

# AIM Symposium

Mark Seidenberg  
Vilas Research Professor  
Department of Psychology



Thank you AIM for this honor!

Thank you, Hollis, for your work and for this honor!

Let's talk about HOLLIS' research.

1. Prospective longitudinal studies of children at risk for dyslexia
2. African American children's familiarity with School English
3. On the efficacy of reading to young children
4. Phonemic awareness in skilled adult readers

1.

## **Very Early Language Deficits in Dyslexic Children**

**Hollis S. Scarborough**

*Brooklyn College, City University of New York*

SCARBOROUGH, HOLLIS S. *Very Early Language Deficits in Dyslexic Children*. CHILD DEVELOPMENT, 1990, **61**, 1728–1743. At 2½ years of age, children who later developed reading disabilities were deficient in the length, syntactic complexity, and pronunciation accuracy of their spoken language, but not in lexical or speech discrimination skills. As 3-year-olds, these children began to show deficits in receptive vocabulary and object-naming abilities, and as 5-year-olds they exhibited weaknesses in object-naming, phonemic awareness, and letter-sound knowledge that have characterized kindergartners who became poor readers in other studies. These late preschool differences were related to subsequent reading status as well as to prior language skills, but early syntactic proficiency nevertheless accounted for some unique variance in grade 2 achievement when differences at age 5 were statistically controlled. The language deficits of dyslexic children were unrelated to maternal reading ability and were not observed in children from dyslexic families who became normal readers. The implications of the results for etiological issues are discussed.



# Are reading difficulties due to *reading* difficulties?

Current debate focuses on teaching:

teacher preparation  
curricula, practices

But struggling readers are behind on **the first day of Kindergarten**.

*That's not because of how they were taught.*

What about early experience  
with language  
what language is used for and about

2.



 Full Access

## Familiarity With School English in African American Children and Its Relation to Early Reading Achievement

Anne H. Charity, Hollis S. Scarborough, Darion M. Griffin

### Abstract

For children whose everyday speech differs greatly from the School English (SE) they encounter in academic materials and settings, it was hypothesized that greater familiarity with SE would be associated with more successful early reading acquisition. Sentence imitation and reading skills of 217 urban African American students in kindergarten through second grade (ages 5 to 8 years) were assessed. Children in each grade varied widely in the extent to which their imitations of SE sentences included phonological and grammatical forms that are acceptable in African American Vernacular English but not in SE. Higher familiarity with SE (reproducing SE features more often when imitating) was associated with better reading achievement, and these relationships were independent of memory ability.

# What if child's language is different, not deficient?

In the US, “achievement gaps”

between high and low income children

between whites and minority children (e.g., African Americans)

# Our recent research on causes of achievement gap for African American children

Julie Washington (Georgia State University)

Maryellen MacDonald (Wisconsin)

1. African American English: a major dialect of English
2. Spoken to some degree by most AA children, families
3. Low prestige dialect. Differs from dialect in school, books. (“general” English)

Phonology: pronunciations of words

Morphology: verb tense, agreement

Syntax: different expressions for common concepts

Discourse: uses of language, pragmatics

## Basic idea:

Children who use AAE have **more to learn** than children who speak “standard” English

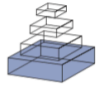
They have to learn the mainstream dialect, code switching.

Their path to reading is more difficult.

But are assessed against the same yearly achievement milestones.

Therefore, part of the achievement gap is “built in”

Even **before** SES, other factors are considered.



# Impact of dialect use on a basic component of learning to read

***Megan C. Brown<sup>1</sup>, Daragh E. Sibley<sup>2</sup>, Julie A. Washington<sup>1</sup>, Timothy T. Rogers<sup>2</sup>, Jan R. Edwards<sup>3</sup>, Maryellen C. MacDonald<sup>2</sup> and Mark S. Seidenberg<sup>2\*</sup>***

The Triangle Model ("4 part processor")

A computer simulation of children's learning

With different kinds of language background.

Computer model: cause and effect is clear.

Main finding: it takes **longer** to learn spelling-sound correspondences when dialect pronunciations conflict.

Also, slower reading aloud even when accurate.

Other issues for AAE speakers:

Assessment, identification of reading/language/learning difficulties

**Phonemic awareness tasks.** Which words start/end with the same sound?

AAE allows optional deletion of final phonemes

Phonemic awareness: poorer on final phonemes than initial phonemes.

**Rhyming:** AAE doesn't emphasize perfect rhymes; uses other types of sound-play.

**Identification of speech-language disorders:**

Some diagnostic features are **well-formed** in AAE. E.g., reduction of complex phoneme clusters, word-final inflections

These (and other) findings create difficult personal choices

Progress in reading is related to knowledge of school dialect.

Implication: provide greater early exposure to school dialect. Model, promote code-switching. Second dialect learning, like second language learning.

**Problem:** Conveys that home dialect is defective. Ethics of imposing language change.

Solution: pre-K focused on language, topic knowledge  
NOT starting reading instruction earlier





3.



## Developmental Review

Volume 14, Issue 3, September 1994, Pages 245-302



Regular Article

# On the Efficacy of Reading to Preschoolers

Scarborough, Hollis S., Dobrich, Wanda

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<https://doi.org/10.1006/drev.1994.1010>

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## Abstract

We review more than three decades of empirical research pertaining to the hypothesized influence of parent-preschooler reading experiences on the development of language and literacy skills. The literature provides evidence for this association, although the magnitudes of the observed effects have been quite variable within and between samples and, on average, have been unexpectedly modest. Demographic, attitudinal, and skill differences among preschoolers all apparently made stronger direct contributions to prediction in investigations that permitted such comparisons. Implications of the findings for theory and research on literacy acquisition, for educational practice, and for parental guidance are discussed.

# Importance of early spoken language experience

The starting point for reading is speech.

Child does not **re-learn** language when they learn to read.

They link print to existing knowledge.

Many “reading” problems arise from spoken language.

**amount, variety** of speech to children

**type** of speech (discourse functions)

Amount and variety of speech to children varies.

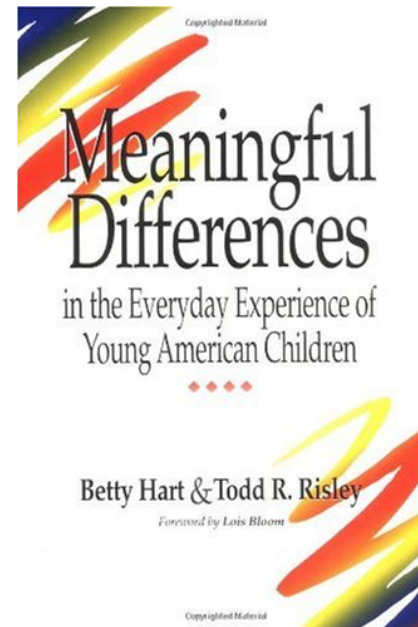
In the US: Hart & Risley study is famous

Data about parents' speech to children, what children learn

Very large differences associated with SES of family

# The Early Catastrophe

*The 30 Million Word Gap by Age 3*



Later studies (in US) show

variability **within** lower SES families

variability at **other** SES levels

(Anne Fernald, Catherine Snow, others)

Weaker knowledge of spoken language affects learning to read

Follow-up of Hart & Risley subjects

Studies of children at risk for dyslexia (Scarborough, Snowling & Hulme, Molfese)

Much other research

In the US, awareness of these findings is growing.

## What can be done?

Efforts to change parental behavior: more speech to and with child.

Old message: reading to children is essential!

New message: talking with children is essential!

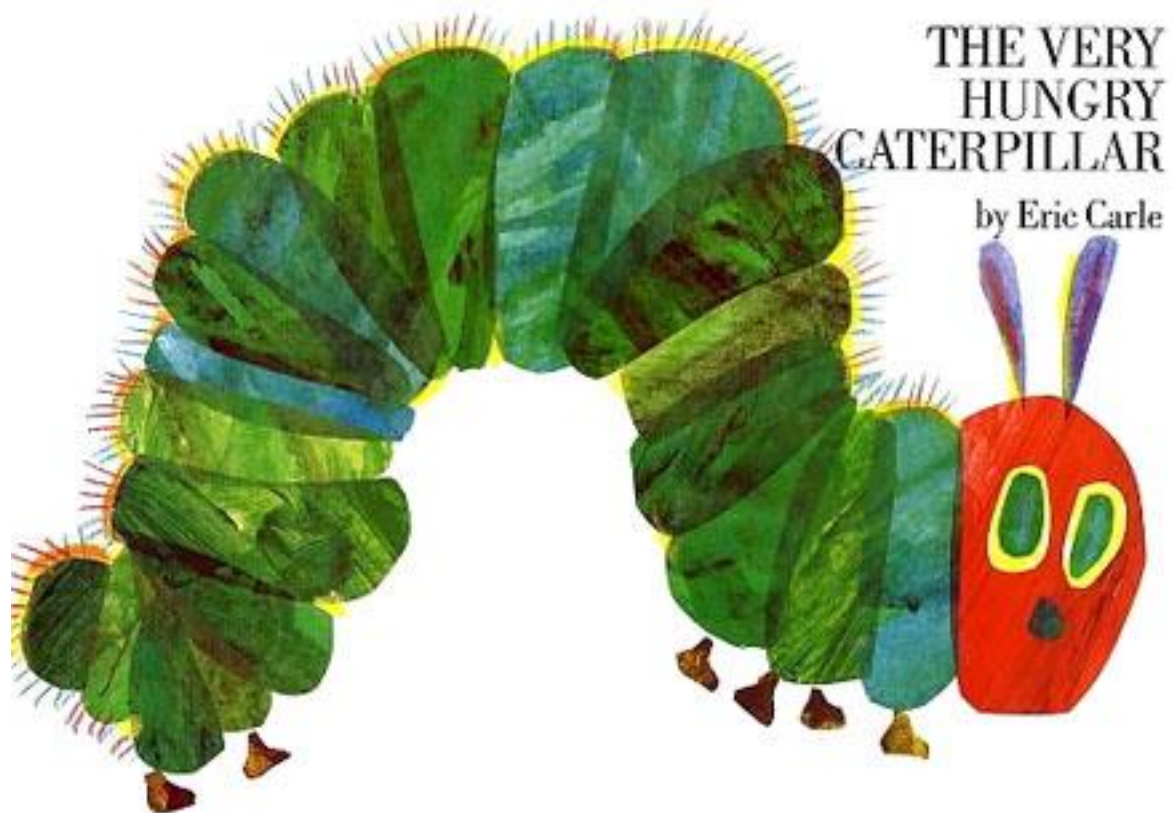
Changing how parents verbally interact with children is HARD.

But notice: reading to children IS a form of speech to children

And books have language that differs from what children usually hear

## Maryellen MacDonald's insight

(Montag & MacDonald, JEP:G, 2015; others)



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In the light  
of the moon  
a little egg  
lay on a leaf.

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1 apple  
2 pears  
3 plums  
4 strawberries  
5 oranges  
1 piece of chocolate cake  
1 ice cream cone  
1 pickle  
1 slice of Swiss cheese  
1 slice of salami  
1 lollipop  
1 piece of cherry pie  
1 sausage  
1 cupcake  
1 slice of watermelon  
1 green leaf

In the great green room there was a telephone and a red balloon and a picture of a cow jumping over the moon.

The night Max wore his wolf suit and made mischief of one kind and another his mother called him “WILD THING!” and Max said “I’LL EAT YOU UP!” so he was sent to bed without eating anything.

In an old house in Paris **that was covered in vines**  
Lived twelve little girls in two straight lines.

Relative clause.  
“academic” language

## Summary:

1. Children learn spoken language from adult speech (mainly)
2. Reading to children is a unique **type** of speech
3. It expands their knowledge of spoken language.

A really important benefit of reading to children—  
If there are books in home, caregiver who can read.

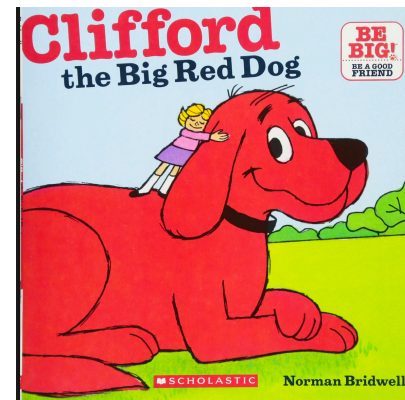
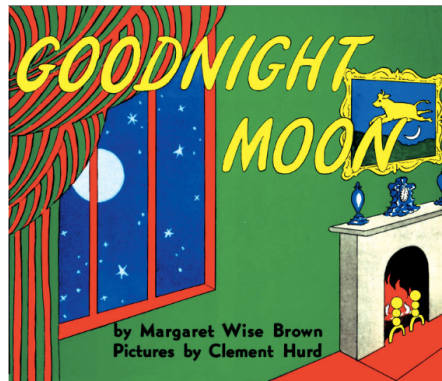
But Hollis' findings?

# Some of our current work: a glimpse

## Content of children's books

We have created biggest database of children's books (~240 and growing) in the world  
Can track vocabulary, linguistic complexity, content

*Oops:* Children's books may be a source of early pink/blue gender stereotypes.



## "Big data" analyses of children's books

Gender associations for words (from adults)

Statistical analyses of word co-occurrences

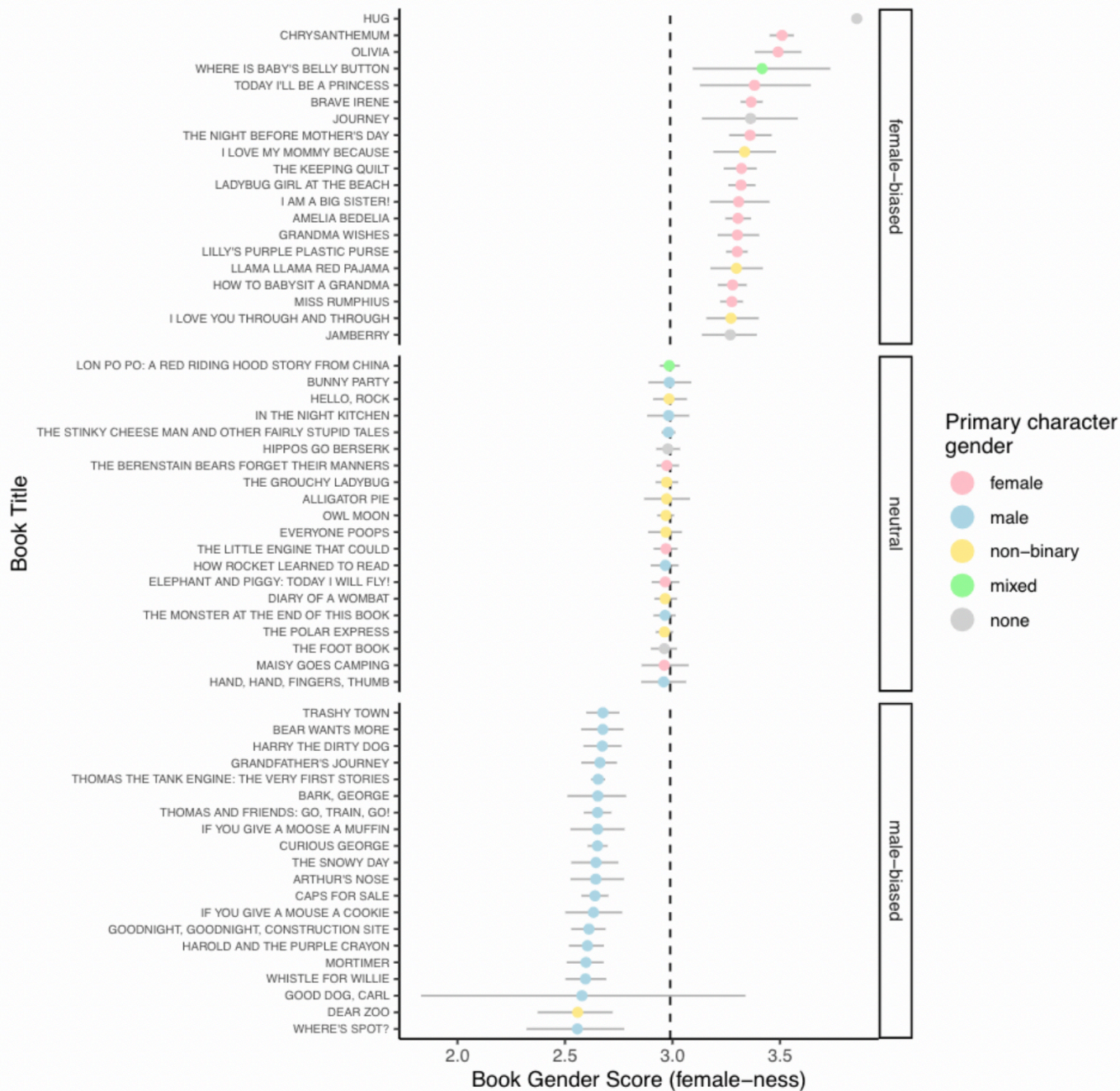
Clusters of "pink" vs. "blue" words

Go to [https://mlewis.shinyapps.io/SI\\_KIDBOOK/](https://mlewis.shinyapps.io/SI_KIDBOOK/) to see data for all books and other words.

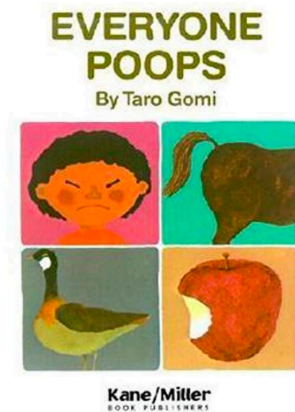
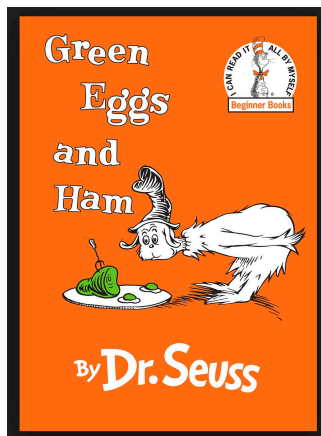
Category	Effect Size	<i>N</i>	Examples
<b>Female-Biased Clusters</b>			
affection	1.33 [0.9, 2.1]	21	kisses, loved, smile, tears, heart, care
modifiers	0.79 [0.49, 1.27]	34	probably, whenever, truly, likely, completely, yet
communication verbs	0.74 [0.43, 1.14]	25	spoke, listened, heard, explained, asked, answered
school	0.54 [0.12, 1.12]	20	learning, practicing, school, students, writing, book
food	0.44 [0.15, 0.8]	43	meatballs, soup, eggs, milk, pie, salad
<b>Neutral Clusters</b>			
family relationships	0.19 [-0.18, 0.63]	29	children, brother, sister, uncle, aunt
body parts	0.14 [-0.16, 0.48]	41	eye, knee, ankle, hair, bone
house parts	0.08 [-0.24, 0.4]	40	bedroom, floor, lamp, roof, window
quantifiers	0.05 [-0.29, 0.4]	36	few, almost, many, most, whole
spatial terms	-0.31 [-0.71, 0.02]	39	across, long, low, through, close
<b>Male-Biased Clusters</b>			
zoo animals	-0.53 [-1.27, -0.07]	23	giraffe, elephant, gorilla, lion, monkey, zebra
movement verbs	-0.83 [-1.21, -0.54]	37	climbed, walked, jumped, knocked, pulled, swung
tools	-0.89 [-1.42, -0.52]	20	axe, blade, knife, bow, stick, wood
transportation (ground)	-1.23 [-1.62, -0.93]	40	car, bicycle, trains, ambulance, engine, traffic
professions	-1.35 [-2.19, -0.92]	23	judge, policemen, guard, sailor, mayor, clerk
<i>Note:</i> Effect size measure is Cohen's <i>d</i> based on a one-sample <i>t</i> -test. Brackets give bootstrapped 95 percent confidence intervals. <i>N</i> indicates number of words in cluster.			



## Mean Gender Rating by Book



(gender neutral)





4.



## Scientific Studies of Reading

 **Routledge**  
Taylor & Francis Group

ISSN: 1088-8438 (Print) 1532-799X (Online) Journal homepage: <http://www.tandfonline.com/loi/hssr20>

# The Fate of Phonemic Awareness Beyond the Elementary School Years

Hollis S. Scarborough , Linnea C. Ehri , Richard K. Olson & Anne E. Fowler

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Everyone is talking about "the science of reading".

Mainly focused on phonics (vs. "literacy"), still.



### An Old and Contested Solution to Boost Reading Scores: Phonics

As test scores lag, there's a growing debate between proponents of the "science of reading," which emphasizes phonics, and traditional educators who prefer to instill a love of literature.

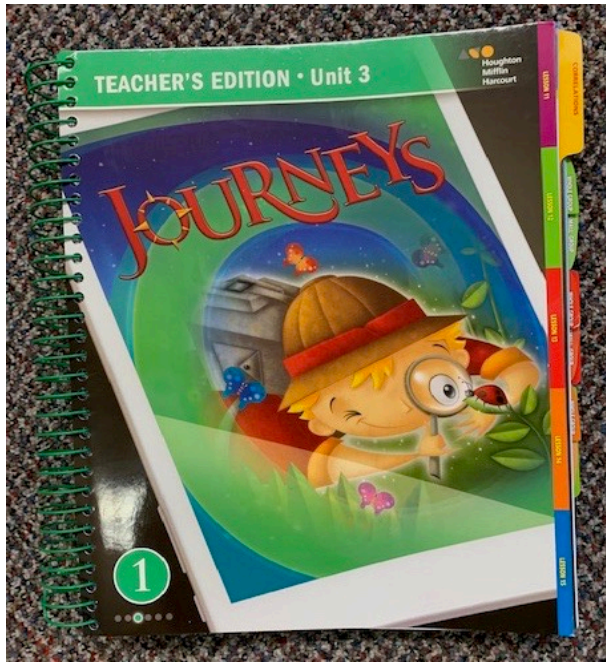
There is more to the "science of reading" than phonics.

Let's talk about phonics.

Publishers' main response to Reading Wars I:

Kitchen sink approach

All the major reading curricula include phonics



There's phonics in there but not in a usable form.

Calkins, Fountas & Pinnel: optional

(Next up: they will all say they incorporate "structured literacy" and there will dyslexia modules.)

What *do* we know about phonics?

That learning how print relates to sound is very important.

What do we know about how to teach this?

That explicit, systematic better than indirect, "catch on"

But what about

- which units?

- how many to teach?

- what order?

- how long?

- using what activities?

- which curriculum works best?

- is most consistent with science?

At IDA last year I asked people why they taught this material the way they do.

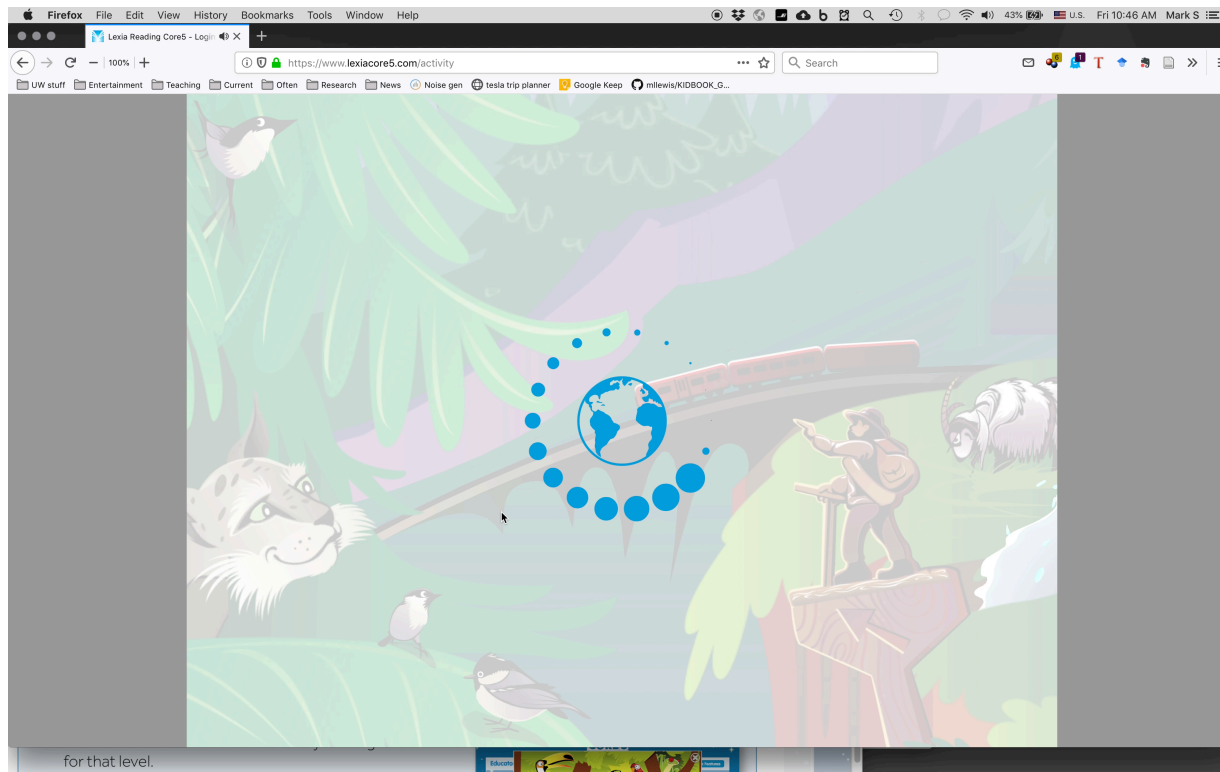
And the answer can't be "because I know it works"

Phonics is taught a lot of different ways.

Lots of assumptions about learning, e.g.,

About what is to be learned  
rules, sight words

And how to teach it  
e.g., memorize the pronunciations of isolated vowels  
patterns independent of meaning  
learn explicit rules. Lots of them.



Audio: description of a complex spelling rule for doubling the final z in a word like BUZZ

Is this effective? For whom? Compared to what?



Recognizing and understanding words should be like a REFLEX

Teaching children complex rules with many exceptions

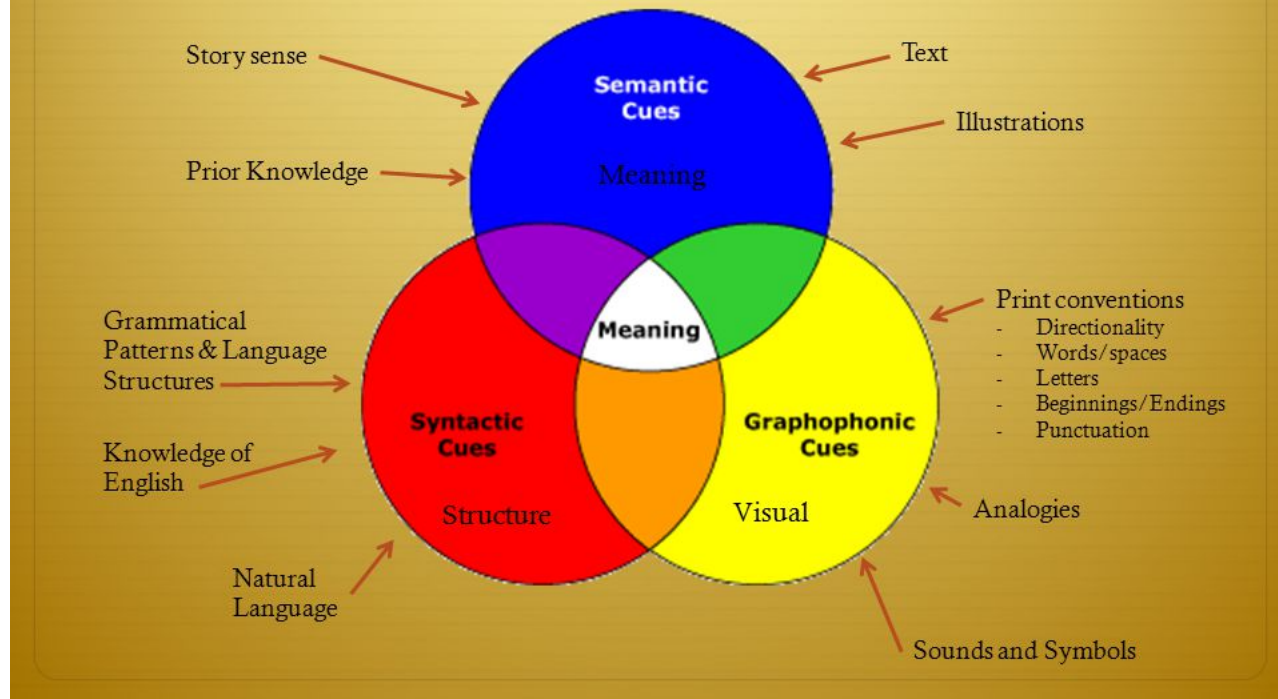
Strategies labeling parts of words

Strategies to help with sounding out words

Is this the path to fluency?

It shares a lot with this:

# 3 Cueing Systems



What's wrong with this? Slow, inefficient. The opposite of "fluent".

What is missing is a better theory of

Learning

What is to be learned

Lots of reading research focuses on predicting outcomes

What factors affect which components of reading skill?

Also, descriptions of important phenomena.

"cracking the code"

"the alphabetic principle"

"phonemic awareness"

"zone of proximal development"

"scaffolding"

These descriptions can support a lot of different practices, not all effective.

What are the underlying types of knowledge and learning mechanisms?

I have done some work on this....

"Triangle model" of word reading.

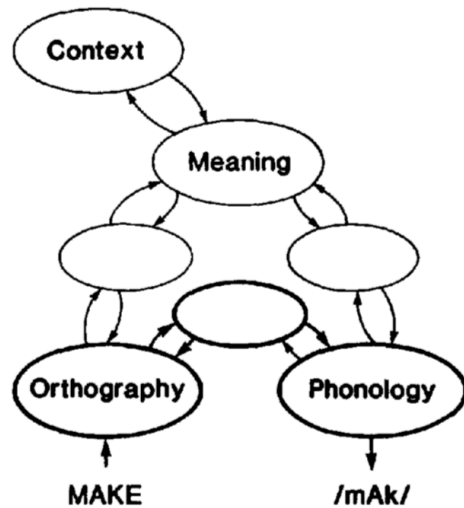
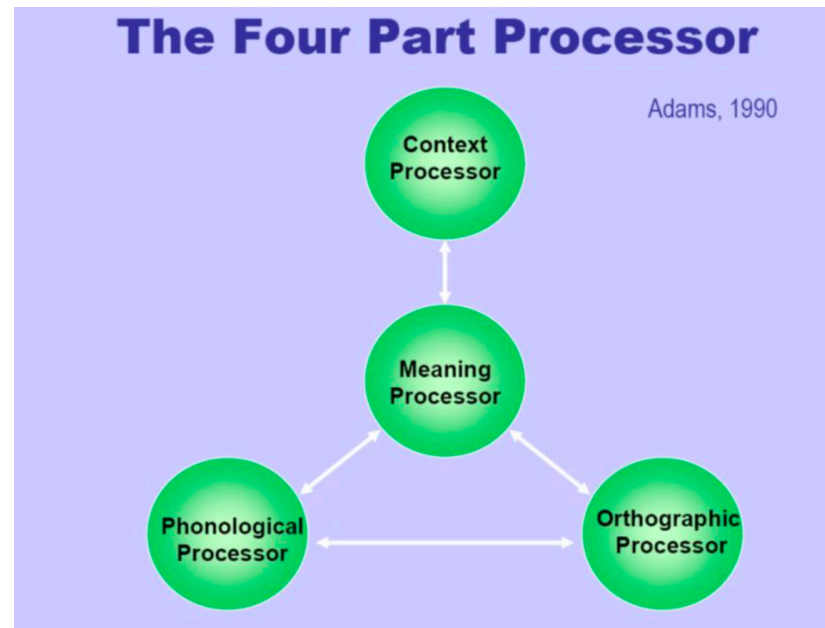


Figure 1. General framework for lexical processing.  
(The implemented model is in boldface type.)

Seidenberg, McClelland et al.

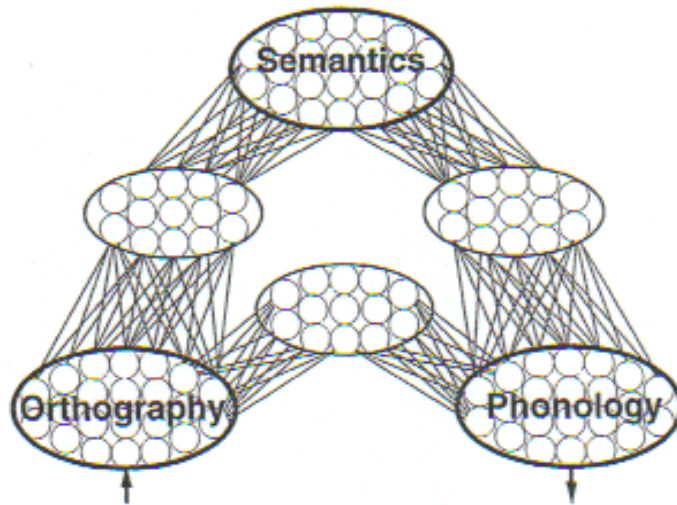


Adams, Moats

These are not the same.

Statistical mappings  
No rules, no sight words  
Implicit learning, mostly

Traditional phonics  
Rules, sight words  
Explicit instruction, mostly



This is a theory of  
what to learn  
how to learn

What: partial regularities, patterns,  
Subpatterns

How: statistical learning plus some  
Explicit instruction

Supports generalization w/out rules  
Identifies true sight words

Learning = increasing sensitivity to **statistical** patterns across words

Phonemes and other units **emerge**

With sufficient skill, becomes more "whole word" like.

Model explains Hollis' results about weak "phonemic awareness" in adult readers.  
As proficiency increases, internal structure of words has less impact on performance.

Finally: how much do we know about best instructional practices?

Science of reading

A lot is known.

Science of teaching

Science of teaching reading using the science of reading? Not so much.

My review of core findings in science of reading (phonics, context, comprehension)

It was all basic science.

Did not include any outcome studies.

Lack of strong outcome studies: **doesn't mean the science was wrong.**

Means: we need more research on translating science to practice.

What can we accomplish?

A lot more. Using a lot of science that hasn't been assimilated yet.

We have a lot of wonderful new science (e.g., on brain)  
But we haven't even made use of a lot of earlier work.

We could.

The need is great.



# Thank you!

## THE MANY STRANDS THAT ARE WOVEN INTO SKILLED READING

### LANGUAGE COMPREHENSION

BACKGROUND KNOWLEDGE  
(facts, concepts, etc.)

VOCABULARY  
(breadth, precision, links, etc.)

LANGUAGE STRUCTURES  
(syntax, semantics, etc.)

VERBAL REASONING  
(inference, metaphor, etc.)

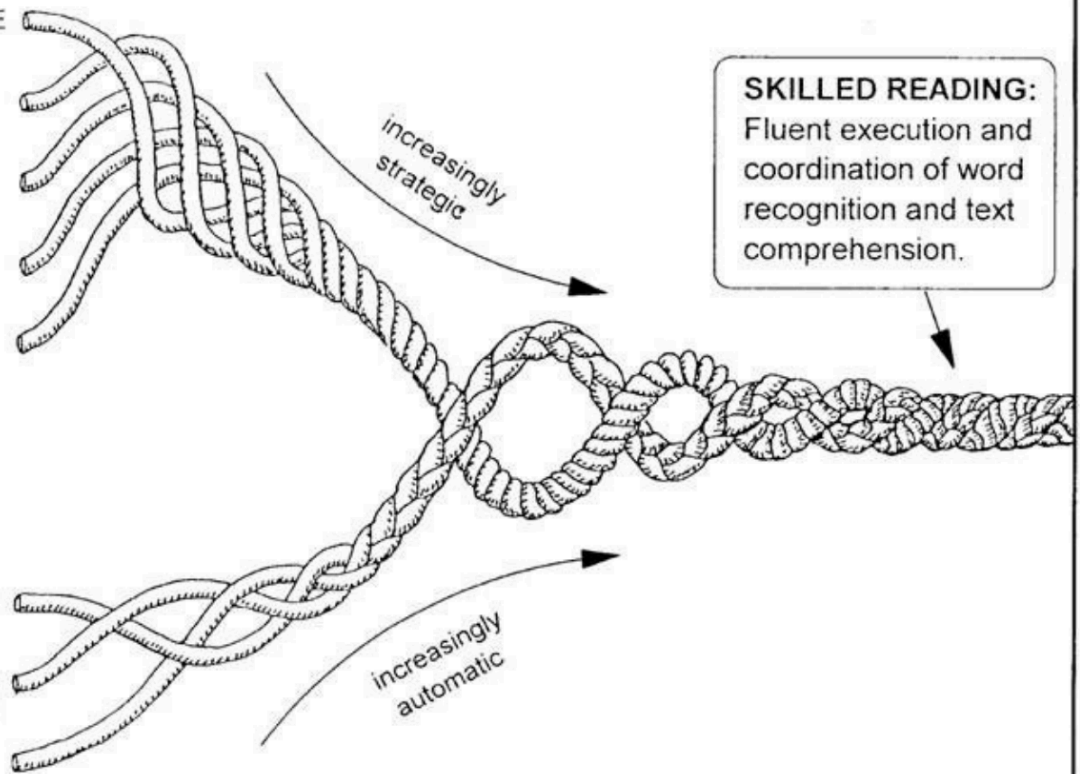
LITERACY KNOWLEDGE  
(print concepts, genres, etc.)

### WORD RECOGNITION

PHONOLOGICAL AWARENESS  
(syllables, phonemes, etc.)

DECODING (alphabetic principle,  
spelling-sound correspondences)

SIGHT RECOGNITION  
(of familiar words)

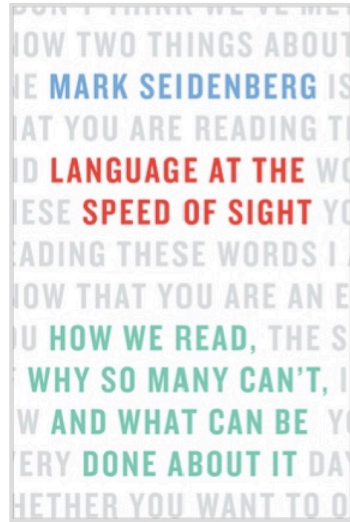


Mark S. Seidenberg  
seidenberg@wisc.edu  
@marksseidenberg

Lab: lcnl.wisc.edu

Readir

Book:



"Cognitive neuroscientist Seidenberg digs deep into the science of reading to reveal the ways human beings learn how to read and process language.... Seidenberg explores current research into dyslexia and other literacy problems, especially as they pertain to the challenges facing the American education system. **His approach is pragmatic, myth-destroying and rooted in science—and his writing makes for powerful reading.**" —Publishers Weekly

"Mr. Seidenberg makes a strong case for how brain science can help the teaching profession.... **[He] has that rare knack of sounding reasonable and righteous at the same time.**" —New York Times, 12/29/2016

"**Every teacher of young children as well as those who train them should read this book.**" Wall Street Journal, 1/10/2017.

Look for study guide April 1 on Reading Matters website. Free!