Advances in the Assessment and Intervention for Students with Reading and Writing Disorders

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Advances in Three Domains

- Diagnostic Updates
- Causation research
- Assessment

DIAGNOSTIC ADVANCES

DSM-IV

- Reading Disorder, Math Disorder , Disorder of Written Expression, and LD-NOS
- Disorders of Childhood Section
- Written language as measured by standardized testing of accuracy and comprehension is **below expected chronological age, intelligence and education**

DSM-5

- Specific Learning Disorder
- Neurodevelopmental Section
- Disorder impedes the ability to learn or use foundational academic skills
- Learning difficulties are ‘unexpected’ in that other aspects of development seem to be fine

DSM-IV

- Criteria A – significantly interferes with either academic skills or activities of daily living which require reading

- Criteria B – if a sensory deficit is present the writing difficulties are in excess of those associated with it

DSM-5

- Criteria A -the presence of a difficulty with written expression that has **persisted for at least 6 months despite the provision of interventions that target those difficulties**

- Criteria B - the affected academic skills are substantially and quantifiably **below those expected** for age and cause impairment in academic, occupational, or everyday activities, as confirmed by **individually administered standardized achievement measures and comprehensive clinical assessment**

- Criteria C - during the school-age years, although **may not fully manifest until young adulthood** in some individuals

- Criteria D - **Intellectual Disabilities, uncorrected auditory or visual acuity problems**, must be **ruled out** before a diagnosis of SLD can be confirmed.

Severity

- The severity should be specified as follows:
  - **Mild:** Difficulties are mild enough severity that the individual **may be able to compensate** with appropriate accommodations
  - **Moderate:** Marked difficulties in written expression such that the individual is **unlikely to become proficient without intensive and specialized teaching** during the school years;
  - **Severe**: Severe difficulties cause the individual to be **unlikely to learn** without ongoing **intensive individualized and specialized teaching** for most of the school years

Final note from DSM5

- Poor spelling or handwriting alone, in the absence of other writing difficulties, is insufficient for the diagnosis of specific learning disorder with impairment in written expression.
  - For children with poor motor coordination that causes poor handwriting, a diagnosis of developmental coordination disorder (315.4/F82) may be appropriate.

Summary Changes

- Go from three diagnoses to one overarching diagnosis

- Abandonment of the IQ-Achievement Discrepancy
  - Reauthorized IDEA regulations (2004) which state that: “the criteria adopted by the State **must not require the use of a severe discrepancy** between intellectual disability and achievement for determining whether a child has a specific learning disability, as defined in 34 CFR 300.8 (c)(10).”

- Psychometric data alone are insufficient for a DSM-5 diagnosis of SLD
  - Requires evidence of symptom persistence
  - Quantify low academic achievement from multiple sources
    - formal and informal school records
    - academic portfolios
    - instructional history

TOPIC # 1
ADVANCES IN CAUSATION RESEARCH

Dysgraphia Defined - Traditionally

A. Errors of writing that are analogous to errors in reading (e.g., surface, phonological)

B. Deep dysgraphia corresponding to orthographic delays in writing

C. Difficulties in handwriting control

Variables in Developmental Dyslexia Castles and Coltheart (1993)

- Deep Dyslexia
  - Poor Letter/Sound recognition - Phonological Issues
  - Poor non-word readers (Word Attack – WJ4)
- Gave – Cave

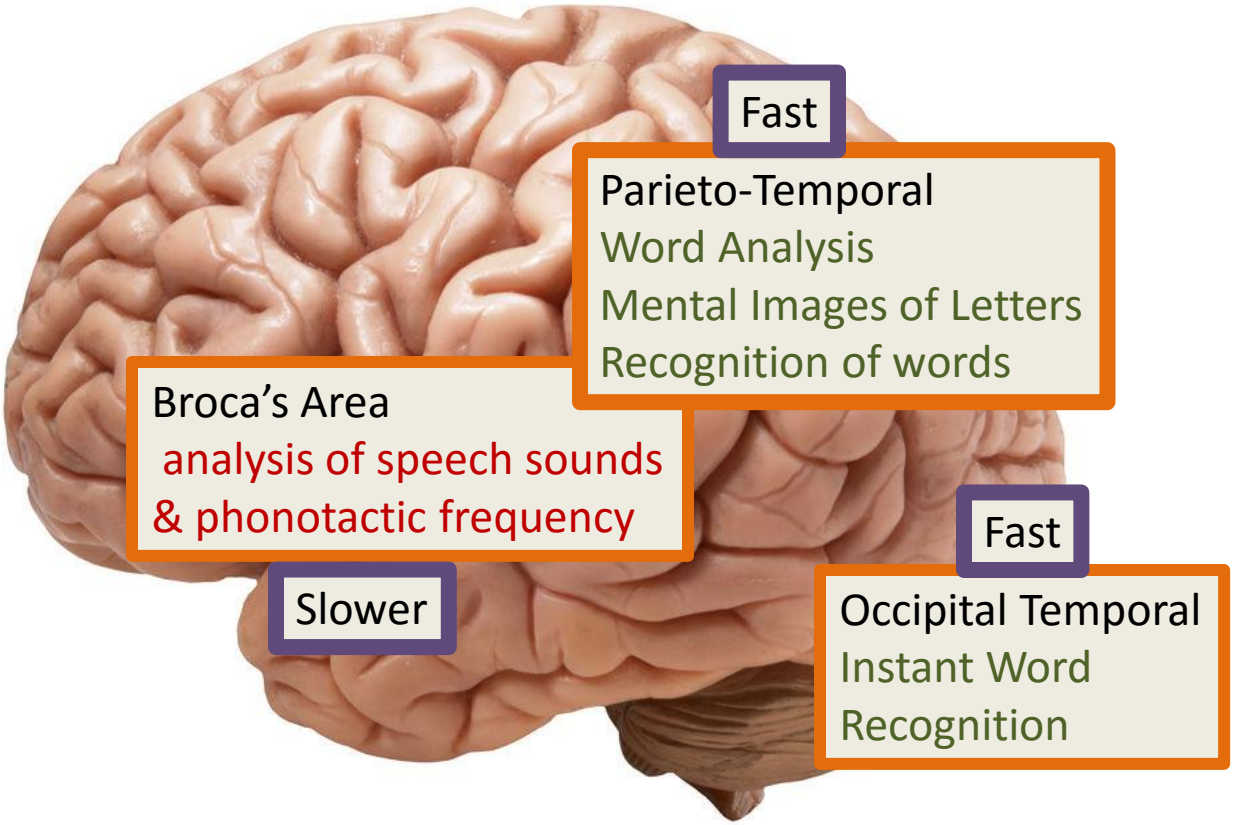
- Surface Dyslexia
  - Poor Word Recognition - Orthographic Delays
  - Poor Spelling
- Gave - Have

Connectionist Model
Seidenberg and McClelland (1989)

- Dual Route Theory
  - Unknown/Novel words are decoded phonemically
  - Known words are encoded orthographically

  - One can have impairments in:
    - Phonemic Awareness
    - Orthographic Awareness
    - Dual Impairment

3 neural pathways for reading



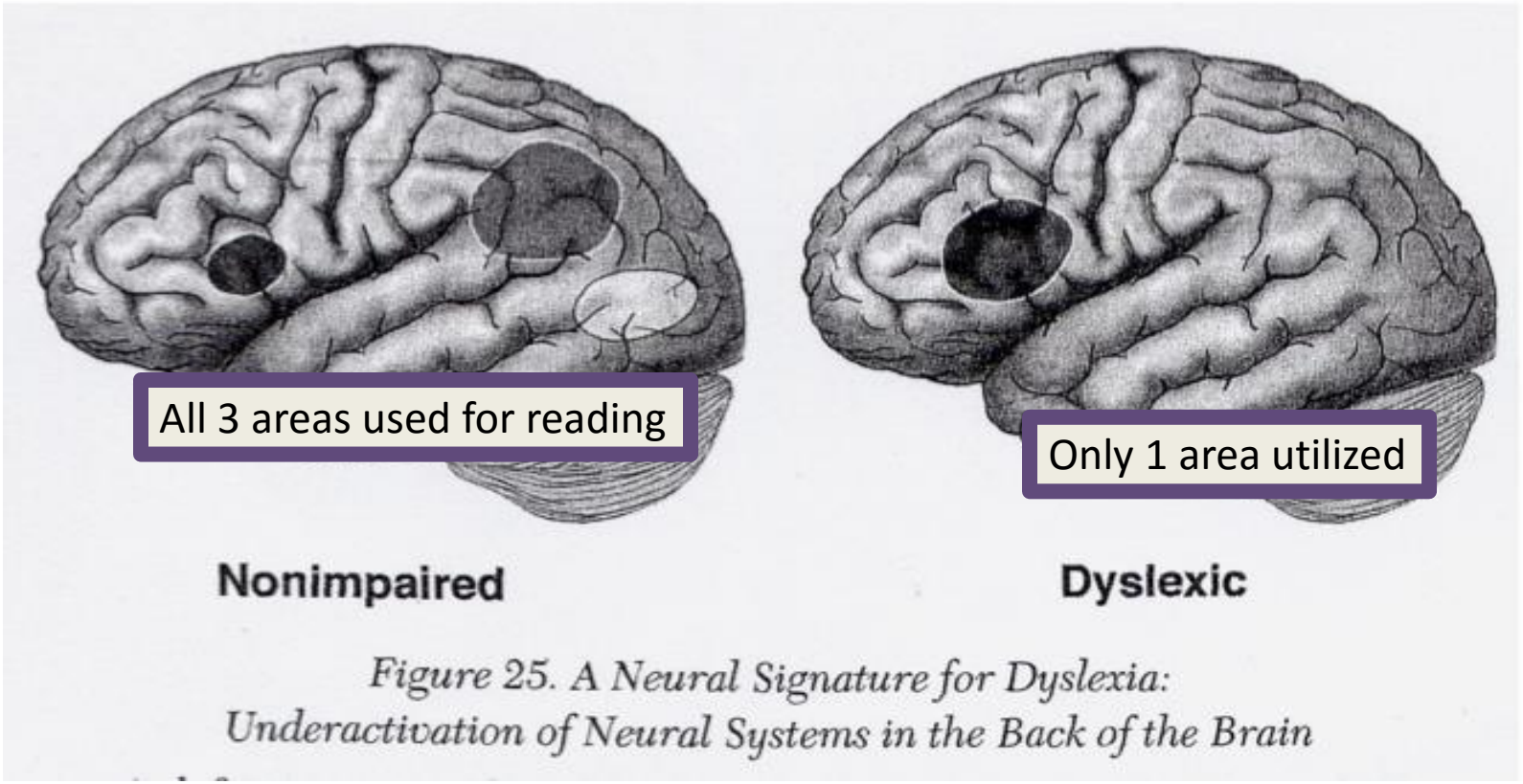
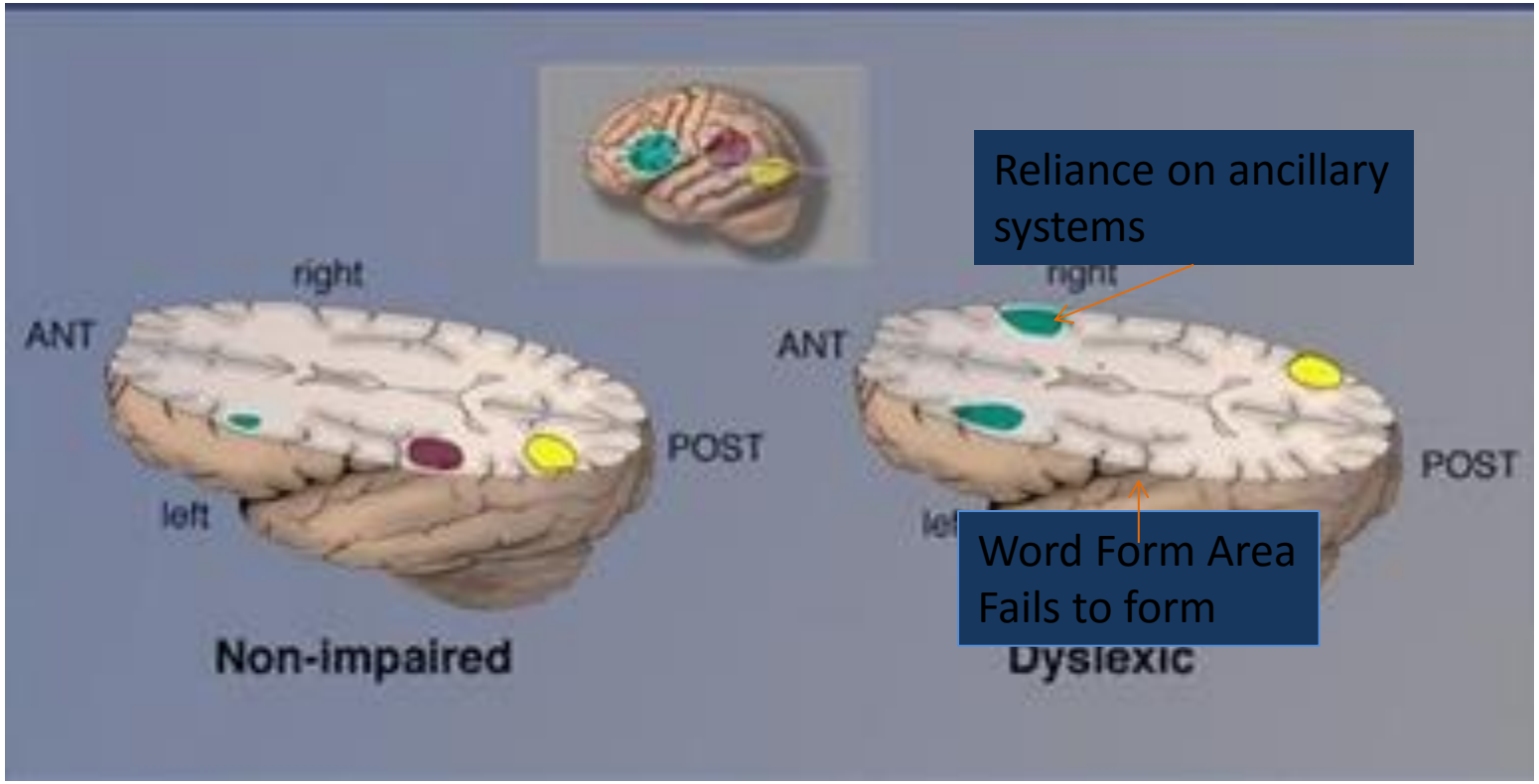
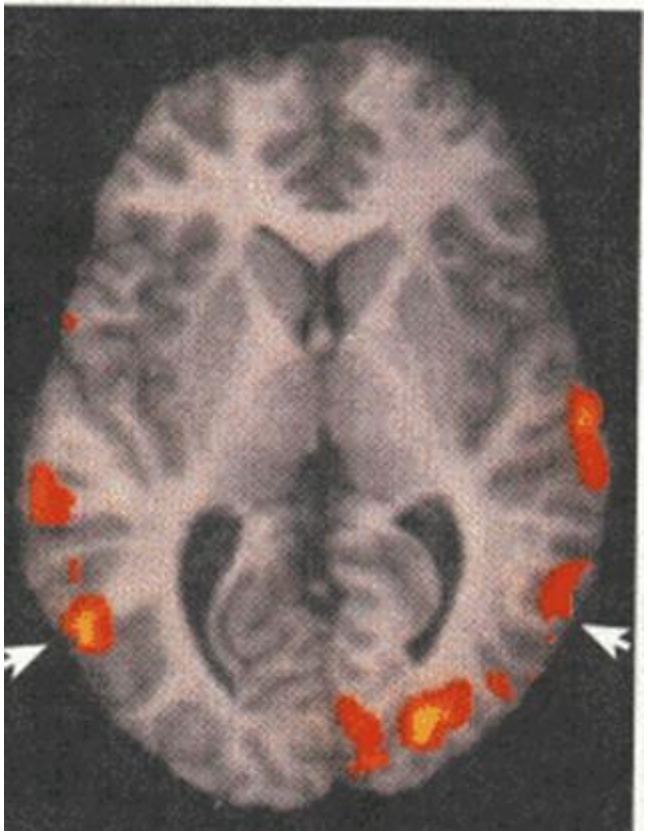


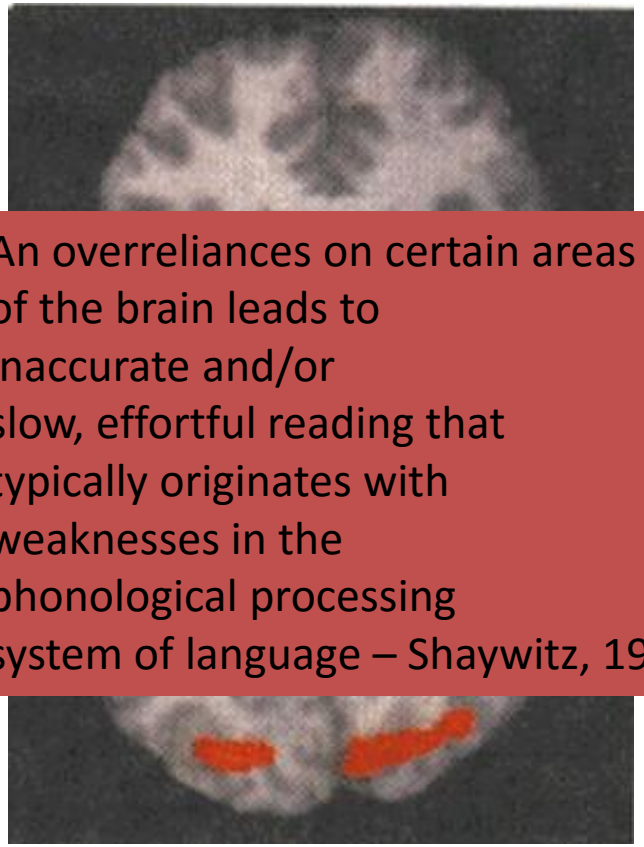
Figure 25. A Neural Signature for Dyslexia: Underactivation of Neural Systems in the Back of the Brain



Remediation compensates for accuracy not automaticity

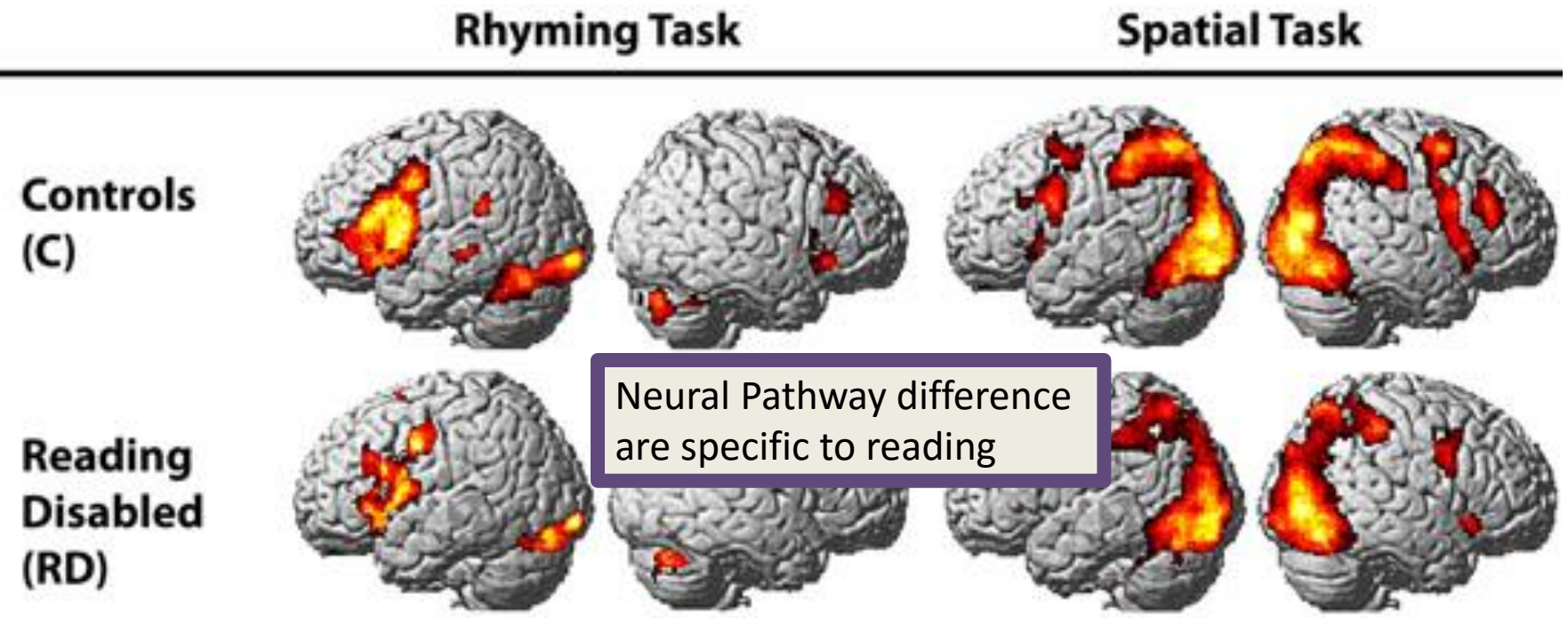


Non -impaired brain while reading



An overreliances on certain areas of the brain leads to inaccurate and/or slow, effortful reading that typically originates with weaknesses in the phonological processing system of language – Shaywitz, 1992

Child with reading disability While reading



Geshwind, 2003

Development of Subtypes of Dyslexia Frank Manis (2005)

- Looks at 1500 cases identified with “learning issues”
- 20% of cases were found to be “pure dyslexics” identified as deficits in phonemic awareness alone
- 76% were dual impaired affecting the development of other skills
- Indicating an overlap between skill development

Relationship between dyslexia and dysgraphia

- Mather (2003)
- good reading and poor spelling (termed dysgraphia),
- poor reading and poor spelling (termed dyslexia)
- and control adolescents.
- Both groups of poor spellers showed a specific deficit under dual task conditions when having to tap with their right hand and judge line orientation at the same time.

- Reflecting a left hemisphere processing limitation

AD/HD and Dysgraphia

- (Adi-Japha et al., 2007)

- Boys with AD/HD and writing difficulties but normal reading (termed dysgraphia)
- With control children
- The authors concluded that the boys with AD/HD and dysgraphia suffered primarily from motor planning errors rather than linguistic impairment.

Motor Skills and Dyslexia

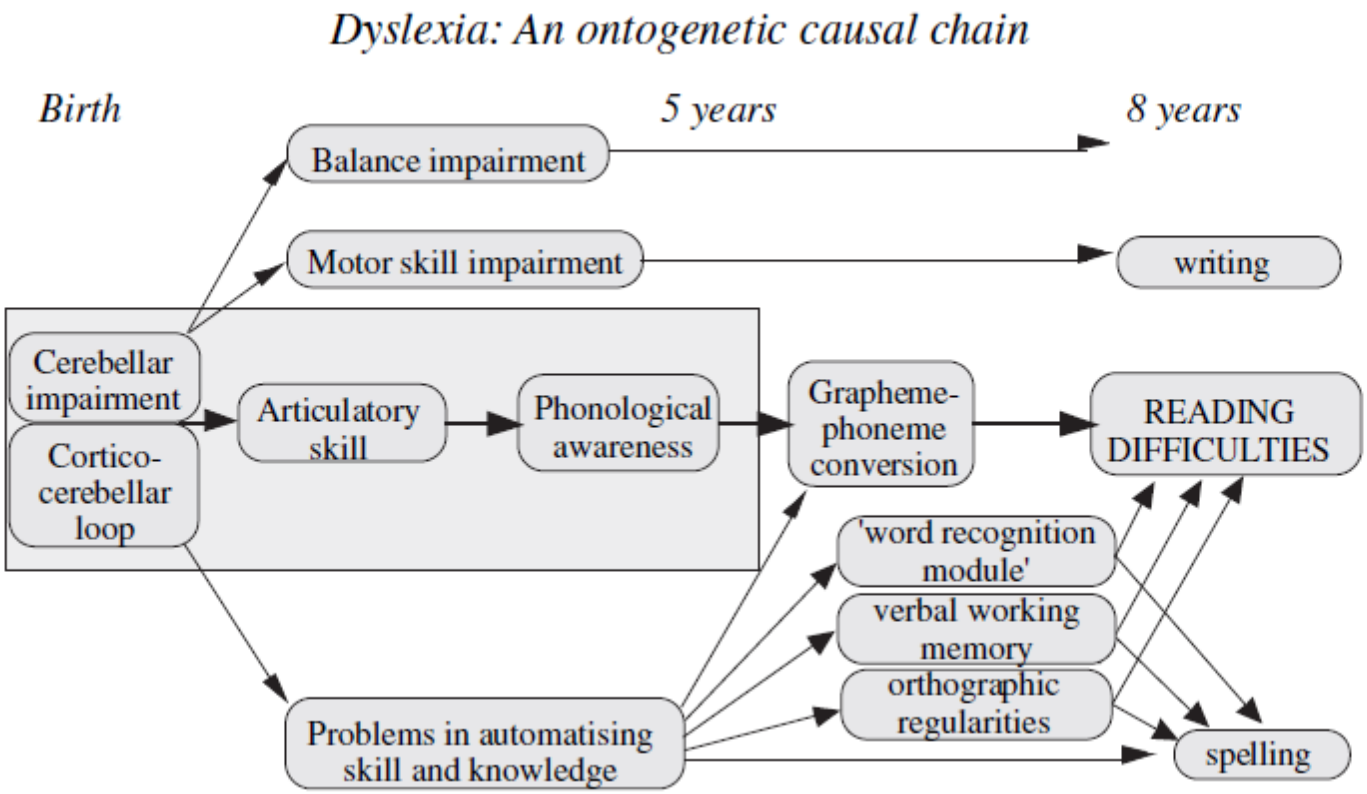
(Viholainen et al., 2006)

- Significant links between slow motor development and both language and reading speed deficits in children at familial risk for dyslexia.

- A particular issue has been the presence or otherwise of balance deficits.

- Nicolson and Fawcett have consistently argued that the majority of children with dyslexia show balance problems

- (Chaix , 2007) – balance may explain the comorbidity of AD/HD and dysgraphia as opposed to dyslexia and dysgraphia


Dyslexia: An ontogenetic causal chain
Birth
5 years
8 years
Balance impairment
Motor skill impairment
writing
Cerebellar impairment
Cortico-cerebellar loop
Articulatory skill
Phonological awareness
Grapheme-phoneme conversion
READING DIFFICULTIES
'word recognition module'
verbal working memory
orthographic regularities
Problems in automatising skill and knowledge
spelling

Summary of Causation Research

- There is no difference in the assessment, outcome or treatment of those with surface vs deep dysgraphia
- Most student overlap between phonemic and orthographic errors
- Reading and math skills tend to overlap with writing skills

ADVANCES IN ASSESSMENT

The psychologist role in diagnosing LD

- Learning Disorders are no longer defined by psychometric data

- DSM5 committee on new criteria :
- *A shift from 'assessment for diagnosis' to 'assessment for intervention' and have more time to provide psychoeducation and consultation with parents and teachers*.

Evaluation vs. Assessment

Dr. Alan Kaufman

… there is a demand for the comprehensive assessment to drive intervention. This is the way it has always been, and this is the way it will always be because the referral questions for children with SLD have always asked, What is wrong? And how can we help? These questions demand differential diagnosis, a large part of which is determined by the cognitive abilities present in the individual child (p. 211).

Source: Kaufman, A. S., Lichtenberger, E. O., Fletcher-Janzen, E., & Kaufman, N. L. (2005). *Essentials of the K-ABC-II Assessment.* New York: John Wiley & Sons.

Use of Neuropsychology for the diagnosis of LD

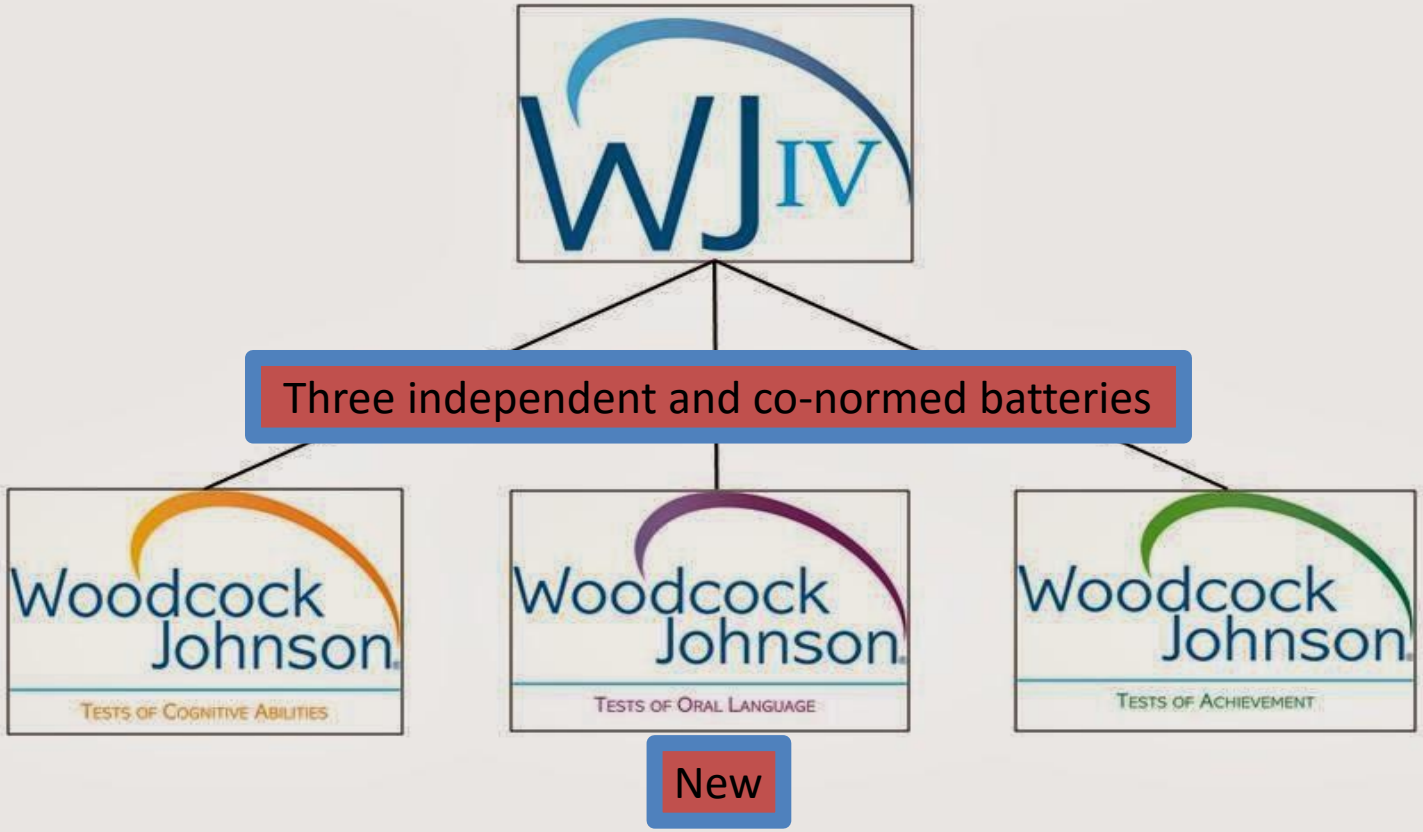
- The neuropsychological evaluation is the evaluation of choice when educators and parents want to answer not only “what” is going on academically, but “why?”

- Auditory-linguistic abilities
- Visual abilities
- Memory
- Processing Speed

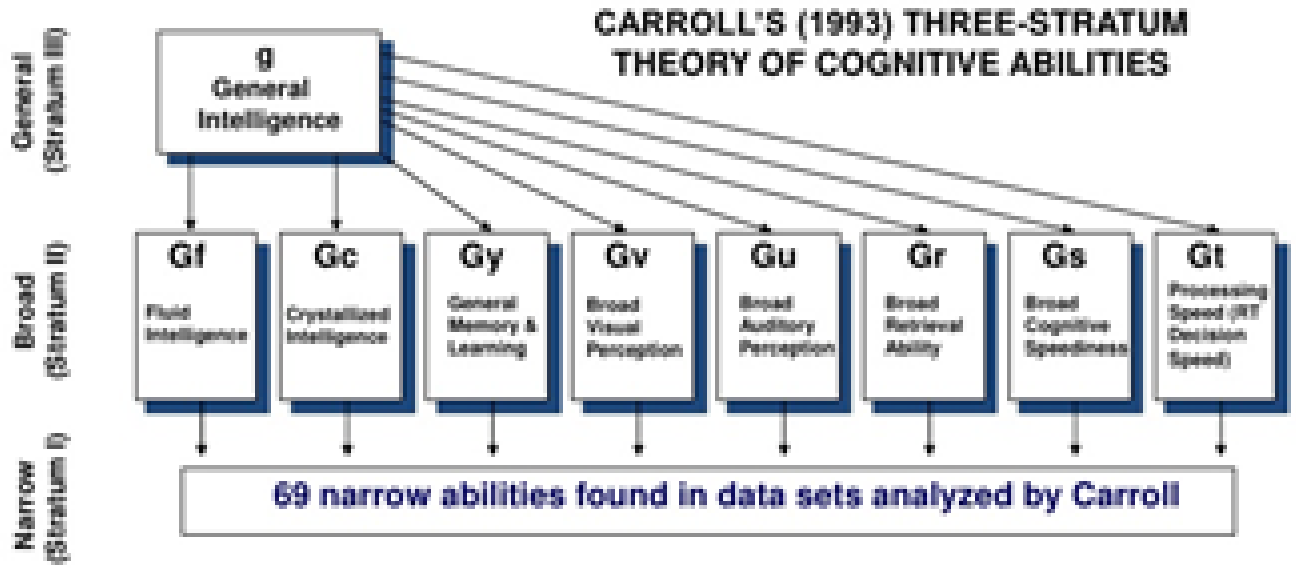
- INS Conclusion - Limited testing, consisting only of IQ testing and assessment of achievement levels, **does not provide sufficient information about the child’s or adult’s brain functioning** to enable the best standard of care and most relevant/targeted interventions to be provided.

Woodcock-Johnson IV

Organizational overview of WJ IV



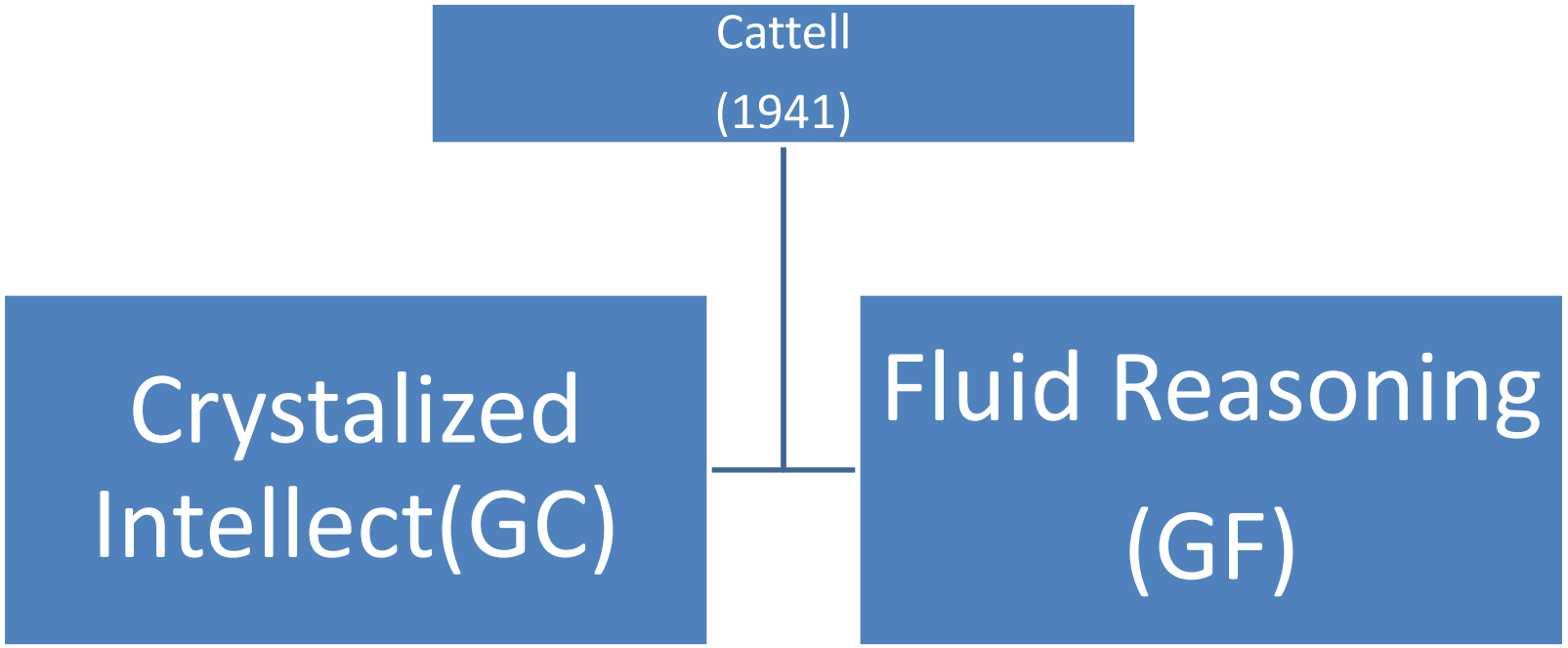
Cattell-Horn-Carroll Theory



-Cognitive abilities vary by degree of generality or breadth (three strata – general, broad, narrow)

- General intelligence or g exists, and different cognitive abilities are more related (correlated) with g than others

Raymond Cattell



Assessing Crystalized knowledge

- Vocabulary
- Define the following:
- Cable
- Injury
- Fort
- Dam

- Math
- 4x12=

Assessing Fluid Reasoning

- Vocabulary

Bandage : Blood

As

Cable : Bridge

Cast : Injury

Fort : Army

Dam : River

Math

3	6	9
6	12	18
18	?	36

GC vs GF example

Students with Autism	**Students with AD/HD**
Strength in Crystalized (GC)	Poor GC
Good acquisition of factual behavior	Unattended Details/facts
Weak Fluid Reasoning (GF)	Strong GF
Idiosyncratic Reasoning	Can reason through even if details are missing

	CHC- Writing	
Crystalized Intellect	**Fluid Reasoning**	**Fluency**
Spelling	Writing Samples	Writing Fluency
Editing/Spelling of Sounds		

Assessment scores

- 4 levels of interpretation
- Relative standing in a group – norm referenced Standard Score
- Qualitative – weighted sums
- Level of Development – age equivalents
- Level of proficiency – Relative Performance Index

Qualitative Assessment
W Scores

Qualitative – How many difficult words can the student read?

W Scores - Items sorted by difficulty level

Each Raw Score is assigned a value representing its difficulty level.

This value is termed the W difficulty.

Table 3.
Relative Performance Indexes (RPI) Associated With W Differences (W DIFF) Along the W Scale

W DIFF	RPI	W DIFF	RPI	W DIFF	RPI
29 and above	100[1]/90	−1	89/90	−36	15/90
28	99/90	−2	88/90	−37	13/90
27	99/90	−3	87/90	−38	12/90
26	99/90	−4	85/90	−39	11/90
25	99/90	−5	84/90	−40	10/90
24	99/90	−6	82/90	−41	9/90
23	99/90	−7	81/90	−42	8/90
22	99/90	−8	79/90	−43	7/90
21	99/90	−9	77/90	−44	7/90
20	99/90	−10	75/90	−45	6/90
19	98/90	−11	73/90	−46	5/90
18	98/90	−12	71/90	−47	5/90
17	98/90	−13	68/90	−48	4/90
16	98/90	−14	66/90	−49	4/90
15	98/90	−15	63/90	−50	4/90
14	98/90	−16	61/90	−51	3/90
13	97/90	−17	58/90	−52	3/90
12	97/90	−18	55/90	−53	3/90
11	97/90	−19	53/90	−54	2/90
10	96/90	−20	50/90	−55	2/90
9	96/90	−21	47/90	−56	2/90
8	96/90	−22	45/90	−57	2/90
7	95/90	−23	42/90	−58	2/90
6	95/90	−24	39/90	−59	1/90
5	94/90	−25	37/90	−60	1/90
4	93/90	−26	34/90	−61	1/90
3	93/90	−27	32/90	−62	1/90
2	92/90	−28	29/90	−63	1/90
1	91/90	−29	27/90	−64	1/90
0	90/90	−30	25/90	−65	1/90
		−31	23/90	−66	1/90
		−32	21/90	−67	1/90
		−33	19/90	−68	1/90
		−34	18/90	− 69 and	0[2]/90
		−35	16/90	below	

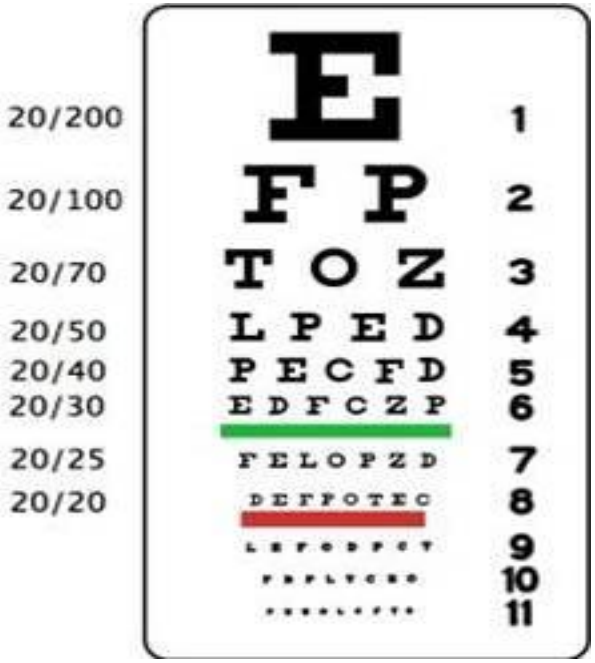
Relative Proficiency Index

- 90/90
  - level of proficiency on tasks that typical age- or grade-peers would perform with 90% proficiency

- 55/90
  - on the Letter-Word Identification subtest would indicate that the student would demonstrate 55% accuracy, whereas age- or grade-peers would demonstrate 90% accuracy

RPI - vision corollary

Snellen Chart



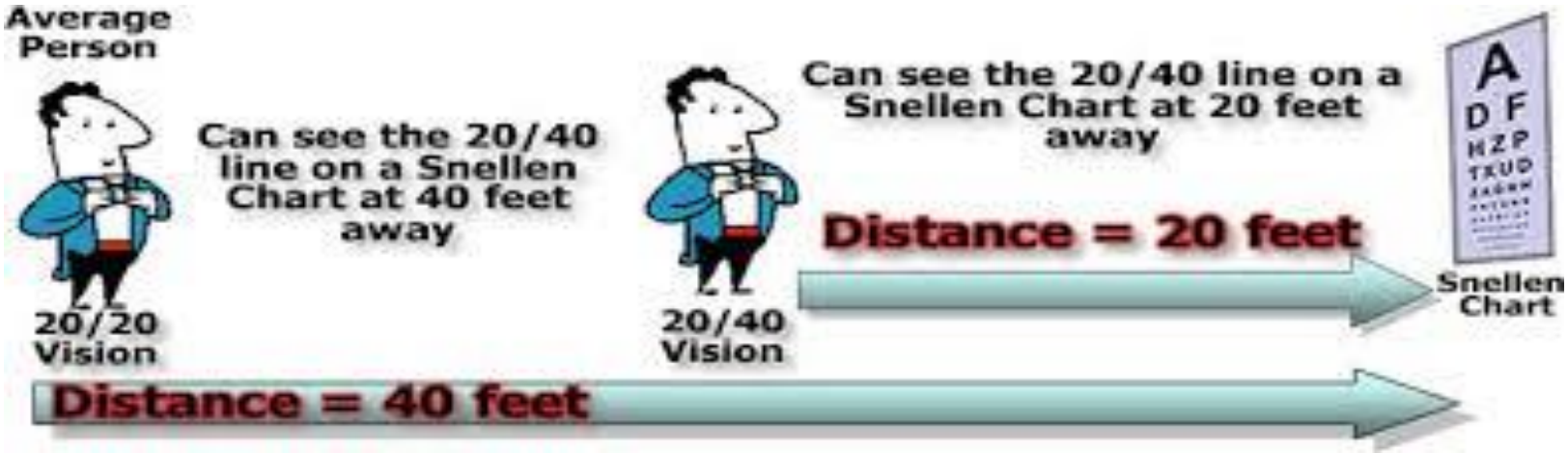


Table 4.
Descriptive Labels and Implications Corresponding to W Differences (W DIFF) and Relative Proficiency Indexes (RPI)

W Difference	RPI	Proficiency	Functionality	Development	Implications for Age- or Grade-Level Tasks
+31 and above	100/90	Very Advanced	Very Advanced	Very Advanced	Extremely Easy
+14 to +30	98/90 to 100/90	Advanced	Advanced	Advanced	Very Easy
+7 to +13	95/90 to 98/90	Average to Advanced	Within Normal Limits to Advanced	Age-Appropriate to Advanced	Easy
–6 to +6	82/90 to 95/90	Average	Within Normal Limits	Age-Appropriate	Manageable
–13 to –7	67/90 to 82/90	Limited to Average	Mildly Impaired to Within Normal Limits	Mildly Delayed to Age-Appropriate	Difficult
–30 to –14	24/90 to 67/90	Limited	Mildly Impaired	Mildly Delayed	Very Difficult
–50 to –31	3/90 to 24/90	Very Limited	Moderately Impaired	Moderately Delayed	Extremely Difficult
–51 and below	0/90 to 3/90	Negligible	Severely Impaired	Severely Delayed	Impossible

Independent Level = RPI 96/90 or above (EASY)
Instructional Level = RPI 95/90 to 76/90
Frustration Level = RPI 75/90 or below (DIFFICULT)

Date of Birth: 11/11/1990 Teacher: XXX
Age: 23 years, 2 months Grade: 14.5
Sex: Female ID: XXXX
Date of Testing: 01/23/2014 Examiner: XXXX

TABLE OF SCORES
Norms based on age 23-2

CLUSTER/Test	SS (68% Band)	PR
BRIEF ACHIEVEMENT	*91 (89-93)*	*27*
BROAD READING	*84 (82-86)*	*15*
BROAD MATH	*98 (96-100)*	*45*

Date of Birth: 11/11/1990 Teacher: XXX
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TABLE OF SCORES
Norms based on age 23-2

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BRIEF ACHIEVEMENT	*91 (89-93)*	*27*	*63/90*
BROAD READING	*84 (82-86)*	*15*	*47/90*
BROAD MATH	*98 (96-100)*	*45*	*88/90*

Independent Level = RPI 96/90 or above (EASY)
Instructional Level = RPI 95/90 to 76/90
Frustration Level = RPI 75/90 or below (DIFFICULT)

W Scores comparisons

- Michael was tested on the Passage Comprehension test at age 8 years, 3 months (8–3) and again at age 11 years, 2 months (11–2).

Age	Standard Score	Percentile Ranking
8-3	84	14
11-2	84	14

- No change in standard score but a change in RTI score
- A 26-point increase indicates that the sentence difficulty level Michael could previously read and understand with 50% success, he can now read and understand with 94% success

W Scores comparisons

- Michael was tested on the Passage Comprehension test at age 8 years, 3 months (8–3) and again at age 11 years, 2 months (11–2).

Age	RTI	W Increase	Standard Score	Percentile Ranking
8-3	50/90		84	14
11-2	84/90	+26	84	14

- No change in standard score but a change in RTI score
- A 26-point increase indicates that the sentence difficulty level Michael could previously read and understand with 50% success, he can now read and understand with 94% success

Normative Assessment

- Compares examinees
- The goal is to **rank the set** of examinees so that decisions about their opportunity for success (e.g. college entrance) can be made.
- Measures **broad skill areas** sampled from a variety of textbooks, syllabi, and the judgments of curriculum experts.
- Each individual is compared with other examinees
- Insensitive to instruction

Criterion Related Assessment

- Criterion-referenced tests (or CRTs) compare examinee's performance to a pre-defined **set of criteria** or a standard.
- The goal with these tests is to determine whether or not the candidate has the **demonstrated mastery** of a certain skill or set of skills.
- Measures **specific skills** which make up a designated curriculum. These skills are identified by teachers and curriculum experts.
- Each individual is compared with a preset standard for acceptable achievement.
- The performance of other examinees is irrelevant.

Radical Proposal

- If we are using assessment to determine the need for intervention
- AND
- If we are using assessment to determine response to intervention
- Then
- Stop looking at ranking and start using criteria

Thank You

- Dr. Barbara Firestone
- The Summit Staff
- Postdocs