The Science of Reading and Literacy Outcomes: Who Needs to Know What?

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Reading Matters
Connecting Science and Education

www.seidenbergreading.net

Who am I? A scientist who studies reading and language.

Language & Cognitive Neuroscience Lab

Production · Comprehension · Reading · Dyslexia · Behavior · Brain · Development

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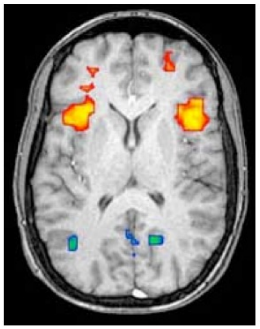

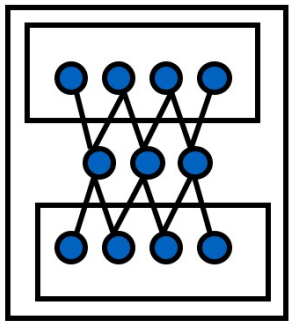

Brain circuits

Computational models

Behavior

Children, adults
Typical, atypical
Varied backgrounds
SES, language, dialect

Why am I here?

Shared view that what we've learned about how reading works and children learn could help improve literacy outcomes.

Efforts underway in many states. This project prominent among them.

Congratulations for getting multiple stakeholders together.

It's the only way to succeed.

Key element: incorporating more of that good science.

pre-service teacher education

in-service support and PD

curricula, practices, assessment

Obstacles:

Revising existing beliefs

Limited background knowledge

Lack of reliable resources

Perception that reforms are anti-teacher.

Risks:

Weak translations of science to practice

Investment doesn't pay off in better outcomes

Squandered opportunity.

Science gets blamed.

In the time that's available, I will stick to a few basic observations and assertions. Food for thought.

1. Want to connect research findings and education?
   YOU NEED MORE SCIENTISTS

Who is leading discussions of the "Science of reading"? Not the researchers.

Lots of self-taught "experts", second-third-nth-hand knowledge from the Internet

"Science of reading" influencers on TikTok, Instagram

Not good.

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Lots of interest in "science of reading" but lack of resources.

People have started to fill the vacuum in this market.

Interested parties, probably well-meaning, but not researchers. Their understanding of the science is limited. The materials they produce address demand but aren't closely tied to research.

Poor translations of research to practice undermine the utility of the research.

If you are developing
- new curricula, support materials
- new teacher education programs
- new PD materials

If you are training coaches and other support staff
If you are developing websites and other on-line resources
If you are planning legislative remedies for low literacy

You need input from researchers who understand the findings.

My article “Lost in Translation” in RRQ was, in part, an attempt to get more researchers involved in these issues.

They need incentives.

2. Who needs to know what?

"Science of reading": a huge body of research from multiple disciplines.
How much does a person need to know?
How much can they be expected to absorb?

If your job is training future teachers, you need to know a lot.
You are the experts who are shaping the behavior of future teachers.
You need to be able to read research, critically assess its validity, importance, implications for instruction.

What do prospective teachers need to know?
A lot. Linguistics 101, cognitive science, developmental psychology, scientific literacy, translating science to practice, more.

They need incentives.

What do in-service teachers need to know?

They need to have major findings, concepts explained in ways they can grasp given their backgrounds. We need to use modern ways of presenting information, not just books and webinars.

This information needs to be explicitly linked to their work. What happens in classrooms. Being able to succeed with as many children as possible.

Warning: there can be overteaching (too much information) and underteaching (simplistic renderings of research).

3. What's the level at which research is relevant to practice?

Currently: a lot of focus on details about practices.
People who lack much background discussing research findings.
Social media-level discussions.

Teachers don't need to be scientists. Teachers don't need to read the primary literature. Teachers need to understand essential findings that are relevant to classroom and have huge potential impact.

What are they? Some examples.
Not an exhaustive list. Not in order of importance.

Concept 1: Learning to read depends on three things:

knowledge of spoken language
knowledge of the world (what we use spoken language to communicate about)
knowledge of how written code represents spoken language

Same for all learners.
Instruction needs to take into account differences in background, experience.

Spoken language: young children's experience varies. Amount and variety of speech; how language in the home relates to language used in school. Big individual differences, big impact on learning to read.

Quiet schools. Order/control favored over communication?
SILENT LUNCH??

Knowledge of the world: again, experience varies. Associated with culture, income/opportunities, family context.

Books are a potential source of knowledge beyond immediate experience.
Need for teaching materials, activities to reflect these differences.

Print: requires instruction, sufficient opportunities to learn. i.e., practice.
Again, practices need to take into account children's circumstances.

Concept 2: Many “reading” difficulties are not about reading.

Reading depends on spoken language, knowledge of world
Children’s knowledge of these varies a lot. “Individual differences”

When a child in K-1-2 struggles with reading, we naturally assume the problem is with the reading part: recognizing letters, printed words; eye-movements across the page. The visual code stuff.

But, these difficulties may be sequelae—downstream consequences—of issues related to spoken language. Or world knowledge.

Why it’s essential that school activities emphasizes language growth.
Why it would be beneficial to have pre-K that emphasized language.
Same for “knowledge of the world”.

Goal is to expand children’s knowledge beyond immediate experience.

Concept 3: The goal of reading instruction is reading

(The goal is actually literacy = reading, writing, spelling. "Reading" for short.)
Have we lost track of this?

Many people have learned that reading consists of several components.
The National Reading Panel report encouraged this view.

Phonemic awareness
Phonics
Fluency
Vocabulary
Comprehension

Instruction then focuses on each component.

Two massive problems with the “components” approach:

1. The components aren’t independent. They overlap. You treat them as Independent, you fail to take advantage of overlap. That makes learning more difficult.

2. Intensive focus on components, but where’s the reading?

The goal is becoming a reader.

Instruction in components is justified only to the extent it advances this goal.

- Vocabulary instruction (can be embedded in other activities).
- Topic knowledge (which isn’t in the 5 pillars)

If the child doesn’t understand the words or the topic, they need instruction.

What about phonemic awareness, phonics?

Only justified to the extent they advance children’s reading.

No pre-specified amount of instruction or level of mastery is required.

The only question is: how well is the child reading? Where do they need additional help?

Conclusion? Instruction needs to be conditionalized on the child's READING.

We can specify the kinds of behaviors that underlie reading skill.
(These are essentially the same for all children.)

How much instruction in various areas is required to get there: that DEPENDS.
One size does not fit all!

4. Educational practices need to work equally well for all children regardless of background

Currently, curricula and practices are very oriented to a hypothetical child who seems to be middle class, has access to resources in the home and community, speaks ”mainstream” English.

Many lessons, exercises, activities do not work as well for children from other backgrounds. Examples:

Phonics: child doesn’t pronounce the word that way
Background knowledge: story assumes knowledge of events, situations that aren’t part of the child’s culture.
math word problems are terrible this way!

Also, many curricula assume the availability of resources in the home. A lot of instruction is outsourced. E.g., phonics practice or multiplication tables.

This is how educational practices MAGNIFY impact of poverty, SES.

OK: I have to stop here.

Message: Science of reading isn't about details of research studies.

It's also more advanced than

5 Pillars

Simple View

Stages in reading acquisition

Cognitive science of the 1970s-1980s (Goodman, Smith, etc.)

We can communicate important findings so that teachers can understand and utilize.

Pre-service, in-service. Curricula and practices.

This level should be helpful for people who teach teachers, for advocacy groups, for legislators and their staffs.

This approach to "the science of reading" doesn't dictate what the teacher should do on a given day.

But, incorporating these principles will lead to better instruction and outcomes.

Closer fidelity, better translations into practice, better outcomes.

Thanks for your work.
Thanks for listening.

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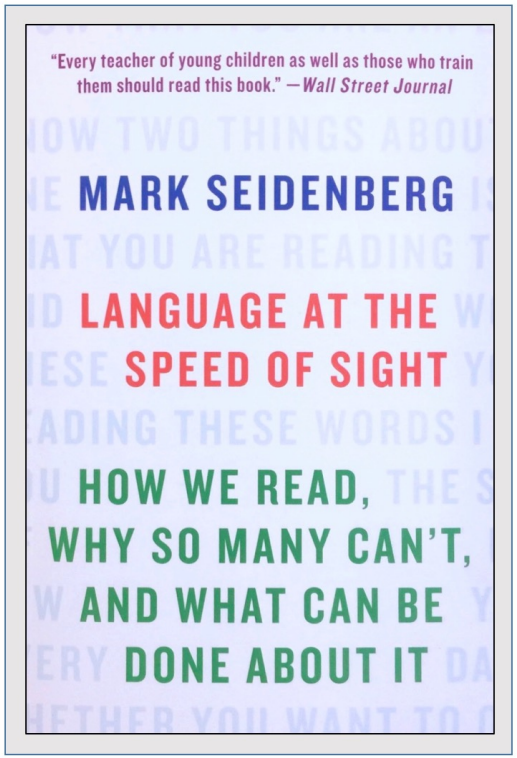

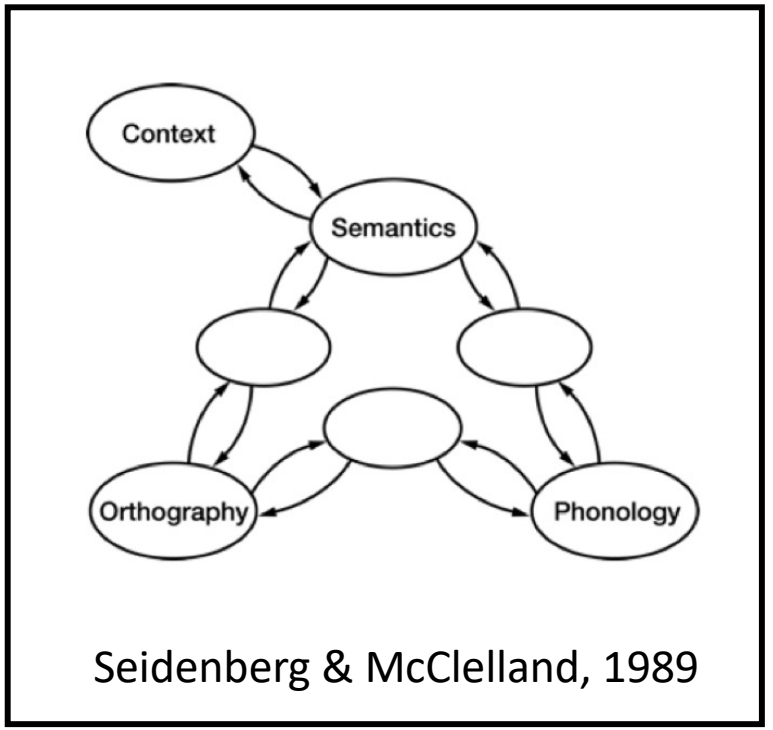

Seidenberg & McClelland, 1989

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Specifying goals but not how to get there

1. Need more scientists
2. Existing resources not adequate
   Too much detail, too little relevance
   Poor rendering of science: accuracy
   Narrow focus on phonics, phonology
3. Teachers don't need to have detailed knowledge of research, but

People who teach them do, and people who develop teaching materials.

4. What do teachers need to know?

Not: results of a meta-analysis of phonemic awareness interventions, effect sizes
Not: the Pillars of Reading Instruction. 1 day phonics.

This: important, essential findings stated as fundamental guidelines or principles.
There's more than 5 of them, but less than 20.

I'm trying to develop this set of principles.
Doesn't tell teachers exactly what to do.
Leaves room for poor translation, true.
But, points to things to try to achieve and away from poor practices.

Simple View of Reading ignored this issue.

At the start of school:
Child already knows spoken language (at the level of a 5 year old: YES_
Child doesn't have to re-learn spoken language: TRUE
Child needs to learn about print: YES

But: The child doesn't JUST need to learn about print.
Their spoken language continues to develop.
Their knowledge of the world continues to develop.

Moreover, print and spoken language are connected:
- Knowledge of spoken language affects learning about print.
- Learning about print affects knowledge of spoken language