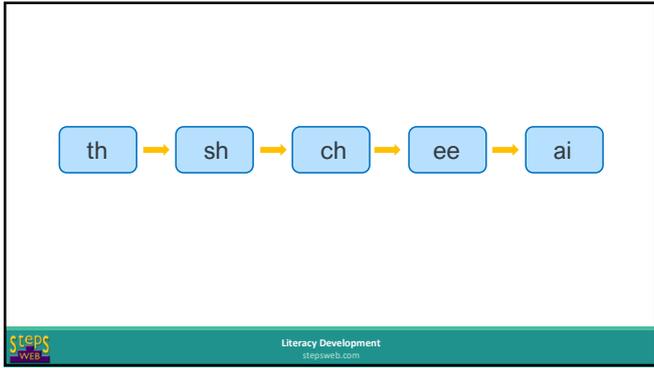


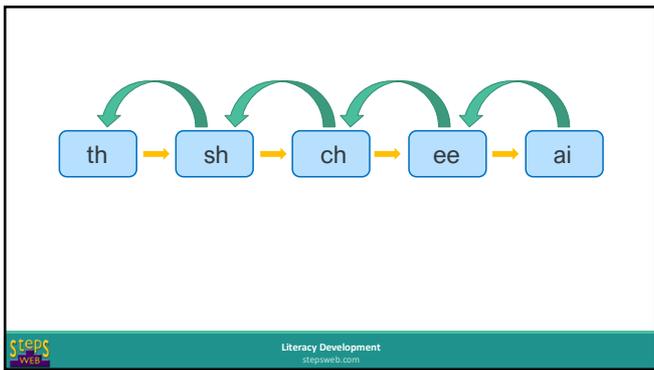
(Bateman, B., 1991)

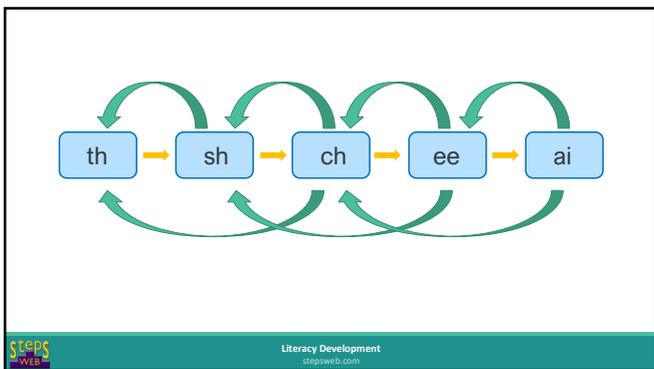
The Circular Progression

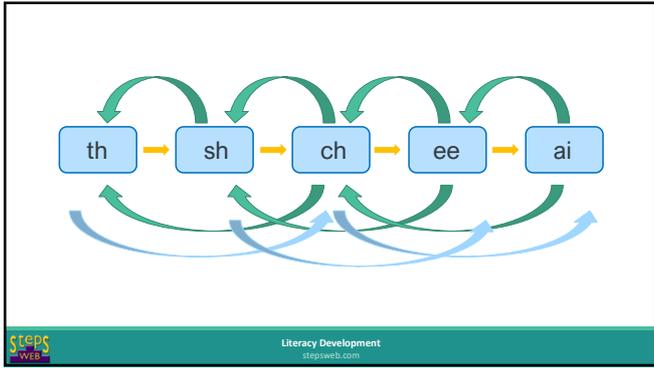


The importance of constantly going back, re-checking and, if necessary, re-teaching









Visual Figure-Ground

The ability to identify visual detail from a 'busy' background.

Many readers – particularly those with dyslexia, find it difficult to process visual detail with a busy background.

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Processing and perceptual skills – the Big Five

Problems with these are associated with:

Phonological Awareness

Poor decoding and spelling

Visual Perception

Poor sight vocabulary

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Processing and perceptual skills – the Big Five

Motor Development

Sequencing

Phonological Awareness

Visual Perception

Memory (working)

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Memory

Visual Memory

- Visual memory
- Visual sequential memory
- Auditory sequential memory
- Working memory
- Long-term memory and retrieval

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Memory Strategies

- Repetition
- Chunking
- Associating words with letters

Inner voice!

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Personal Observations!



Struggling learners often don't automatically understand memory strategies.

Therefore:

We need to specifically teach memory strategies.

We need to incorporate memory activities into our modern curriculum.

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Key phases of literacy development

Ehri, L. 1985

Logographic Phase

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Logographic Phase

Typically 3-5 years of age

Logographic Stage

A young learner may be able to read a *tiny* number of very high frequency words or words with a particular significance - their own name, for example.

Only using visual recognition. This learner doesn't yet have the phonemic skills and phonic knowledge to decode words.

Won't be able to read unknown words.

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Logographic Phase

Typically 3-5 years of age

Logographic Stage

Also likely to be confused with words of a similar shape.

David

Daniel

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Key phases of literacy development

Ehri, L. 1985

Logographic Phase

➔

Alphabetic Phase

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Alphabetic Phase

Typically 6+ years of age

Alphabetic Stage

The learner is acquiring key skills and knowledge:

- Phonemic Awareness
- Phonic Knowledge

Using those skills to learn to **decode** (read) and **encode** (spell).

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Phonemic Awareness

The awareness of individual sounds in words.

Alphabetic Stage



"Can you hear the sounds in cat?" **c - a - t**



"What is the first sound in rabbit?" **r**

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Phonemic Awareness

The ability to 'manipulate' individual sounds in words.

Alphabetic Stage



"Take the first sound away from cat and what do you get?" **-at**

"Take away the 'c' and add 'b' instead. What do you get?" **bat**



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Phonic Knowledge

Knowing what letter or letters go with each sound.

Alphabetic Stage



"What sounds can you hear in this word?"

"Let's see if we can write those sounds"

f

igh

t

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Phonic Knowledge

Much more complex than alphabet knowledge!

How many letters do we have?

26



How many sounds do we have?

44



Alphabetic Stage

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Alphabetic Phase

So what can we expect a learner in this phase to be able to do?

Read unknown words – providing they're reasonably regular!

Write unknown words.

Alphabetic Stage

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Alphabetic Phase

Errors are likely to be phonetically correct.

coff cough



Alphabetic Stage

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Alphabetic Phase

Alphabetic Stage

Main reading strategy: conscious decoding



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Key phases of literacy development

Ehri, L. 1985

Logographic Phase

Alphabetic Phase

Orthographic Phase

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Orthographic Phase

Orthographic Stage

So what can we expect a learner in this phase to be able to do?

Be aware of the more complex phonic patterns and be able to use them for reading and spelling.

Recognise words automatically without having to consciously decode them.

(Ehri, L., 1998)

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Orthographic Phase

Orthographic Stage

How does this happen?

Competent 'decoders' start to acquire a memory for common patterns, which no longer need to be consciously decoded.

Once a new word has been decoded for the first time, the word or letter pattern is associated with (mapped to) similar patterns in long-term memory.

(Kilpatrick, D., 2015)


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Orthographic Phase

Orthographic Stage

This process is known as **Orthographic Mapping**.

Crucial for reading fluency and, hence, vocabulary acquisition and comprehension.

(Kilpatrick, D., 2015)


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Key phases of literacy development

Ehri, L. 1985

Logographic Phase

Alphabetic Phase

Orthographic Phase

Visual recognition – tiny number of words.

Ability to decode regular words.

Visual recognition of words without conscious decoding.


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Orthographic Phase

Orthographic Stage

Key points:

Orthographic Mapping is essential for reading fluency.

Dehaene & Cohen 2011


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Orthographic Phase

Orthographic Stage

Key points:

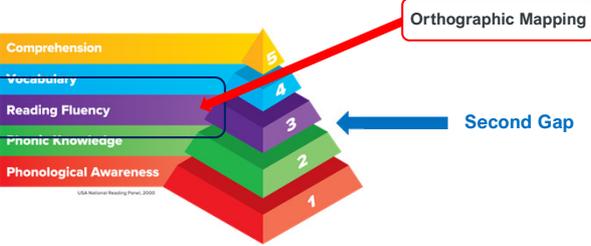
Orthographic Mapping is essential for reading fluency.

If you're still reading by a mainly decoding strategy, you can't effectively follow the sense of the passage.

Decoding is not fun!!!!

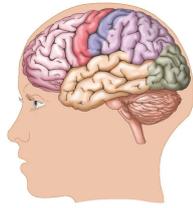

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So where is the second gap?




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Neurological Aspects

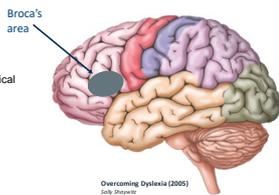


Overcoming Dyslexia (2005)
Sally Shaywitz



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Left hemisphere brain activation



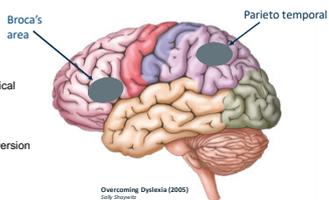
Broca's area
articulation and phonological
processing

Overcoming Dyslexia (2005)
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Left hemisphere brain activation



Broca's area
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Parieto temporal
grapheme/phoneme conversion

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Left hemisphere brain activation

Broca's area
articulation and phonological processing

Parieto temporal
grapheme/phoneme conversion

Occipito temporal - VWFA
visual and orthographic encoding - whole-word recognition

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Left hemisphere brain activation

Broca's area
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Neural Signature for Dyslexia

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Neural Signature for Dyslexia

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Compensatory Systems

Non-impaired Dyslexic

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Conclusion

Dyslexic Learners have:
An impaired occipito-temporal (Visual Word Form Area)

They therefore over-rely on the wrong areas:

- Broca's area and parieto-temporal in left hemisphere
- Right hemisphere areas

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Sally Shaywitz

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Consequences

- Decoding areas (over)develop as instruction progresses.
- Wrong reading strategies being employed for fluency.
- Wrong areas of the brain being activated and developed.

Reading fluency never develops!

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Sally Shaywitz



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Correct process

- Learner analyses and reads the word the first few times
- using the *decoding areas of the brain*.
- Neural model of the word is formed
- stored in the *Visual Word Form Area*.
- The word can now be recognised automatically – *without decoding!*

Fluency achieved!



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Understandable Question

*“How do I know when my student starts to use the **Visual Word Form Area** for Orthographic Mapping?”*

Supporting research studies suggest that the **Visual Word Form Area** operates at around 150ms or faster.

It is now possible to measure this speed.



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Visual Recognition Speeds by Age

Age	Low 0 - 19%	Low Average 20 - 35%	Average range 36 - 65%	High Average 66 - 80%	High 81 - 100%
5:00 - 5:11 yrs	700 - 800	600 - 700	450 - 600	350 - 400	50 - 200
6:00 - 6:11 yrs	600 - 800	450 - 550	300 - 400	200 - 250	50 - 100
7:00 - 7:11 yrs	550 - 800	400 - 500	250 - 350	150 - 200	50 - 100
8:00 - 8:11 yrs	450 - 800	350 - 400	150 - 200	100	50
9:00 - 9:11 yrs	350 - 800	300 - 300	100 - 150	50	-
10:00 +	300 - 800	150 - 250	50 - 100	-	-

Exploring the relation between visual recognition speed, teacher literacy assessment and age. Analysis of the StepsWeb Visual Recognition Speed Test for ages 5.0 - 8.8
Cowie S., Plimmer B., & Lugg R., 2017



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Visual Recognition Test Results

Date Taken	Result	Summary
16 Nov 2022	50ms	Age Appropriate
17 Jun 2020	150ms	Low Average
29 May 2019	750ms	Low

Note: For this test, a lower score is better. It represents the amount of time it takes to look at an item or image to identify it. Test results range between 50ms and 800ms.



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Developing Visual Recognition Speed

Not complicated – Plenty of exposure to words!

Creating and reinforcing the neural images of those words.

Practising retrieving and recognising those neural images using the Visual Word Form Area.



Reading

Re-reading!



Word games

Writing



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Developing Visual Recognition Speed

Word Flash
Help Back

shot
frost
strong
plot
cross
cast
drop
song
lost
pond
body
wrong

wrong

Pass

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Automatic Analysis

Personal Details
Date of Birth: 20 Apr 2012

Learning Information
Course Position: Level 7 - Revision 1B
Accent: en-NZ
Mode: Focus
Weekly Goal: 20
Time Required: 30min (school setting)
World Flash Delay: 200ms
Word Grid High Score: 3
Total Diamond Medals: 11
Total Gold Medals: 437
Total Silver Medals: 233

Profile

Level 7

Revision 1B

- kind
- kindness
- weak
- weakness
- cheerful
- cheerfulness
- happy
- happiness
- damp
- dampness

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Developing Visual Recognition Speed

Speedreading

Tuesday	main	month	said	wait	Sunday	stain
again	Monday	week	old	Thursday	chain	sail
paid	Friday	train	snail	rain	mail	Wednesday
Saturday	nail	year	waited	stain	weekend	again

Times:

--	--	--	--	--	--

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Key messages

Lexicographic Phase
Alphabetic Phase
Orthographic Phase

- Need to be aware of what stage our learners are at.
- **Need to teach and develop the foundational skills.**
 - Phonological awareness
 - Phonic knowledge and skills
- Need to explicitly help learners to transition to orthographic mapping:
 - recognition of whole words, without the need to consciously decode.



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Key messages

Lexicographic Phase
Alphabetic Phase
Orthographic Phase

- Need to be aware of what stage our learners are at.
- Need to teach and develop the foundational skills.
- **Need to explicitly help learners to transition to orthographic mapping:**
 - recognition of whole words, without the need to consciously decode.



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Time for questions – or comments

Notes are on the website

Q & As – live now, but will be published on the website

Personal contact: Ros Lugg
ros@stepsweb.com



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