

How does knowledge about word structure support reading and spelling?

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How can we understand evidence on “what works”?



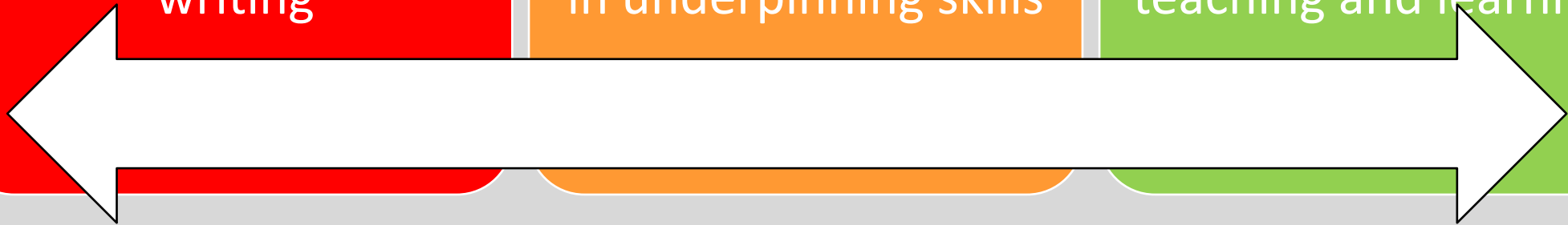
Cognitive processes
during reading and
writing



Development and
individual differences
in underpinning skills



Understanding
applications to
teaching and learning



Word reading and spelling

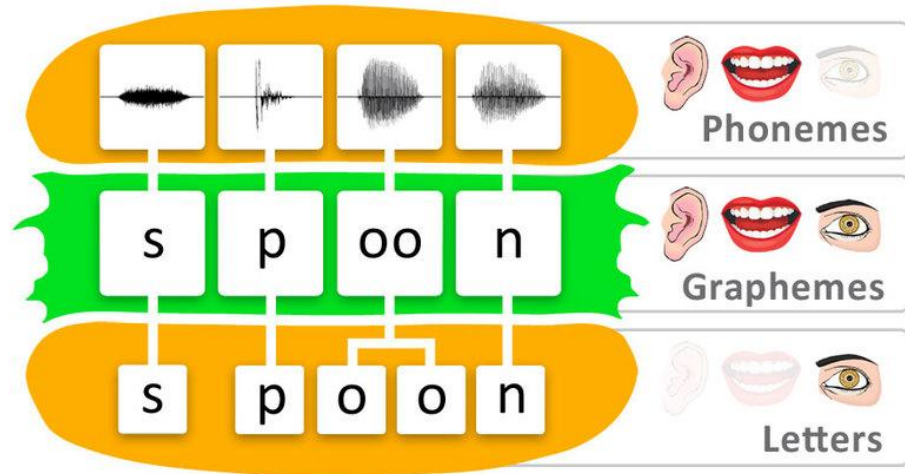
Linking spoken and written forms of language

Phonological skills

Orthographic skills

Associations

Word reading and spelling

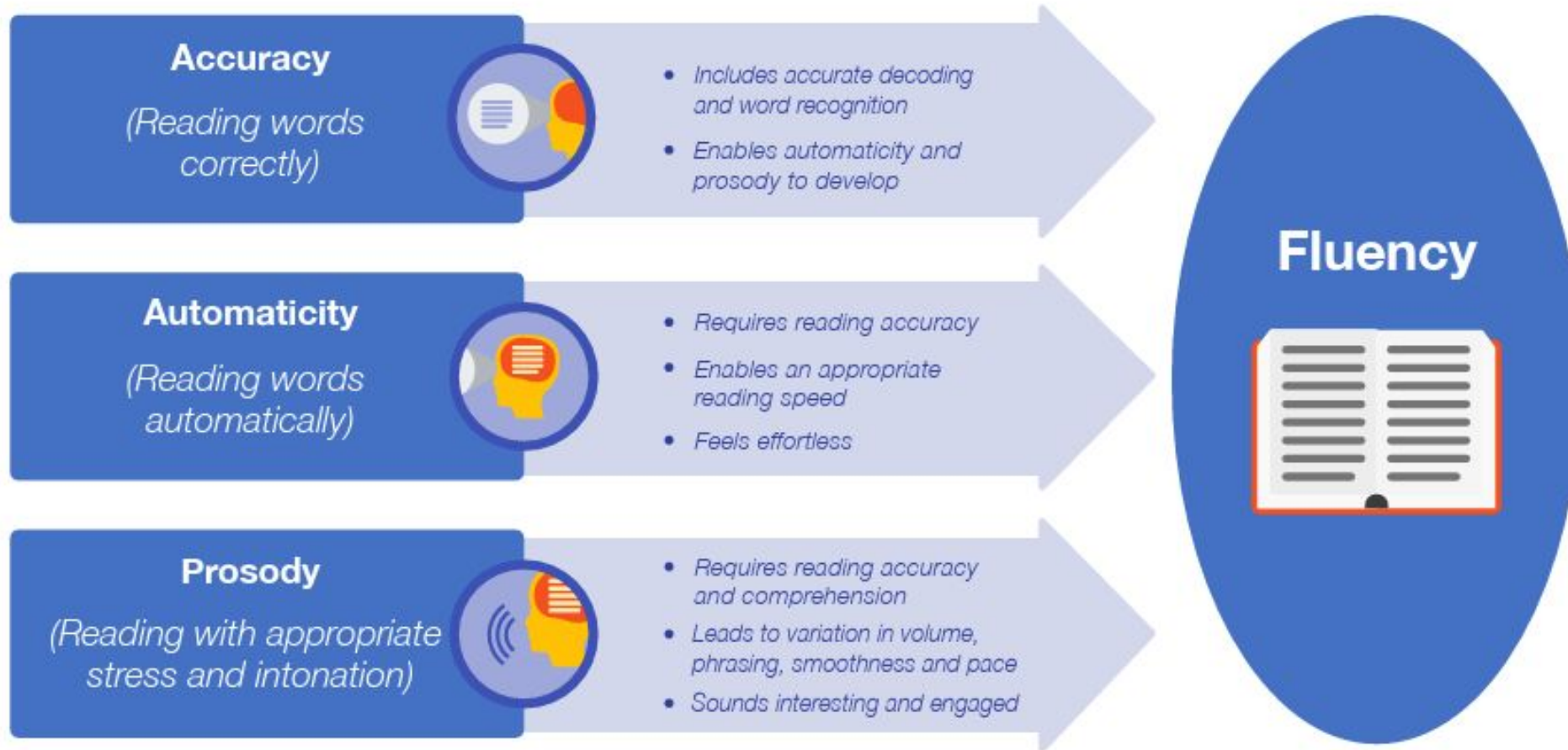


sonix

Systematic Synthetic Phonics:

- Explicit teaching of the most common and reliable associations
- Effective in teaching pupils to decode – decoding is *necessary* but decoding not *sufficient*
- Implementation - should be engaging, include teaching to recognise phonemes, texts to apply and extend learning
- Main methods of initial instruction in England

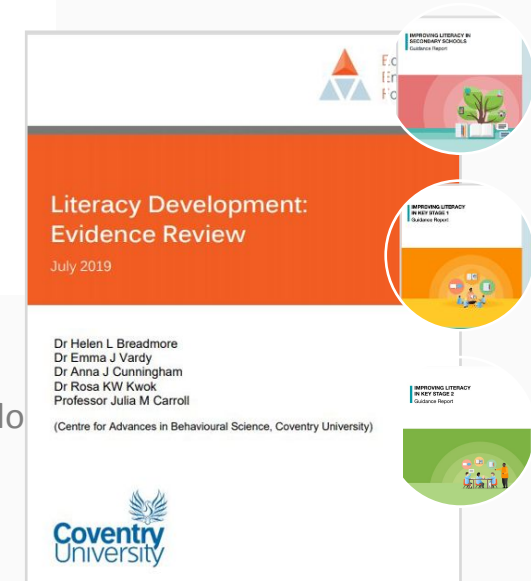
Figure 5: Reading fluency



Bilton, C., & Duff, A. (2021). *Improving literacy in Key Stage 2: Guidance Report*. Education Endowment Foundation, London.

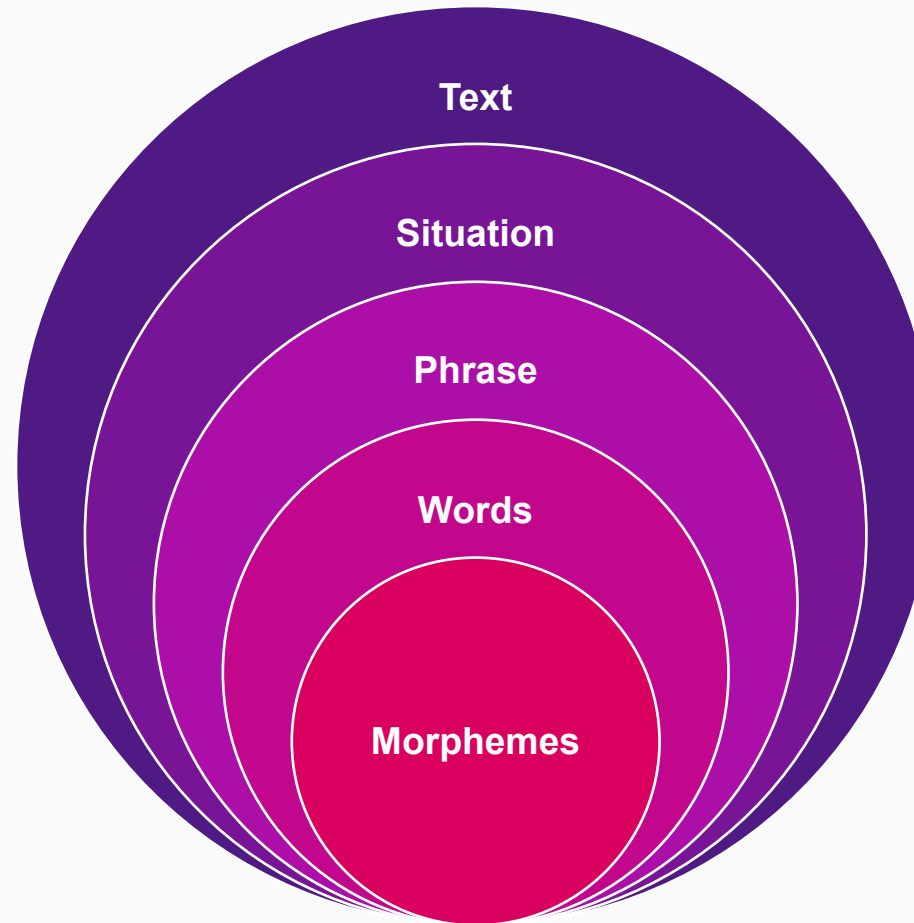
Breadmore, H.L., Vardy, E.J., Cunningham, A.J., Kwok, R.K.W., & Carroll, J.M. (2019). *Literacy Development: Evidence Review*. London: Education Endowment Foundation.

https://educationendowmentfoundation.org.uk/public/files/Literacy_Development_Evidence_Review.pdf

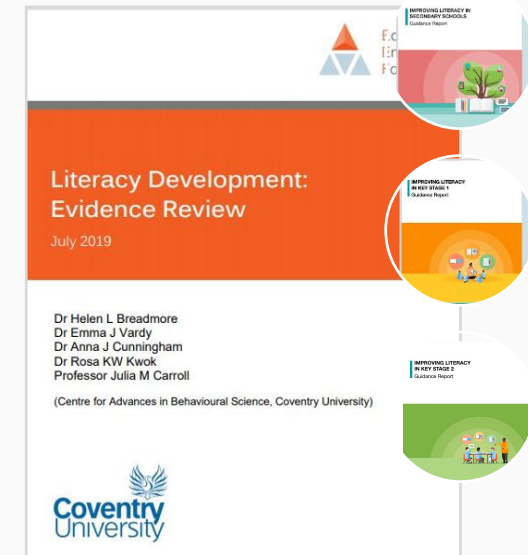


Constructing meaning beyond words

Reading fluency and comprehension

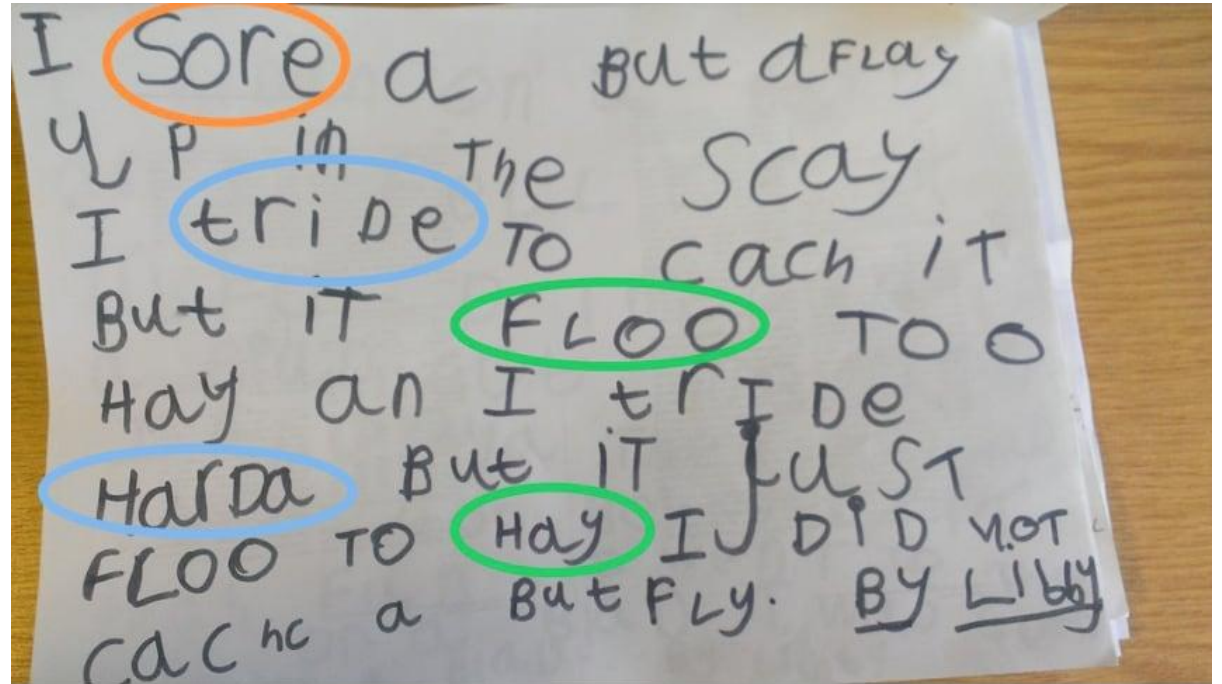


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Phonological encoding is insufficient

- English is a morpho-phonemic orthography
- Spelling requires word specific precision
- Misspellings reveal gaps in knowledge
- Word reading and spelling fluency – accuracy and automaticity



These misspellings all illustrate over-reliance on letter-sound correspondence, without also using other spelling knowledge.

***sore** (saw) is a homophone error – wrong word selected.

***floo** (flew) and ***hay** (high) hasn't used word specific letter combinations (orthography).

***tride** (tried) and ***har da** (harder) hasn't applied knowledge of spellings for inflectional suffixes (morphology).

Orthographic awareness

Position effects

<ck> can't be word-initial

<bb> can't be word-initial

Beginning spellers rarely violate (Treiman, 1997)

*aot contains a rare word-initial vowel combination, but letter-sound knowledge to decode approximates the target (out)

Conditional rules

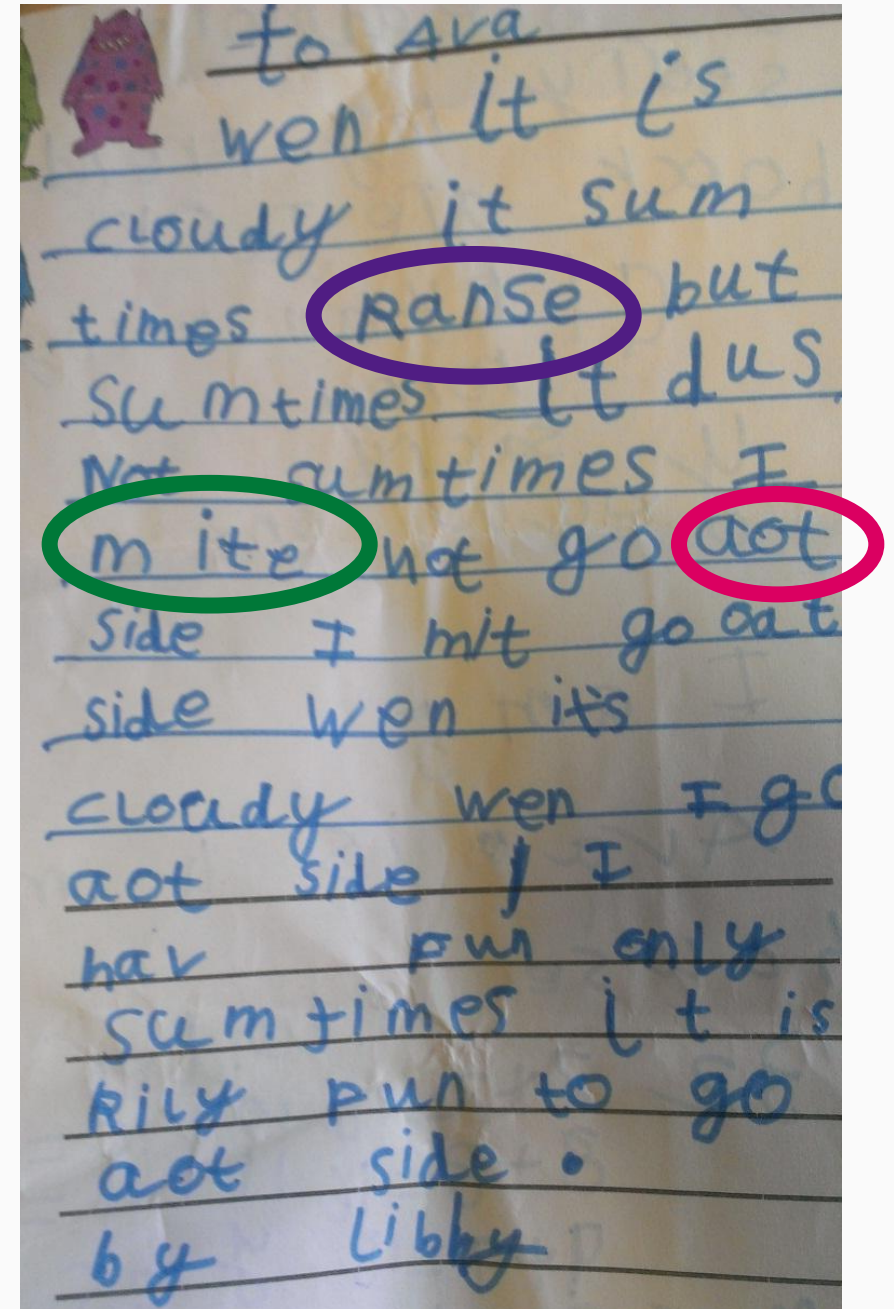
Final e (*mat-mate*)

*ranse uses conditional final e to lengthen the vowel (rains)

*mite also uses conditional final e to lengthen the vowel (might)

Irregular (word) parts and foreign words

Yacht, yak, café



Knowledge about morphology

Dog



s



/z/



/s/



/lz/

Morphology: Meaningful structure of words.

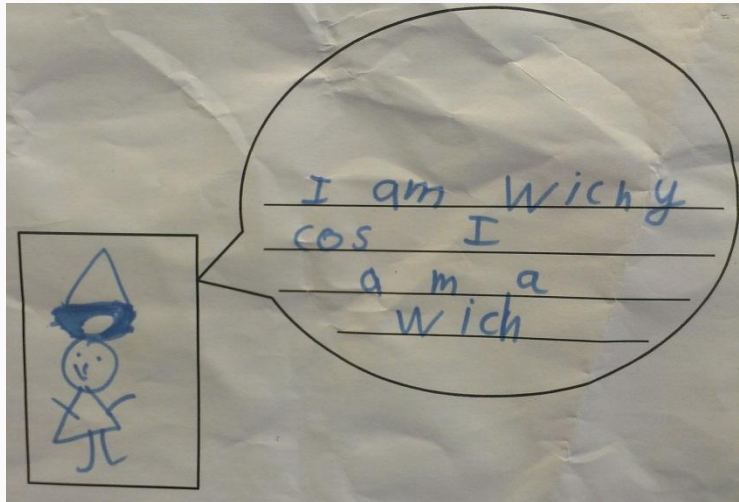
Morpheme: Smallest meaningful unit.

Etymology: origins of meaning



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Morphology is productive



<https://www.oed.com/information/updates/september-2023/new-word-entries/>

Information

- Using the OED
- Understanding entries
- About the OED
- Editorial policy
- Purchasing
- Institutional account management
- Get help with access
- ▼ Updates
 - Platform updates
 - ▼ September 2024
 - ▼ June 2024
 - ▼ March 2024
 - ▼ December 2023
 - ▼ September 2023
- New word entries**
- New senses
- Additions to unrevised entries
 - ▼ June 2023
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New word entries

- **adultification**, n.: "The action or practice of treating children or young people like adults in ways that are considered harmful or abusive, typically by subjecting them..."
- **à la Tartare**, adv. & adj.: "With reference to the preparation or consumption of steak or seafood: uncooked, raw."
- **alt text**, n.: "Text included in the code of a web page which describes the appearance or function of an image, which may be displayed in place of the image when it..."
- **anti-realistic**, adj.: "Tending to reject or transcend realism, esp. in literature and the arts. Also: that advocates a philosophical theory of anti-realism (see..."
- **anti-republican**, n. & adj.: "A person who opposes republicanism or a Republican political party."
- **anti-rightism**, n.: "Opposition to right-wing or reactionary people and opinions."
- **anti-rightist**, adj. & n.: "Opposed to right-wing or reactionary people and opinions."
- **anti-romantic**, adj. & n.: "Opposed to romance, romanticism, or what is romantic."
- **anti-sentimental**, adj.: "Opposed to or avoiding sentimentality; that is the antithesis of what is sentimental."
- **anti-technology**, adj. & n.: "Opposed or averse to technology."
- **anti-terror**, adj.: "That prevents or combats the activities of terrorists; prohibiting the use of political tactics characterized as violent or intimidating."
- **anti-terrorism**, n.: "The policy or position of opposing terrorism; military or political measures designed to prevent or combat terrorism."
- **anti-woman**, adj.: "Hostile to the rights and interests of women; antagonistic to women."
- **anti-women**, adj.: "Hostile to the rights and interests of women; antagonistic to women; = anti-woman, adj. Now frequently in predicative use."



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Morphology is multidimensional

Morphological awareness: Ability to manipulate structure of words.

Morphological decoding disambiguates spelling

Mist – missed

Sign – signature

[Photo][bomb][ing]

Morphological analysis supports vocabulary development, meaning comprehension.

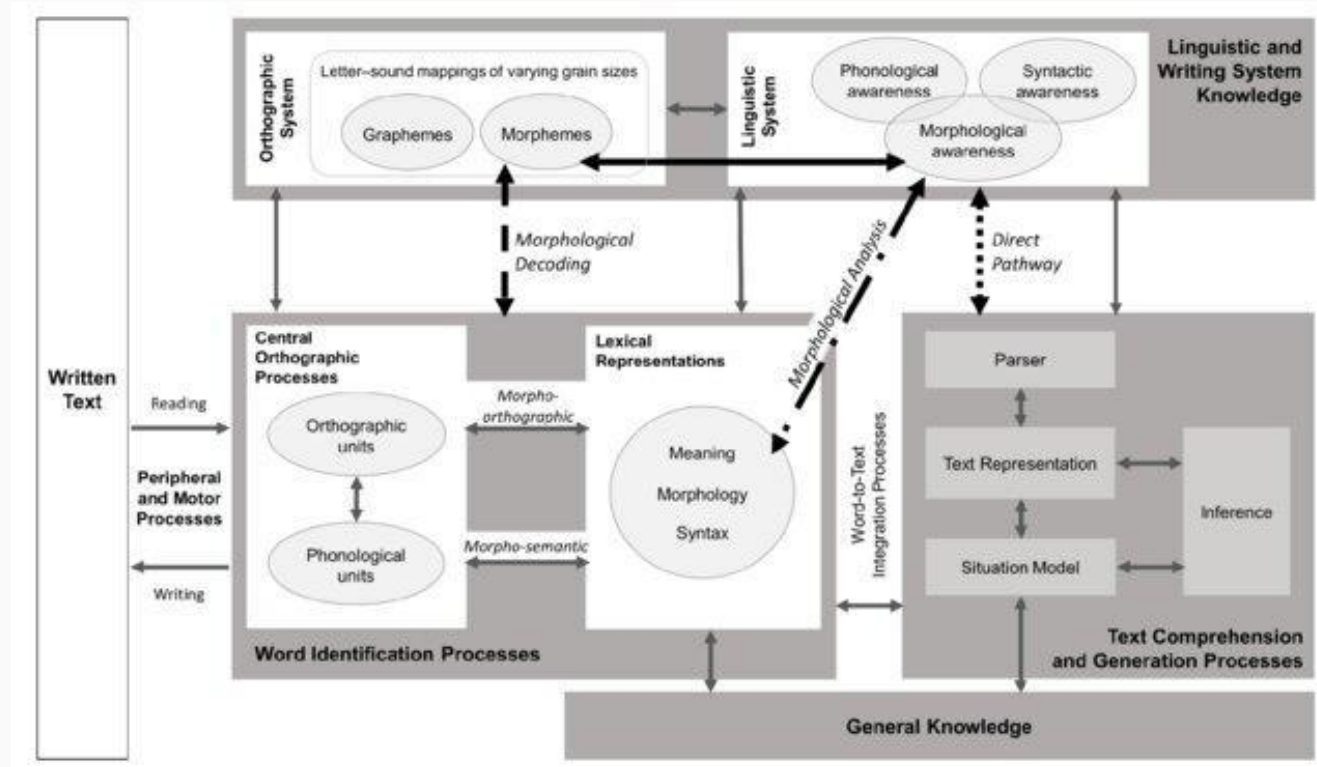
Grammar

part of speech

Agreement

the girl(s) play(s) in the park

“Binding agent” (Kirby & Bowers, 2017)



Levesque, K., Breadmore, H.L., & Deacon S. H. (2021). How morphology impacts reading and spelling: Advancing the role of morphology in models of literacy development. *Journal of Research in Reading*. 44(1). 10-26. <https://doi.org/10.1111/1467-9817.12313>

What does The Reading Framework say about morphology?



Department
for Education

The reading framework

- 7/10 references to morphology are in the glossary
- *“In English and in other lessons, teachers should continue to provide pupils with practice in decoding unfamiliar words from a text they are about to read, both single and multi-syllabic words, and those containing rarer GPCs. They should also explain their meanings, drawing on **morphology** where it is helpful.” p63*
- *“Pupils who need the support to develop fluency... In English and in other lessons, teachers should know who these pupils are and continue to provide them with practice in decoding unfamiliar words from a text they are about to read, both single and multi-syllabic words, and those containing rarer GPCs. They should also explain their meanings, drawing on **morphology** where it is helpful.” p70*
- *“Preparing pupils to read the text... Identify and explain new vocabulary that is essential to pupils’ understanding, first demonstrating how to decode each word, also drawing on its **morphology** and etymology where possible and explaining its meaning in the context of the passage, in pupil-friendly language rather than from a dictionary, without asking pupils to guess.” p105*

What does the national curriculum for English say about Morphology?

Terminology avoided or used inconsistently.

- “Word families” (DfE, 2013 p76)
- “Word endings” focus on sound and orthographic features
“Endings which sound like /ʃən/, spelt –tion, -sion, -ssion, -cian”
(DfE, 2013, p. 62)

Some teachers may lack vocabulary/confidence to discuss morphology

(Cawley et al., submitted, Breadmore et al., in prep)

DfE. (2013). *English programmes of study: key stages 1 and 2 National curriculum in England*. London, UK: Crown Copyright Retrieved from <https://www.gov.uk/government/publications/national-curriculum-in-england-english-programmes-of-study>

Cawley, K. Critten, S., Breadmore, H.L., & Carroll (submitted). “It’s just about printing the list, getting children to copy them”: Teachers’ experiences of the Key Stage 2 national curriculum for spelling and how it is implemented in primary schools.

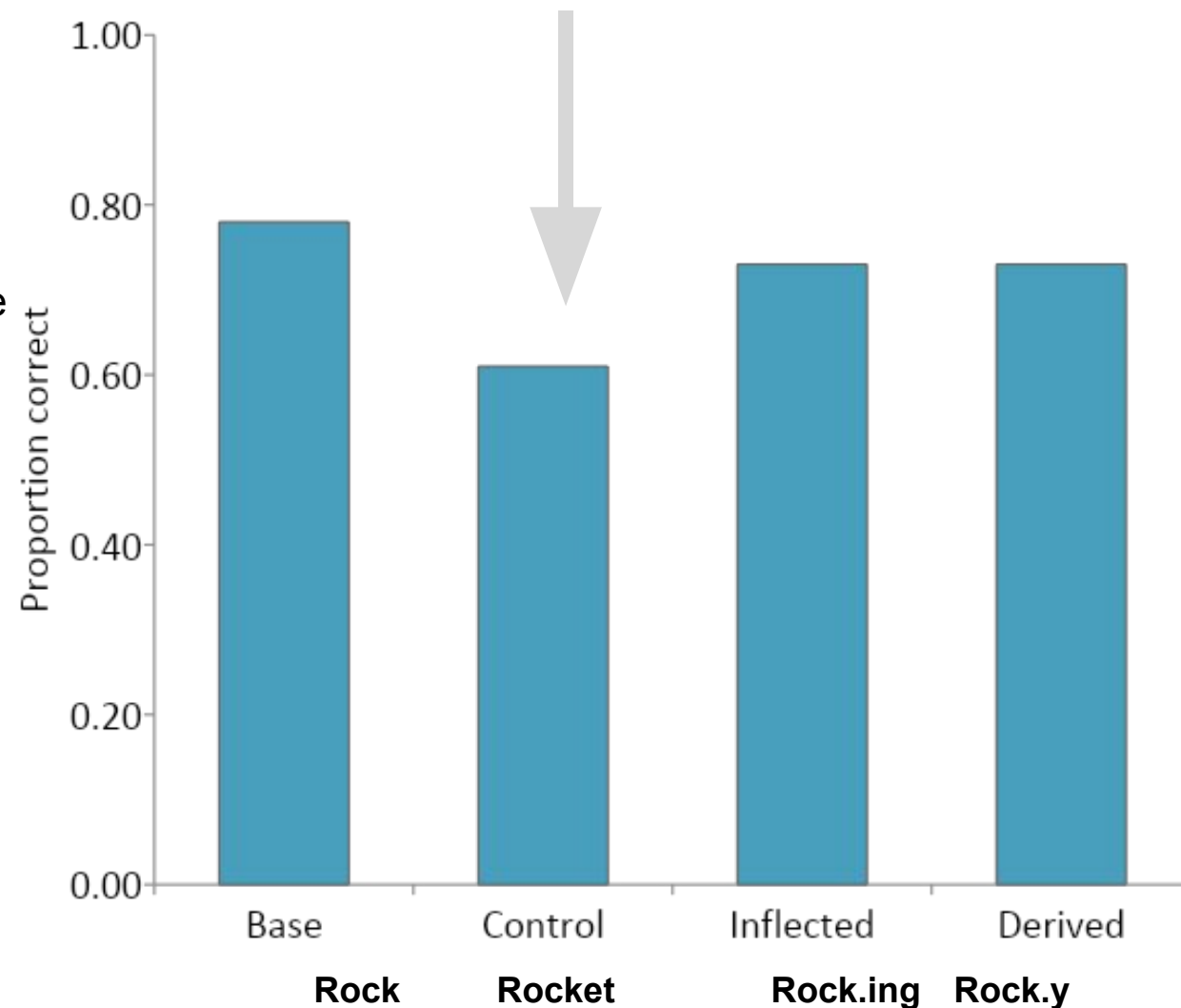
Cognitive processes

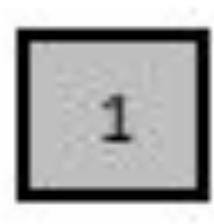
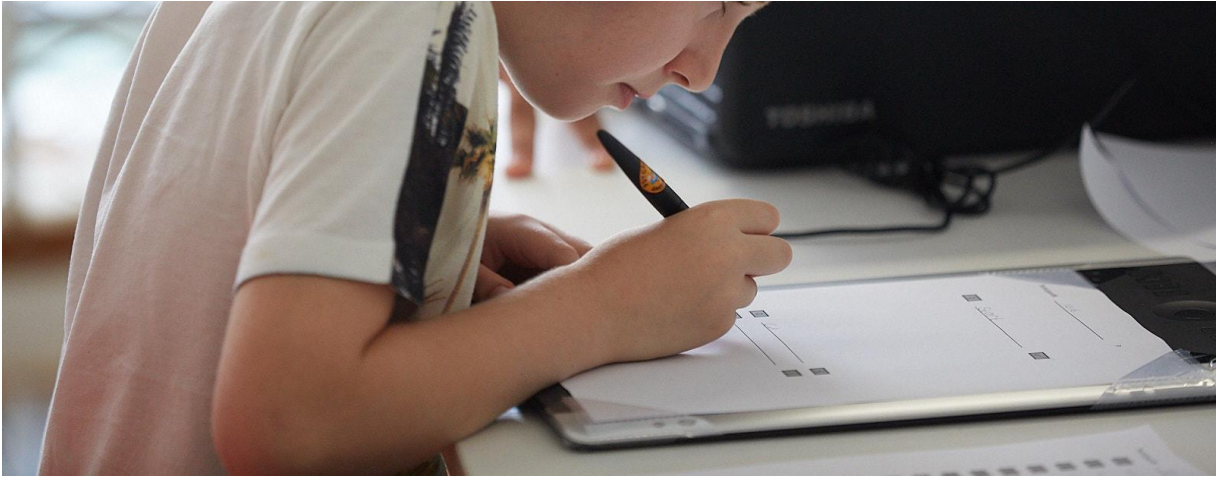
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at <https://doi.org/10.1080/10888438.2023.2186233>

Use morphology in spelling

- Spelling tasks show children, including with low literacy, can use morphemes to support spelling
(Breadmore, 2008; Breadmore et al., 2012; Breadmore & Carroll, 2016)
- 7-year-olds use morphemes (root consistency)
Inflected and derived > accurate than control words
Increases through childhood, approach ceiling at 9 years
(Deacon, 2008; Deacon & Dhooge, 2010)





a r t i s t



Morphological Processing Before and During Children's Spelling

Helen L. Breadmore and S. Hélène Deacon

^aCoventry University; ^bDalhousie University

ABSTRACT

Our understanding of spelling development has largely been gleaned from analysis of children's accuracy at spelling words under varying conditions and the nature of their errors. Here, we consider whether hand-drawn durations can inform us about the time course with which children process morphological information to produce accurate spellings of root morphemes. Six- to 7-year-old ($n = 23$) and 8- to 11-year-old ($n = 25$) children produced 28 target spellings in a spelling-to-dictation task. Target words were matched quadruplets of base, control, inflected, and derived words beginning with the same letters (e.g., *rock*, *rocket*, *rocking*, *rocky*). Groups of children showed evidence of morphological processing during preparation for spelling: writing onset latencies were shorter for morpheme words than control words. The findings are consistent with current learning theories of spelling development and theories of spelling quality that include a role of morphology.

The Timing Tells the Tale: Multiple Morphological Processes in Children's and Adults' Spelling

Helen L. Breadmore , Emily Côté , and S. Hélène Deacon

^aCentre for Global Learning, Coventry University, Coventry, UK; ^bDepartment of Psychology and Neuroscience, Dalhousie University, Halifax, Canada

ABSTRACT

Purpose: Despite abundant evidence that morphemes are important in reading and spelling, little is known about the nature of processing in spelling. This study identifies multiple morphological processes over the time course of spelling, revealing that these processes are influenced by development.

Method: Twenty adults and 46 children (8;0-12;1 years) completed an auditory lexical decision task followed by a spelling task, to explore the effects of morphological structure and cross-modal morphological priming by analyzing handwriting latencies before and during spelling production.

Results: Adults and children both demonstrated morphological processing during lexical access – they were faster to begin to write morphologically complex words (e.g., *artist*) compared to matched monomorphemic controls (e.g., *article*). Adults (but not children) also demonstrated cross-modal morphological priming. Further, adults (but not children) demonstrated the effects of morphological processing during spelling production. Inter-letter latencies were shorter between the last two letters of a root morpheme than the same letters in monomorphemic control words (e.g., *ar* in *artist* compared to *ar* in *article*).

Conclusion: Together, these findings reflect multiple facilitative effects of morphological processing during spelling production – during lexical access and spelling production. This highlights the need for greater integration of morphological processes into theories of skilled spelling and spelling development.



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<https://doi.org/10.1080/08841838.2018.1499745>

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SCIENTIFIC STUDIES OF READING
2023, VOL. 27, NO. 5, 408-427
<https://doi.org/10.1080/08841838.2023.2186233>

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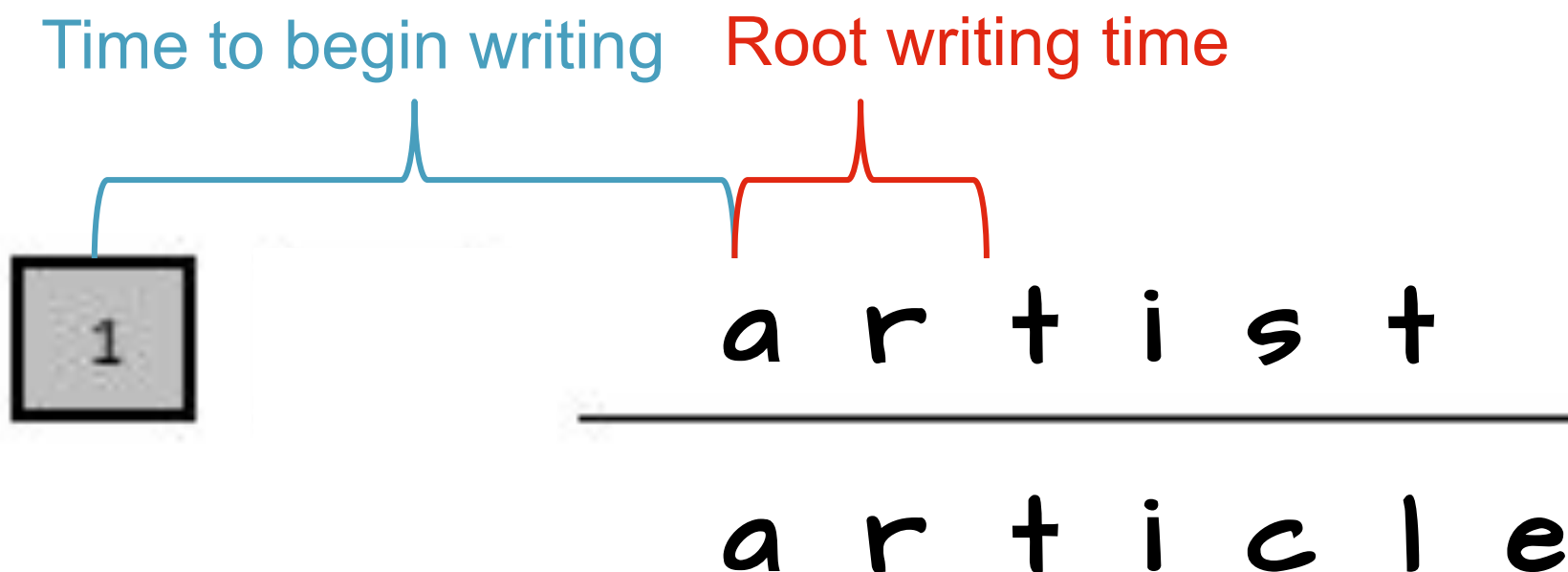
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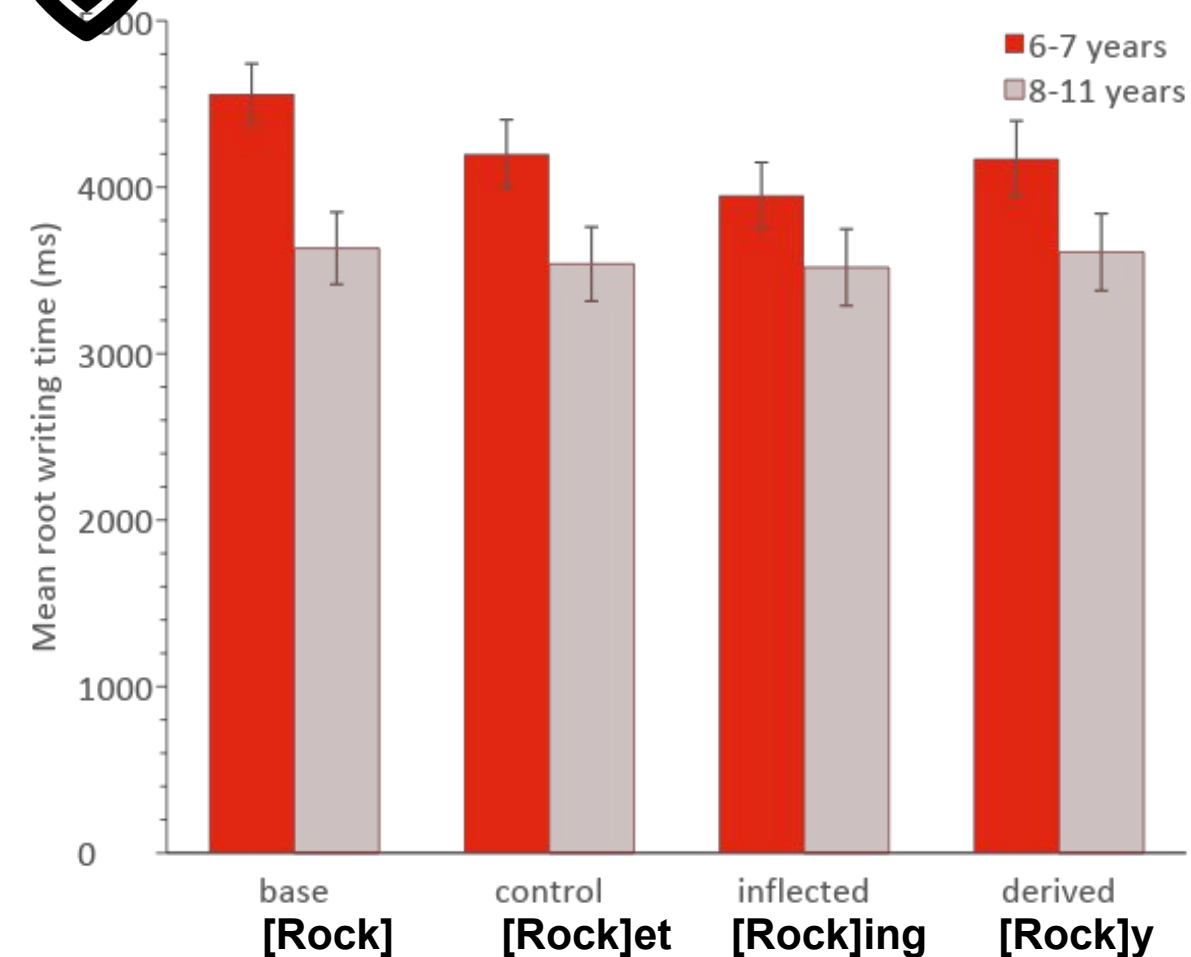
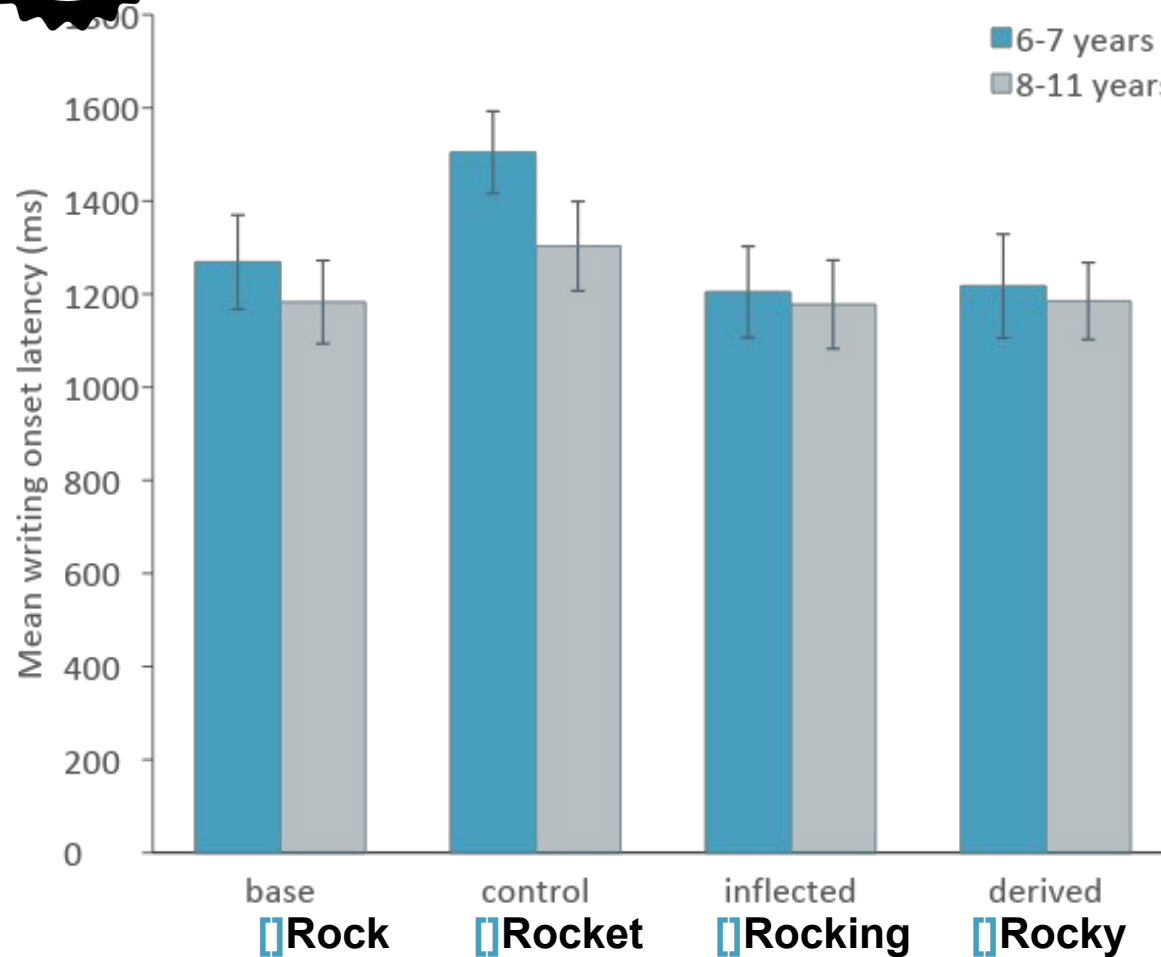
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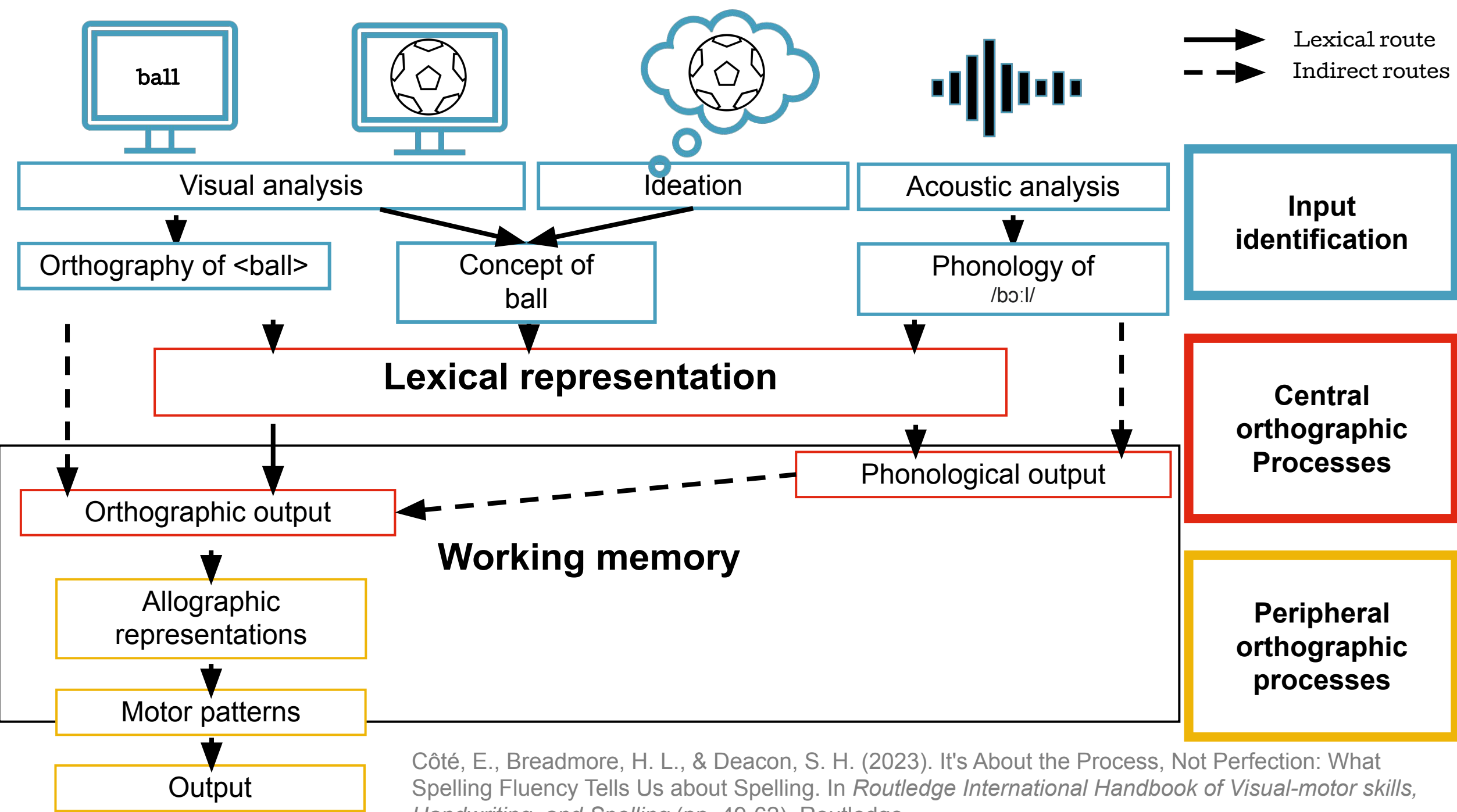
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Morphological Processing Before and During Children's Spelling

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Côté, E., Breadmore, H. L., & Deacon, S. H. (2023). It's About the Process, Not Perfection: What Spelling Fluency Tells Us about Spelling. In *Routledge International Handbook of Visual-motor skills, Handwriting, and Spelling* (pp. 49-62). Routledge.

Priming task:
a r t



Visual analysis

Orthography of <ball>

Concept of
ball

Phonology of
/bɔ:l/

Lexical representation

**Input
identification**

**Central
orthographic
Processes**

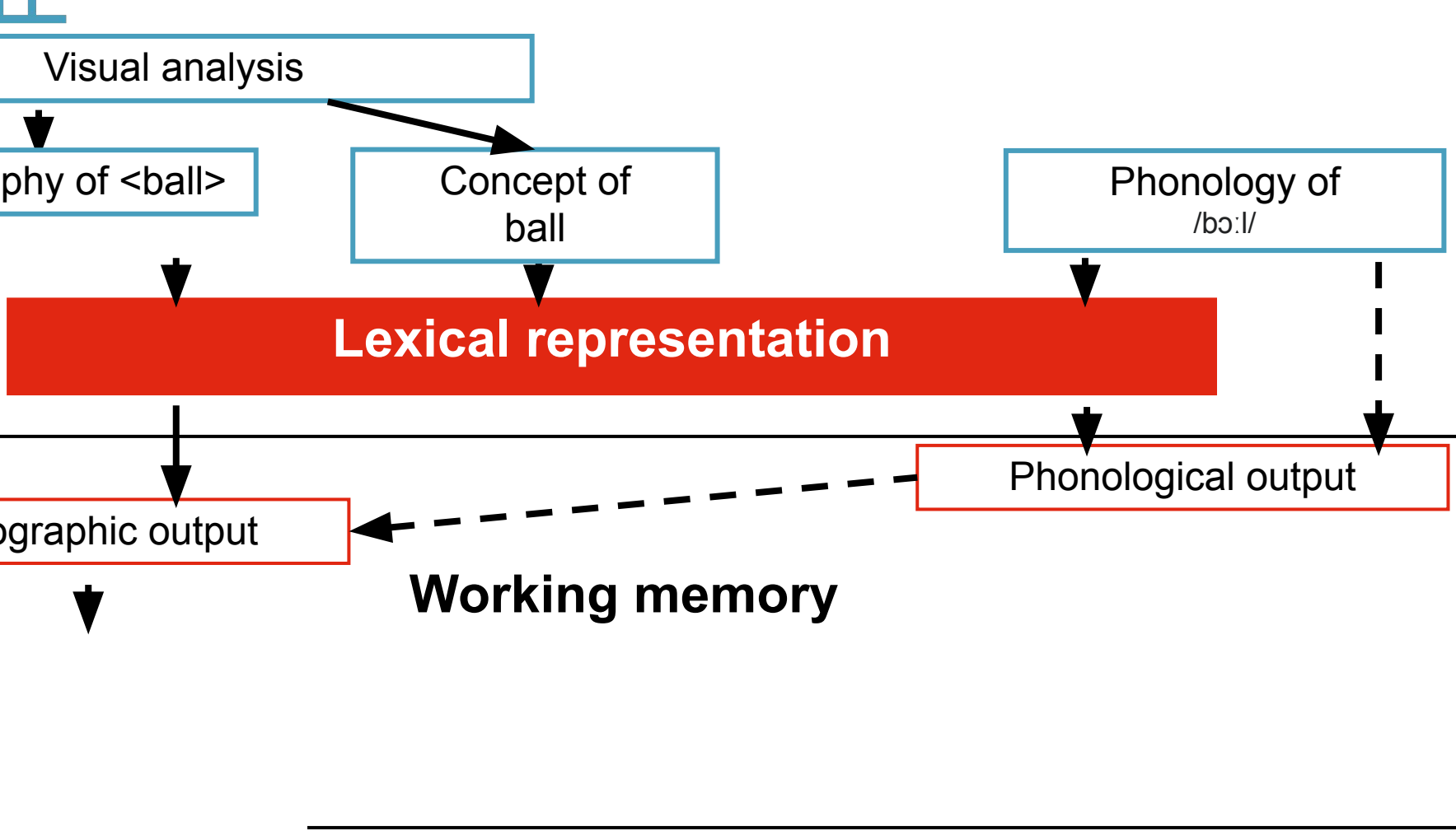
**Peripheral
orthographic
processes**

Phonological output


Orthographic output

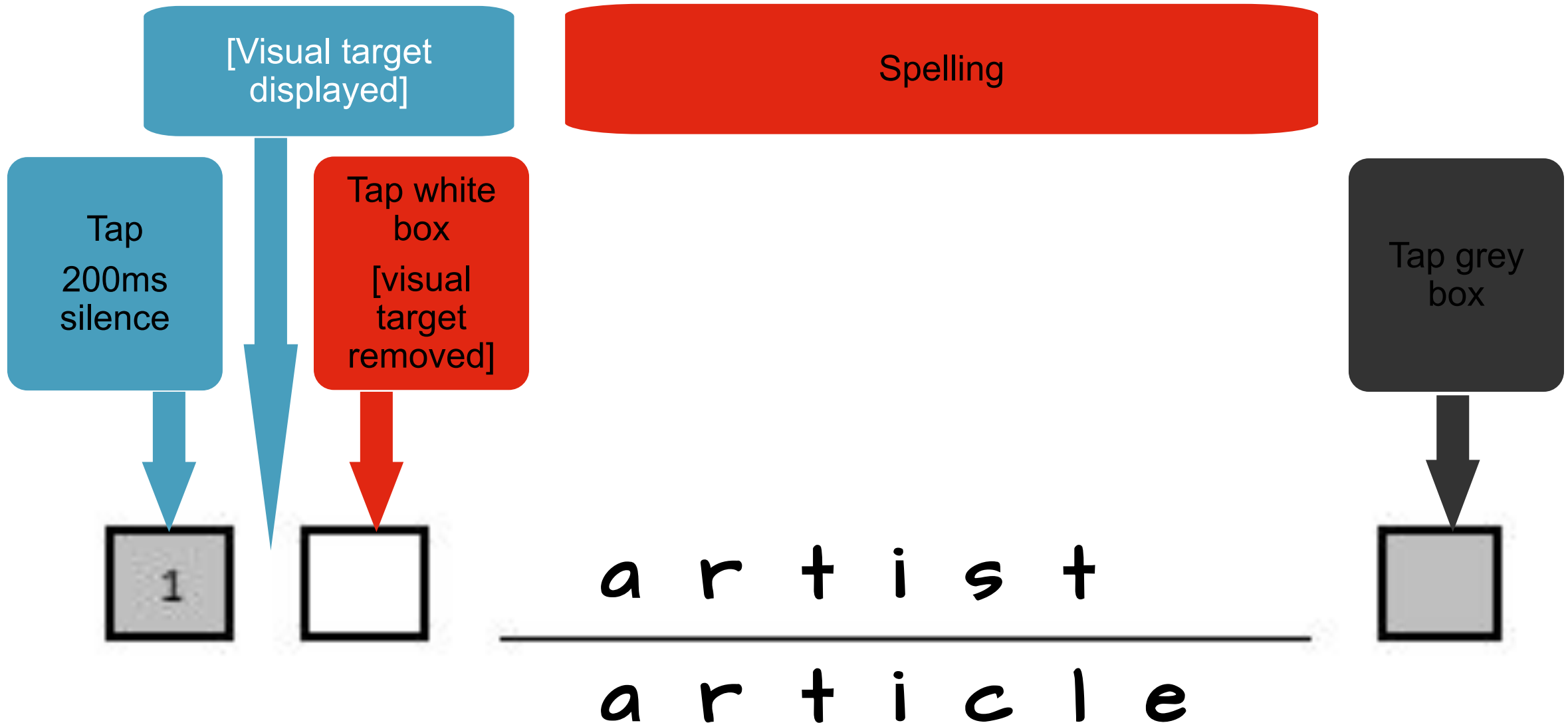
Working memory

—→ Lexical route
- -→ Indirect routes



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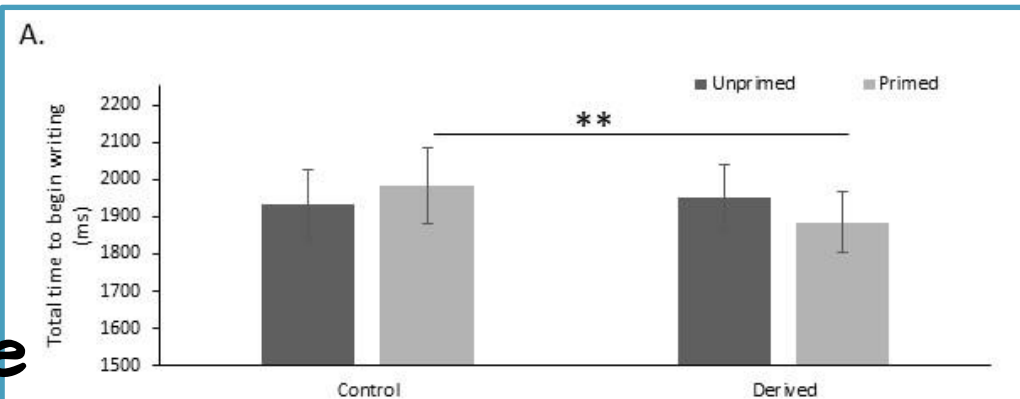


Adults

art
artist
article



Before



Time to begin writing:

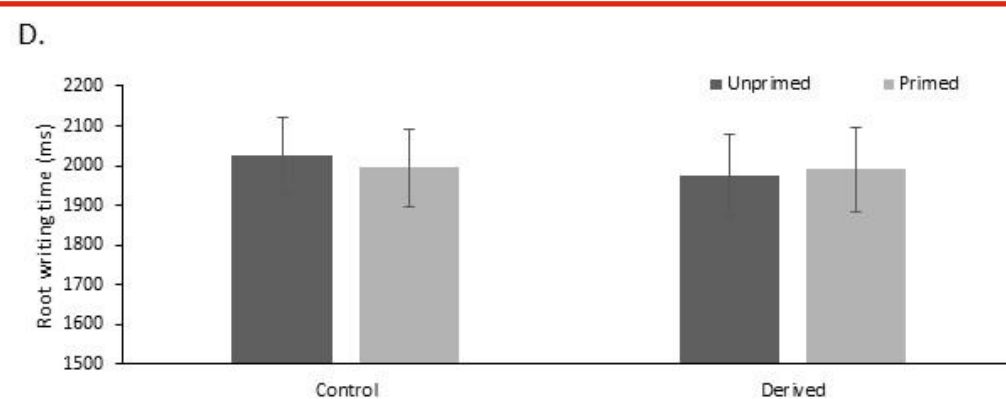
Priming*Condition interaction $\chi^2(1) = 5.84, p = .0157$

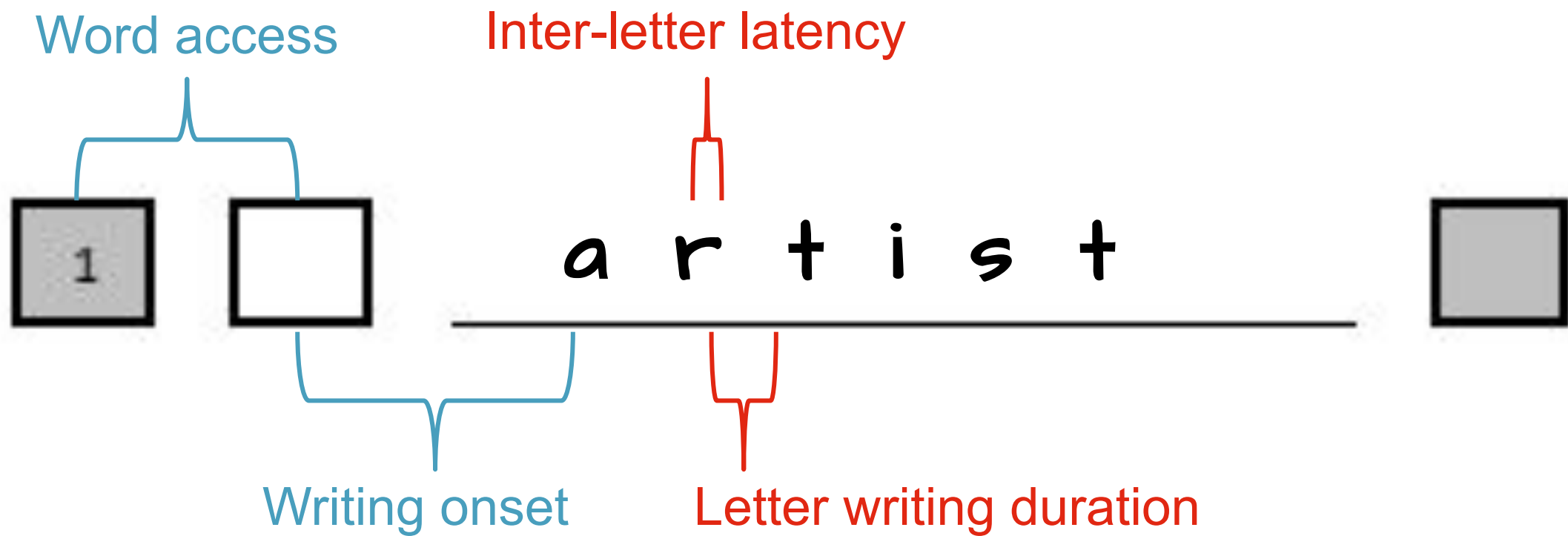
Main effect of structure for **primed** words $\chi^2(1) = 9.47, p = .0021$ (faster to respond to **derived** words, particularly when primed)

NS for unprimed words



During



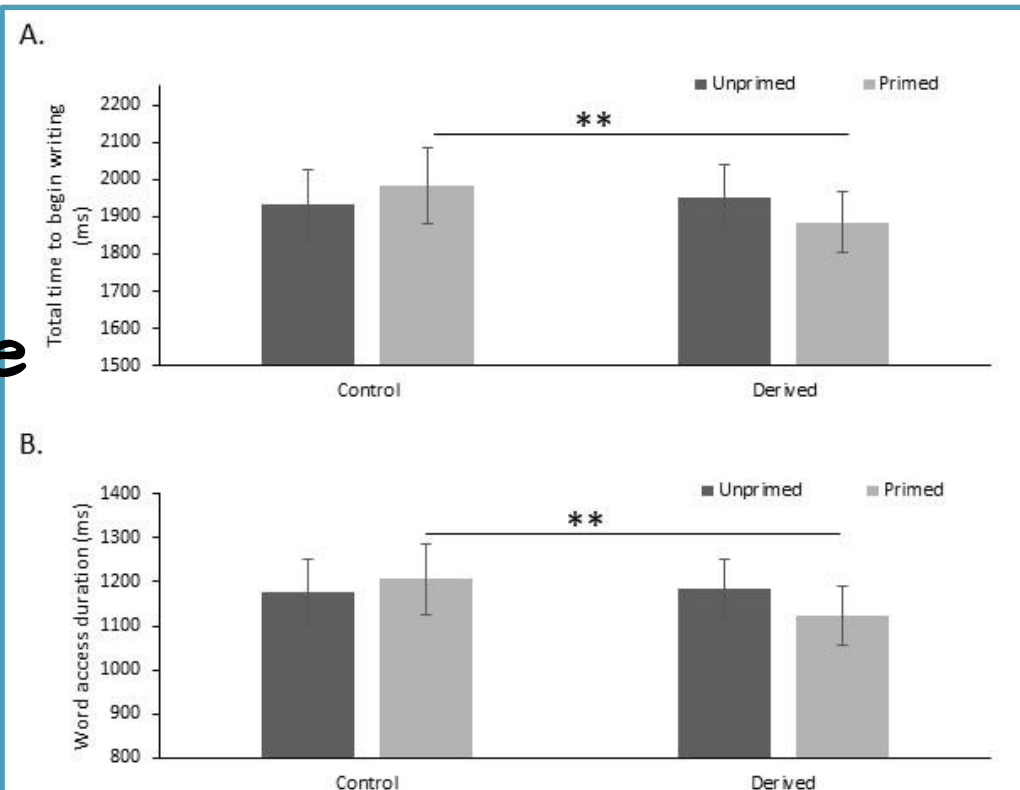


Adults

art
artist
article



Before

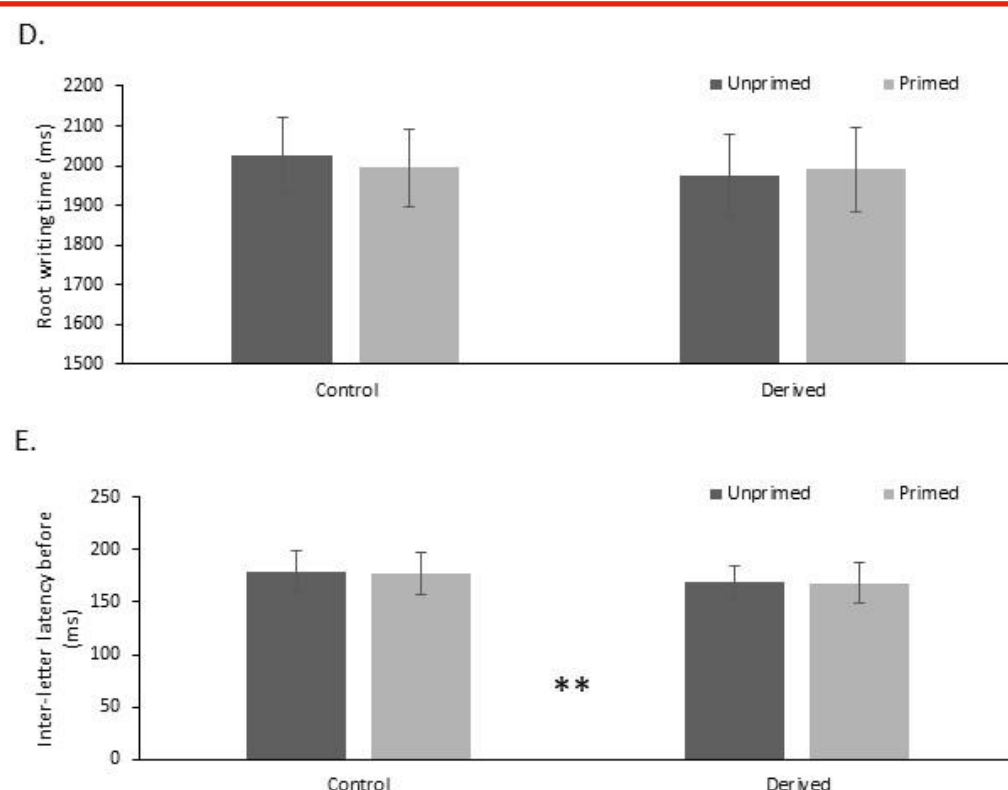


Priming*Condition interaction $\chi^2(1) = 5.84, p = .0157$

Main effect of structure $\chi^2(1) = 4.14, p = .0420$
(overall faster to respond to derived words when primed)



During



Priming*Condition interaction NS

Main effect of structure $\chi^2(1) = 4.14, p = .0420$
(faster to respond to derived words)

Children

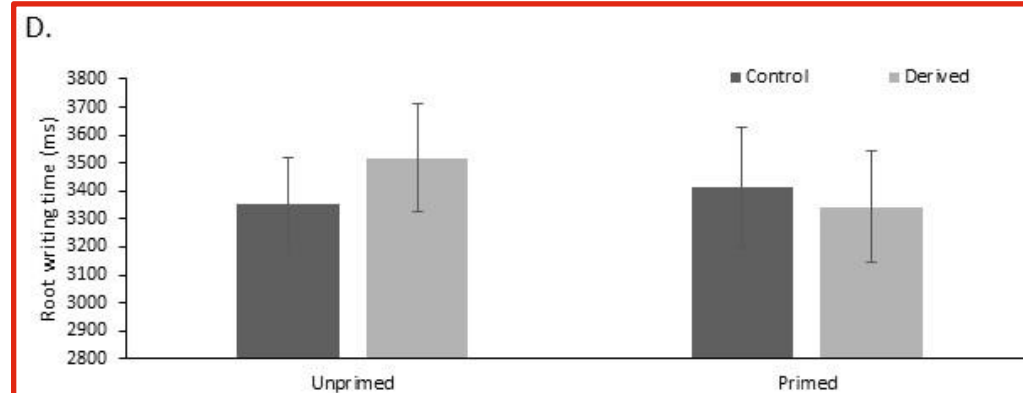
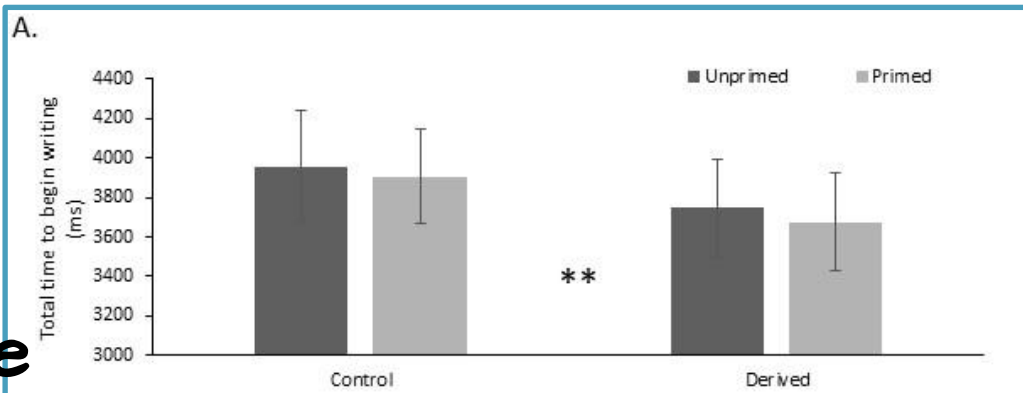


Before



During

art
artist
article



Priming*Condition interaction NS

Main effect of structure $\chi^2(3) = 12.55, p = .0057$
(faster to respond to **derived** words)

Children

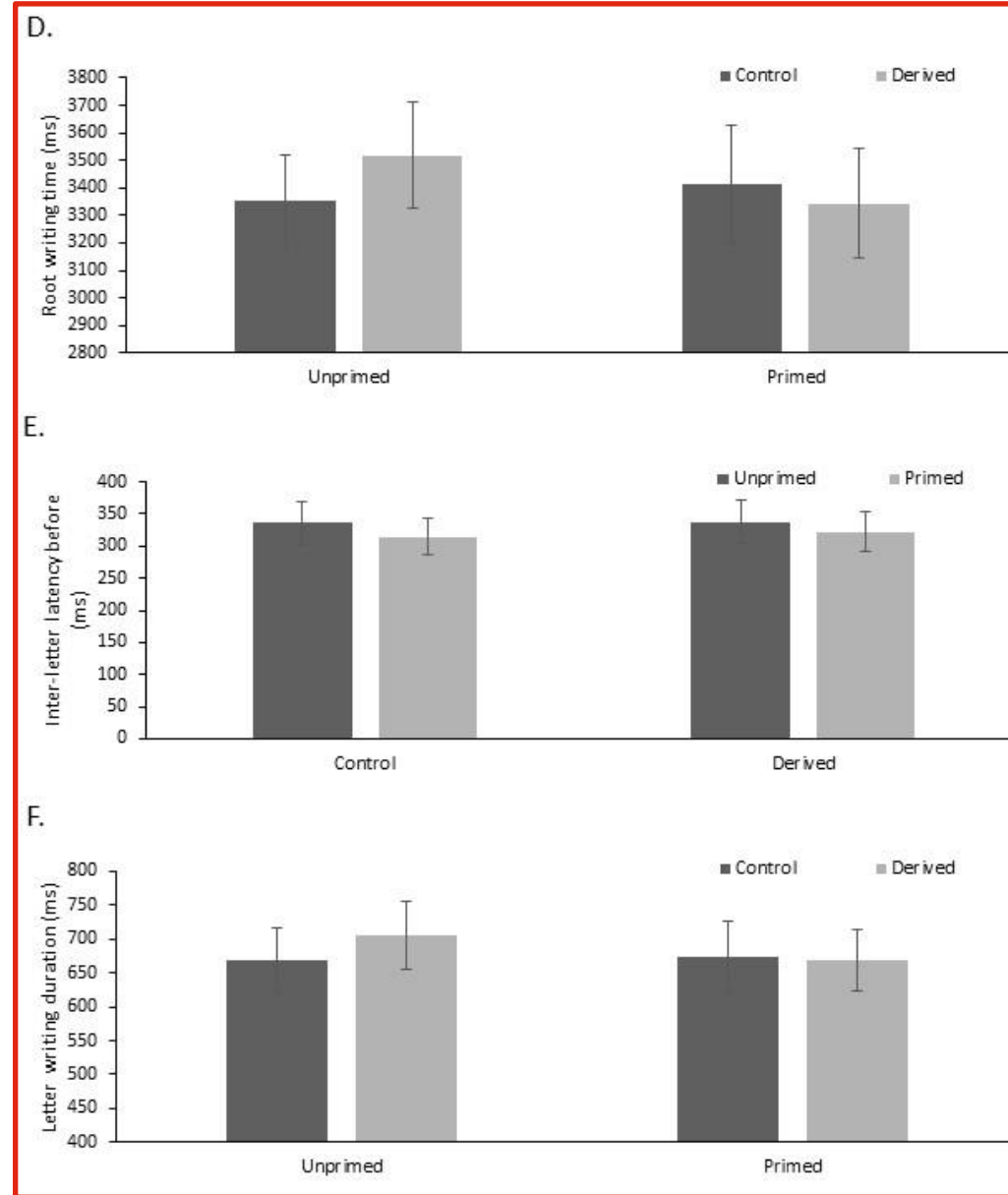
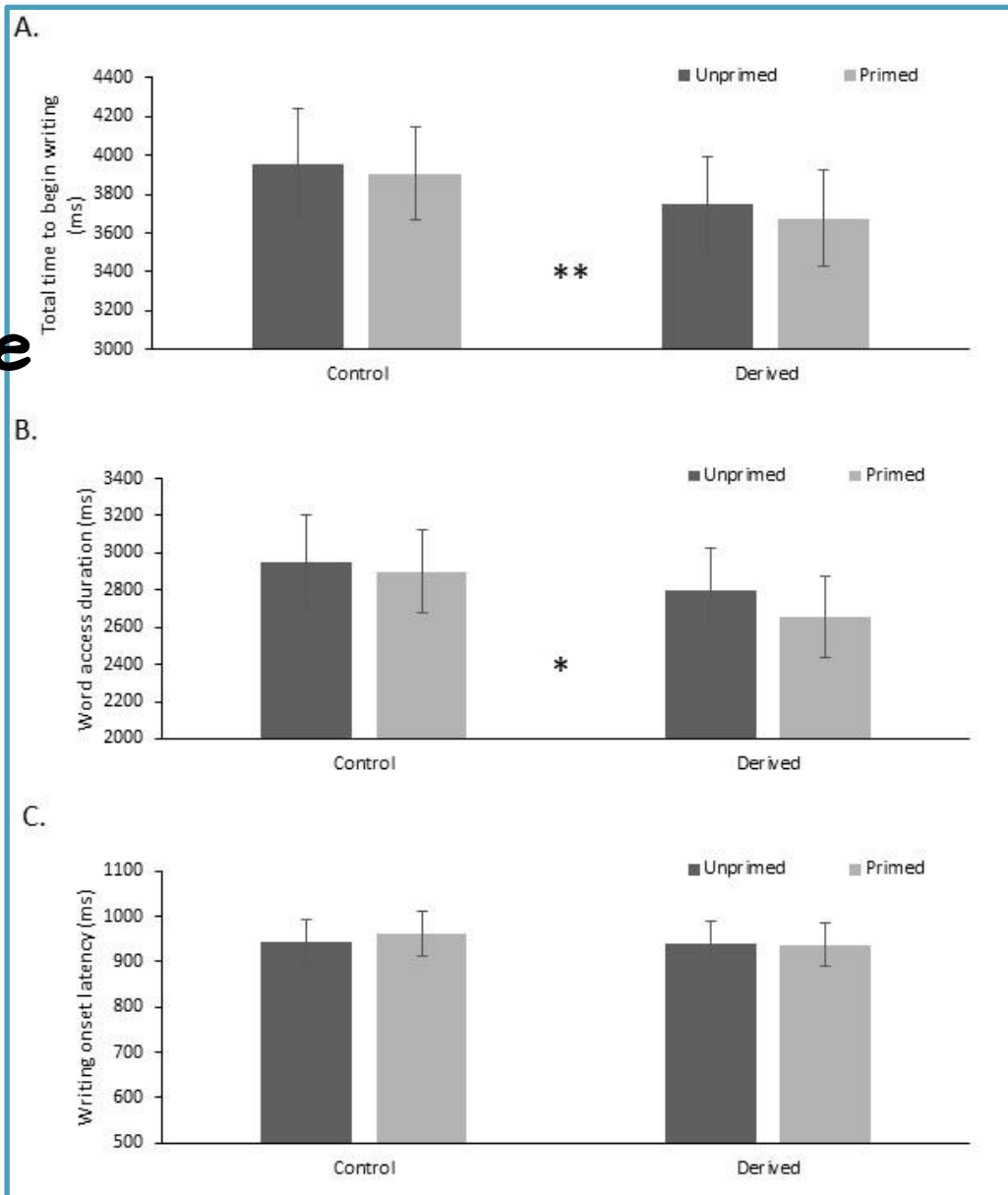


Before



During

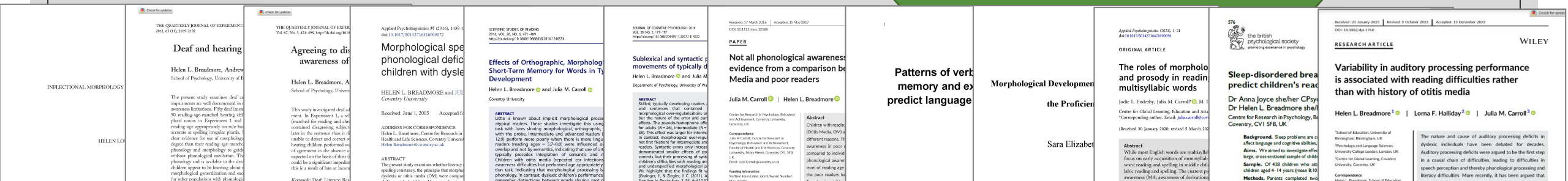
art
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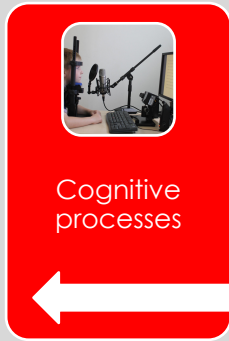




What skills are needed? Who might need help?

- Individual differences, SEND
 - Risk and protective factors
 - D/deaf
 - OME (glue ear - fluctuating hearing)
 - Dyslexia
 - Developmental Language Disorder
- Methods: Longitudinal, cross-sectional, ability-matched

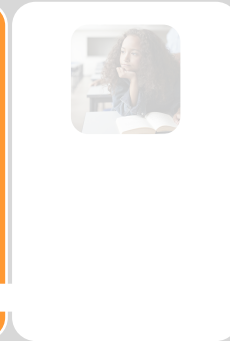




Cognitive processes



Development and individual differences



When does morphological processing happen?

- What skills need to be in place to use morphology?
- Do phonological skills need to be secure?

Applied Psycholinguistics 37 (2016), 1439
doi:10.1017/S0142141616000072

Morphological spelling in children with dyslexia

HELEN L. BREADMORE and JULIA M. CARROLL
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ABSTRACT
The present study examines whether literacy
spelling contains the principle that novel
dyslexia or otitis media (OM) were com-
plexity matched children. Monomorphemic
complex derivations. Used not and a
particularly derivational morphemes. Dyslexia
then their chronological age matched peers
children showed a specific weakness in
the spelling difficulties in each case dyslexia
morphological relationships, while the OM

Research into literacy impairment
phonics-grapheme correspond-
language, and in order to learn to
phenomena and morphemes with gl
in different words even at the expec-
ple, the spelling of the word-final
context"; the English past-tense
variation in pronunciation (e.g., *be*
Similarly, roots are spelled consist
provide an explanation for many
the spelling of "quality" is determin
pronunciation; Bourassa & Trembl
morphological knowledge in litera
of morphological complexity by cha
The aim is to establish whether eit

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is properly cited. 0142-1616/16/000000-00
doi:10.1017/S0142161616000072

Keywords: Deaf; Literacy; Morphology; Grammar.

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Effects of Orthographic, Morpho-Short-Term Memory for Words in Development

Helen L. Breadmore and Julia M. Carroll
Coventry University

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ABSTRACT
Little is known about implicit morphological
atypical readers. These studies investigate this
task with four groups: morphological orthography
with the probe. Intermediate and advanced read-
12–25 perform more poorly when there is more
readers reading ages = 57–83 were influ-
overlapping and not by semantics, indicating that
typically precedes integration of semantic
Children with otitis media (repeated ear in-
awareness difficulties but performed age appropriate
task, indicating that morphological process
phonology. In contrast, dyslexic children's perform-
children are sensitive to morphology but not
phenemes. This pattern differed from reading-age
children with circumscribed phonological diffi-

Morphological awareness is closely linked to the
Deacon & Kirby, 2004). A useful distinction ca
morphological processing. Morphological awaren
morphemes, often productively. Morphological
reading or spelling (Deacon, Parrilla, & Kirby
morphemes or generating complex words
morphological processing has focused on spell
signs that similarly require explicit manipulat
& Seymour, 2006). Less is known about the dev
This article examines the development of morph
development.
Most models of reading development consid
decoding. Meanwhile, the roles of morphological
discussed in much depth (Dixon, Torg, & M
morphological processing typically suggest that it is integrat
phonics decoding and is closely linked to wit
Martins, & Carroll, 2013; Nunes, Bryant, & B

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is properly cited. 0142-1616/16/000000-00
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Sublexical and syntactic movements of typically developing children

Helen L. Breadmore and Julia M. Carroll
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ABSTRACT
Little is known about implicit morphological
atypical readers. These studies investigate this
task with four groups: morphological orthography
with the probe. Intermediate and advanced read-
12–25 perform more poorly when there is more
readers reading ages = 57–83 were influ-
overlapping and not by semantics, indicating that
typically precedes integration of semantic
Children with otitis media (repeated ear in-
awareness difficulties but performed age appropriate
task, indicating that morphological process
phonology. In contrast, dyslexic children's perform-
children are sensitive to morphology but not
phenemes. This pattern differed from reading-age
children with circumscribed phonological diffi-

A comprehensive model of reading m
data from oral and silent reading are
typical development. We know that
integrate multiple sources of information
clearly well reading, including int
orthography, phonology, morphol
and the ways in which readers acc
occurs and when it develops. This s
these factors simultaneously in skills
intermediate typically developing
as children with dyslexia. Participa
texts containing pseudo-hom
morphemes, morphological over-regu
knowledge), and syntactic errors (e.g.
always, ending, ...), and we exami
ments in response to these errors.
The power of eye-tracking data illu
illustrates the time course of read
Examining this time course can, in
help us to understand the underly
and the ways in which readers acc
approximately 25% of the

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is properly cited. 0142-1616/16/000000-00
doi:10.1017/S0142161616000072

Keywords: Deaf; Literacy; Morphology; Grammar.

Received: 17 March 2016 | Accepted: 15 May 2017
DOI: 10.1111/dede.12248
https://doi.org/10.1111/dede.12248

Not all phonological awareness deficits are created equal: Evidence from a comparison between children with Otitis Media and poor readers

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ABSTRACT
Children with reading difficulties and children with a history of repeated ear infections
(Otitis Media, OM) are both thought to have phonological impairments, but for quite
different reasons. This paper examines the profile of phonological and morphological
awareness in poor readers and children with OM. Thirty-three poor readers were
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level of reading age matched controls. Unexpectedly, a significant minority (25%) of
the poor readers had some degree of undiagnosed mild or very mild hearing loss.
Twenty-nine children with a history of OM and their matched controls completed the
same battery of tasks. They showed relatively small delays in their literacy and showed
no impairment in morphological awareness but had phonological awareness scores
below the level of reading age matched controls. Further analysis suggested that this
weakness in phonological awareness was carried by a specific weakness in segmenting
and blending phonemes, with relatively good performance on phoneme manipulation
tasks. Results suggest that children with OM show a circumscribed deficit in phoneme
segmentation and blending, while poor readers show a broader metalinguistic impair-
ment which is more closely associated with reading difficulties.

RESEARCH HIGHLIGHTS
• Children with a history of ear infections (Otitis Media, OM) and poor readers were compared to individually matched chronological age and reading age controls. Their phonological awareness and morphological awareness skills were consistently at the level of reading age matched controls. Unexpectedly, a significant minority (25%) of the poor readers had some degree of undiagnosed mild or very mild hearing loss. Twenty-nine children with a history of OM and their matched controls completed the same battery of tasks. They showed relatively small delays in their literacy and showed no impairment in morphological awareness but had phonological awareness scores below the level of reading age matched controls. Further analysis suggested that this weakness in phonological awareness was carried by a specific weakness in segmenting and blending phonemes, with relatively good performance on phoneme manipulation tasks. Results suggest that children with OM show a circumscribed deficit in phoneme segmentation and blending, while poor readers show a broader metalinguistic impairment which is more closely associated with reading difficulties.

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How morphology spelling: advancing morphology in development

Kyle L. Levesque and Helen L. Breadmore
Coventry University

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Research into literacy impairment
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IT'S ABOUT THE PER

What Spelling Fluency

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The Timing Tells the Children's and Adults

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Variability in auditory processing performance is associated with reading difficulties rather than with history of otitis media

Helen L. Breadmore, Lorna F. Halliday, and Julia M. Carroll
Coventry University

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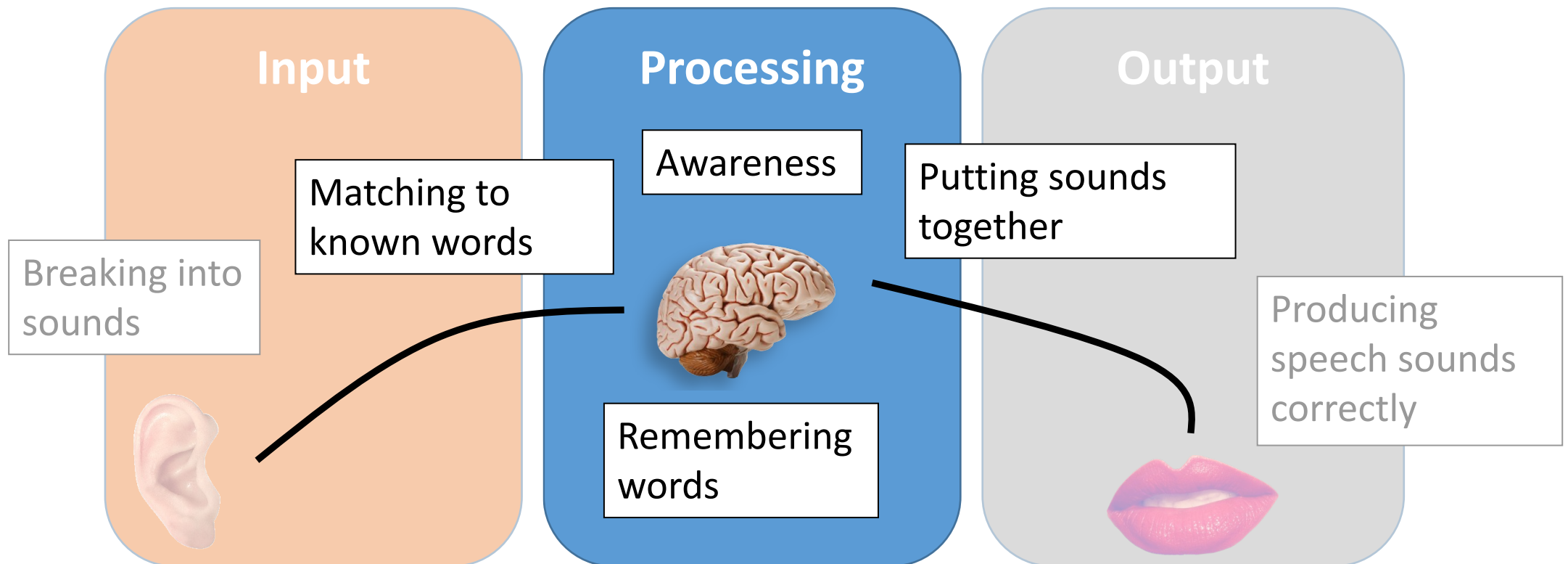
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Dyslexia

Phonological awareness: Ability to manipulate the sounds of spoken language

Difficulty in reading and spelling (particularly fluency) (Carroll et al., 2025)

Associates with phonological awareness difficulties - unknown aetiology (Snowling & Carroll, 2011)



Otitis media with effusion (OME)

Middle ear infections, glue ear

- 46% of 3 year olds (Teele, 1989)
- Prevalence declines with age

Moderate

40-69dB

Difficulty following speech

Mild

25-39dB

Can be difficult to follow speech, particularly in noise

Oral language and auditory processing skills

Hearing aids and ventilation tubes

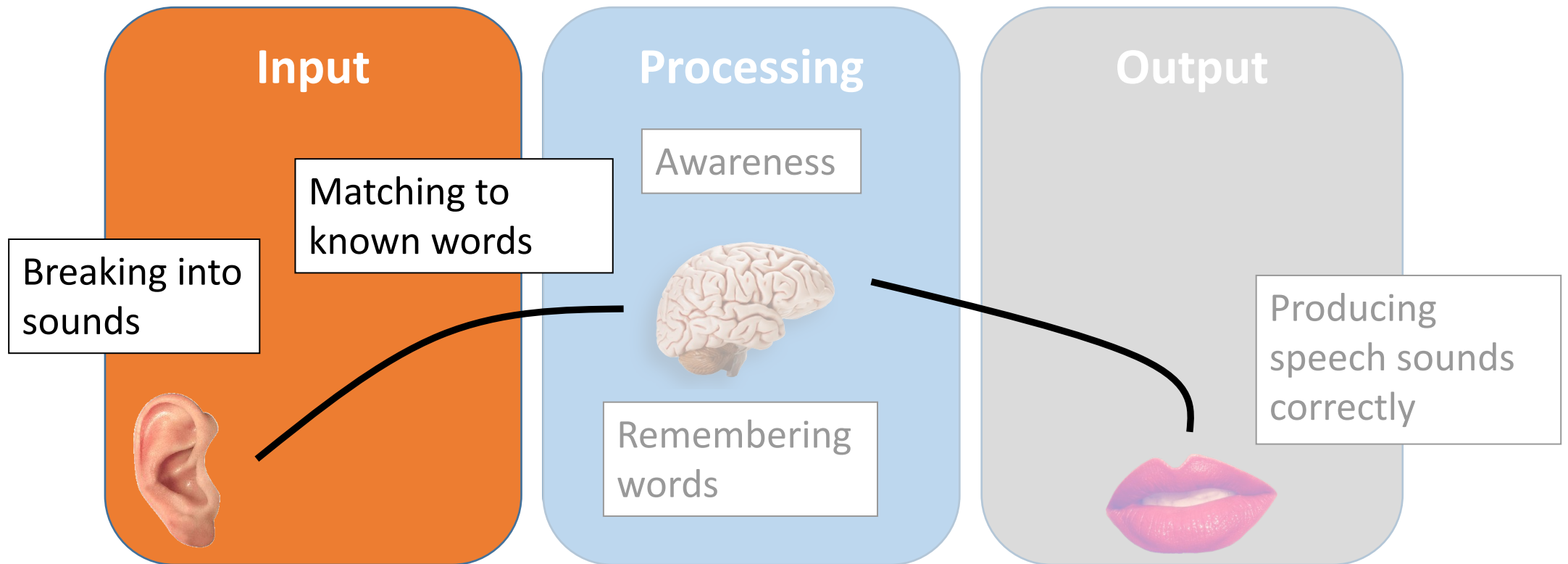
Fluctuating

Increasing access to speech sounds (phonology)

OME

Severe and persistent cases

Phonological difficulties of known aetiology



Participants

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DOI: 10.1111/desc.12388

WILEY

Developmental Science

PAPER

Not all phonological awareness deficits are created equal: evidence from a comparison between children with Otitis Media and poor readers

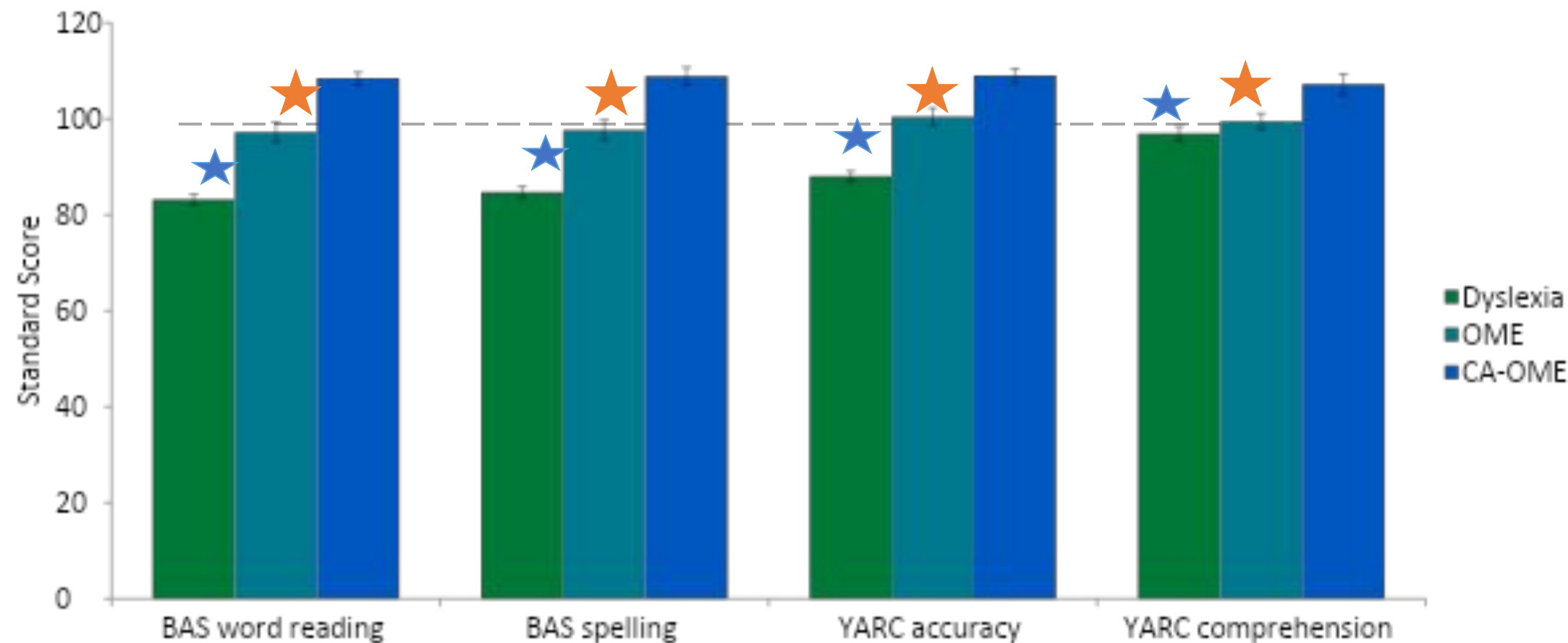
Julia M. Carroll | Helen L. Breadmore

Centre for Research in Psychology, Behaviour and Achievement, Coventry University

Abstract

	Dyslexia		OME	
N	36		29	
CA	9;1	(7;5-10;9)	9;2	(8;0-10;9)
RA	7;3	(5;7-8;9)	9;2	(5;10-12;3)
Chronological CA	9;1	(7;8-10;10)	9;2	(7;9-10;7)
age match RA	10;6	(8;9-12;9)	10;5	(8;9-12;9)
Reading CA	7;4	(5;4-9;3)	8;8	(6;0-11;6)
age match RA	7;5	(5;10-8;9)	9;3	(5;7-12;3)

Literacy



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DOI: 10.1111/osc.12588

PAPER

WILEY Developmental Science

Not all phonological awareness deficits are created equal:
evidence from a comparison between children with Otitis
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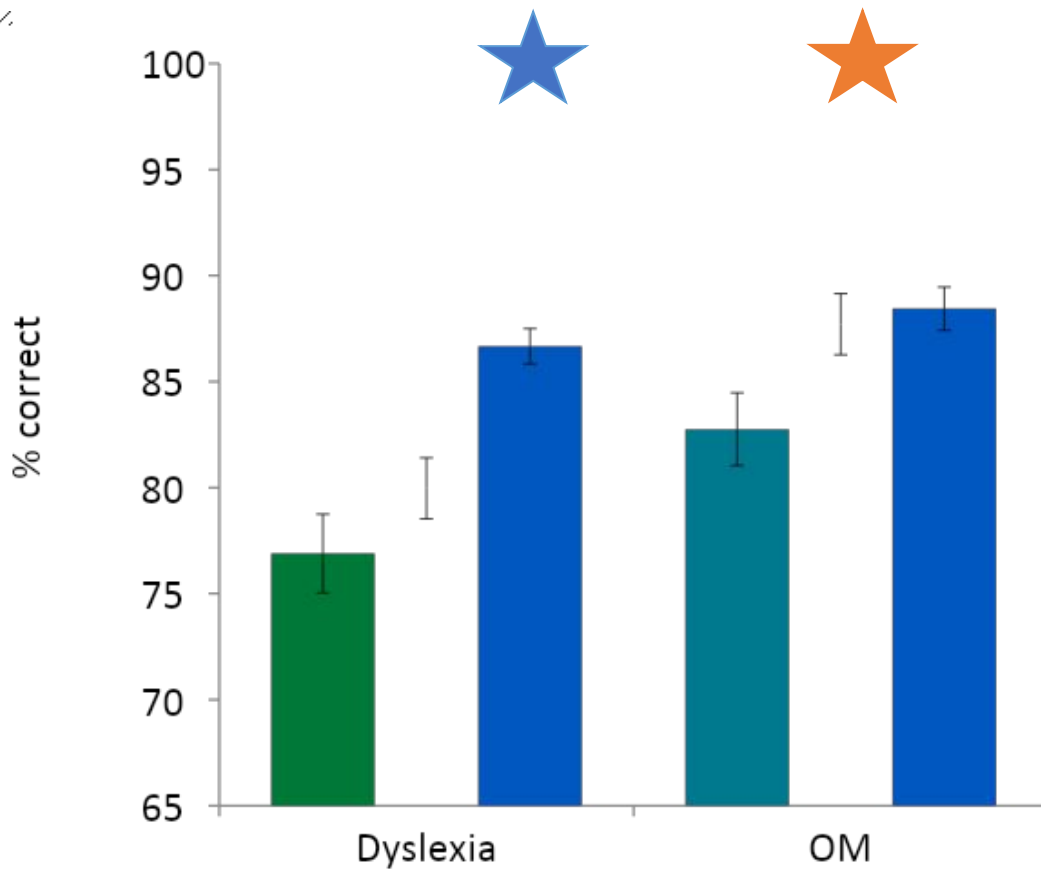
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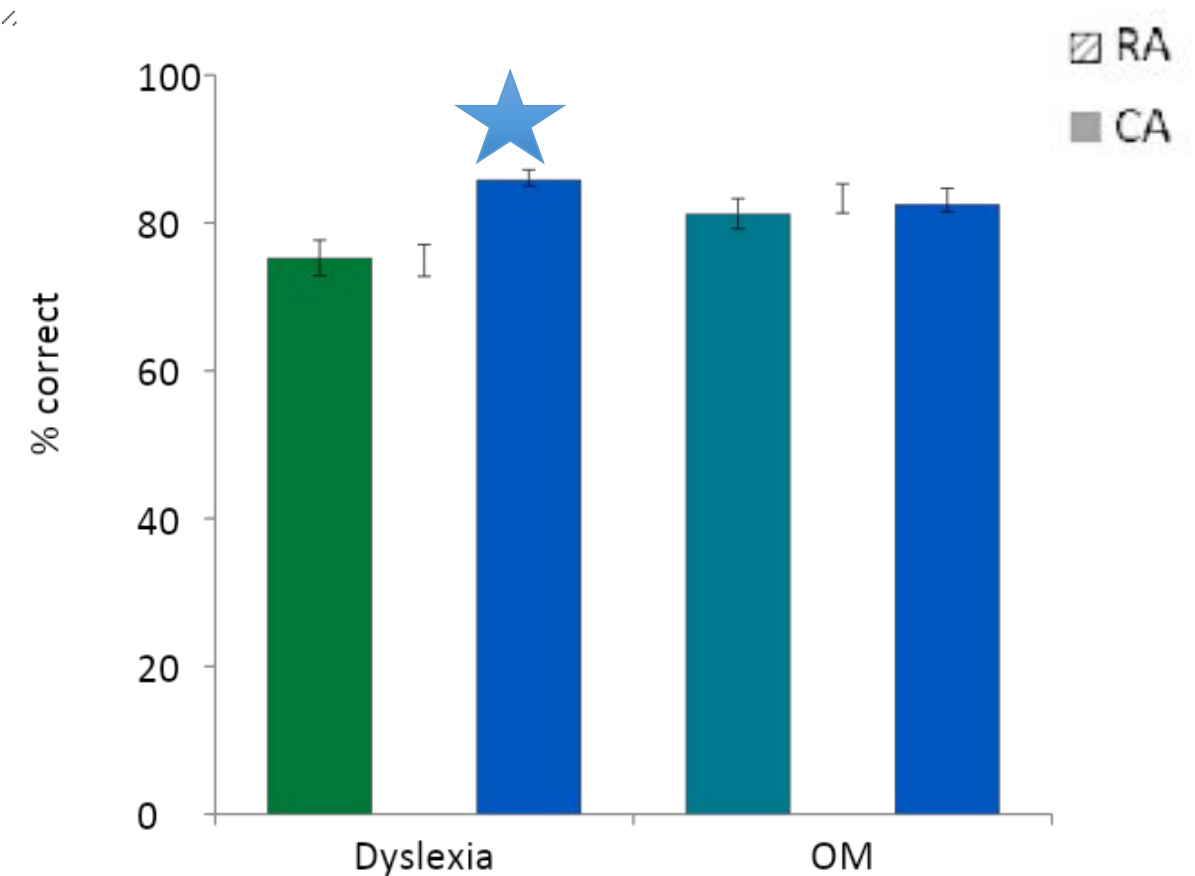
Abstract

Awareness

Phonological: (CELF PA)



Morphological (CELF MA)



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Abstract



Cognitive processes



Development and individual differences



When does morphological processing happen?

- What skills need to be in place?
- Do phonological skills need to be secure?

Dyslexia: Weaknesses in PA and MA OME: Weaknesses in PA but not MA

Received: 17 March 2024 | Accepted: 15 May 2024
DOI: 10.1111/ded.12548

PAPER

WILEY Developmental Science

Not all phonological awareness deficits are created equal: evidence from a comparison between children with Otitis Media and poor readers

Julia M. Carroll | Helen L. Breamore

Centre for Research in Psychology, Behaviour and Education, Coventry University, Coventry, UK

Abstract
Children with reading difficulties and children with a history of repeated ear infections (Otitis Media, OM) are both thought to have phonological impairments, but for quite different reasons. This paper examines the profile of phonological and morphological awareness in poor readers and children with OM. Thirty-three poor readers were compared to individually matched chronological age and reading age controls. Their phonological awareness and morphological awareness skills were consistently at the level of reading age matched controls. Unexpectedly, a significant minority (25%) of the poor readers had some degree of undiagnosed mild or very mild hearing loss. Twenty-nine children with a history of OM and their matched controls completed the same battery of tasks. They showed relatively small delays in their literacy and showed no impairment in morphological awareness but had phonological awareness scores below the level of reading age matched controls. Further analysis suggested that this weakness in phonological awareness was carried by a specific weakness in segmenting and blending phonemes, with relatively good performance on phoneme manipulation tasks. Results suggest that children with OM show a circumscribed deficit in phoneme segmentation and blending, while poor readers show a broader metalinguistic impairment which is more closely associated with reading difficulties.

Applied Psycholinguistics 35 (2016), 1439
doi:10.1017/S0142716416000072

Morphological spelling difficulties in children with dyslexia

HELEN L. BREAMORE and JULIA M. CARROLL
Coventry University

Received: June 1, 2015 | Accepted: July 1, 2015

Abstract
Little is known about implicit morphological orthographic readers. These studies investigate this task with lines sharing morphological, orthographic and semantic information. Results show that children with dyslexia performed worse than controls on this task, indicating that morphological processing is impaired in dyslexia. This finding is consistent with the idea that dyslexia is a phonological disorder.

Journal of Cognitive Psychology 138 (2018), 101–117
doi:10.1080/00131644.2017.1342222

Sublexical and syntactic processes in reading: A comparison of children with dyslexia and children with specific reading impairment

Helen L. Breamore | Julia M. Carroll

Department of Psychology, University of Warwick, Coventry, UK

Abstract
This study examined the role of sublexical and syntactic processes in reading. Children with dyslexia and children with specific reading impairment were compared on a range of reading tasks. Results showed that children with dyslexia had difficulties with sublexical processes, while children with specific reading impairment had difficulties with syntactic processes.

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Morphological Processing

Helen L. Breamore | S. Hélène Deacon

Coventry University, Coventry, UK

Abstract
Our understanding of spelling development is based on studies of children's accuracy at spelling words. However, little is known about the morphological information that children use when they spell. This study investigated the role of morphological information in spelling development. Children were asked to spell words that were either morphologically related or unrelated to a target word. Results showed that children used morphological information to spell words, even when they were not aware of the morphological structure of the words.

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How morphology spelling: advancing morphological processing in reading development

Kyle Levesque | S. Hélène Deacon

Department of Psychology and Neuroscience, University of Alberta, Edmonton, Canada

Abstract
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Received: 23 January 2023 | Revised: 5 October 2023 | Accepted: 13 December 2023
DOI: 10.1111/ded.12548

RESEARCH ARTICLE

Variability in auditory processing performance is associated with reading difficulties rather than with history of otitis media

Helen L. Breamore | Lorna F. Halliday | Julia M. Carroll

School of Education, University of Birmingham, Birmingham, UK

Abstract
The nature and cause of auditory processing deficits in dyslexia have been debated for decades. Auditory processing deficits were argued to be the first step in a causal chain of difficulties, leading to difficulties in speech perception and thereby phonological processing and literacy difficulties. More recently, it has been argued that auditory processing difficulties may not be causally related to language and literacy difficulties. This study compares two groups who have phonological processing impairments for different reasons: dyslexia and a history of otitis media (OM). We compared their discrimination thresholds and response variability to chronological age- and reading age-matched controls, across three auditory processing tasks: frequency discrimination, rise-time discrimination and speech perception. Dyslexic children showed raised frequency discrimination thresholds in comparison with age-matched controls but did not differ from reading age-matched controls or individuals with a history of OM. There were no group differences in the other two tasks.



Is there evidence that morphological training can work?

- What skills need to be trained?
- What training is effective?

Morphological training improves word knowledge – reading, spelling, vocabulary

Systematic reviews and meta-analyses

(Bowers et al., 2010; Goodwin & Ahn, 2010; Goodwin & Ahn, 2013; Bratlie et al., 2022; Colenbrander et al., 2024).

Colenbrander et al. (2024)

- Small to medium effect sizes
- Transfer to untrained words for spelling (but possibly not reading?)
- Less evidence of effects on comprehension

Studies tend to be small scale, effects, dosage and outcome measures are variable.

Intervention contents varies – often unclear what components of morphological knowledge are trained (rarely all!).

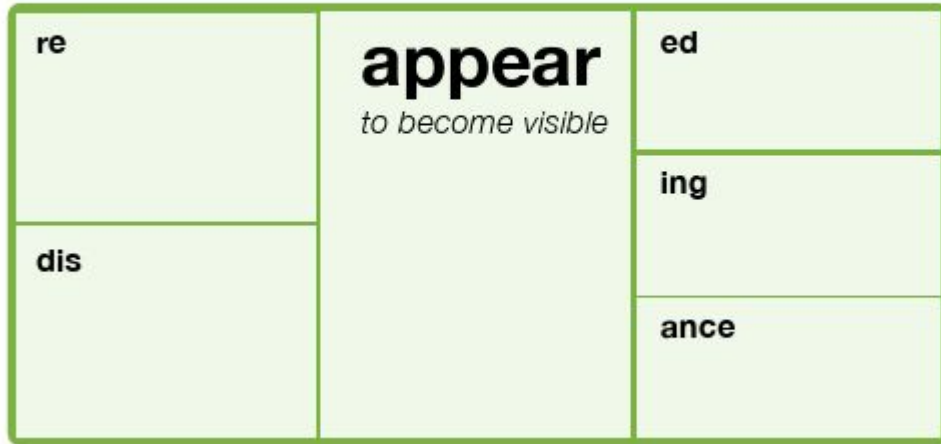


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Colenbrander, D., von Hagen, A., Kohnen, S., Wegener, S., Ko, K., Beyersmann, E., Behzadnia, A., Parrila, R., & Castles, A. (2024). The Effects of Morphological Instruction on Literacy Outcomes for Children in English-Speaking Countries: A Systematic Review and Meta-Analysis. *Educational Psychology Review*, 36(4), 119. <https://doi.org/10.1007/s10648-024-09953-3>

Different types of morphological interventions

Figure 13: An example of a graphic organiser for morphology



Bilton, C., & Duff, A. (2021). *Improving literacy in Key Stage 2: Guidance Report*. Education Endowment Foundation, London.

Direct morphological decoding instruction (e.g., Savage et al., 2024)

- primarily text based, focus on decoding and synthesis of morphemes.

Morphological inquiry (e.g., Bowers et al., 2010; Kribby & Bowers, 2017; Colenbrander et al., 2022; Savage et al., 2024)

- primarily oral and inquiry led, focus on meaning, high demands on teacher.

Implicit (e.g., Torkildsen et al., 2021)

- learn from increased exposure to statistical regularities in the language, low demands on teacher.



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Ongoing research

Morphological spelling intervention for Year 3 (Cawley et al., forthcoming)

- 10 weeks, detailed lesson plans
- Cumulative and sequentially structured (includes revision and consolidation)
- Mapped to national curriculum for English

Morphological training programme for Chinese-English bilinguals (Yin et al., forthcoming)

- 8 weeks, digital programme
- Sequentially structured
- Impact on English spelling, reading and comprehension
- Cross-language transfer?



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Conclusions

- Good evidence that we use morphology during literacy tasks
- Good evidence that morphological skills associate with literacy abilities
 - Even when other skills (e.g., phonological awareness) are weak/impaired
 - Although children with dyslexia often have difficulties in both
- A range of different morphological interventions have been shown to increase morphological skills and literacy skills

Take home message:

Assess morphological skills (awareness, decoding, analysis)

Integrate morphological training into literacy instruction

Thank you!

Participants: pupils, parents and teachers

Key collaborators: Julia Carroll, Hélène Deacon

PGR students: Katherine Hall, Parminder Khela, Sara Whyllie, Jodie Enderby,
Kathryn Cawley, Zhenyan Yin

Any questions?



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