

Orthographic Mapping

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JOURNAL

What is it, exactly?

"Orthographic mapping is a permanent storage system for written words that builds gradually and involves developing phonological awareness and word level reading skills.

Simply put, when you can read a word instantly without putting any effort into decoding it, you know that word has been orthographically mapped into your brain's storage system.

This way, the ability to store words makes reading seem magical because it means we can listen to the story with our eyes and escape into the world of a great book."



What is it, exactly?

"The mental process we use to permanently store words for immediate, effortless retrieval.

It is the process we use to take an unfamiliar printed word and turn it into an immediately recognisable word."

D.Kilpatrick, 2015

Key Point: This is not the same as learning words as purely visual patterns. It relies on understanding the phoneme-grapheme connections and word structure.



So what's a sight word, then?

~~Sight word is one which has been learned purely from its visual pattern.~~

A sight word is a word which has initially been decoded
 - or its phonic structure has been explained.

said **s ai d**

Then it's repeatedly seen until it becomes a sight word – which can be recognised automatically without decoding.

STEPS Orthographic Mapping
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What is Orthographic Mapping?

Orthographic Mapping in the Acquisition of Sight Word Reading, Spelling Memory and Vocabulary Learning

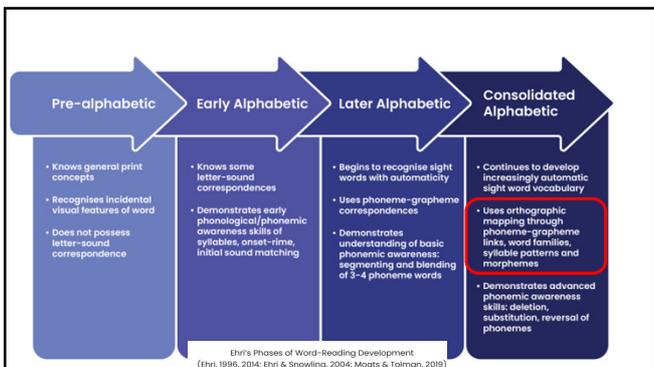
Linnea C. Ehri, 2013

"Orthographic mapping involves the formation of letter-sound connections to bond the spellings, pronunciations, and meanings of specific words in memory.

It explains how children learn to read words by sight, to spell words from memory, and to acquire vocabulary words from print."



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Key phases of literacy development

Frith, U. 1985



Visual recognition
– tiny number of words.

Ability to decode
regular words.

Visual recognition of
words without
conscious decoding.



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Orthographic Phase

Key points:

Orthographic Mapping is essential for reading fluency.

Dehaene & Cohen 2011



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Orthographic Phase

Key points:

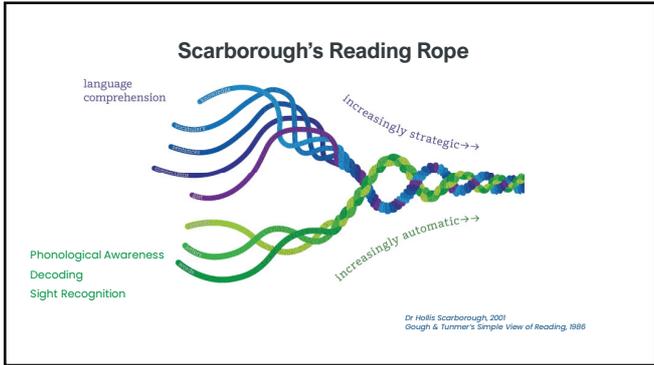
Orthographic Mapping is essential for reading fluency.

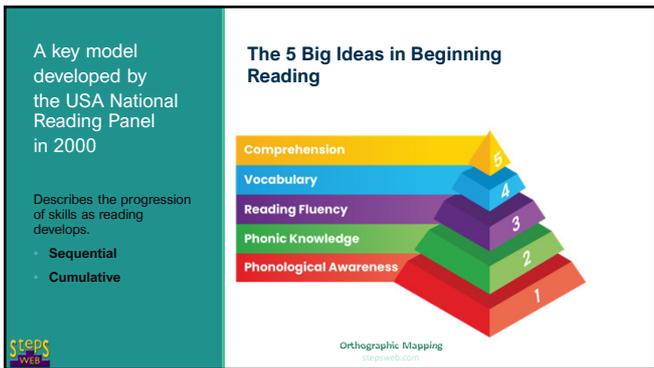
If you're still reading by a mainly decoding strategy, you can't effectively follow the sense of the passage.

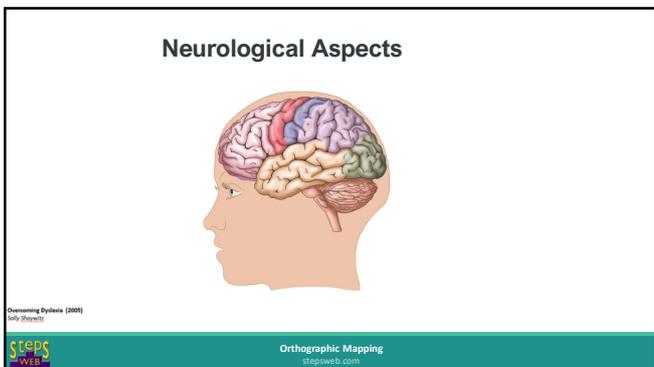
Decoding is not fun!!!!



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Left hemisphere brain activation

Left inferior frontal gyrus (Broca's area) – articulation and phonological processing

Parieto-temporal – grapheme-phoneme conversion

Occipito-temporal – visual and orthographic encoding (whole word recognition). **Visual Word Form Area**

Overcoming Dyslexia (2005)
Sally Shaywitz

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Neural Signature for Dyslexia

Overcoming Dyslexia (2005)
Sally Shaywitz

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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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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!



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.
- Now that the word has been 'orthographically mapped',
it can be recognised automatically – without decoding!

Fluency achieved!



Understandable Question

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

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



Understandable Question

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

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

It is now possible to measure this speed.



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 - 300
6:00 - 6:11 yrs	600 - 800	450 - 550	300 - 400	200 - 250	50 - 150
7:00 - 7:11 yrs	550 - 800	400 - 500	250 - 350	150 - 200	50 - 100
8:00 - 8:11 yrs	450 - 800	250 - 400	150 - 200	100	50
9:00 - 9:11 yrs	350 - 800	200 - 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 - 8.9

Cowin S., Plimmer B., & Lugg R., 2017

Visual Recognition Test Results

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

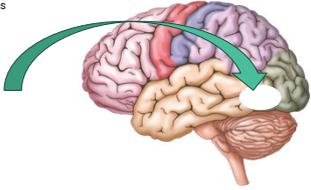
Note: For this test, a lower score is better. ? represents the amount of time a student needed to look at an item to visually recognize it. The color range between 100ms and 800ms.

Word-Reading Development		
Ages	Phonological Skill	Word-Reading
4-6	Early phonological awareness: rhyming, alliteration, first sounds	Letters and Sounds: requires simple phonology to learn sounds that correspond to letters
6-7	Basic phonemic awareness: blending, segmenting	Phonic Decoding: requires letter sound knowledge and blending; a gateway to orthographic mapping
8+	Advanced phonemic awareness: phonemic proficiency including phoneme manipulation	Orthographic Mapping: requires letter-sound skills and advanced phonemic awareness

Also requires visual memory - and visual recognition and retrieval skills

Three Stages of Orthographic Mapping

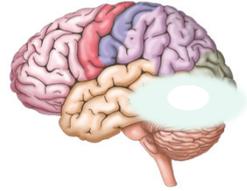
Stage 1 - information in
Primarily phonological process



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Three Stages of Orthographic Mapping

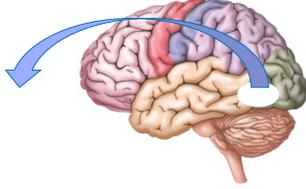
Stage 2 - Information stored
Primarily visual memory



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Three Stages of Orthographic Mapping

Stage 3 - Information out
Primarily visual process



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Automatic Analysis

Profile

Personal Details	Date of Birth: 20 Apr 2012
Learning Information	Course Position: Level 7 - Revision 1B
	Account: en-NZ
	Mode: Focus
	Weekly Goal: 20
	Medal Required: Silver (school setting)
	Word Flash Delay: 200ms
	Word Oral High Score: 3
	Total Diamond Medals: 11
	Total Gold Medals: 437
	Total Silver Medals: 233

Level 7

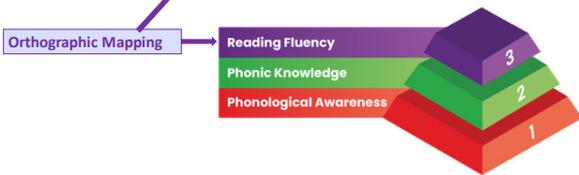
Revision 1B

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

Developing Orthographic Mapping

Most adults have a store of 30,000 – 70,000 words in their Visual Word Form Area

D. Kilpatrick, 2015



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Other key facts

Most readers need 1 – 4 exposures to a word to map that word effectively

Some dyslexic learners can take up to 1300 exposures to add a word to their visual memory!

B. Bateman, 1991



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Developing Visual Recognition Speed

Not complicated – plenty of exposure to words!

Creating and reinforcing the neural images of those words.



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Developing Visual Recognition Speed

So how do we do it?

Developing the process of orthographic mapping – putting words into the VWFA.



Reading

Re-reading!



Word games

Writing



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Developing Visual Recognition Speed

Reading stories

Decodables

But also plenty of other mileage!

Re-reading familiar texts.

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Developing Visual Recognition Speed

Other activities

Word games - Stargame

Word walls!

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Developing Visual Recognition Speed

Speedreading

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

Times:

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Developing Visual Recognition Speed

Word Flash

Specifically develops instant recognition and retrieval

Reading
Re-reading!
Word games
Writing

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Word Flash

Cashlyn Shore - 1-2 Tricky words

Help Back

their
all
for
have
they
him
want
said
but
with
goes
new

Pass

Visual Recognition Speed Test

Significant benefits to educators:

- Identify when a learner is over-reliant on the decoding areas of the brain
- Track progress and identify when they make the transition to using the Visual Word Form Area
- In other words, when they start using orthographic mapping

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Would you like to trial this test?

This is how you do it (if you don't already have a StepsWeb account):

Go to www.stepsweb.com.

Sign up for an account using the 14-day free trial.

Email me at ros@stepsweb.com and we will extend your free trial.



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