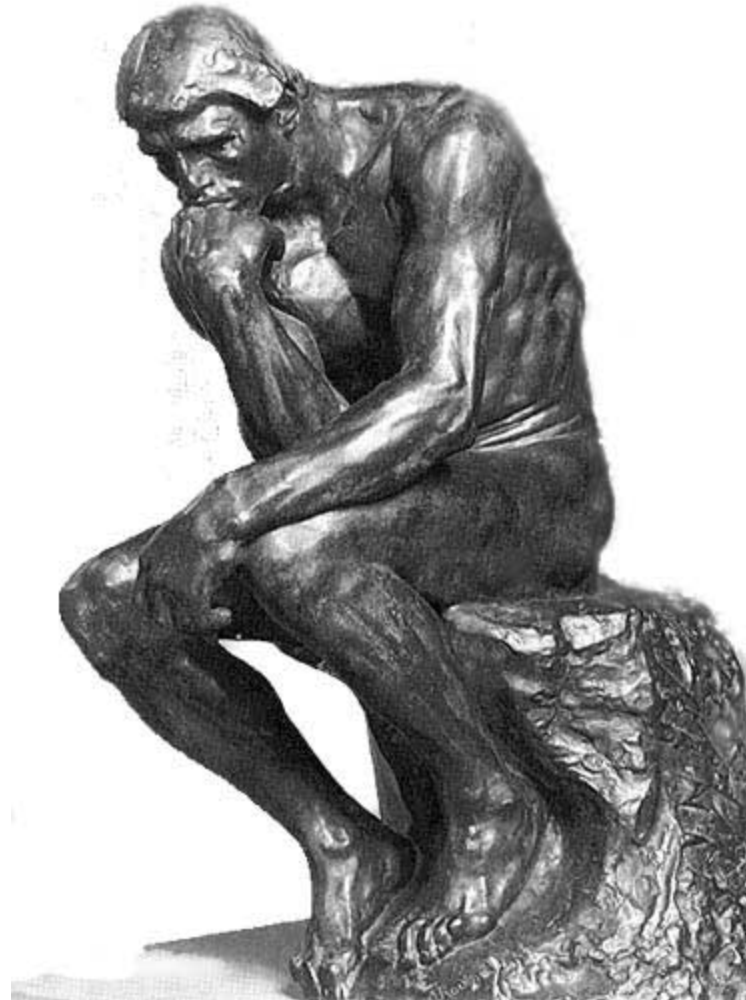


# **Neuropsychological Evaluation of the Cognitive Correlates of Epilepsy**

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Center**

**Department of Neurology  
and Neurological Sciences**



# Different Approaches to the Brain and its Disorders

- Neurology
- **Neuropsychology**
- Neurosurgery
- Psychology
- Psychiatry



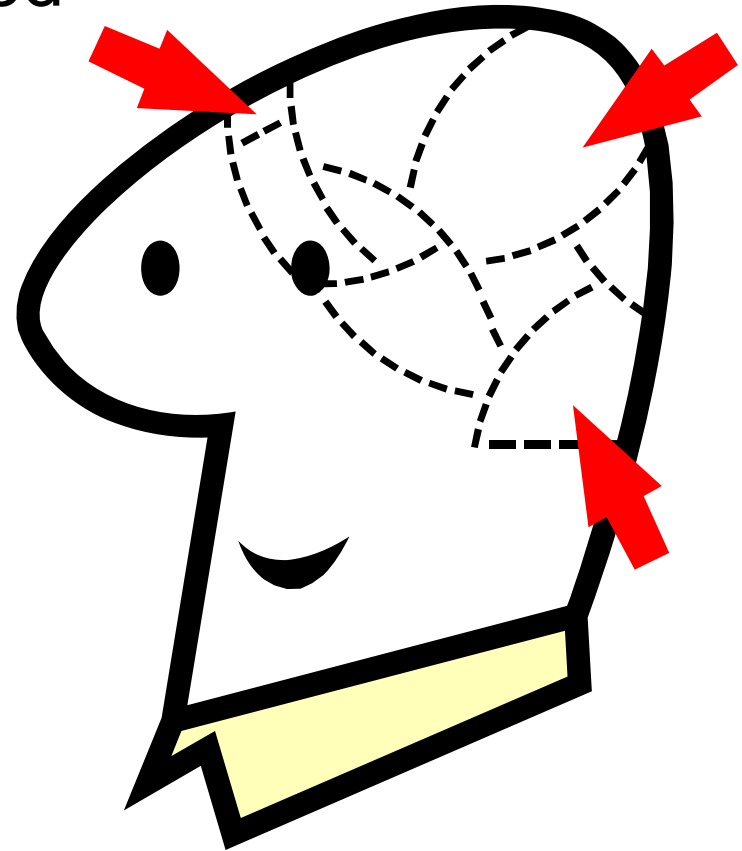
# Definition

- Study of brain-behavior relationships
- Evaluation of the effects of cerebral dysfunction on mental performance and behavior.
  - Standardized instruments
  - Interpretation using a normative data base

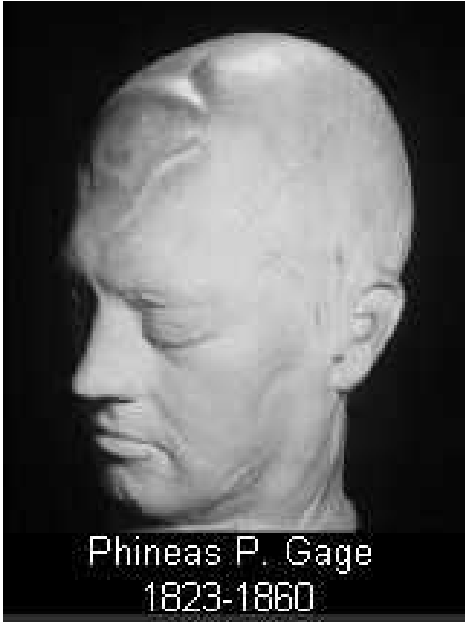


# Neuropsychology Test Battery

- Cognitive Domains Assessed
  - Intelligence
  - Achievement
  - Learning and Memory
  - Language
  - Attention
  - Executive Function
  - Motor Function

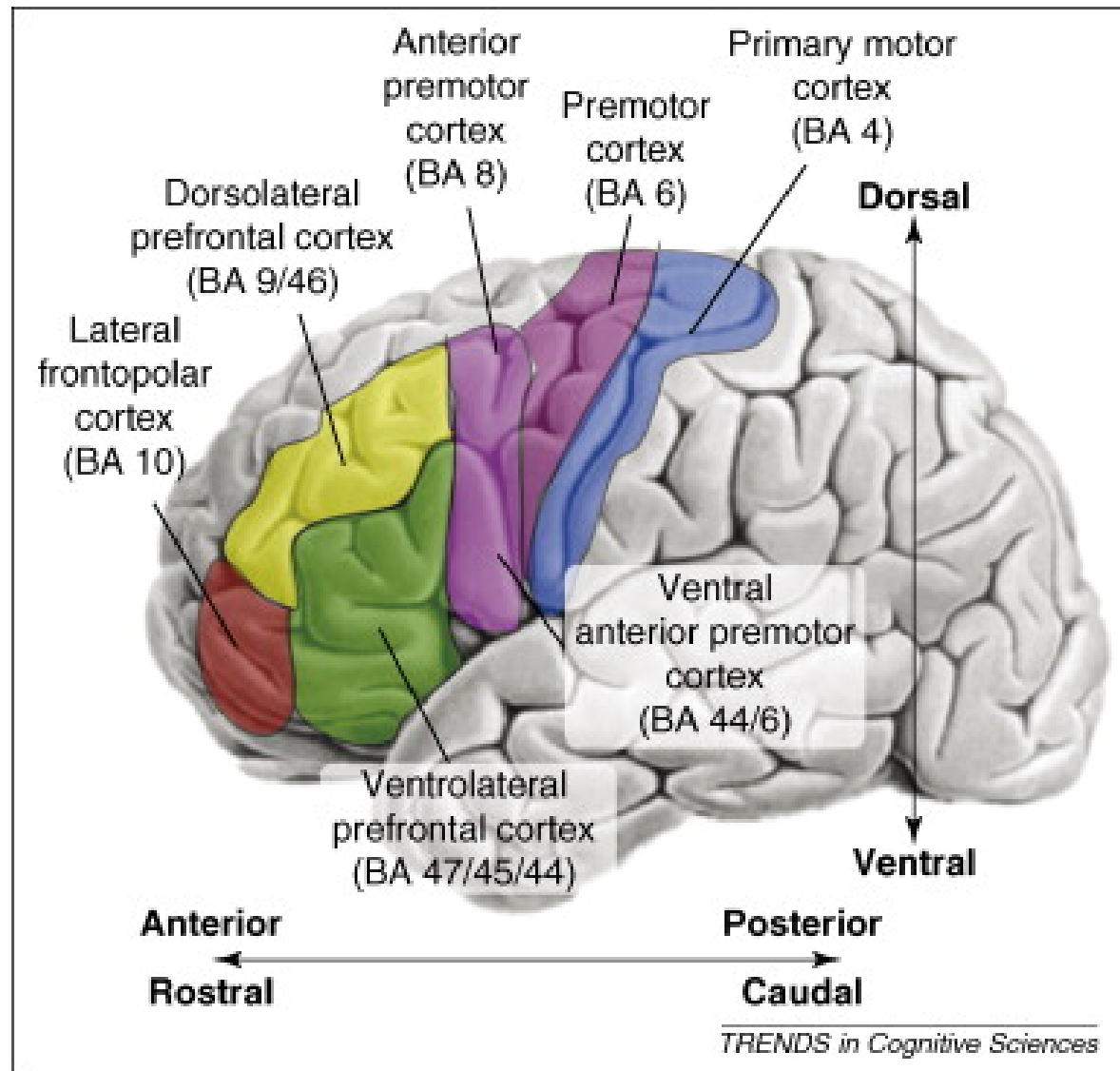


# Phineas Gage

Phineas P. Gage	
 <p>Phineas P. Gage 1823-1860</p>	
Born	July 9?, 1823
Died	May 21?, 1860
Occupation	Railroad construction



# Frontal Lobes



# Executive Functions

- Working Memory
- Conceptual Reasoning
- Planning
- Set-Shifting
- Multi-tasking
- Inhibition
- Fluency



# Children with Frontal Lobe Seizures



Can neuropsychologists measure cognitive functioning in these children????





# Children with Frontal Lobe Seizures

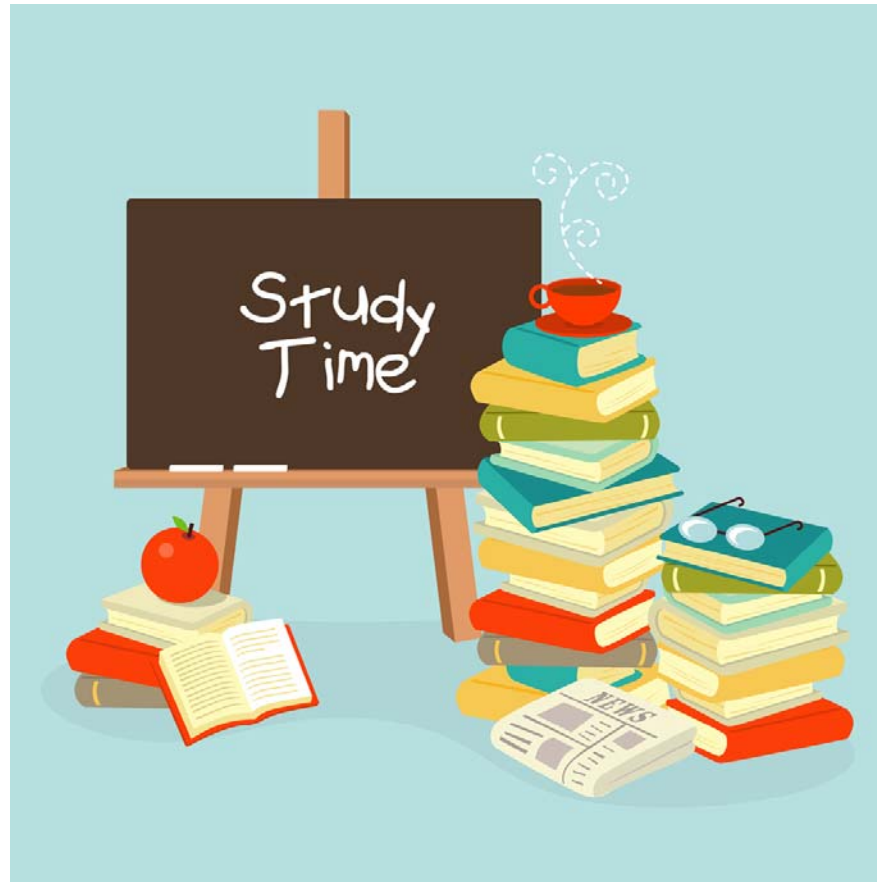
- Deficits in planning and impulse control (Culhane-Shelburne et al. 2002 JINS).
- Deficits in planning and motor coordination (Hernandez et al. 2002 Neuropsychologia).
- Deficits in speed of shifting mental set and perceptual motor speed (Sinclair et al. 2004 Pediatr Neurol).

# Seizure Variables to Consider

- Age of Seizure Onset
  - Early age of onset
- Duration of seizures
  - Longer seizure duration
- Seizure Frequency
  - Greater number of seizures

# Frontal Lobe Epilepsy and Academic Ability

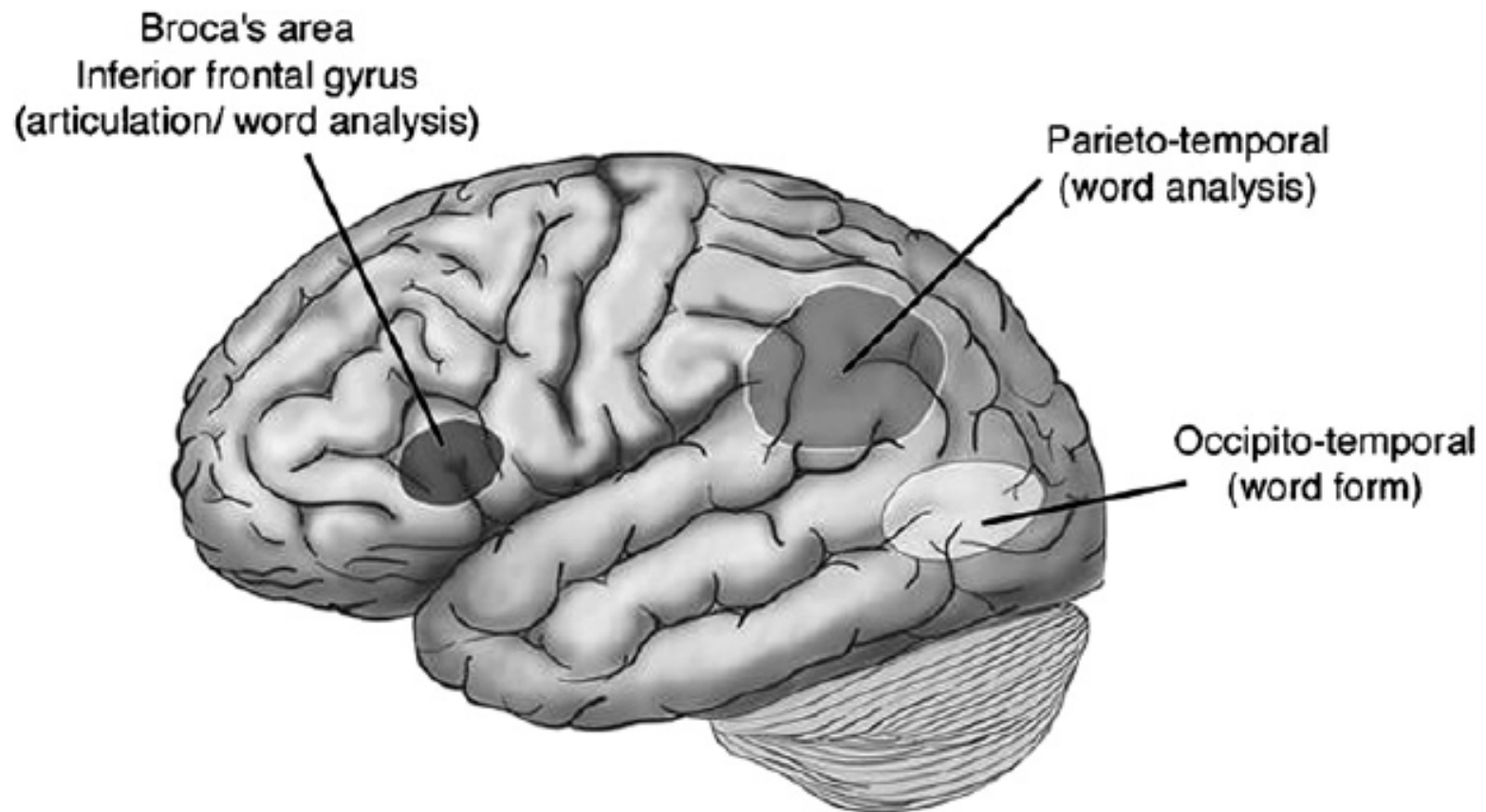
Do frontal lobe seizures affect reading???



# Epilepsy and Learning Disabilities

- Prevalence of learning disabilities ranges from 2% to 10% in children.
- Prevalence of learning disabilities in children with epilepsy is 25%.

# Reading and the Brain



Copyright Sally Shaywitz, *Overcoming Dyslexia*, 2003

# Phonological Awareness

Sensitivity to the sound structure of words

- Rhyming

**Take**

**Cake**

- Phoneme Segmentation

**Bold**

**Old**

- Blending Phonemes

**Tuh**

**Oy**

**TOY**

# Reading Measures

## Nonwords

– ib

– gat

– sluck

– maut

## Irregular Words

– yacht

– subtle

– debris

– island

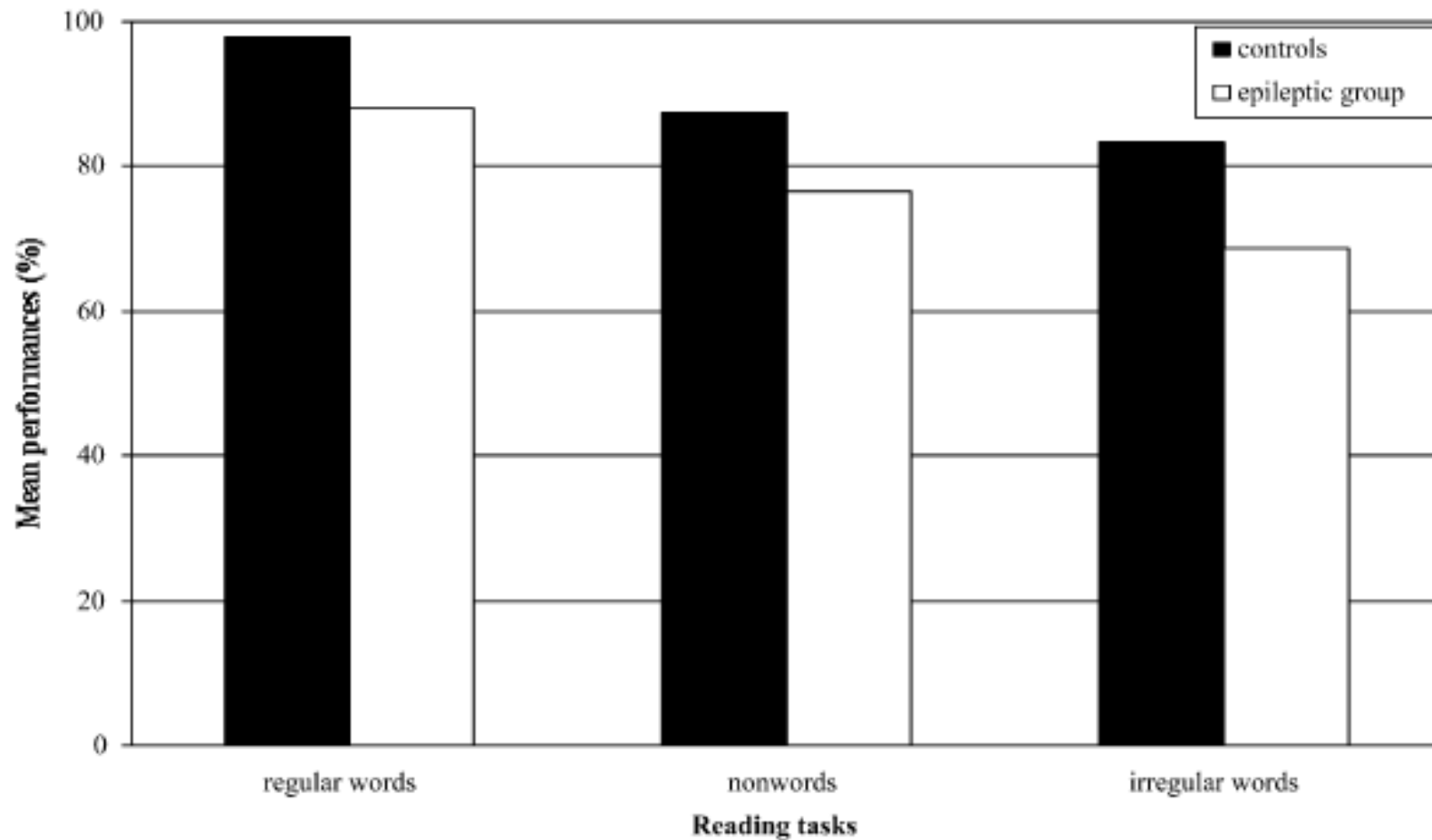
# Reading Performance in Children with Frontal Lobe Epilepsy

- Children with frontal lobe seizures (n = 10), temporal lobe seizures (n = 10), and absence seizures (n = 10) were compared on tasks of phonological awareness and reading.
- Mean age 10.1 years

Vanasse, et al. 2005 Epilepsy & Behavior



# Reading in Children with Epilepsy



Vanasse, et al. 2005 Epilepsy & Behavior

# Phonological Awareness in Children with Epilepsy

Percentage of correct responses obtained on metaphonological tasks by epileptic and control children

	Metaphonological tasks				
	Nonword repetition	Rhyme production	Phonemic blending	Phonemic segmentation	Phonemic inversion
<i>Epileptic group</i>					
TLE	79.5	89	90.8	86.3	85.8
(left/right)	(82.2/68.8)	(91.3/80)	(91.6/87.5)	(91.5/65.7)	(91.6/62.5)
FLE	75.8	75.7	74.4 <sup>a</sup>	79.2	69.2 <sup>a</sup>
(left/right)	(75.3/77.5)	(73.4/85)	(72.2/83.4)	(77.1/87.6)	(63.6/91.7)
ABS	83.8	90.3	92.9	81.1 <sup>a</sup>	83.1
<i>Control groups</i>					
TLE	83.25	92.35	97.36	91.28	91.66
FLE	81.75	85.99	98.24	86.27	93.32
ABS	83.75	84.01	96.57	91.89	93.87

<sup>a</sup>  $P < 0.05$ .

# Importance of Early Identification and Intervention



- “Wait ... They Will Catch Up”
- Explicit Training in Phonological Awareness Skills
- Intervention –Frequent, Regular, and Sufficient Duration
- Resources
  - Overcoming Dyslexia by Sally Shaywitz
  - Schwab Learning [www.schwablearning.org](http://www.schwablearning.org)
  - Learning Disabilities Association of America [www.ldanatl.org](http://www.ldanatl.org)

# Conclusions

- Neuropsychology plays an important role in furthering our knowledge of brain function.
- The neuropsychological evaluation is useful in measuring behavior in individuals with epilepsy.
- Children with epilepsy are at risk for academic problems.

# Questions

