

Process Assessment of the Learner -II

Virginia Wise Berninger
PAL-II User's Guide for Reading and Writing (online)
<http://www.pearsonclinical.com/education/relatedinfo/products/pal-ii-resource-library.html> (2007)

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Virginia Wise Berninger Research

- ▶ At the time that the author's research began in the early 1980s, the major tools that psychologists had for assessing children for reading writing and math problems were intelligence tests and a few academic achievement tests.
- ▶ Underachievement on measures of reading, writing and math were often explained by using subtest analysis on intelligence measures.
- ▶ This resulted in case formulations that did not mesh with cognitive, linguistic and neuropsychological research on academic learning.

Virginia Wise Berninger Research

- ▶ The PAL is based on research supported variables that more directly explained reasons for underachievement in reading, writing and math, and more directly linked to evidence based interventions.
- ▶ The variables include cognitive, linguistic and neuropsychological processes necessary for academic learning.
- ▶ The first edition of the PAL based was published in 2001. The revised PAL-II, published in 2007, reflects broader, ongoing research since the original PAL.

PAL-II

- ▶ The PAL -II is a battery of subtests designed to measure various domains of reading, writing math and related processes in children K- grade 6.
- ▶ It was developed in three phases. There was a pilot phase, a tryout phase and a national standardization and validation phase in 2006. The PAL-II RW and PAL -II M were administered to 700 children between K and grade 6. The sample included 100 children in each grade group, 50 males and 50 females. The standardization sample was stratified by age, race/ethnicity, sex, parent education and geographical region. The proportion of race/ethnic groups were based on race/ethnic group proportions of children in K-Grade 6 in the US population according to the Oct. 2003 census survey.

Reliability and Validity

PAL-II User's Guide for Reading and Writing (online)
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- ▶ Statistical properties of the PAL-II are used to establish the degree of confidence with which an interpretation of performance on individual subtests may be made.
- ▶ Reliability measures assess the stability of the underlying construct being measured.
- ▶ The results of the reliability studies indicate that most of the PAL -II subtests have adequate to high internal consistency or stability. Individual subtests with the highest reliability include: Pseudoword Decoding, Rhyming, Are They Related, Find the True Fixes, Morphological Decoding Fluency, Compositional Fluency, Verbal Working Memory Letters, Words and Sentences. Listening had the highest internal consistencies.
- ▶ The lowest reliability coefficients were related to academic processes calculated with test-retest reliability such as Alphabet Writing and Copying.

Reliability and Validity

PAL-II User's Guide for Reading and Writing (online)
<http://www.pearsonclinical.com/education/relatedinfo/products/pal-ii-resource-library.html> (2007)

- ▶ Validity - Does the test measure what it proposes to measure?
- ▶ PAL -II is distinctive in that it measures a set of processes that were first validated in a substantial amount of research by the author and other investigators before translating it into psychometric measures.
- ▶ The PAL-II will ultimately be evaluated by its treatment validity.

Reliability and Validity

PAL-II User's Guide for Reading and Writing (online)

<http://www.pearsonclinical.com/education/relatedinfo/products/pal-ii-resource-library.html> (2007)

- ▶ Three validity studies were completed. The purpose of the first two studies was to determine whether the PAL -II assesses processes that are not fully accounted for by cognitive assessment of intellectual abilities. Unless it does, PAL-II results are redundant with intelligence tests and there is no justification for additional testing.
- ▶ The purpose of the third study was to evaluate whether the PAL-II assesses processes that are not fully accounted for by a test battery that assesses neuropsychological systems from a developmental perspective not explicitly linked to literacy learning.

Validity Study Results

PAL-II User's Guide for Reading and Writing (online)

<http://www.pearsonclinical.com/education/relatedinfo/products/pal-ii-resource-library.html> (2007)

- ▶ Validity studies using the Differential Abilities Scale- II and the Wechsler Nonverbal Scale of Ability confirm that the PAL -II assesses processes that are not fully accounted for by cognitive assessment of intellectual abilities.
- ▶ The third validity study evaluated the relationship between the PAL- II and neuropsychological functioning assessed via the NEPSY-II . Results confirm that the NEPSY-II provides broadband assessment of neurodevelopmental processes that are generally not related to the PAL-II narrowband assessment of neuropsychological and cognitive processes related to reading writing and math.
- ▶ Each assessment provides a different kind of information.

Importance of Validity Studies

- ▶ The PAL-II is designed to be used with broadband assessments of cognitive and neurodevelopment processes while providing supplementary narrowband assessments of cognitive and neurodevelopmental processes that are more directly linked to reading, writing and math difficulties.

Who Uses the PAL-II?

- ▶ **Psychologists** use PAL-II to explain to teachers and parents why a child is struggling and to generate instructional recommendations.
- ▶ **Speech and Language Therapists** assessing oral language may use the PAL-II. PAL-II has phonological, morphological, syntactic, and metalinguistic tasks that can be used to supplement receptive and expressive language assessments to identify persistent problems in language learning.

Who Uses the PAL-II

► Occupational and Physical Therapists

Author's research over last 25 years has shown that many handwriting problems are related to receptive and expressive orthographic coding problems

► Special Education And General Ed Teachers- Early Intervention and remediation.

Conceptual Framework of the PAL-II RW Domains READING SKILLS

Reading Subtests

Domain	Key Subtests
Phonological Decoding	Pseudoword Decoding
Morphological Decoding	Find the True Fixes Morphological Decoding Fluency
Silent Reading Fluency	Sentence Sense

Reading Related Subtests

Domain	Key Subtests
Orthographic Coding	Receptive Coding Expressive Coding
Phonological Coding	Rhyming, Syllables, Phonemes, Rimes

Conceptual Framework of PAL-II RW Domains READING SKILLS

Reading Related Subtests cont.

<u>Domains</u>	<u>Key Subtests</u>
Morphological/Syntactic Coding	Are They Related? Does it Fit? Sentence Structure
Verbal Working Memory	Letters Words Sentences Listening
RAN/RAS	RAN letters RAN Letter Groups RAN Words RAS Words and Digits <u>Oral Motor Planning,</u> Finger Sense- Finger Localization, Finger Recog.

Conceptual Framework of the PAL-II RW Domains WRITING SKILLS

Writing Subtests

<u>Domain</u>	<u>Subtest</u>
Handwriting	Alphabetic Writing, Copying Task A and B
Orthographic Spelling	Word Choice
Narrative Compositional Fluency	Compositional Fluency
Expository Note Taking and <u>Report Writing</u>	<u>Expository Note Taking and Report Writing</u> Cross- Genre Compositional and Expository Writing

Conceptual Framework of the PAL-II RW Domains WRITING SKILLS

Writing Related Subtests

Domain	Subtest
Orthographic Coding	Receptive Coding, Expressive Coding
Phonological Coding	Syllables, Phonemes, Rimes
Morphological/Syntactic Coding	Are they Related? , Does It Fit? Sentence Structure
Verbal Working Memory	Letters, Words, Sentence Listening, Sentence Writing
RAN/RAS	RAN Letters, RAN Letter Groups RAN Words, RAS words and Digits Finger Sense- Finger Repetition, Finger Succession

Reading Skills *Phonological Decoding*

Pseudoword Decoding Grades 1-6 Timed 60 sec. Circle last item pronounced and continue to administer untimed until child has finished all of the words or the discontinue criterion has been met. Discontinue after 7 consecutive scores of 0.

Child is instructed to read each word even if he can only say part of it.

Pseudoword Decoding Fluency is Total Correct at 60 seconds.
Pseudoword Decoding Accuracy is Total Raw Score

Reading Skills *Morphological Decoding*

Find the True Fixes- Grades 2-6 all items. Untimed. The child must differentiate between spelling patterns that are and are not prefixes and suffixes. Child circles response in response book. One point for correct response for Task A, Task B and Task C to obtain a Total Raw Score

Say "Sometimes we add parts to the beginnings or ends of words. These parts do not mean anything by themselves but can signal meaning when used with a word. Parts added to the beginning of a word are prefixes. Some words have true suffixes. Other words have parts spelled the same or nearly the same but they are not true suffixes that have a special meaning."

Sample A Say "For example, the s in looks is a true suffix but the s in miss is not." Task A" Please circle the true suffixes."

Sample B Say " Some words have true prefixes. Others have parts spelled the same or nearly the same which are not prefixes that have a special meaning. For example replay has a true prefix, but read does not." Task B ' Please circle the true prefixes."

Sample C Say " Some words have true suffixes. Others have units spelled the same way or nearly the same which are not suffixes that have special meaning. For example, bulder has a true suffix, but corner does not ." "Please circle all the true suffixes."

Reading Skills *Morphological Decoding*

Morphological Decoding Fluency- Grades 1-2 (set 1) 3-6(set 1-5) Time each subset and set. Allow 3 seconds to begin responding. Purpose is to evaluate the child's ability to pronounce words when different suffixes are added to the same base word (set 4 and 5). Record time and accuracy for each set.

Child is provided with sets of words to read and instructed to read quickly and accurately.

The Morphological Decoding Fluency Accuracy (MDFA) Total Raw Score is the sum of all Set Total Accuracy Scores. Max grades 1-2 is 26. Max grades 3-6 is 100.

The Morphological Decoding Fluency (MDF) Total Time is the sum of all the set times.

Reading Skills

Silent Reading Fluency

Sentence Sense- Grades 1-3- Items 1-10, Grades 4-6 All items. Record Total Time in which the child completes the items administered. The Child circles her responses in the Response Booklet.

The child reads three sentences per item and identifies the one which makes sense. Two of the three sentences are incorrect due to the inclusion of one real word that does not fit the sentence context.

Sample A

- a. The little girl lost her new brush and comb.
- b. The little girl lost her knew brush and comb.
- c. The little girl last her new brush and comb.

Sentence Sense Accuracy Total Raw Score

Sentence Sense Fluency Total Raw Score

Reading and Writing Related Processes

Phonological Coding (PL)

Rhyming (RY) Kindergarten child selects word that does not rhyme with other two (task A). Child says as many real words that rhyme with a spoken word (task B).

Syllables (SY) K-6 designated items-Child repeats a polysyllabic word presented by examiner. Then is asked to say remaining syllable when a targeted syllable is deleted

Phonemes (PN) K-6 Child repeats a word presented by examiner. The examiner repeats the word with a phoneme deleted. The child is asked to repeat what the examiner just said and to identify the missing sound. Example Examiner says "Say pill." After child repeats correctly. Examiner says "Now say ill." Pause for response and ask child what is the missing sound. To obtain a score of one, the child must repeat the word correctly and identify the missing sound.

Task B and C- Examiner reads a word and asks child to repeat it, then asks child to say the word with a targeted sound/phoneme deleted. Task D- Examiner reads a pseudoword and asks child to repeat it. Then Examiner asks child to say the word with a targeted phoneme deleted.

Rimes (RI) 1-6 The rime is the portion of the syllable left when the initial phoneme or blend is deleted. Child says remaining portion of monosyllabic or polysyllabic word when a targeted rime is deleted.

Phonological Coding Composite (PLC)

Reading and Writing Related Processes Orthographic Coding (OR)

Receptive Coding (RC) K-6- The child reads a written word from a stimulus book and without looking at it, is presented with another word and must decide if they are the same or different. (This evaluates if the word is coded in memory.)

Expressive Coding (EC) Grades 4-6 The child reads a word and without looking at the word, writes the word or targeted letter group from memory.

Orthographic Coding Composite (ORC)

Reading and Writing Related Processes Morphological /Syntactic Coding (MSC)

Are They Related? (RR) Grades 2-6 Untimed Discontinue after 3 consecutive scores of 0

Items 1-40 Response Booklet

Examiner reads a pair of words while student looks at them. Sometimes the pair is related in meaning because the first word comes from the second word. Child's job is to circle yes if the first word comes from the second word and they are related, or no if the first word did not come from the second word.

Sample A corner corn

Sample B builder build

Reading and Writing Related Processes Morphological /Syntactic Coding (MSC)

Does It Fit? (DF) Grades 2-6 Untimed. Discontinue after 3 consecutive scores of 0

Response Booklet

The child chooses the one made up word from a group of made up words (pseudomorphs) that has a suffix that grammatically fits the sentence.

Sample Have student read the following: parns, parnness, parned, parnly

Instruction -Circle the correct word in the response booklet that fits the sentence.

My brother blank yesterday.

Jane gave two blank to her mother.

The boy smiled blank

Blank is fun.

Reading and Writing Related Processes Morphological /Syntactic Coding (MSC)

Sentence Structure (ST) Grades 2-6 Untimed Discontinue after 2 consecutive scores of 0

Response Booklet

Examiner says " I will read you a set of three sentences. Your job is to decide which one could be the real sentence. Circle the letter of your choice. Let's try this one.'

Sample A

- a. The elephant ate the bananas in the box.
- b. The box ate the bananas in the elephant
- c. The box ate the elephant in the bananas.

Morphological/Syntactic Coding Composite (MSCC)

Reading and Writing Related Processes Verbal Working Memory

Letters Grades 1-6

Examiner says" I want you to tell me the letter that comes before or after another letter of the alphabet. Sometimes you will tell me the letter just before or after a letter. Sometimes you will tell me the letter that is tow or three letters before or after a letter.

What letter comes before C ?

Reading and Writing Related Processes Verbal Working Memory

Words Grades 1-6 5 seconds for each Spelling backward item and 5 sec for each letter position item Discontinue after 5 consecutive scores of 0.

"First we will spell a word forward together. Next I want you to close your eyes and see the word in your mind's eye while you spell that word backward on your own. Then I will ask you to think of the word in its forward normal letter order. Then I will as you to tell me the letter positions in the word. Lets try one together."

"Spell *ball* forward with me. We will both name each letter aloud. B-A-L-L"

"Now close you eyes and spell it backward aloud on your own."

Wait 5 sec. for a response

Say, " Tell me the first letter in the word when it is normally spelled.

Wait 5 sec for a response.

If child responds incorrectly, provide correct responses. No further teaching on items 1-20

Reading and Writing Related Processes

Verbal Working Memory

Sentence Listening K-6 Timing 5 sec for process questions and 5 sec for the Repeat. Discontinue after 2 consecutive Repeat scores of 0.

Sample A

Examiner says " After I read a sentence or a set of sentences to you, I want you to answer a question about what I read to you. Then I will ask you to repeat the sentence or sentences exactly as I first read them. Listen carefully because I can't repeat anything. I will say the word Listen to remind you to listen. I will say the word Question before I ask you the question."

Listen. "The cat is orange."

Question. " What color is the cat?"

Pause. Say "Repeat"

Reading and Writing Related Processes

RAN/ RAS Rapid Automatic Naming/ Rapid Automatic Switching

Grades 1-6 Timed

RAN Letters, Letter groups and Words

RAS Words and Digits (alternating)

Oral Motor Planning

Finger Sense

Why Use the PAL-II The Other 3-Tier Model

Berninger, V.W. PaTTAN Conference March 10. 2017

- ▶ Prevention of Disabilities in Reading, Writing and Math and Early Intervention. Due to biological and environmental diversity not all students require the same kind of differentiated instruction at Tier 1 and are most likely to respond to personalized instruction tailored to their individual instructional needs.
- ▶ Remediation and Problem Solving Consultation with inter disciplinary Team and Modify Reading Plan.
- ▶ Differential Diagnosis and Evidence Based Treatment Planning.

Tier1 of the Other Three Tier Model Kindergarten Screen-Intervene

Letter Naming and Writing Screen (all in manuscript letters)

Ask student to name each of the 26 lower case alphabet (letters not presented in alphabetic order).

Ask student to write from dictation each of the 26 lower case alphabet letters (not presented in alphabetic order).

PAL II RW alphabet task Ask student to write all 26 lower case letters in alphabetic order. Score for first 15 seconds and total legibility.

Intervene and Record RTI on Growth Graphs in Each Lesson.

Rubel, B. (1995). *Big Strokes for Little Folks*. Tucson, AZ: Therapy Skill Builders.

Manuscript handwriting from Slingerland@Institute for Literacy
www.slingerland.org

Tier 1 of the Other Three Tier Model Kindergarten Screen-Intervene

Sounds in Words Awareness Screen

PAL II RW Rhyming Task A and B, Syllables Task A, and
Phonemes Tasks A and B

Intervene and Record RTI on Growth Graphs in Each Lesson.

Sound Games on pages 196-219 and

Looking Games on pages 191-192, 236

in Berninger, V. (1998). *Process assessment of the learner (PAL). Guides for intervention. Reading and Writing.* Pearson.

Tier 1 of the Other Three Tier Model: First Grade Reading

Reading Screen

PAL II RW Syllables items 6 to 20, Phonemes items 1 to 30, Rimes
items 1 to 10, Receptive Coding A, B, and C,
Pseudoword Reading and Word Choice—accuracy,
and Sentence Sense

Reading Intervene--Record RTI on Growth Graphs in Each Lesson.

1. Sound Games on pages 196-219 and Looking Games on pages 191-192, 236,
and Word Decoding, Whole Word Reading, and Word Families Activities on
pages 239-241 in *PAL Guides for intervention. Reading and Writing.* (1998)
Pearson.

2. Lesson Set 1 in *PAL Research Supported Reading and Writing Lessons*
(2003) and associated Reproducibles and Talking Letter Cards. Also books
from classroom library

3. Read Naturally. (1997-2008). *Read Naturally Masters Edition (ME)*. Saint
Paul, MN: Read Naturally.

Tier 1 of the Other Three Tier Model: First Grade Writing

Writing Screen PAL II RW Alphabet Writing (15 sec, total legibility, total time) and Compositional Fluency Prompts 1 and 2 scored for number of words and correctly spelled words

Writing Intervene and Record RTI on Growth Graphs in each Lesson.

Lesson Set 3 in *PAL Research Supported Reading and Writing Lessons* (2003) and associated Reproducibles and Talking Letters Card and Handwriting Card

PAL Handwriting Lessons (in manuscript with composing prompts to transfer across levels of language)

Grade 1 lessons in Fry, E. (1996). *Spelling book. Level 1-6, Words most needed plus phonics*. Westminister, CA: Teacher Created Materials, Inc. www.teachercreated.com

Tier 1 of Three Tier Model: Second Grade Reading

Reading Screen

PAL II RW Syllables items 6 to 20, Phonemes items 1 to 30, Rimes items 1 to 10, Receptive Coding A, B, and C, Pseudoword Reading accuracy and time, Word Choice items 1 to 15 accuracy and time, and Sentence Sense items 1 to 10

Reading Intervene and Record RTI on Growth Graphs in Each Lesson.

Lesson Set 2, Lesson Set 6, and Lesson Set 9 in *PAL Research Supported Reading and Writing Lessons* (2003) and Associated Reproducibles and Talking Letters Instruction on cross-code mapping in the reading direction.

Read Naturally. (1997-2008). *Read Naturally Masters Edition (ME)*. Saint Paul, MN: Read Naturally Transfer of oral reading of words to sentences and text.

Classroom library.

Tier 1 of the Other Three Tier Model: Second Grade Writing

Writing Screen (manuscript)

PAL II RW Alphabet Writing (alphabet 15, total legibility, total time), and Narrative Compositional Fluency Prompts 3 and 4 scored for number of words and correctly spelled words and handwriting errors during composing

Writing Intervene and Record RTI on Growth Graphs in Each Lesson (manuscript).

Lesson Set 4 in *PAL Research Supported Reading and Writing Lessons* (2003) and associated Reproducibles and Talking Letters Card and Manuscript handwriting Warm Ups and instruction in cross-code mapping in the spelling direction.

Grade 2 lessons in Fry, E. (1996). *Spelling book. Level 1-6, Words most needed plus phonics*. Westminister, CA: Teacher Created Materials, Inc. www.teachercreated.com

Continued practice in manuscript handwriting drawing on:

Slingerland®Institute for Literacy manuscript see www.slingerland.org

The Zaner-Bloser *Handwriting Program* grade 2. www.zanerbloser.com/fresh/handwriting-over

Tier 1 of the Other Three Tier Model: Third Grade Reading

Reading Screen

PAL II RW

Receptive Coding A, B, C, Are They Related? items 1 to 40,
Finding the True Fixes Tasks A, B, C, Does It Fit? items 1 to 10,
Word Choice Items 1 to 15 accuracy and time,
Pseudoword Reading accuracy and time,
Morphological Decoding Fluency Sets 1 to 5
Does It Fit? items 1 to 10, Sentence Structure items 1 to 10, and
Sentence Sense items 1 to 10

Reading Intervene and Record RTI on Growth Graphs in Each Lesson

Lesson Set 11 in *PAL Research Supported Reading and Writing Lessons* (2003) and Associated Reproducibles and Talking Letters Instruction in Cross-Code Mapping in the oral reading direction.

Read Naturally. (1997-2008). *Read Naturally Masters Edition* (ME).
Saint Paul, MN: Read Naturally but use more recent versions.

Classroom Library for free choice reading to develop reading for pleasure (and practice)

Tier 1 of the Other Three Tier Model: Third Grade Writing

Writing Screen

PAL II RW Alphabet Writing (alphabet 15 seconds, total legibility, total time), and Narrative Compositional Fluency Prompts 1 and 2 scored for number of words and number of correctly spelled words and handwriting errors during composing

Writing Intervene and Record RTI on Growth Graphs in each Lesson.

Lesson Set 5, Lesson Set 7, and Lesson Set 8 in *PAL Research Supported Reading and Writing Lessons* (2003) and Associated Reproducibles and Talking Letters

Instruction in Cross-Code Mapping in the Spelling Direction.

Grade 3 lessons in Fry, E. (1996). *Spelling book. Level 1-6, Words most needed plus phonics*. Westminister, CA: Teacher Created Materials, Inc. www.teachercreated.com

Introduce cursive handwriting instruction (Alstad et al., 2015)

Slingerland®Institute for Literacy cursive see www.slingerland.org

The Zaner-Bloser *Handwriting Program* grade 3. Cursive www.zanerbloser.com/fresh/handwriting-overview.html

The Other Tier 2: Problem Solving Consultation

- ▶ Reach out annually to parents—send home the parent questionnaire in *PAL II User Guide*
- ▶ Members of interdisciplinary team visit classrooms and complete Pay Attention to Teaching ratings in *PAL II User Guide*
- ▶ Members of interdisciplinary team implement problem solving consultation for Reading, for Writing, and for Math in *PAL II User Guide*

Note: School-designed tools can also be used.

Seven Steps of the Tier 2 Problem Solving Consultation Process

- ▶ Initial Teacher Interview to Discuss Referred Child
- ▶ Classroom Observation During Reading, Writing, and/or Math Instruction
- ▶ Teacher Interview with Follow-Up.....
- ▶ Matrix for Selecting Subtests to Identify Nature of Reading, Writing, and/or Math Problem.....
- ▶ Branching Diagnosis to Identify Processes Related to the Reading, Writing, and/or Math Problem.....
- ▶ Planning Modified Reading, Writing, and/or Math Program and Progress Monitoring.....
- ▶ Evaluating Response to Modified Reading, Writing, and/or Math Program
- ▶ Deciding if Additional Modifications are Needed

Note. Tools for supporting each of the steps in PAL II User Guide.

Tier 2—Examples of School-Implemented Problem Solving Consultation

- ▶ Weekly team meeting (before or after school or during planning time) of principal, assistant principal, instructional coaches or specialists in school, general education and special education teachers, school psychologist, speech and language specialist, physical or occupational therapist to discuss any students of concern and possible modifications to current program and plan for evaluating effectiveness of these modifications
- ▶ Teacher, Parent, Child, School Psychologist Plan for Teaching Appropriate Behavior at School (see Honor Roll Model 3 Jim Van Velzer, *Interdisciplinary Frameworks for Schools* APA Books)
- ▶ Drop-in consultation with general education teachers as needed before or after school or during planning time
- ▶ Communication vehicle (e.g., online form, paper form) for teachers to make requests for classroom observations to aid in consultation
- ▶ Clarification and problem-solving with teachers during grade-level or staff meetings around referral paperwork, behavior plans, and other topics
- ▶ Helping teachers prepare for schoolwide parent-teacher conferences

More Examples...

- ▶ Drop-in consultation with students during recess time regarding school or family or other stressors
- ▶ Creating proactive relationships with parents through annual questionnaires around behavior, motor, or academic concerns; follow-up phone or in person meetings
- ▶ Maintain parent rooms at school where parents can come to obtain assistance in helping their children at home with a variety of educational issues
 - ▶ Behavioral or academic concerns
 - ▶ Tips for behavior management and homework assistance
 - ▶ Help with transitioning children into new schools or programs
 - ▶ Community resources for assistance with mental health, medical, or financial concerns
- ▶ Regular sharing of informational resources with parents around various topics (e.g., within a regular school newsletter)
 - ▶ Typical child development for learning and self-regulation of behavior
 - ▶ Age-appropriate expectations for learning and behavior
 - ▶ Activities to increase academic skills and self-regulation of behavior

Tier 3 Differential Diagnosis of Specific Learning Disabilities (SLDs)

See Silliman & Berninger (2011), Berninger (2015), and Berninger & Wolf (2016)

Rule out

Developmental Disabilities (Pervasive or Specific) in cognitive, language, sensory motor, social emotional, and/or attention executive functions outside the normal range and/or, other neurogenetic disorders, injuries, toxins or typical language learner. Care about students with those disorders and their families and develop specialized instruction for them but don't confuse them with SLDs.

Identify a student's Learning Profile and Associated Working Memory Phenotype Profile

Dysgraphia, Dyslexia, Oral and Written, Language Learning Disability (OWL LD), Dyscalculia none of the above; compare to developmental, educational, medical, and family histories

Working Memory Phenotype Profiles of 3 SLDs

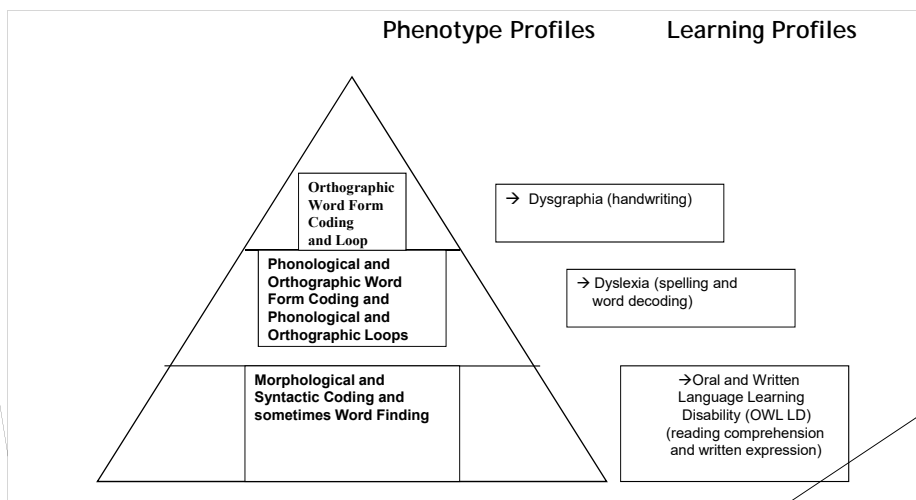
Common Lower Level Executive Function Problems across all 3 SLDs
(Supervisory Attention).

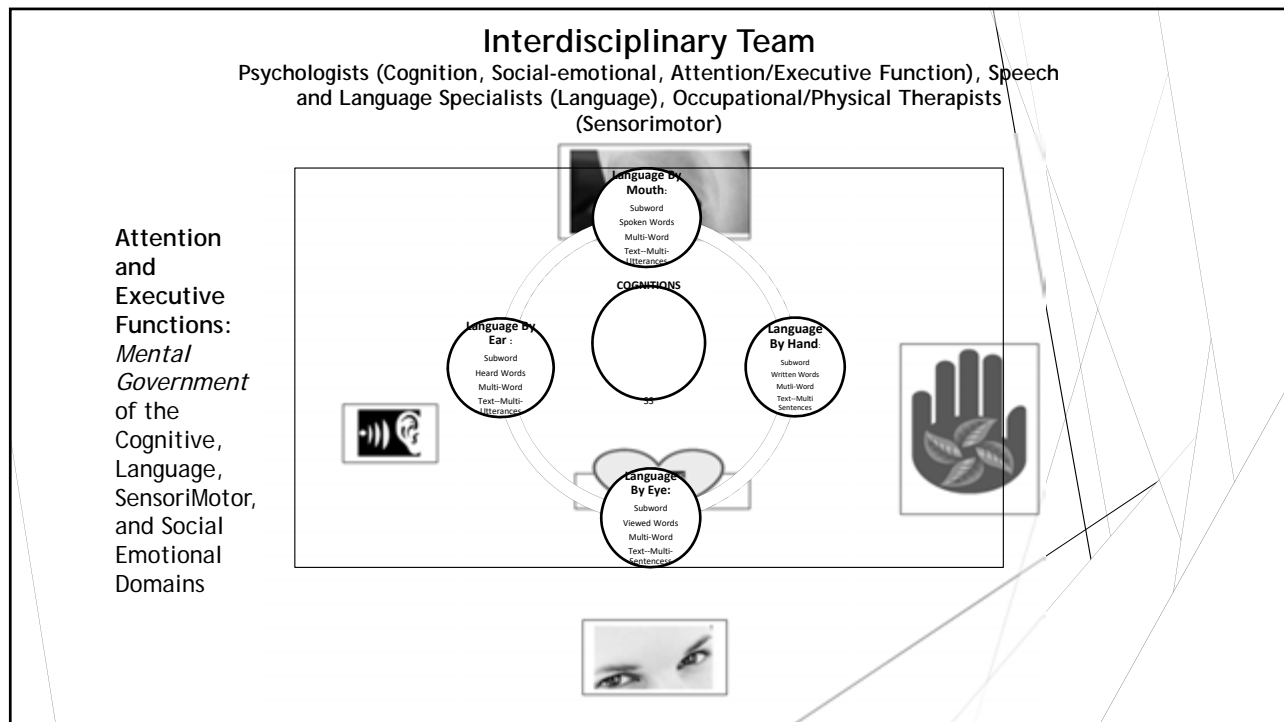
Orthographic Loop= Orthographic Coding of Letters/ Words and Sequential Finger Movements

Phonological Loop=Phonological Coding of Letters /Words and Sequential Mouth Movements

Coding=Storing and Processing Word Forms **Syntax Buffer** Stores and Processes Accumulating Words.

Working Memory Phenotype Profiles of 3 SLDs





Does research show how to define dyslexia? Are all reading problems dyslexia?

YES, dyslexia, a Greek word that means impaired **word reading** and **spelling**, exists and can be defined. NO, not all reading and spelling problems are dyslexia.

Learning Profile for Dyslexia: Impaired word reading (decoding, word identification—accuracy and/or rate; oral and/or silent) and spelling

Phenotype Profile for Dyslexia: Impaired phonological coding, orthographic coding, phonological loop, and/or orthographic loop.

Has research shown there a brain basis for dyslexia? yes

Does research show how to define dysgraphia?

Are all writing problems dysgraphia?

- **YES**, dysgraphia, which is a Greek word meaning impaired letter writing by hand, exists and can be defined. **NO**, not all handwriting problems are related to dysgraphia. Handwriting problems are also found in Developmental Motor Disorder. But different treatments are needed for that than for dysgraphia.
- **Learning Profile for Dysgraphia:** Impaired legible and automatic alphabet letter writing (handwriting) (which may interfere with learning to spell and compose, and legible and accurate numeral writing, which may interfere with written math.
- **Phenotype Profile for Dysgraphia:** Impaired orthographic coding (mind's eye), sequential finger planning, orthographic loop from letter coding in mind's eye to sequential finger movements to produce letters, and executive functions for supervisory attention.
- Has research shown there a brain basis for dysgraphia? yes

Does research show how to define OWL LD?

Are all aural/oral problems OWL LD?

- ▶ **YES**, research has shown that some children struggle in learning oral language during the preschool years and then during the school years they struggle in understanding teacher's instructional talk, reading written language in instructional materials, using written language to express themselves, and using language to learn. **NO**, some children have a developmental disability in language (overall language development outside the normal range) or speech (severe articulation problems) or severe hearing problems.
- ▶ **Learning Profile for OWL LD:** Nonverbal cognition may be higher than verbal cognition. Impaired listening comprehension, oral expression, reading comprehension, and written expression/composition.
- ▶ **Phenotype Profile for OWL LD:** Impaired syntactic coding and often morphological coding. Impaired syntactic levels of four language systems (by ear, mouth, eye, and hand) with or without word finding problems.
- ▶ Has research shown a brain basis for OWL LD? yes

Dyslexia

Learning Profile

- ▶ First signs in Kdg or 1st grade
 - ▶ naming letters
 - ▶ associating sounds with them
- ▶ No preschool history of problems in oral language milestones or primary oral language disability
- ▶ Impaired accuracy and/or rate in lists or passage context
 - ▶ word decoding (pseudowords)
 - ▶ word reading (real words), and/or
 - ▶ word spelling (dictation and composing)

Phenotype Profile

- ▶ Impaired phonological coding
- ▶ Impaired orthographic coding
- ▶ Impaired phonological loop
- ▶ Impaired orthographic loop
 - ▶ internal codes for letters and written words
 - ▶ finger sequencing plans
 - ▶ integration of orthographic codes with finger movements for letter and word production

Silliman, E. R., & Berninger, V. W. (2011). Cross-disciplinary dialogue about the nature of written language problems in the context of developmental, academic, and phenotypic. *Topics in Language Disorders, 31*(1), 6-23.

Dysgraphia

Learning Profile

- ▶ First signs in Kdg or 1st grade
- ▶ Impaired handwriting (primary feature)—legibility of letter formation and/or automaticity of retrieval of ordered letters from memory and production of letter forms with a model (copy) or from memory
- ▶ Impaired spelling (with or without handwriting impairment) even when copying
- ▶ Impaired spelling without impaired word reading (incidence 1% to 4%)
- ▶ Impaired handwriting or spelling can interfere with written composition or work completion

Phenotype Profile

- ▶ Impaired receptive and/or expressive orthographic coding (storing and processing written words in working memory and analyzing the letters in them)
- ▶ Impaired sequential finger movements
- ▶ Impaired orthographic loop (internal codes for letters and written words, finger sequencing plans, and integration of those orthographic codes with finger movements for letter and word production)

Oral and Written LLD (OWL LD)

Developmental Profile

- ▶ Preschool history of oral language delay
- ▶ Persisting oral and written language problems
- ▶ All other developmental domains in normal range
- ▶ Specific language impairment (SLI) or language learning disability (LLD) occurs in which one or more but not all language skills are impaired

Learning Profile

- ▶ Impaired reading comprehension
 - ▶ Word level (vocabulary)
 - ▶ Sentence level (sentence comprehension)
 - ▶ Text level (factual and inferential questions) following oral and/or silent reading during the school years
- ▶ Impaired syntax or other language problems affect written composition
- ▶ Same impairments as in dyslexia may occur

PHENOTYPE PROFILE

- Impaired morphological coding
- Impaired syntax coding
- Impaired word retrieval
- Impaired listening comprehension
- Same impairments as profile for dyslexia may occur

Case Studies and Discussion