

# Stereotypes to Science: ADHD in the Classroom

Thomas E. Brown, PhD

Brown Clinic for Attention and Related Disorders  
and Adjunct Clinical Associate Professor  
Psychiatry & Behavioral Sciences  
Keck School of Medicine of USC

## How Can Someone So Smart Have ADHD?

- ◆ 16 yo with IQ of 136 (v. superior range- 99%)
- ◆ Honor student until 7<sup>th</sup> grade, then gradual decline in grades & “motivation”
- ◆ 9<sup>th</sup> and 10<sup>th</sup>: significant drop in grades, now almost all failing except for A in math
- ◆ Teachers: no behavior problems, sometimes good participation, many missed assignments, poor prep, e.g. doesn't do assigned reading or homework. Appears disorganized.
- ◆ Parents: no drugs/alcohol/depression, has friends, v. involved in music/computer. Lost sport eligibility.
- ◆ Student: “I know I should and want to do work, but just can't get self to do it. Friends say I have ADD.”

## Skills and Deployment of Skills

- ◆ Some have good skills, but are not able to deploy them effectively except for:
- ◆ Others have poorly developed skills and also have great difficulty in deploying their skills, except for:  
  
...activities that strongly interest or scare them.

## ADHD

- ◆ is essentially a **development impairment** of the brain's management system
- ◆ Its executive functions
- ◆ Its neural networks **for deploying and managing skills**

## Pills and Skills

- ◆ For some with ADHD, medication helps them **deploy their existing skills** quite well—that's enough
- ◆ For others with ADHD, medication helps them become **more available to learn and deploy** needed skills

## School Information

- Reports from teachers more useful for students with same teacher all day
- Teacher reports for Jr High and High School are more variable
- Consider standardized test scores
- Elicit info re: homework completion
- Completes tests in standard time?

## LD in ADHD Children

### Clinical Sample of ADHD Children:

Reading LD	27%
Math LD	31%
Written Expression LD	65%
One or more LD	70%

(Mayes, Calhoun, Crowell, 2000)

### Epidemiological Sample:

CDC National Health Interview Study:

50% of ADHD-diagnosed children are also identified as having LD.

(CDC, 2002, 2008)

## Reading Disorder

- core is phonological processing deficit
- knows words when heard, but can't recognize them in written form
- normally distributed in population
- boys and girls equally affected
- linked to chromosomes 6 & 15
- Fluency, processing speed and working memory also important

## Types of Math Disorder

- procedural
  - counting on fingers/finger writing
  - procedural errors (signs/sequencing)
- semantic memory
  - inability to learn math facts/ tables
  - slow retrieval of facts
- visuospatial
  - misaligns number columns
  - misinterprets place values

## Disorder of Written Expression

- Significant impairment in writing  
grammatically correct sentences &  
organized paragraphs; often, but  
not always poor spelling
- chronic difficulty in what to write,  
organizing ideas, and elaboration
- oral expression adequate or strong  
while weak in written expression

## ADHD vs LD

### Separate entities?

Some think:

**ADHD** = chemical problem in brain

**LD** = “hard-wiring” problem in brain

ADHD and LD may not be so separate

- **shared genetic etiology in Reading Disorder and ADHD** (Willcutt, Pennington & DeFries, 2000)
- **ADHD & LD both involve EF**, esp working memory

## Assessment for Learning Disorders

- Always screen students w/academic probs
- Query re: hx of chronic difficulties in specific courses? Specific modalities?
- WJ-IV or WIAT-III Achievement Tests  
Reading - Math - Writing
- Nelson-Denny Reading Test (grade 9 & up)

## Overlap btwn ADHD & Reading

- Fluency and comprehension in reading requires:
- not only ability to decode words
- but also ability to sustain focused attention
- Medications used to treat ADHD may be helpful in treatment of dyslexia

Shaywitz & Shaywitz, *Development & Psychopathology*, 2008

## Aspects of EF that Impair Reading Comp & Writing

- Working Memory
- Processing Speed
- Ability to move readily between macro view and micro view

## Single word reading vs reading comprehension

Reading comprehension is...more complex than single word reading, with demands that go beyond identifying and decoding single words...It includes higher order cognitive processing of meaning conveyed through sentences and paragraphs...executive control skills... become more necessary as length and complexity of text increases.

(Sesma, et al. 2009)

## 3 questions about assigned vs self-selected reading

- Does mind keep wandering off while trying to follow the text?
- Need to go back to re-read in order to grasp main ideas
- Recall details, but not main ideas.

(Brown, 1996, 2013)



## Reading Comprehension of more complex texts

- Ability to retain central ideas or info
- in segments of text and as a whole
- While continually updating and revising a mental idea of primary ideas or actions
- (Brown, 2013)

## Reading Comprehension Common Problems

- “Licking but not chewing” the words
- Passive reading w/o marking or notes
- “Centrality deficit” difficulty in grasping main ideas of passage (Miller, 2012)

## Impairments of Working Memory & Processing Speed

- Often relatively weak in students with ADHD
- Very bright students are not exempt from these impairments

## Study of Reading Comprehension & Time Pressures in Students with ADHD

145 students aged 13-18 yo

On WISC-IV or WAIS-III IQ Test:

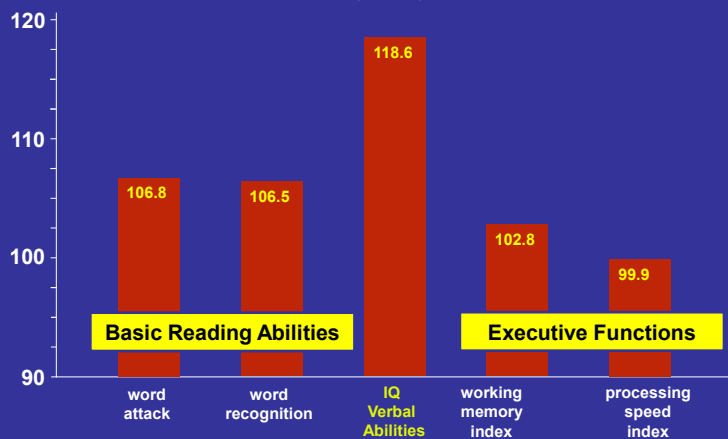
- Verbal Comp Index = 118.6
- Working memory Index = 102.8
- Processing speed index = 99.9
- Basic reading skills = 106.5

## Nelson-Denny Reading Test Comprehension 20 min vs 32 min

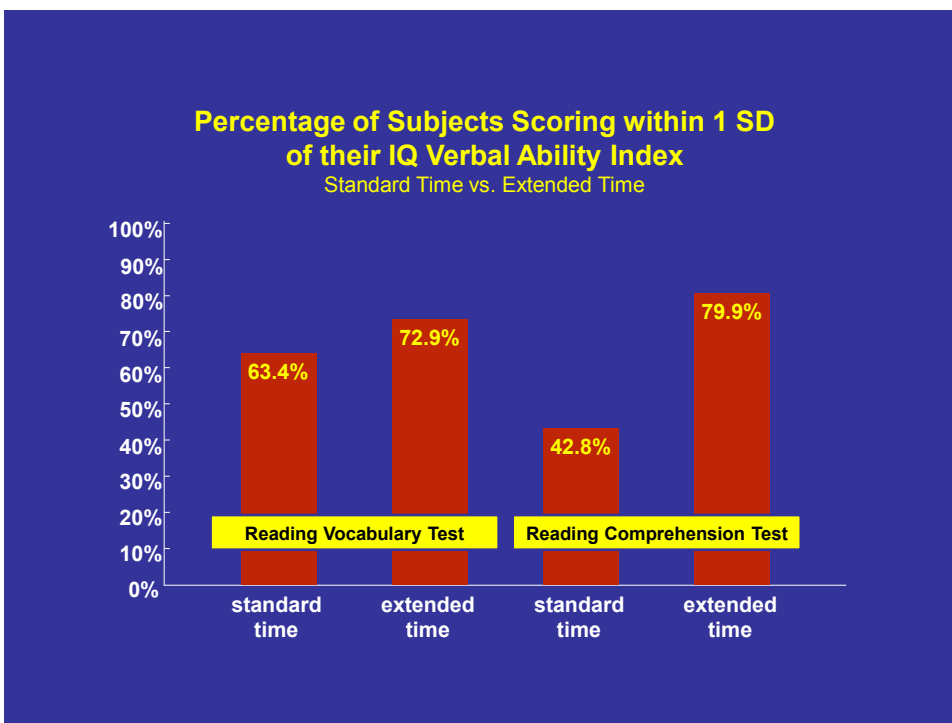
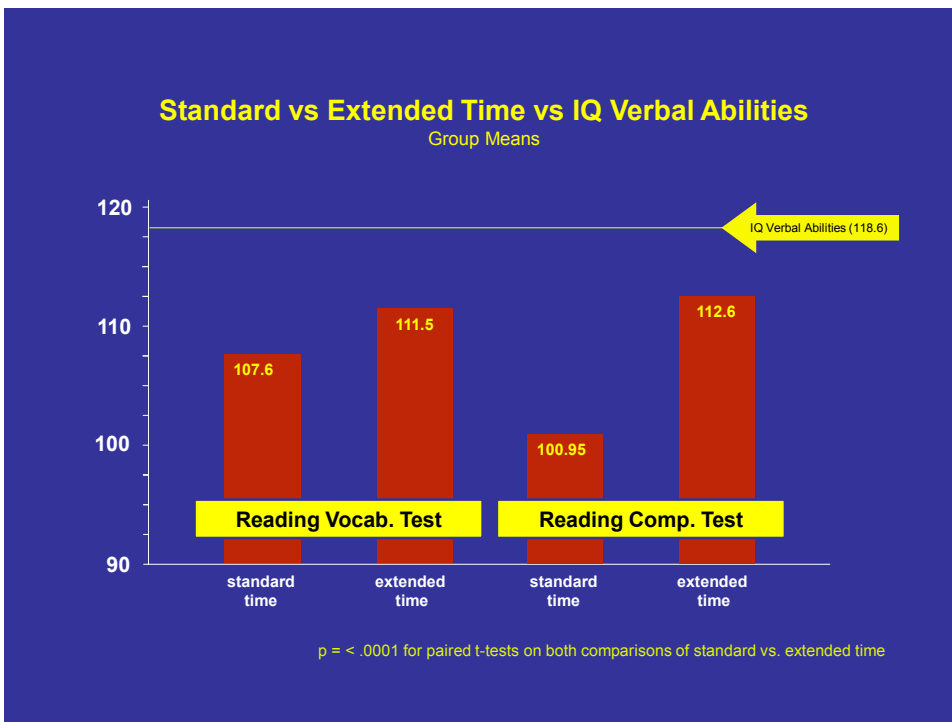
- 53% of ADHD students unable to attempt all 38 questions within standard time
- Under standard time, mean score 17.7 points below mean VCI
- With 12 min extended time, mean discrepancy reduced to 7.4 points

### Basic Reading Abilities & Executive Function Indexes vs. IQ Verbal Abilities

(n = 145)



Basic reading skills are within 1 SD of IQ verbal abilities; executive functions > 1 SD below



## Risks of Superior IQ with ADD

- Problems of superior IQ without ADD
- delayed recognition of ADD
- later emergence of ADD sx
- parent/teacher “support” “attacks”
- denial of need for accommodations
- diminishing expectations & self-esteem
- loss of challenge, peers & hope

## Youths with ADHD & IQ $\geq$ 120

n = 117

**Gender:** 75% male.

**ADHD diagnoses:**

62% Predominantly Inattentive Type and  
38% Combined Type.

**Ages:**

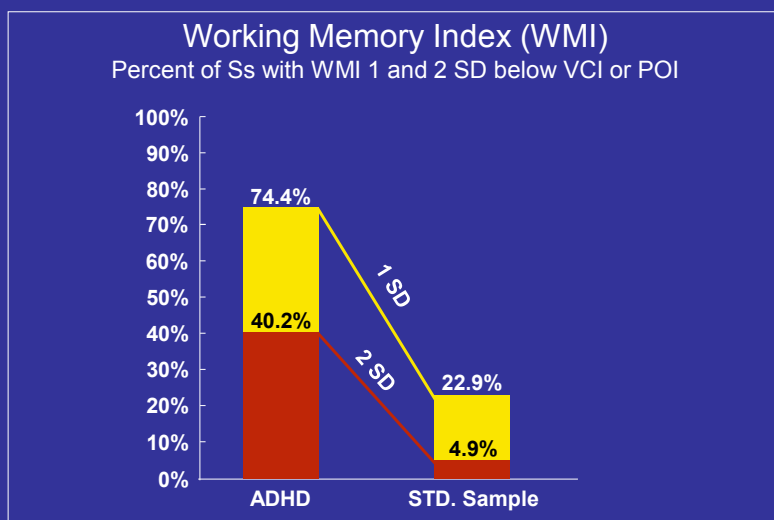
26% 6-11 yrs.

24% 12-15

50% 16-17

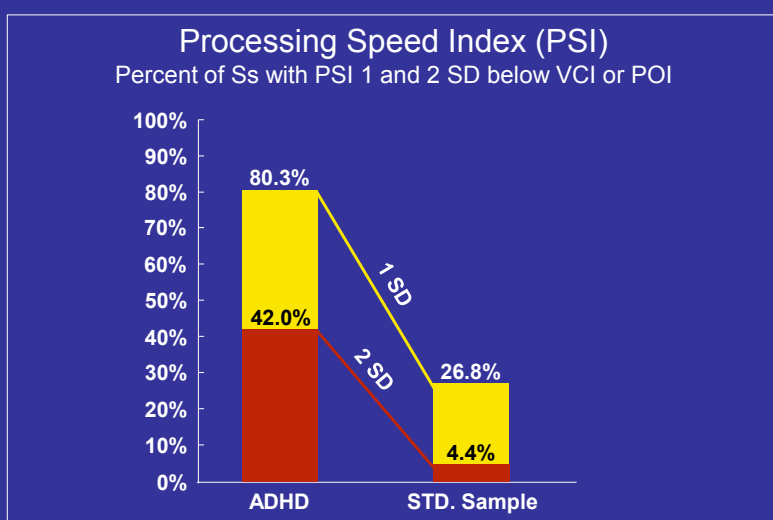
(Brown, Reichel & Quinlan, 2007)

### 117 High-IQ Youths with ADHD



(Brown, Reichel & Quinlan, 2007) **Figure 1.**

### 117 High-IQ Youths with ADHD



(Brown, Reichel & Quinlan, 2007) **Figure 2.**

### 117 High-IQ Youths with ADHD

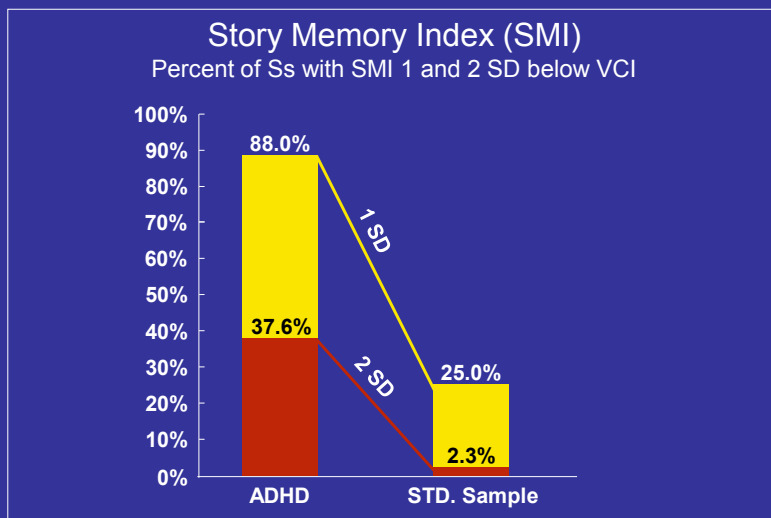


Figure 3.

(Brown, Reichel & Quinlan, 2007)

### 117 High-IQ Youths with ADHD

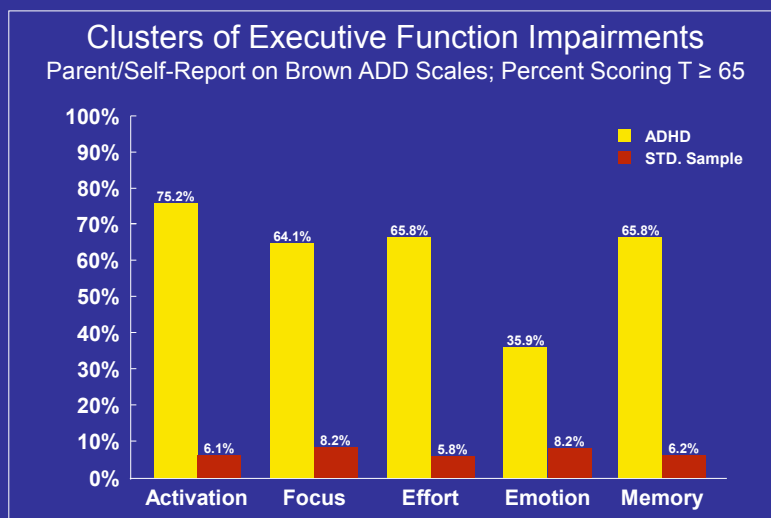


Figure 4.

(Brown, Reichel & Quinlan, 2007)

## High IQ with ADHD

% Impaired on  $\geq 5$  of 8 EF measures

- Youths 62%
- Adults 73%

## Impairment by what measure?

If a high IQ student is consistently getting very poor grades, is this impairment? **Is this due primarily to ADHD or other factors?**

If a successful adult with good education and responsible job is unable to manage personal life, but doing well on job, is this impairment? **Is this due primarily to ADHD or other factors?**

**Should a pt with just 1 paralyzed limb be treated?**



## Who Should Get Accommodations +/- Treatment?

- Only those who are severely impaired in comparison to “average person” of same age?

OR

- Or anyone significantly impaired in comparison to others of same educational level?

(White canes vs eyeglasses)

## Disorder of Written Expression

- Significant impairment in writing grammatically correct sentences & organized paragraphs; often, but not always poor spelling
- chronic difficulty in what to write, organizing ideas, and elaboration
- oral expression adequate or strong while weak in written expression

## Writing Demands Adequate Executive Function

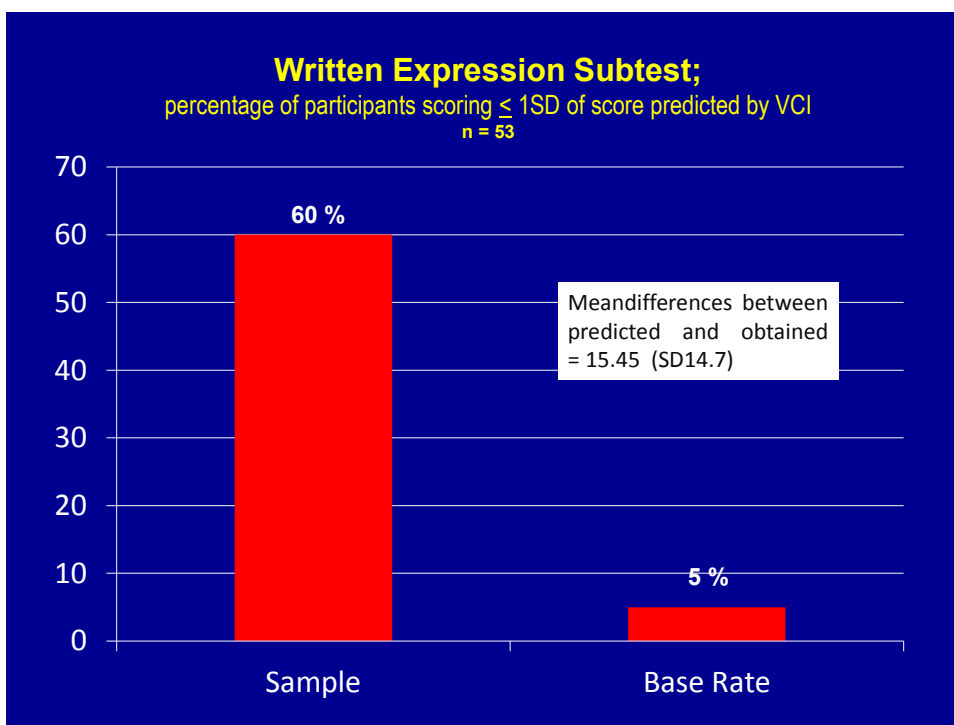
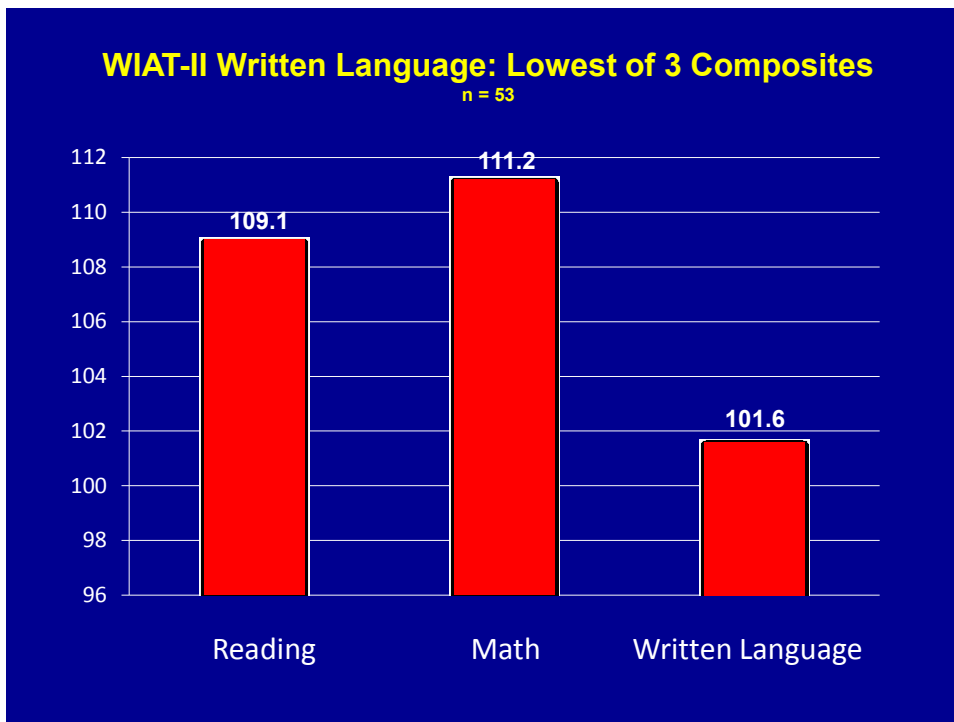
Writing is an immense juggling act, with many more jobs to do than reading:

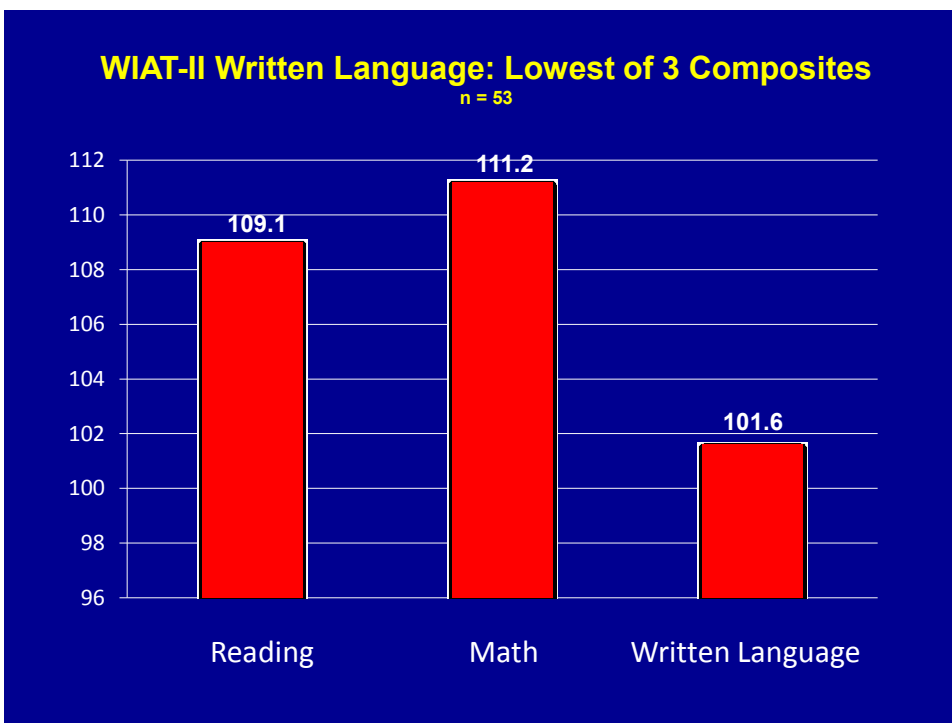
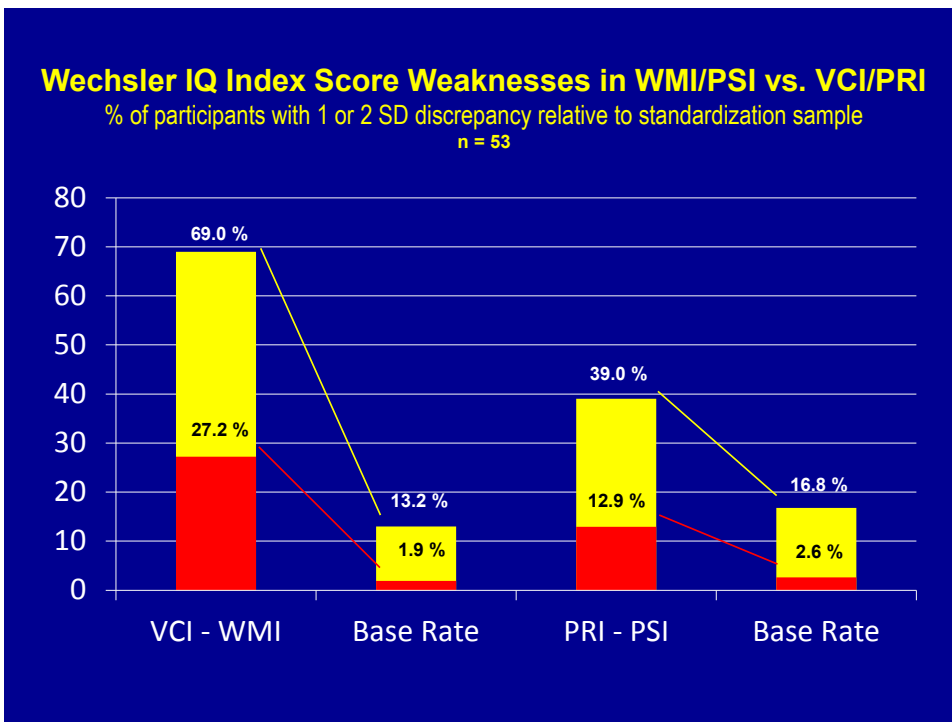
- Generating ideas and setting goals
- Translating ideas into text
- Transcribing the text
- Reviewing and revising the text

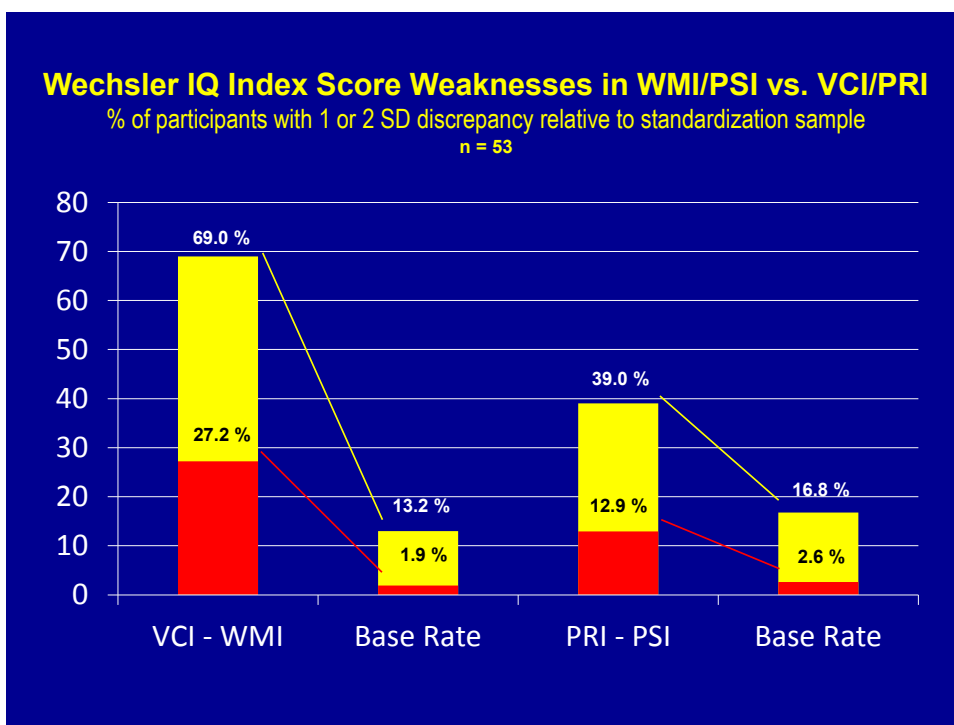
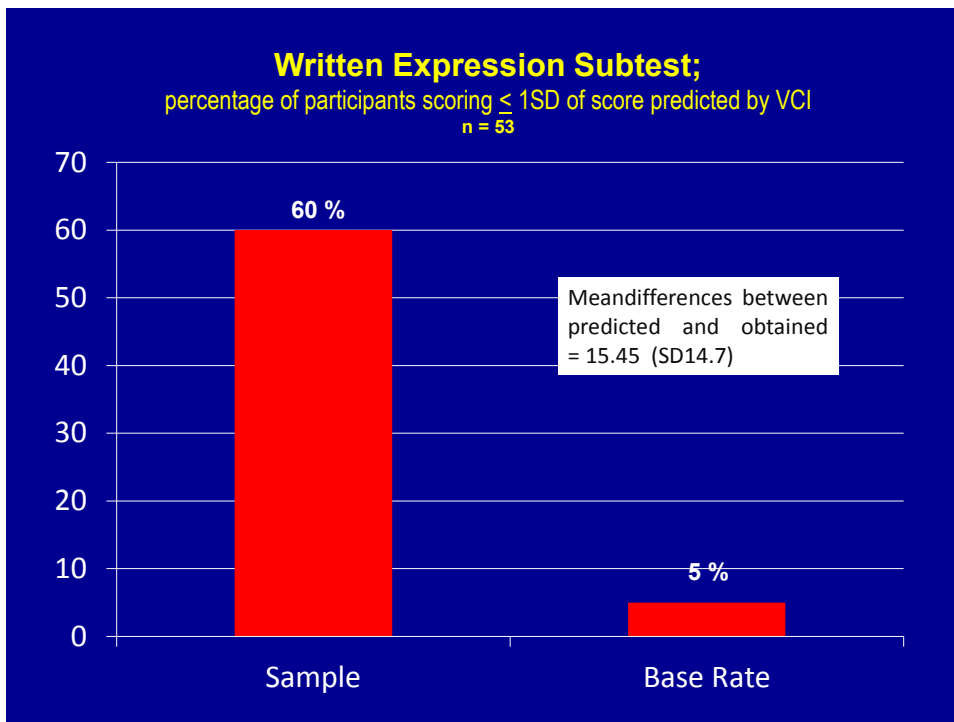
(Berninger & Richards, 2002)

## Written Expression Common Problems

- Failure to identify main points to be made
- Confusion in levels of abstraction
- Excessive perfectionism in initial draft
- Lack of specificity; Insufficient examples







## Graphic Organizer Software to assist in writing

- **Inspiration** (for 6<sup>th</sup> grade to adult)
- **WebspirationPro** (for college & business)

(Info & free-trial @ Inspiration.com)

## Assessment for Learning Disorders

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## Assessment for Accommodations

- Diagnostic Clinical Interview
- Aptitude:
  - WISC-V, WAIS-IV
  - CMS-Story Memory, WMS-III LM-I
- Academic achievement tests:
  - WJ-IV Achievement, WIAT-III
- Nelson-Denny Reading Skills Test

## Key Ideas

- 1. **Even high IQ** students may have ADHD & difficulty deploying their skills
- 2. **ADHD students have co-existing learning disorders more** than others.
- 3. **Working memory & slow processing speed can impair** reading & writing.
- 4. Students with ADHD & learning disorders **may need more than just pills.**