Research about Deaf Children and Reading

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What is language? What is visual attention?

What is happening in the brain? Two languages?

What is the Mom doing to manage all this?
And what does this have to do with READING?
What is language?

Spoken English——Signed Language

The same?  Or Different
Phonology

Morphology/Syllabic structure

Syntax

Semantics

Meaningless building blocks

Words

Sentences, phrases

Discourse
We should focus on the similarities of languages, spoken or signed, and the processes that give rise to their mastery, and to the implications for reading, rather than on their differences. Their differences are that of modality.

“Just like spoken languages, sign language phonology is concerned with the meaningless units (segments, syllables, features) of a linguistic system and how they combine via a set of rules or constraints to form meaningful units (morphemes, words, clauses).” (Diane Brentari, 2013)
During the first year of life

Children are mastering the phonology of their language

(or the phonologies go their languages!)

and timing is important
What is Visual Attention?
the ability to pay attention to things that are relevant to current goals, while ignoring distractions that are not pertinent.

Are deaf children “distractable?”
Just as with the acquisition of phonological awareness, the child’s ability to self-manage and regulate their visual attention —-

Develops in infancy

Must be taught

Eye Gaze

Joint Visual Attention
Deaf and hearing: a different scenario
Three facts to consider—

1. Early language contributes to the development of visual attention skills (and vice versa)

2. Development of these skills in early infancy is Very Important! (The Critical Period Hypothesis.)

3. While deficits in self-regulation of visual attention and language may well lead to “distractability” in a young deaf student, deaf children with normal language development (and this includes ASL) and strong visual attention skills, will actually have A COGNITIVE ADVANTAGE.
It's easy to see: early visual language can enhance early visual attention
What is happening in the brain?
Early Visual Sensory Experiences

Different early visual sensory experiences alter the human brain and its functions.

Increased visual sensory input can lead to Higher Cognitive processing advantages.

Singleton, Bosworth, Corina, Dye, Eden, Hauser, Padden, Rayner Traxler
new fNIRS system
Different areas of the brain are engaged at different periods of development.

This is particularly true for language.

Thus, there is an area of the brain that is engaged when babies are processing PHONOLOGICAL information. There is a peak sensitivity for this between the ages of birth to 3.
But here’s the most amazing part!!

The areas of the brain that are engaged when hearing babies are processing sound-based phonological information are EXACTLY THE SAME areas that are engaged when deaf babies are processing visual-based sign phonology.
Two Languages?
All Early-Exposed *Bilingual* & Monolingual Longitudinal Milestones are the Same

Babbling
~6 months, Hands or Tongue

First Vocabulary
First Signs, or First Words
~12mths

First Sentences
2-Sign, or 2-Word combinations
~18mths

Petitto et al., 2001, *J of Child Lang*
Petitto et al., 2001, *Science*
Petitto et al., 2002, *Nature*
Maturation of hearing and speaking mechanisms does not determine the milestones and structure of early language acquisition.

Testing the “speech is special” hypothesis
Bilingual exposure benefits monolinguals

Cognitive Benefits

Metalinguistic Awareness

Enhanced executive functions: problem solving, attention control, task switching, & more!
Early bilingual exposure does not block the development of speech

but, late exposure may impair language and cognitive development

Davidson, Lillo-Martin, Chen-Pichler, 2014
What does this have to do with READING?
cat

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<td>Mouth Articulatory Gestures</td>
<td>Rhythmic &amp; Temporal Nucleus</td>
<td>Hand Articulatory Gestures</td>
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Etc.
sound phonology

visual phonology

same neural sites/systems

universal level of language organization
It is a well established fact that, among signing adults, ASL is correlated with reading ability.
What are the origins of these correlations?
The better adult deaf readers who sign report being exposed to ASL before starting school.
Among deaf preschoolers, early literacy skills are demonstrated by those with better signing skills, mediated by fingerspelling skills.
You don't have to be a deaf parent to have a positive influence through signing.

Correlations for children with signing parents—either deaf or hearing.
What is the Mom doing?
Resources for Parents
Strategic Focus Area 4: Breakthrough Translation

Melissa Herzig, Education and Research Translation Manager (SFA 4 Leader)

Melissa Malzkuhn, Digital Innovation & Media Strategies Manager

Erica Wilkins, Cara Keith, & Andrea Sonnier

Wei Wang

Yiqiao Wang

Lauren Benedict
Translational Products
Published Bilingual Storybook App
Designed for Deaf Children Based on Research Principles in Intl J of Adv Computer Science

Current Studies
Usability Study

Instructional Guide - Lesson Plans
ASL Development
Bridging ASL-English Languages
Word Study
Guidelines for Reading Baobab with students

The Baobab, An Award-Winning Bilingual Reading Storybook App!
Parent Information Package

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Current Research
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