Morphology in reading:
Binding letters, sounds, and meaning

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Education Peter Bowers April Clausen Miao Li Jeff MacCormack Robert Silvestri Sana Tibi Bozena White Susan Forgues Leah Izenberg Laura Steacy Lorraine van Zon *Psychology* Kelly Geier Abbey Goodine Hengameh Hassan-Yari Claire O'Connor *Neuroscience* Noor Al Dahhan Hee-Jin Kim	*Queen's* Liying Cheng Don Klinger Chris Knapper Elizabeth Lee Douglas Munoz Lesly Wade-Woolley *Alberta* George Georgiou Rauno Parrila *Elsewhere* Kate Cain (Lancaster) Donald Compton (Vanderbilt) Hélène Deacon (Dalhousie) Alain Desrochers (Ottawa) Michael Lawson (Flinders) Rhonda Martinussen (Toronto) Timothy Papadopoulos (Cyprus) Robert Savage (McGill) Xiuli Tong (Hong Kong)	Social Sciences and Humanities Research Council Canadian Language and Literacy Research Network

The Message

1. Morphology is important for reading
   - There are *7* good reasons (at least)
   - But it is rarely taught (Nunes & Bryant, 2006)

2. Morphology works because it helps integrate (**bind**) letters, sounds, and meaning

Morphology describes how words are composed of *morphemes*, the smallest units of meaning

Prefix + Base + Suffix

Examples: walked = walk + ed (an inflection)

design = de + sign (a derivation)

deadline = dead + line (a compound)
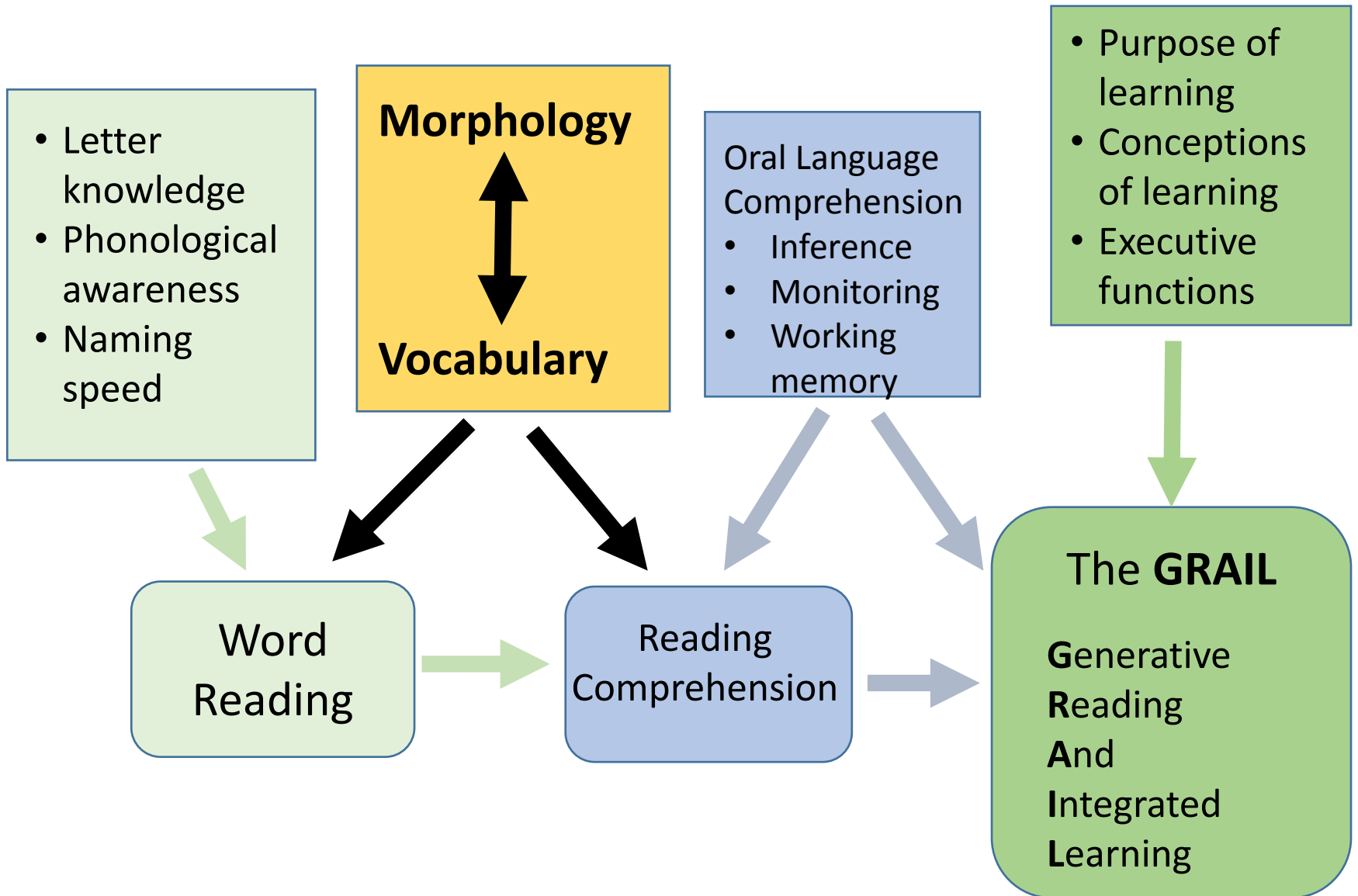
But first, a bit about reading ….

Why study reading?

- Our species' greatest cultural invention?

- Required for success

- Source of enjoyment and learning

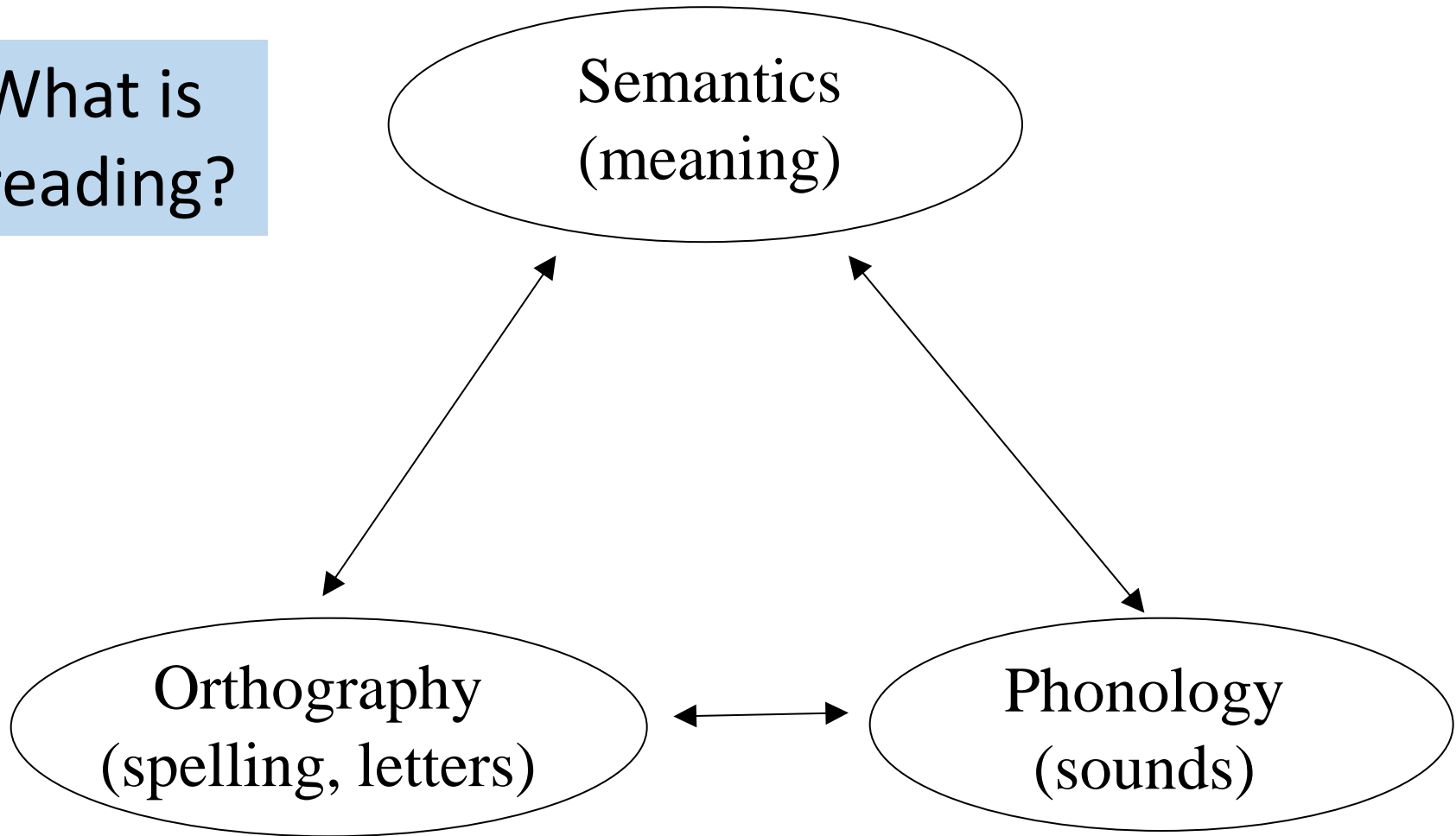- An interesting phenomenon to investigate

Many challenges

- Relation to socioeconomic status

- Many children struggle, especially in English

  - An opaque, not transparent orthography

- How should it be taught?

  - Phonics, whole word, whole language?
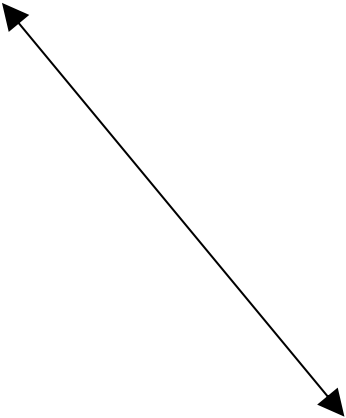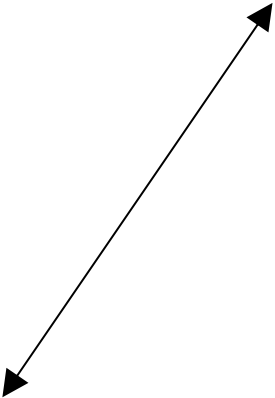
Reading – the big picture

Morphology

↕

Vocabulary

- Letter knowledge
- Phonological awareness
- Naming speed

Oral Language Comprehension
- Inference
- Monitoring
- Working memory

- Purpose of learning
- Conceptions of learning
- Executive functions

Word Reading

Reading Comprehension

The **GRAIL**

Generative
Reading
And
Integrated
Learning

What is reading?

Semantics (meaning)

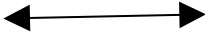Orthography (spelling, letters)

Phonology (sounds)

Whole Language

How to teach reading?

Semantics

Orthography

Phonology

Whole Word

Phonics

Whole Language Instruction

Semantics

Where is morphology?

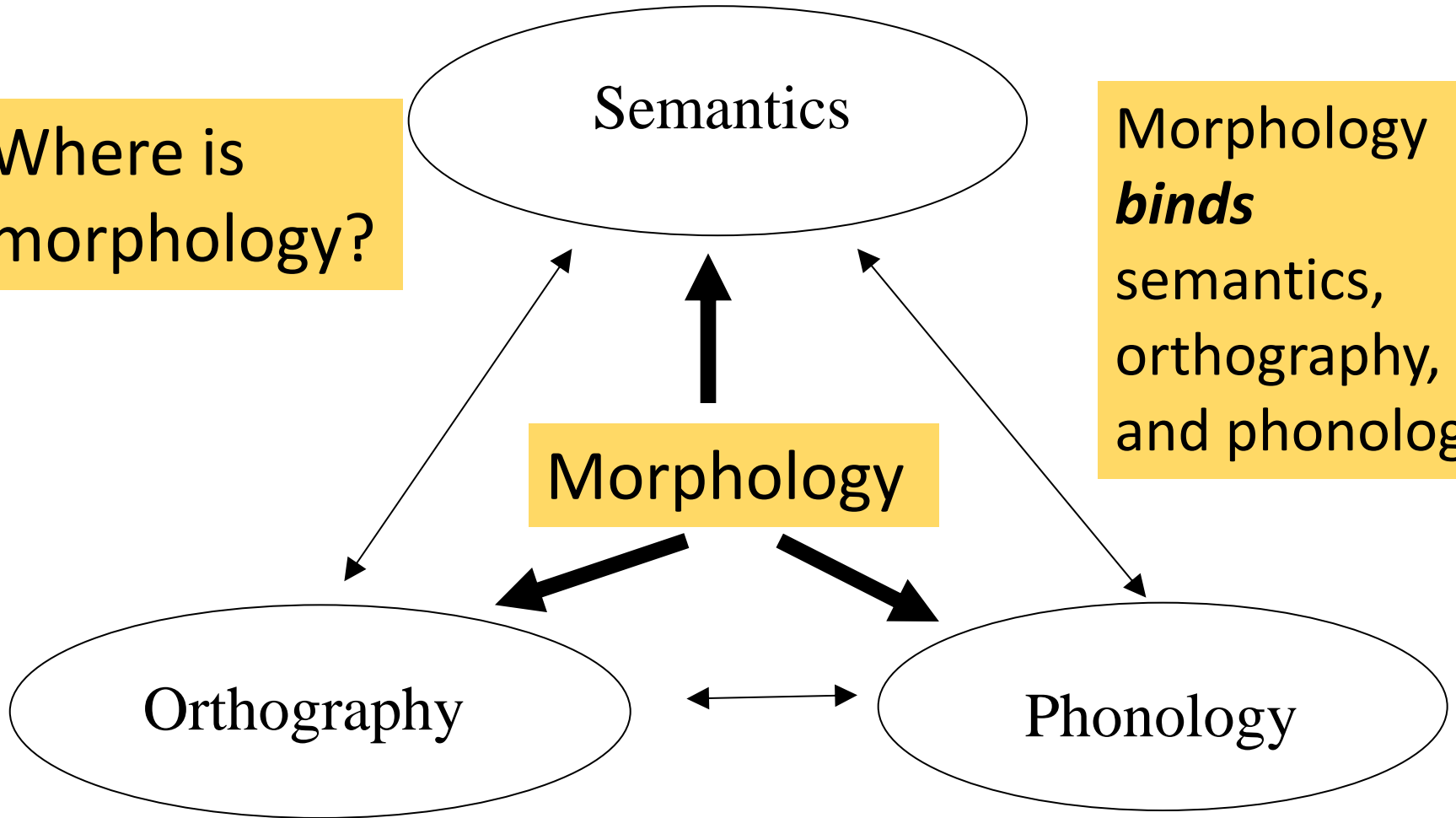Morphology *binds* semantics, orthography, and phonology

Morphology

Orthography

Phonology

Whole Word Instruction

Phonics Instruction
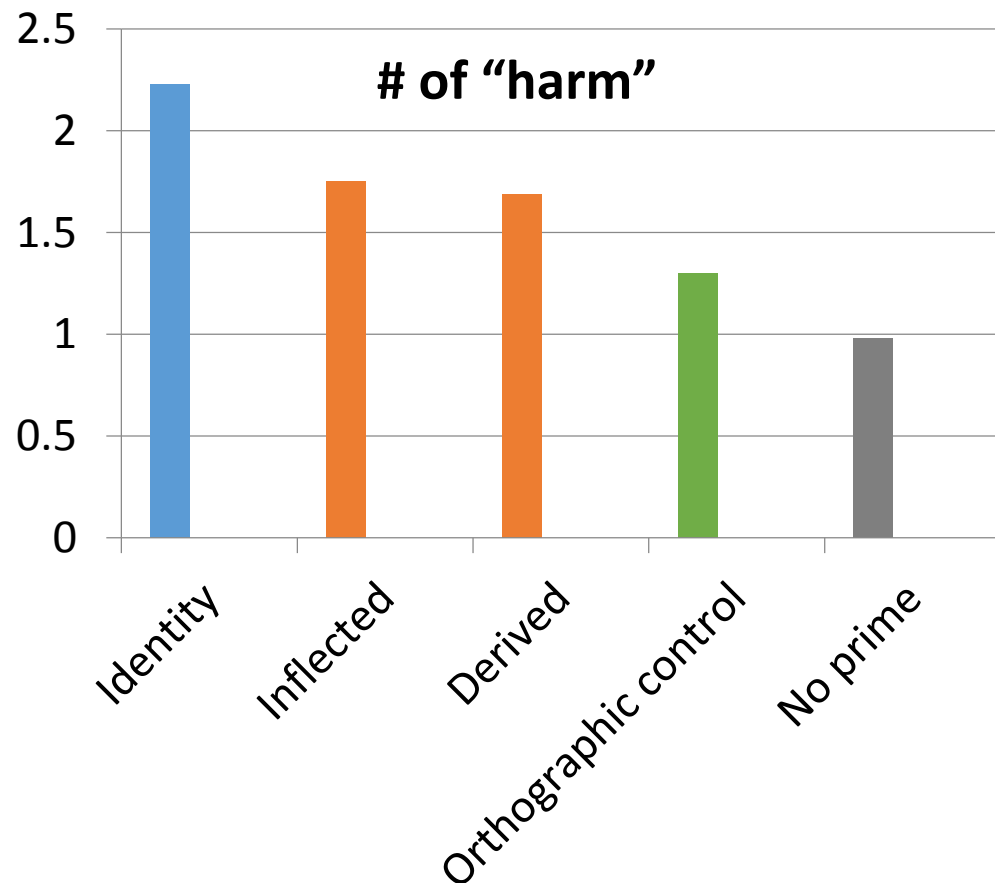
7 reasons to teach morphology

1. English is fundamentally Morpho-phonemic

English orthography "is not merely a letter-to-sound system riddled with imperfections, but instead, a more complex and more regular relationship wherein phoneme and morpheme share leading roles" (Venezky, 1967, p. 77)

2. We already process morphology, automatically and unconsciously

- Evidence from *priming* studies (e.g., Hassan-Yari, Kirby, & Deacon, 2011)
- Shown different words
  Identity: **harm**
  Inflected: **harmed**
  Derived: **harmful**
  Ortho control: **harmony**

- Asked to complete
  h a _ _

Teaching children to do it explicitly and consciously may help

of "harm"

A bar chart titled "# of 'harm'" with y-axis from 0 to 2.5 showing bars for: Identity (~2.25), Inflected (~1.75), Derived (~1.7), Orthographic control (~1.3), No prime (~1.0).

3. Morphological knowledge predicts reading ability

After controlling verbal and nonverbal IQ, and phonological awareness (Kirby, et al., 2012)

Other studies show the same, with other predictors controlled, in many languages, e.g., Arabic (Tibi & Kirby, 2014), French (Kirby, Desrochers, & Thompson, 2010)

% of Variance Predicted
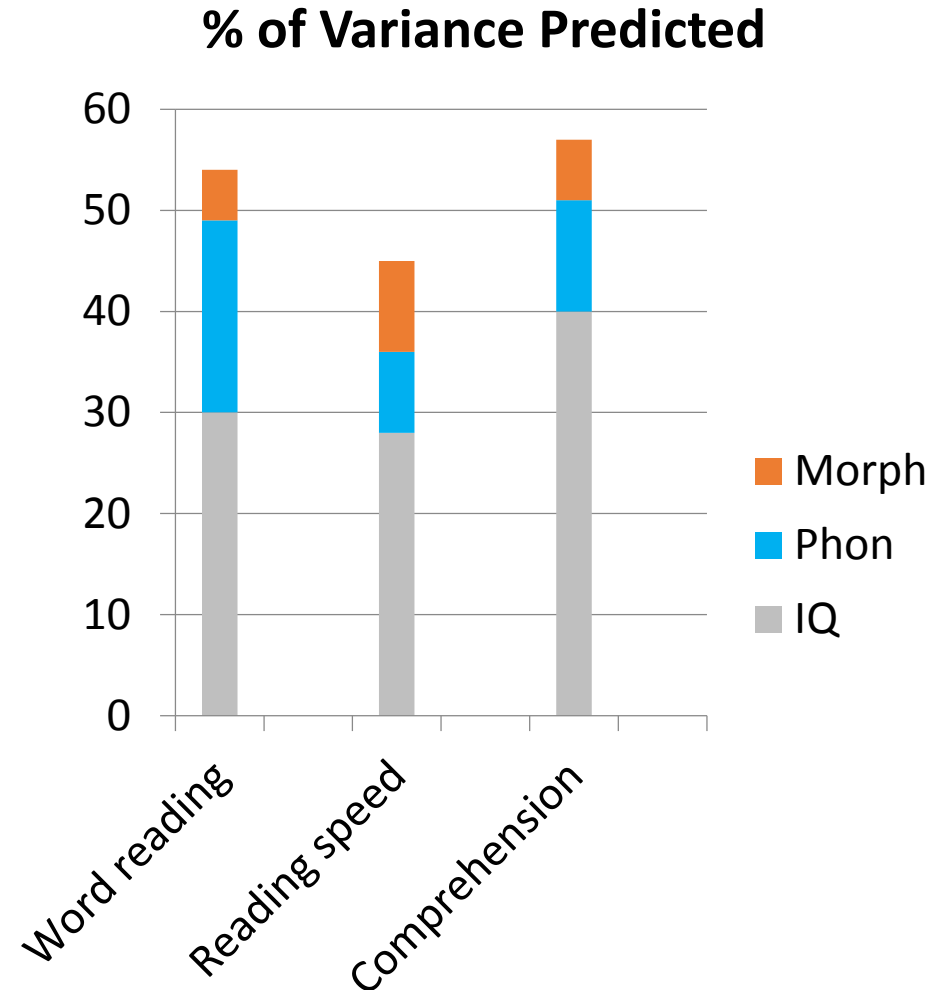
4. Poor Morphological Awareness characterizes poor comprehenders
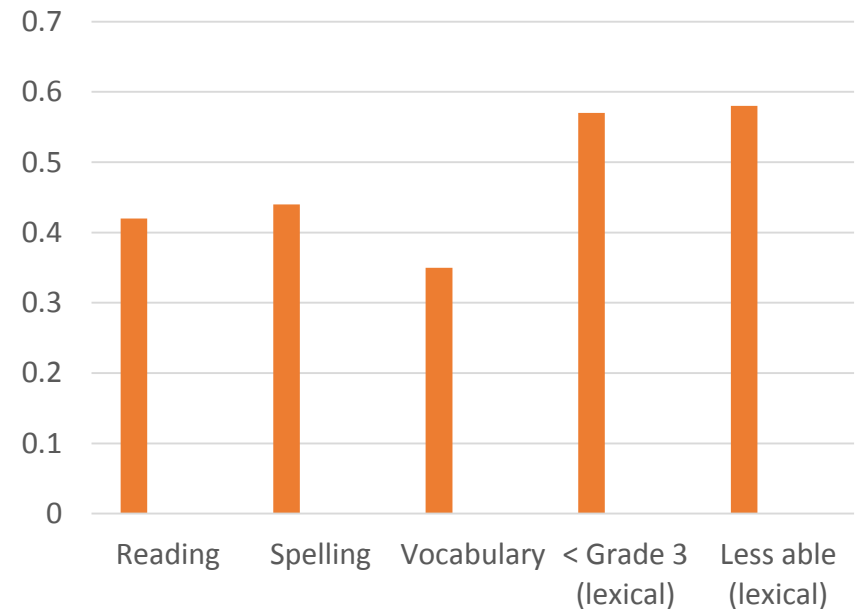
- Grade 5 poor comprehenders performed worse on morphology tasks (derivation) than average readers (Tong, Deacon, Kirby, Cain, & Parrila, 2011)

- In Chinese ESL students, poor and average comprehenders performed worse in morphology than good comprehenders (Li & Kirby, 2014)

- "poor comprehenders" are students with adequate word reading ability but poor reading comprehension

5. Morphological instruction improves reading

Meta-analyses (e.g., Bowers, Kirby & Deacon, 2010) have shown that morphological instruction (compared to regular class instruction)
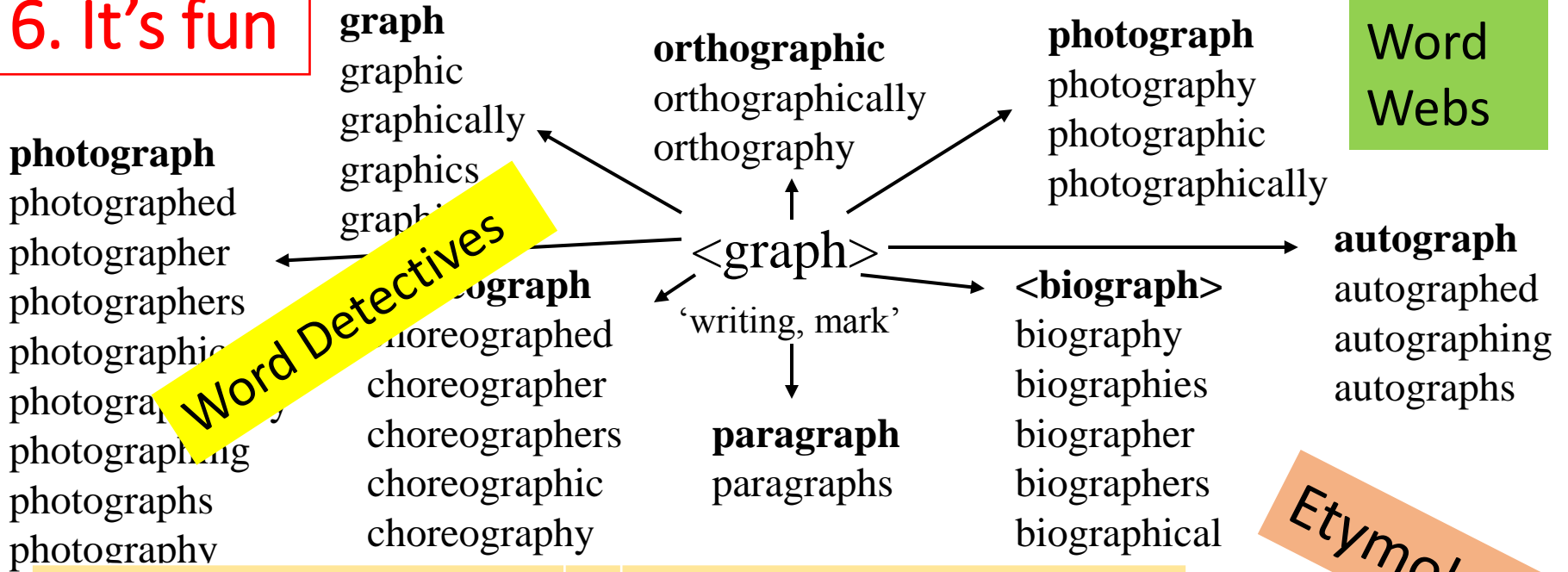
- Improves reading, spelling, vocabulary
- Is more effective for younger children
- Is more effective for less able children
- Medium effect sizes

Effect of Morphological Instruction

Effect sizes: .2 = small
.5 = medium
.8 = large

6. It's fun

graph
graphic
graphically
graphics
graph...

photograph
photographed
photographer
photographers
photographic
photography
photographing
photographs
photography

orthographic
orthographically
orthography

photograph
photography
photographic
photographically

Word Webs

Word Detectives

...ograph
choreographed
choreographer
choreographers
choreographic
choreography

<graph>
'writing, mark'

paragraph
paragraphs

<biograph>
biography
biographies
biographer
biographers
biographical

autograph
autographed
autographing
autographs

Etymology

Word Matrix

un dis	please	ing		
		ure	able	
		ant	ly ness	

Word Sums

please/ + ing → pleasing

please/ + ant + ly → pleasantly

un + please/ + ant + ness → unpleasantness

please/ + ure/ + able → pleasurable

dis + please → displease

Testing hypotheses about morphological structure

7. It fits with theory

Binding Agent theory

- explains effect on **word reading**
- Supports **integrated** instruction
- Effect on vocabulary and grammar explains **comprehension** effect
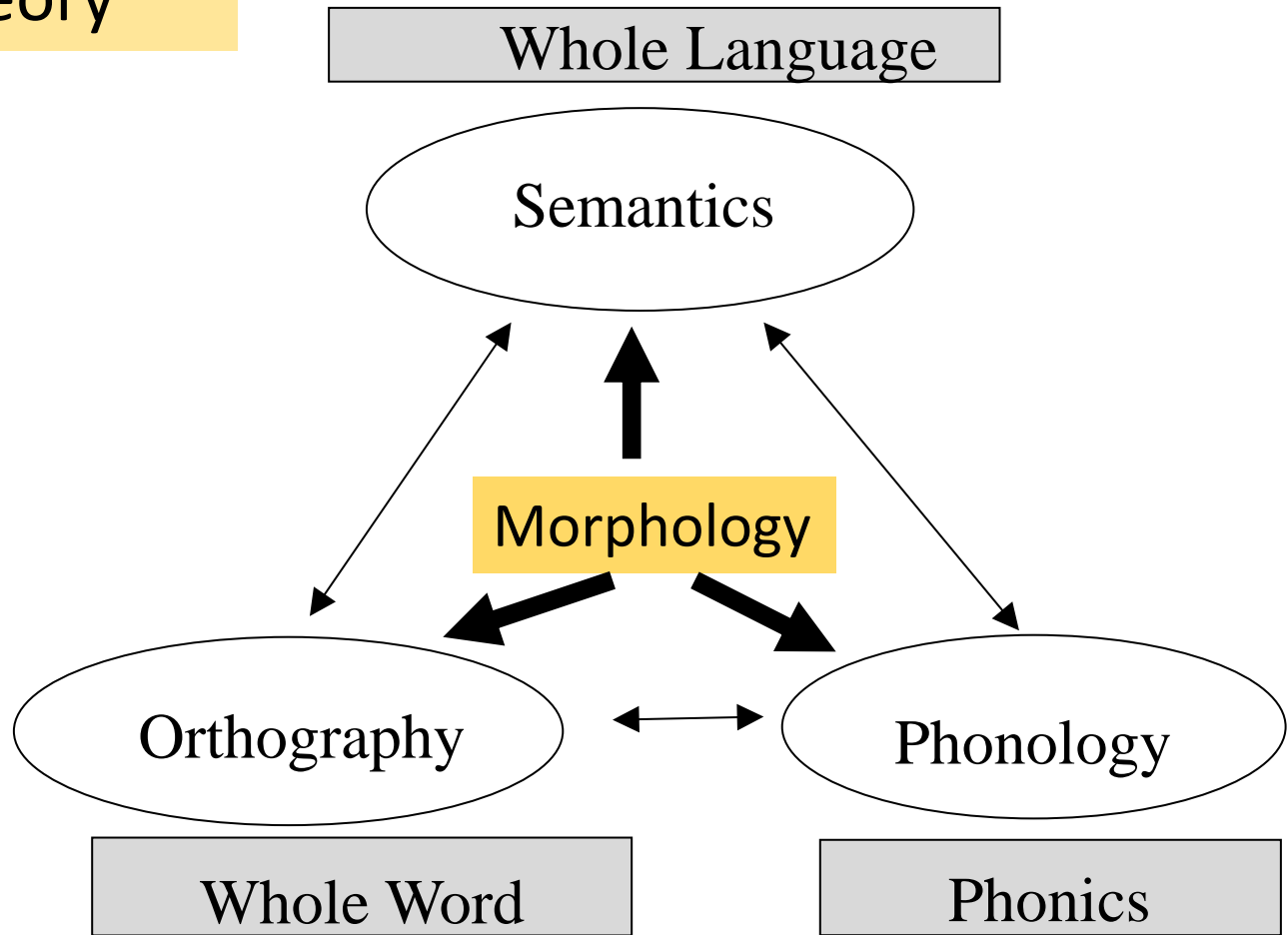
The Message Again:

1. Morphology is important for reading

2. Morphology works because it helps integrate (**bind**) letters, sounds, and meaning

What's next?

- Morphology in other languages
  - Arabic – has a nonlinear morphology (with Sana Tibi)
- Morphological instruction for struggling readers (with Jeff MacCormack and Peter Bowers)
  - Build on a relative strength
- Teachers' knowledge of morphology
- Encourage integrated curriculum development
- ???

Thank You!

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Presentation available at
http://educ.queensu.ca/faculty/profiles/kirby

References

Bowers, P. N. & Kirby, J. R. (2010). Effects of morphological instruction on vocabulary acquisition. *Reading and Writing: An Interdisciplinary Journal, 23*, 515–537.

Bowers, P. N., Kirby, J. R., & Deacon, S. H. (2010). The effects of morphological instruction on literacy skills: A systematic review of the literature. *Review of Educational Research, 80*, 144-179.

Kirby, J. R. & Bowers, P. N. (in press). Morphological instruction and literacy: Binding phonological, orthographic, and semantic features of words. To appear in K. Cain, D. Compton, & R. Parrila (Eds.), *Theories of reading development*.

Kirby, J. R., Deacon, S. H., Bowers, P. N., Izenberg, L., Wade-Woolley, L., Parrila, R. (2012). Children's morphological awareness and reading ability. *Reading and Writing: An Interdisciplinary Journal, 25*, 389-410.

Nunes, T., & Bryant, P. (2006). *Improving literacy by teaching morphemes.* London: Routlege.

Resources

www.wordworkskingston.com

www.etymonline.com/index.php?allowed_in_frame=0&search=battle&searchmode=none

http://www.affixes.org/

www.neilramsden.co.uk/spelling

www.vocablog-plc.blogspot.com

www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/WW_Morphology.pdf

Common affixes

Prefixes	Suffixes	
	Vowel suffixes	Consonant suffixes
a-, ad-, al-, be-, bi-, com-, contra-, de-, di-, dia-, dis-, en-, ex-, in-, inter-, intro-, mis-, non-, ob- , para-, per-, pre-, re-, se-, sub-, syn-, tele-, trans-, un-	-ability, -acle, -acy, -al, -ance, -ate, -ed, -eer, -ence, -er, -ery, -ian, -ibility, -icle, -ing, -ion, -ique, -ism, -ity, -ive, -ize, -or, -ory, -ous, -ule, -ure	-cy, -dom, -ful, -hood, -less, -let, -ling, -ly, -ment, -ness, -ry, -s, -ship, -some, -st, -th, -ty, -ware