



# Are Multisensory Instruction and Science Based Reading Research (SBRR) in Tune?

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New York Branch IDA



Judith R. Birsh

Catherine Ghassemi

# What part of this statement is not true?



"**Good instruction** makes a difference, and **research** has shown that good, **multisensory instruction** yields **changes in the way the brain is processing information**. So if **everyone** got really good instruction from **really good teachers** at a **pace** they could **handle**, we would have **large numbers of literate people**." [a teacher]

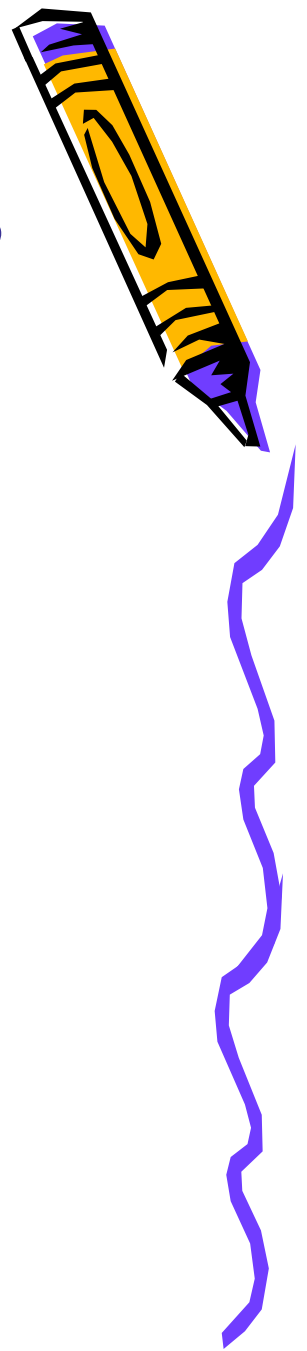
Fertig, (2009)



# What is Science Based Reading Research (SBRR)?

Answers questions about reading through data collection based on:

- Theory
- Research design
- Data gathering
- Analysis
- Interpretation leading to instruction

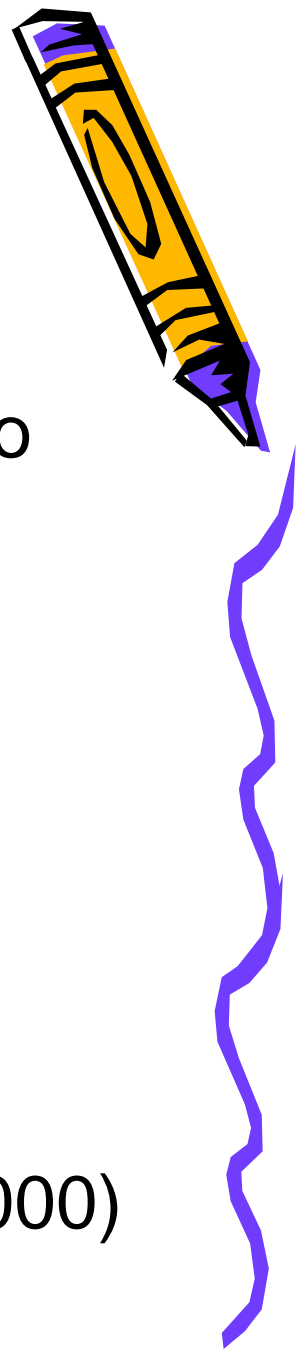


# What we know about SBRR

5 major areas important to reading need to be taught:

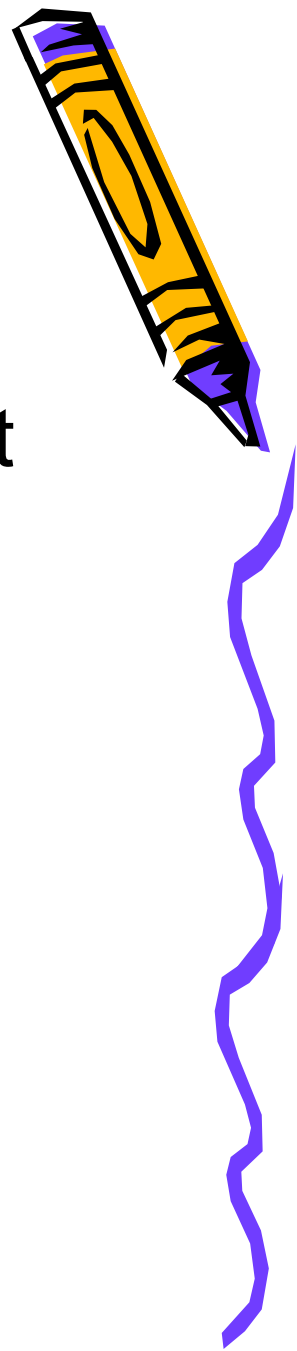
- Phonemic Awareness
- Phonics
- Fluency
- Vocabulary
- Reading Comprehension

(NRP, 2000)

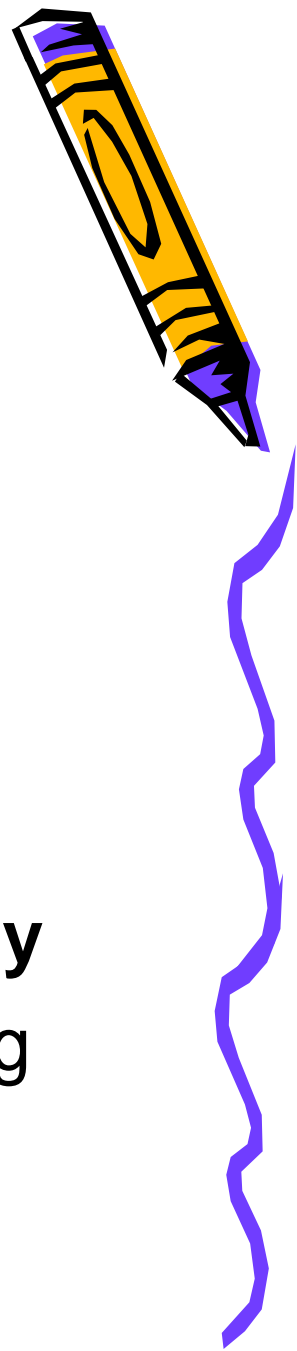


# What we know about SBRR

- Two abilities not included in NRP but are closely allied to and enhance reading:
  - Spelling
  - Writing



# Research

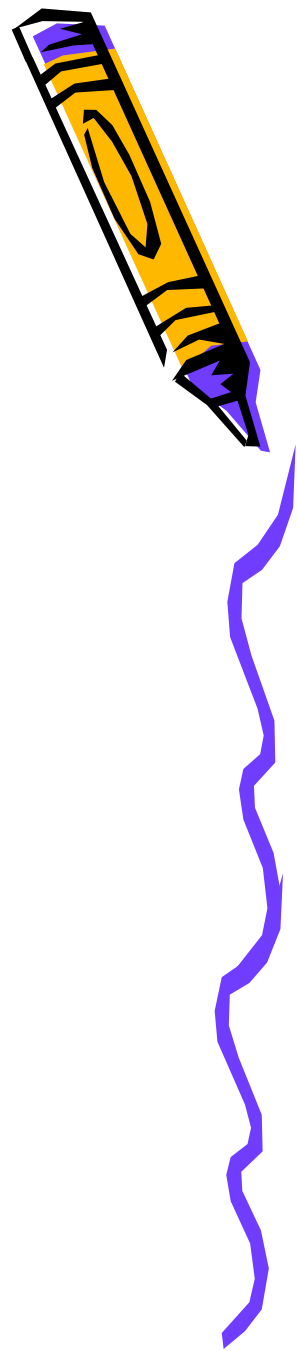


Current research tells us unequivocally that struggling learners benefit:

When the structure of spoken and written language, beginning with phonemes, is represented for them **explicitly**, **sequentially**, **directly** and **systematically**

In the context of a comprehensive reading program





## Instructional practices consistently supported by research

- The efficacy of structured, systematic, explicit teaching of all language-based skills
- Direct instruction works best
- Emphasis on accuracy and fluency
- Progress monitoring and differentiated instruction

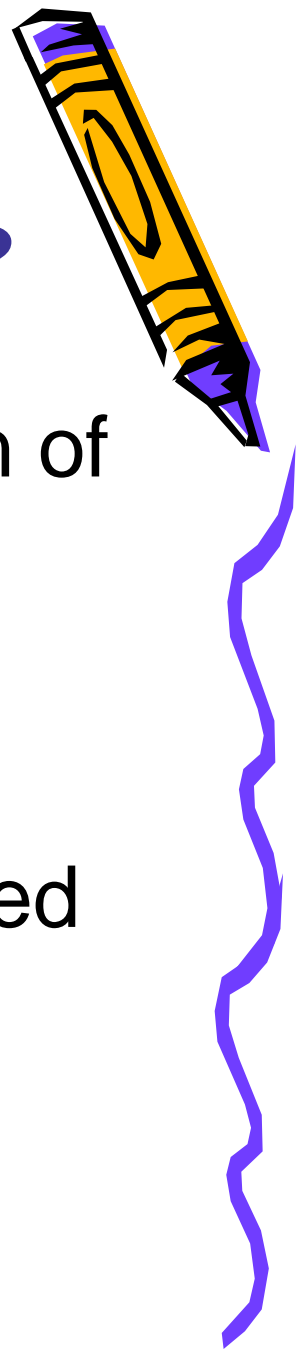




# Where is the research on multisensory components?

- Evidence missing on the contribution of multisensory component to effectiveness of MSLE
- More of the same does not work; need alternative method of teaching

Farrell & Sherman (In press)



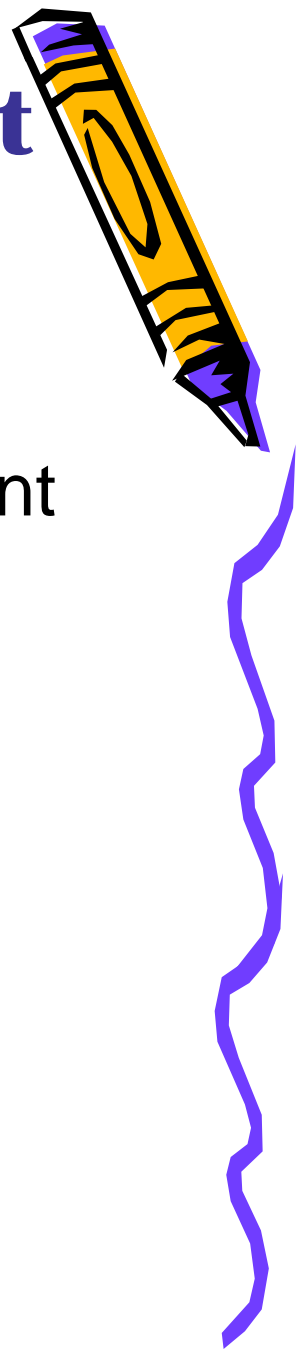


# Research that may lend support for content and approach of multisensory instruction

- Cognition and active learner engagement
  - Efficacy of phonics instruction
  - Insights from neuroscience
    - Studies of the brain



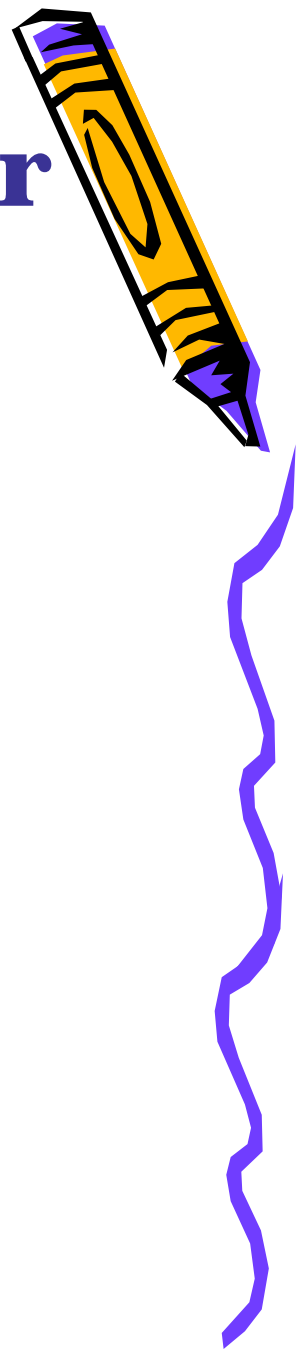
Farrell & Sherman (In press)





# Cognition and Active Learner Engagement

- Connecting new and old established learning
- More effective than rote learning or memorization
- Active responding, verbalizations, explicit use of strategies



# Neuroscience lends theoretical support for use of MSLE based on the way memory works



“...it is easier to integrate multiple sources of information during learning when the material is physically integrated, **auditorily** and **visually**, than when information is presented to each modality separately (Mousavi, Low, & Sweller, 1995).”

Farrell & Sherman (In press)



# Efficacy of Phonics Instruction

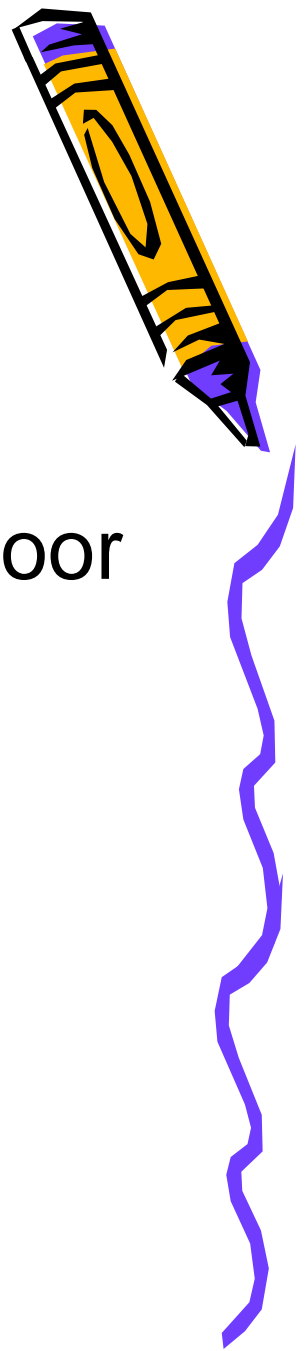
- Decades of research shows effective phonics instruction addresses most basic reading components starting with phonemic awareness in order to read and spell an alphabetic language at all levels- phonology, orthography and morphology





# Efficacy of phonics instruction

- Direct and systematic instruction in phonics addresses many issues of poor readers:
  - Weaknesses in PA
  - Spelling
  - Comprehension



# Evidence from Neuroscience



Children with “phonological disabilities improve in phoneme awareness, reading, and spelling when:

- sensitized to both the articulatory features of the phonemes and phoneme sequences in words they learn
- they learn the written symbols that represent them as linguistic units (Gillon, 2003)”.

Moats & Farrell (2005)





# Neuroimaging Studies After Evidence-based Treatments

“...with effective and intensive treatment, many (though not all) children diagnosed with RD show a degree of normalization of the LH reading circuits that is associated with improved reading skills.”

Pugh (2010)



# Brain Based Intervention Studies

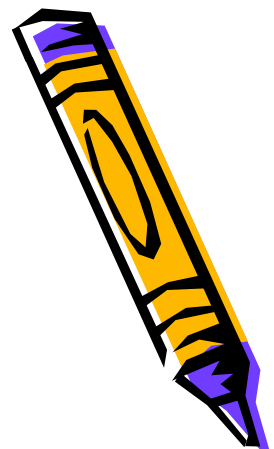
- Functional brain patterns more normalized
- Increased activation in left hemisphere
- Improvement in automatic word recognition
- Use of alternate circuits to compensate







# Studies of the Brain



Reveal:

- How the brain reads
- Dyslexia has neural signature
- Normalized function from structured language interventions
- No information on value of VAKT component

Farrell & Sherman (In press)



# Readers with Dyslexia



“...a dyslexic reader can develop awareness of the sound structure of a word by physically forming the word with his lips, tongue and vocal cords.”

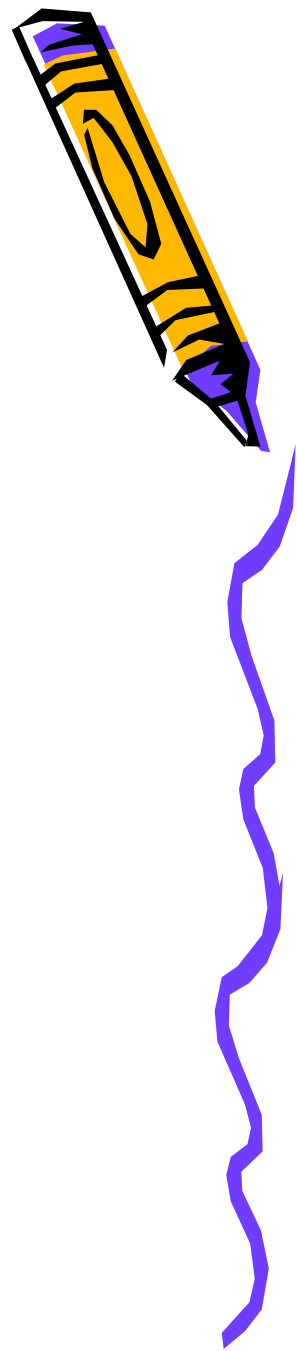
Shaywitz (2003) p.81



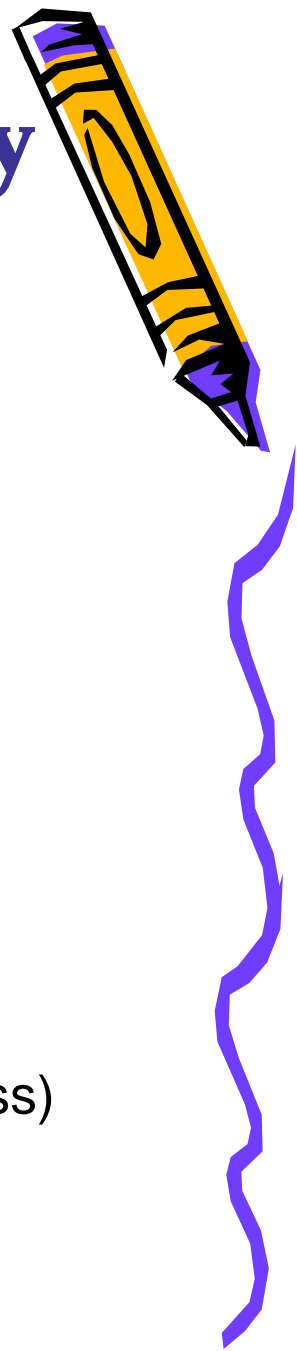
# Reading Brain

- Multiple brain areas involved
- Complex connections among areas
- Highly specialized and widely distributed multisensory networks

Farrell & Sherman (In press)



# Science Discovers Multisensory Design of Brain



- Consonant with clinical wisdom of MSLE instruction
- Humans process all types of information using all of our senses
- Multisensory integration happens at every level of human activity

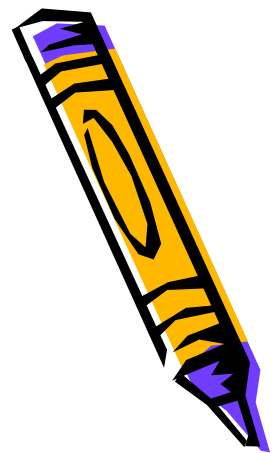
Farrell & Sherman (In press)



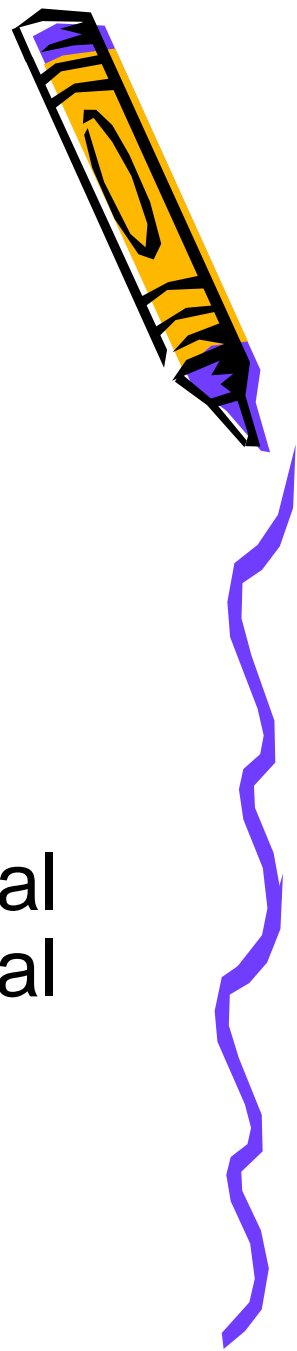


# Structured Language Strategies Efficacy

- May activate sensory motor pathways through involvement of fingertips, hand, arm, whole body, and/or vocal speech during reading instruction
- May establish and access necessary circuits for word recognition more easily



# Who Benefits?

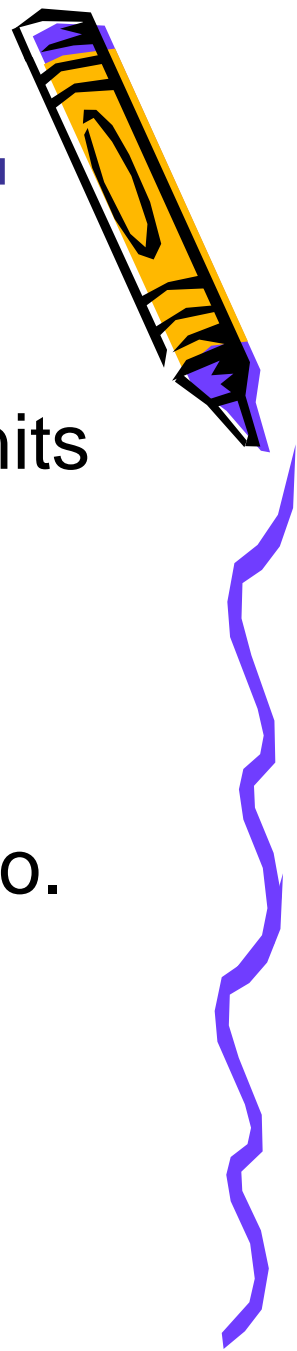


Recommended for learning disorders throughout the 20<sup>th</sup> C. for:

- learners who are poor at reading and spelling
- who lack phonological skills
- with related short term memory of verbal information, and rapid retrieval of verbal information for co-existing attention disorders



# Experience with VAKT



Multisensory experiences with linguistic units may:

- activate more circuitry during language learning than uni-sensory experiences do.



# Experience with VAKT



- New neural networks are established through repeated activation
- more complete and explicit registration of linguistic information (phonological and other) is likely to occur in the learner's working memory
- joined to already existing memories





# Experience with VAKT



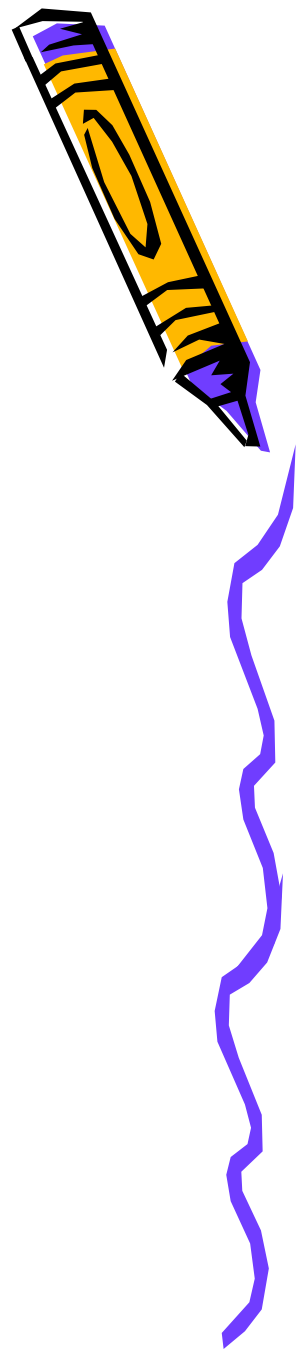
- Its power may come from the mediating effect of various sensory and motor experiences on attention and recall.
- Eventually, cognitive psychology, educational psychology, and the neurosciences may provide even more definitive support for specific techniques of teaching and refinements of practice.



Moats & Farrell (2005)



# Reports of success and lack of empirical evidence for theory and practice



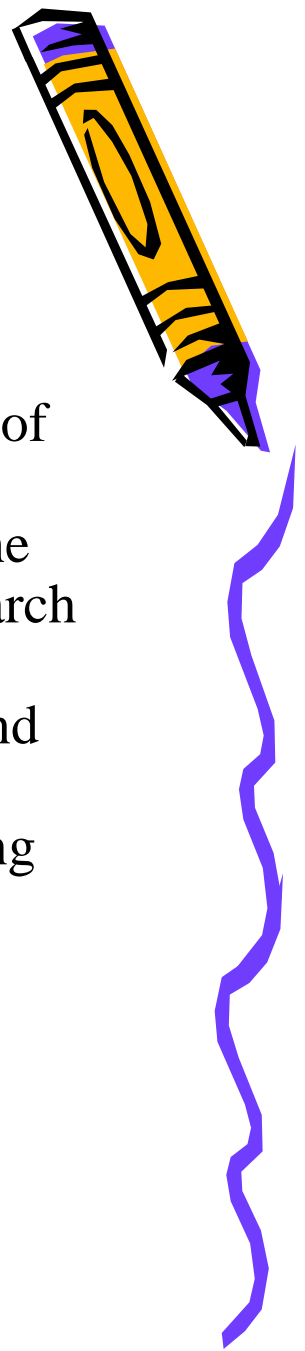
What is needed for SBRR?

- Rigorous manipulation of instructional conditions
- Followed by measurement of outcomes



# *IN THE MEANTIME*

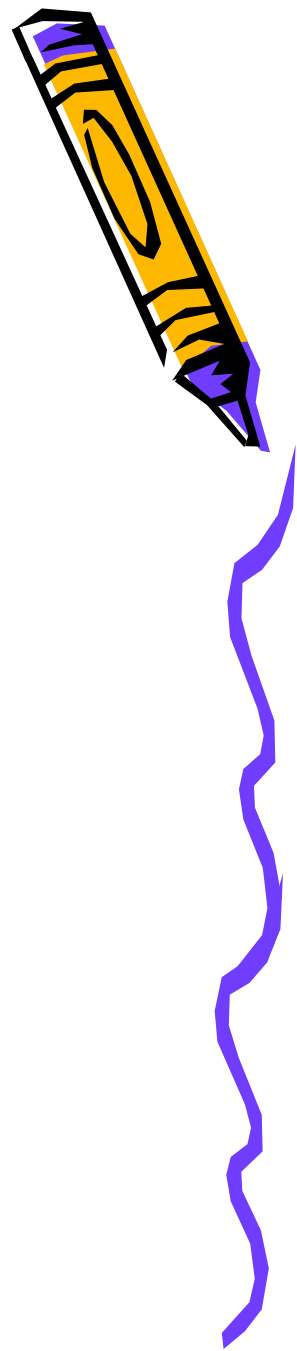
“The fundamental question is whether it is engagement of multiple senses, or the teaching of the structure of language, or the combination of the two that makes the instruction effective. It may be some time before research definitively corroborates the value or the role of multisensory instruction. In the meantime, teachers and practitioners can explicitly teach the structure of the language, engage multiple senses, and promote reading success by making sure all the bases are covered.”  
(Carreker, 2006, pp. 24 & 28)





# Early Clinicians and Teachers use Multisensory Instruction

- Fernald, 1943
- Gillingham & Stillman, 1960
- Montessori, 1912
- Strauss & Lehtinen, 1947
- Orton, J, 1966



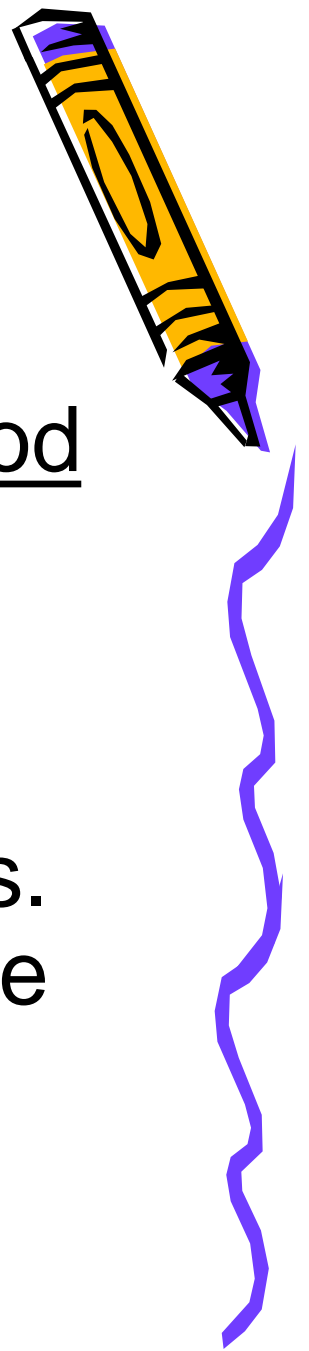
# Looking at Multisensory Teaching



Multisensory teaching links  
listening(ear),  
speaking(voice),reading (eye),  
and writing (hand) to reinforce  
learning of language structure



# Using Multisensory Strategies

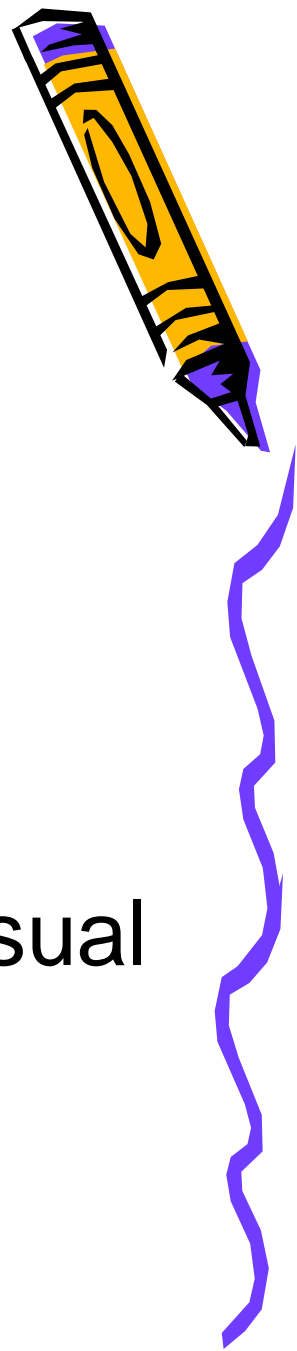


Grace Fernald (1943) Fernald Method  
VAKT

Technique for learning words that involves the **visual**, **auditory**, **kinesthetic**, and **tactile** modalities. The student looks at the word while saying and tracing it.

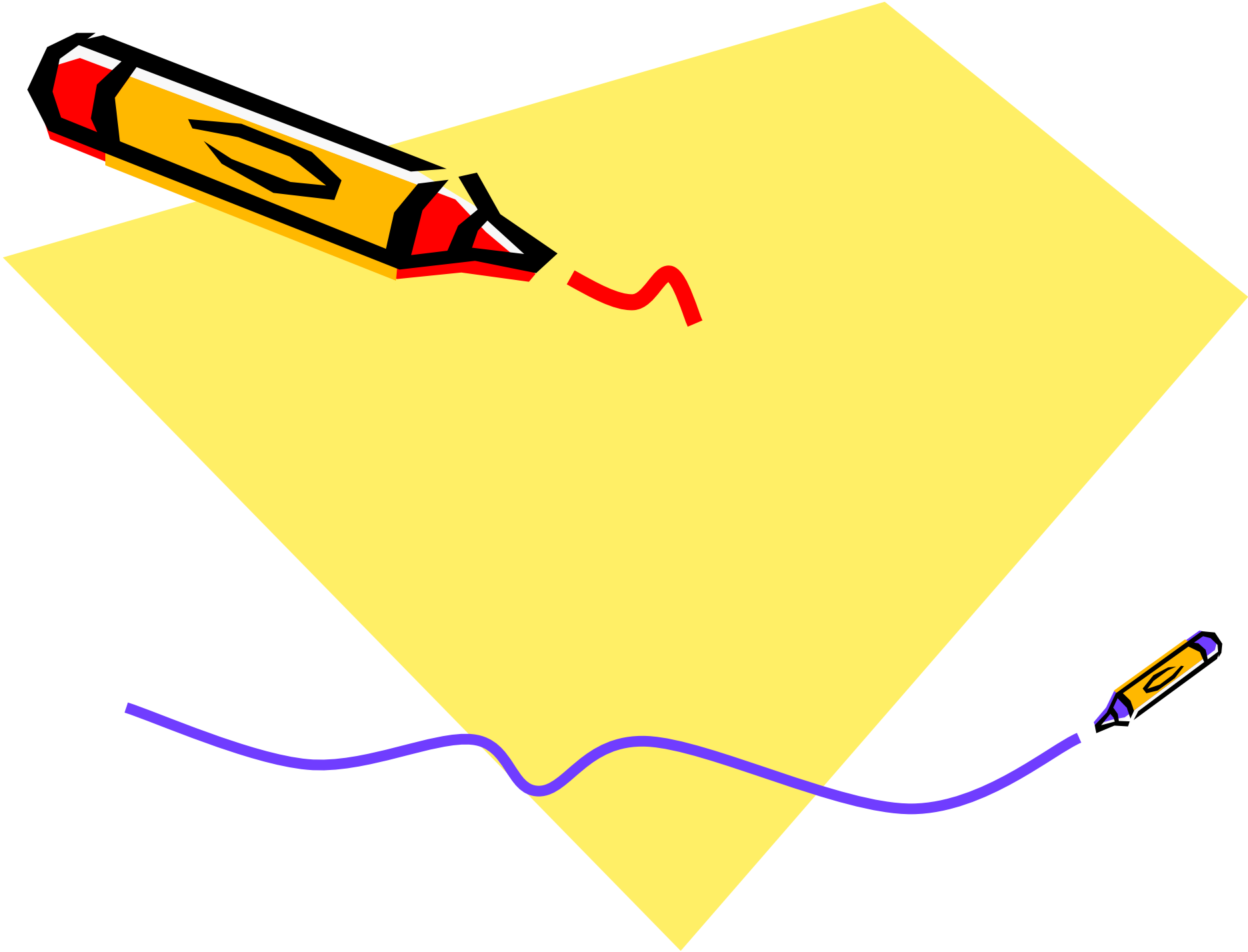


# Looking at Multisensory Teaching



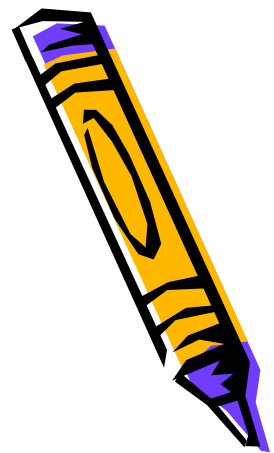
**Simultaneous** and **alternative** deployment of **visual**, **auditory**, **kinesthetic**, and **tactile** sensory modalities that supports the connection of oral language with visual language symbols







# Looking at Multisensory Teaching



Example: /k/ = ck

Discovering a new letter-sound association by **listening** to words with the same sound in the final position while **looking** at the mouth in a mirror **feeling** how it's made, **seeing** a list of the words and **writing** the new digraph.



# Using Multisensory Strategies

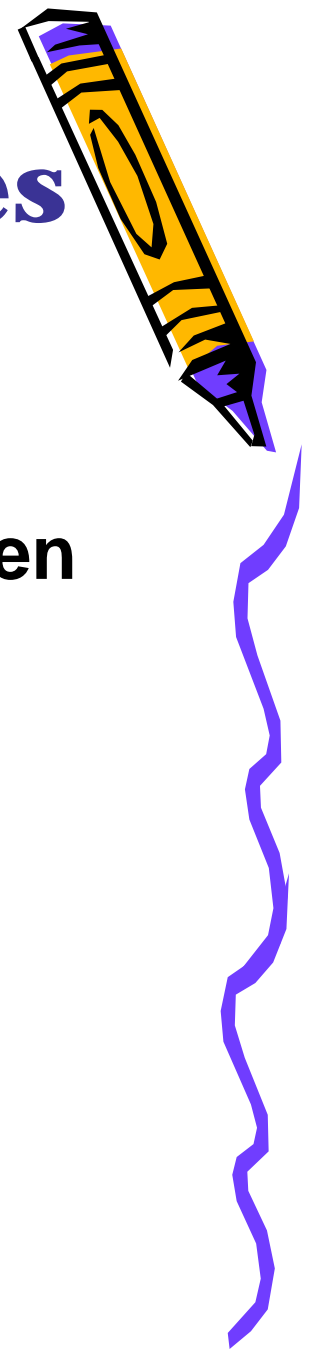


## VISUAL

- \* Look at mouth to see mouth position
- \* Look at card with letter and key word
- \* Look at printed word to identify vowel sounds and number of syllables
- \* Identify base words, prefixes and suffixes



# Using Multisensory Strategies



## Auditory

- Discriminate number of sounds in spoken words
- Say key word and sound
- Segment spoken word into syllables
- Listen for base words, roots and affixes
- Paraphrase sentences accurately



# Using Multisensory Strategies

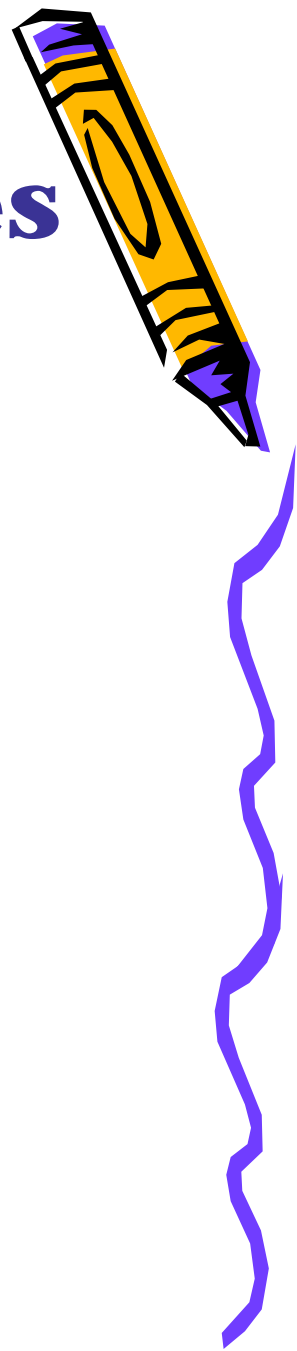


## Kinesthetic

- Arrange letters in alphabetical order
- Use tokens to segment sounds in spoken words
- Feel movement of articulatory muscles when phonemes are spoken
- Build words with syllable cards



# Using Multisensory Strategies

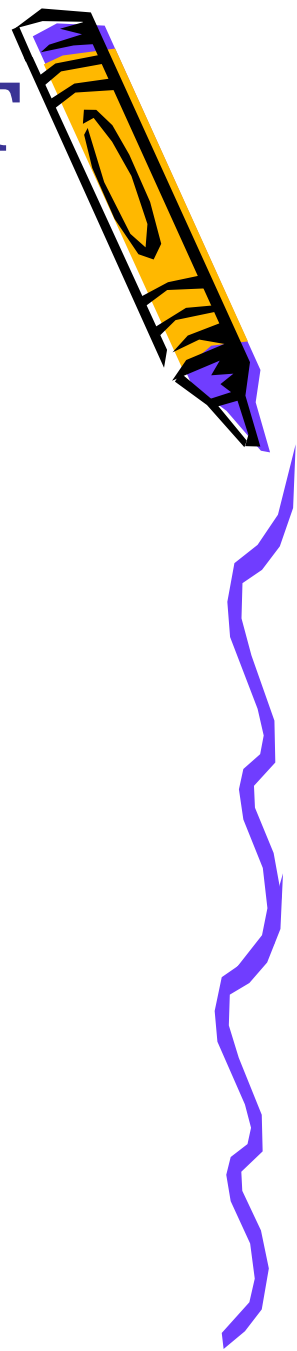


## Tactile

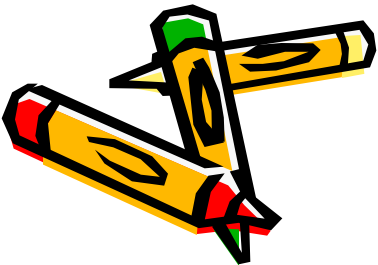
- Feel voicing airflow /th/
- Tap out syllables in words
- Write words and/or
- sentences from dictation



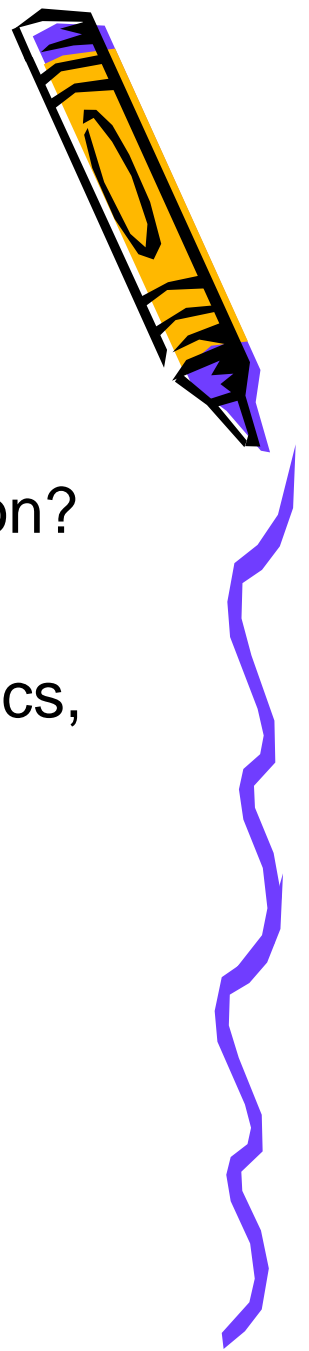
# MSLE LESSON PLAN FORMAT



- Alphabet/Phonemic Awareness
- Letter Naming and Sounds Review
- Spelling Sounds
- Discovery of Linguistic Concept
- Handwriting
- Reading Practice
- Spelling Practice
- Review of Today's New Learning
- Extended Reading/Writing
- Listening/Comprehension



# Questions for Research



- Why do some learners not respond to intensive exposures to evidence based reading remediation?
- How can we better coordinate research in genetics, neuroscience, psychology and education?

Pugh (2010)





# Orton-Gillingham Based Programs

Alphabetic Phonics

Wilson Reading

Slingerland

Preventing Reading Failure

**LANGUAGE!**

Language Enrichment

Sonday System

Spaulding



# IDA MSI Grant Award Program



- To stimulate scientific investigation of the value of multisensory instruction in teaching reading to individuals with dyslexia and other struggling readers
- To inform and enhance instructional practice with translational research

See *Perspectives on Language and Literacy*, (2010), Volume 36, No.1.  
[www.interdys.org](http://www.interdys.org)



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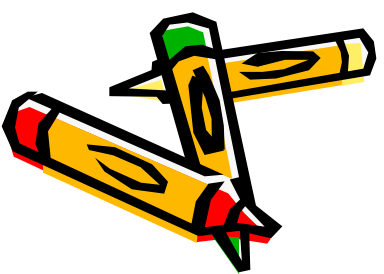
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[jbirsh@mac.com](mailto:jbirsh@mac.com)



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