The Other 3-Tier Model:
Screen-Intervene for Oral Language,
Reading, Writing, and Math (Tier 1)
Problem Solving Consultation (Tier 2)
Instructionally Relevant Differential Diagnosis of
Dysgraphia, Dyslexia, OWL LD, and Dyscalculia (Tier 3)

Virginia W. Berninger,
Professor Emeritus
University of Washington, Seattle, WA
vwberninger@comcast.net

PaTTAN Conference,
Hershey Convention Center, Hershey, PA March 10, 2017
8:30 am to 10:30 am

This presentation is dedicated to the memory of the late Ed Shapiro, an Inspiring Leader in PA and the US for Preventing Learning Disabilities and Fostering School Psychology-Teacher Collaborations. A Special Thank You to PA Department of Education for this invitation to share with the state where I started my career 50 years ago in an inner city classroom with 50 third graders and to Monica McHale-Small for facilitating inviting me.

Monica McHale-Small
Superintendent Saucon Valley School District, PA,
former school psychologist,
former Director of Student Services,
former Curriculum Director, current tutor and IDA Board Member

Interdisciplinary Perspectives,
Acknowledgements, and Conflicts of Interests

Experience as general education, special education, and reading specialist educator
Students and Colleagues in inner city schools in Philadelphia and Pittsburgh PA and Baltimore MD, in suburban school in Pittsburgh, and rural school in Frederick MD where P.L. 94-142 was piloted 1972-1975
Experience as a clinical psychologist specializing in learning disabilities and developmental disabilities
Clients and families of clients and interdisciplinary teams at Boston's Children's Hospital and Eunice Kennedy Shriver Center MK that assessed, designed intervention plans, and consulted with schools attended by clients.
Experience as a researcher supported by Grants
-from the Binational Science Foundation (Israel and US)
-from the US Department of Education on Physical and Communication Disabilities and Math Assessment and Instruction for Students who are Gifted or Average Intellectually with Math Talent and/or Math Disability
-from the Institute of Ethnic Studies and Graduate School Research Fund at the University of Washington

Contributions of children and parents participating in the Research Studies, Graduate Students, Staff, and Colleagues on Research Teams and Numerous Other Researchers (including other LD Centers), Clinicians, and School Professionals and Students and Parents over the past 50 years
Faculty who taught education and psychology courses I took at Elizabethtown College, Temple University, and University of Pittsburgh in PA and the Johns Hopkins University in MD.
NICHD Provided More Than Funding: Also Mentoring by Thought Leaders

Reid Lyon 1990-2006
Brett Miller 2006-2017

David Gray 1988-1990
Peggy McArdle 2000-2015

Colleagues in UW LDC 2011-2017

Todd Richards on right
Tom Grabowski on left

Left to right: Bill Nagy, Scott Beers, Wendy Raskind, Bob Abbott, and Liz Sanders

Also consultant to center
Joanne Carlisle, Professor Emeritus
University of Michigan

Mentors in Professional Development for Translating Interdisciplinary Research into Educational Practice

Victoria and Dennis Molfese whose research documents the relevance of developmental neuropsychological research for educational assessment and intervention.

Malt Joshi, whose cross-language research shows that, while phonology is necessary, so is orthography!

The late Richard Venezky’s Alphabetic Principle in English, which is a Morphophonemic Orthography, works differently in the reading and spelling direction.

The late Robert C. Colligan, Mayo Clinic
Epidemiological Studies — 1 in 5 children show signs of SLD + or ADHD during schooling; and Writing Disabilities: The Forgotten SLD
Disclosure of Conflicts of Interest Re Author Research-Generated Resources

Aurelio Prifitera, President of then Psychological Corporation and now Pearson in North America, proposed translating the University of Washington Research into Process of the Learner (PAL) assessment tools such as PAL II Reading and Writing Diagnostic and PAL II Math Diagnostic and intervention tools such as PAL Intervention Guides, Intervention Kit, and Reading and Writing Lessons.

Disclosure of Conflicts of Interest Re Author Research-Generated Resources

Opt-Ed (Marshall Raskind) has distribution rights from UW for the computerized oral and written language lessons, which are organized by levels of language. They were developed in most recent funding cycle and are available within the context of professional development and consultation not as off the shelf product. Contact Opt-Ed beginning Aug 2017: marshall.raskind@mhraskind@gmail.com

Marshall Raskind
Technology for Teaching Students with SLDs (not just for Accommodations)

Transition to Featured Language Learning Scientist-Practitioners and Multiple Resources for the Other Three Tier Model and Professional Development Learning Objectives
Featured Language Learning Scientist-Practitioners for Other Resources

Beverly Wolf, former teacher and principal, currently national structured language instruction trainer, co-author of books, author of book chapters, and now published researcher.

Elaine Silliman, Professor Emeritus University of South Florida, ASHA Fellow and Honors, author of many Research Publications, and Editor of many Cross-Disciplinary Books on Language Learning.

Nickola Wolf Nelson, Professor Emerita, Western Michigan University Editor-in-Chief, Topics in Language Disorders, who as Principal Investigator of IES grants, developed the TILLS assessment tool for language which can be used in the Other 3-Tier Model.

Featured Working Memory (Language Learning Mechanism) Scientist-Practitioner

Lee Swanson Levels of Language in Working Memory Distinguished Professor, Legacy Chair Educational Psychology/Special Education Institute of Educational Sciences (IES) Grant Funding for Research

Professional Development Learning Objectives

• Language is one of the five domains of development each of which is relevant to literacy acquisition.
• Language is not a homogeneous construct—there are 4 language systems: language by ear, language by mouth, language by eye, and language by hand.
• Each of the language systems has multiple levels of language of cascading size—subword, word, syntax, and text.
• Literacy acquisition builds on earlier learning of the informal conversational register of language but depends greatly on learning the academic register of language as well.
• A multi-component working memory system supports the language learning mechanism.
• During the school year’s problems in learning language by eye and language by hand can be prevented to a large degree in typically developing students through grade-appropriate screen-intervene models and teaching to all levels of language close in time in a way that fosters development of all five domains of development—language, sensori-motor, cognitive, social emotional, and attention/executive function.
• Provide numerous assessment and instructional resources including opportunities for on-line or in-person trainings in your own professional communities so you can Keep Learning!
Student Language Scale (SLS) on the Test of Integrated Language and Literacy Skills (TILLS)
Funded by Institute of Educational Science (IES) and Published by Paul H. Brookes

Prepared by Nickola Wolf Nelson
nickola.nelson@wmich.edu

Link to YouTube webinar on learning about TILLS including understanding Percentile Scores:

Two Underlying Factors:
Subword Phonological/Word Level Vocabulary and Syntax/Text

Age Levels: 6:0 through 18:11 but some reading and writing measures start at 6:6

Consider teacher, parent, and student input on the SLS

Correlation between Items 3-4 and Sound/Word Composite:
Teachers = .671**
Parents = .595**

Correlation between Item 8 and Written Composite:
Teachers = .528**
Parents = .631**
Students = .267**

Screening using teacher (and parent) ratings on the first 8 items.

• Are 2 or more ratings <57
  → High sensitivity
  92% of 66 students with LLD identified accurately as having problems

• Are all (but 1) ratings ≥57
  → High specificity
  90% of 203 students with NL identified accurately as not having problems

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
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<tbody>
<tr>
<td>Teacher</td>
<td>61/66 = .92</td>
<td>182/203 = .90</td>
</tr>
<tr>
<td>Parent</td>
<td>203/239 = .85</td>
<td>1065/1290 = .83</td>
</tr>
<tr>
<td>Student</td>
<td>66/90 = .73</td>
<td>257/419 = .61</td>
</tr>
</tbody>
</table>

Correlation between Items 1-8 and total TILLS for Teachers = .752**
Parents = .613**
Structured Language Approach to Teaching Literacy
Prepared by Bev Wolf bwolf2@mindspring.com

The Slingerland® Adaptation of the Orton Gillingham Approach
The Slingerland® Approach integrates each day’s handwriting lesson with functional written language – spelling, affixes, phrases, sentences and paragraphs. The practice allows students to clearly express ideas without struggling to recall letter form or spelling. See next slide.

Writing demands sufficient working memory to enable the student to remember and think at the same time. Much cognitive research has shown that learning automatic letter and spelling writing at the same time they are learning to express their thoughts on paper links the letter and word production with creative processes in the child’s mind. See Florey, K. (2009). Script and scribble. Brooklyn, NY: Melville House Publishing.

Letter practice
Spelling practice
Phrase practice
Completed sentence

Slingerland teacher training is offered at sites throughout the United States. In addition to the complete training, short courses are offered in written expressive language, handwriting, phonics, reading comprehension and fluency and screening to identify language/learning differences. The goal is to provide the teacher with skills for use in their conventional or special classrooms.

Slingerland: Evidence Based Multimodal (sensori and motor) Multi-Leveled Language Instruction
Slingerland teacher training is offered at sites throughout the United States. In addition to the complete training, short courses are offered in written expressive language, handwriting, phonics, reading comprehension and fluency and screening to identify language/learning differences. The goal is to provide the teacher with skills for use in their conventional or special classrooms.


Wolf has longstanding participation nationally in professional development for structured language that includes multimodal instruction.


Wolf has published a peer reviewed, controlled study showing the effectiveness of structured language instruction with a multimodal approach (sensory input and motor output) not just multimodality.


Research benefits from the participation of teachers (voice of experience)!
Learning from Teachers' Instructional Talk and Reading and Writing across the Content Areas of the Curriculum: Academic Register for English Speakers and ELL Students
Prepared by Elaine Silliman silliman@usf.edu

One important difference is that unlike informal conversation, characterized by frequent turn-taking and short stretches of talk, academic register involves one talker (teacher or presenter) and long stretches of talk, which can be challenging for sustaining heard language in working memory. That is one reason current educational practice advocates for punctuating instructional talk with conversations among classmates.


Teaching with Academic Register of Language in Mind—Word Level
Prepared by Elaine Silliman silliman@usf.edu

Levels of language matter in attending to and processing instructional talk of academic register. At the word level explicit instruction in domain-specific vocabulary across the curriculum matters.


Illustrating Importance of Teaching and Defining Domain-Specific Vocabulary across the Curriculum

Defining Domain-Specific Vocabulary for Working Memory (preparation):

- Three Word-Sets for Coding (Storage and Processing): Heard and Spoken Words (phonological), Read and Written Words (orthographic), and Morphology: Shared across Heard, Spoken, Read, and Written Words (profiles that convey meaning of bases and suffixes that mark tense, number, or comparison or parts of speech that transform bases for linking single words with multiple words in phrases or clauses)


- Phonological loop: Integrating coding of input from eyes or ears with output through the mouth, for example, naming letters or written words; or other visual or orthographic stimuli (visible language) or reproducing orally sounds or heard words or integrating internal sound codes with output through mouth.


- Orthographic loop: Integrating coding of input from eyes or ears or internal word-form codes with output through the hands, for example, writing letters alone or in words.

Teaching with Academic Register of Language in Mind—Syntax Level
Prepared by Elaine Silliman silliman@usf.edu

Both listening comprehension and reading comprehension require storing and processing multi-word constructions (often in clauses but not always) in working memory over time and accessing cognitions not only at the word-level but also at the sentence- and text-levels and inferences that may involve social cognition.


• *Justice, L. M., & Ezell, H. K. (2016). The syntax handbook: Everything you learned about syntax...but forgot. Austin, TX: Pro-Ed

Teaching with Academic Register of Language in Mind—Writing
Prepared by Elaine Silliman silliman@usf.edu

Academic register writing requires production of letters and written words that are sequenced typically in clauses over time to express cognitions. Not only are multiple levels of language involved but also access to the cognitive domain (vocabulary meaning for word spelling and the thought world for sentences and texts) with sensitivity to other (audience) in mind (social emotional domain).


• *Saddler, B. (2012). Teacher’s guide to effective sentence writing. Guilford Press.


Multiple Levels of Language in Verbal Working Memory Supporting Language Learning Mechanism

lee.swanson@ucr.edu contact him about his research with ELL Students who do and do not have WM problems and recent revision of his test

• Swanson developed a unique battery of verbal working memory organized by levels of language (word, syntax, and text) that assessed both storage and processing in working memory.

• Swanson collaborated with the UW cross-sectional study of typical writing and related language development grades 1 to 9 in which his measures were given. Among the many findings, results showed that in the primary grades word-level working memory contributed uniquely to literacy learning but beginning in fourth grade sentence-level working memory also did. See: Berninger, V., Vermeulen, K., Abbott, R., McCutchen, D., Cotton, S., Cude, J., Dorn, S., & Sharon, T. (2003). Comparison of three approaches to supplementary reading instruction for low achieving second grade readers. Language, Speech, and Hearing Services in Schools, 34, 101-116.
Multiple Levels of Language in Verbal Working Memory Supporting Language Learning Mechanism

Swanson’s collaborations with the University of Washington Multidisciplinary Learning Disabilities Center family genetics study showed that phenotypes (behavioral markers of genetic candidates) assess the components of working memory, which cannot be assessed with a single working memory measure, and brain imaging studies provided converging evidence. As illustrated on the next slide these are, as defined earlier:

- **Coding** (storage and processing) of phonological, orthographic, and morphological word forms,
- **Loops** for integrating input or internal codes with output through mouth (phonological loop) or hand (orthographic loop), and
- **Supervisory attention functions** for regulating working memory (inhibition/focused or selective attention, switching attention, sustaining attention, and self-monitoring and updating) including cross-code mapping and loop functions.

Brain Research Has Validated 3 Coded Word Forms for Storage and Processing in Working Memory
2/21/2017

**Phonological and Orthographic Loops in Working Memory**

![Image](image1.png)

**Difference in fMRI connectivity (seed point in the left IFG) between child dyslexics and controls on a phoneme grapheme mapping task.** The result is that child dyslexics have a greater connectivity between left and right IFG than controls before but not after treatment in fMRI connectivity (seed point in the left IFG) in which both phonological loop and orthographic loops were trained.

**Supervisory Attention in Working Memory**

- Anterior cingulate (attention/executive functioning) activated during fMRI cross-code (phonological-orthographic) mapping but not single input mode (phonological listening task).
- Children with dyslexia have problems in self-monitoring while sustaining attention over time in working memory on an fMRI n-back task.
- Children with dyslexia also have problems in sequencing fingers in working memory (involves motor planning and control not just production) on an fMRI task.

**Cross-Site Research Documents the Relevance of Multi-Component Working Memory to Diagnosis of Specific Learning Disabilities (Phenotype Profiles) and Understanding the Language Learning Mechanism**

- Note: Also see review of the seminal work by Morrison and Manis on pattern analysis and recent research by Trieman and colleagues and Pacton and colleagues on the pattern analyzer in working memory (abstractions from exposure to words of phonotactics, orthotactics, and morphotactics related to item identity, position, and sequencing of items within word units) in chapter in Fayol, Alamargot, and Berninger (2012) in Keep Learning Resources.
Transition to the Other Three Tier Model

Most Common Three-Tier Model

Why? To avoid waiting until a student shows large enough discrepancy between full scale intellectual assessment score and achievement for specialized instruction and in the process experiences chronic failure

What?
- Tier 1 Early intervention—Typically for skills identified by National Reading Panel which focused on typical learners not those with specific learning disabilities (SLDs) such as phonological awareness and phonological decoding and reading not writing
- Tier 2-If student does not respond to Tier 1 intervention (RTI), then provide more of the same more intensely.
- Tier 3-If student does not respond to Tier 2 intervention refer to special education (for specialized instruction but not tailored to differential diagnosis—nature of the SLD that differentiates it from other SLDs).

The Other 3-Tier Model

Why?
- 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.

What?
- Tier 1 screen-intervene using evidence-based, grade-appropriate assessment linked to differentiated instruction delivered in walk about model (see Slavin review of the research on walk abouts)
- Tier 2 problem solving consultation of the whole interdisciplinary team and classroom teachers and parents as problems with students arise and deal with them before they are harder to solve
- Tier 3 instructionally relevant differential diagnosis and instruction based on research to identify evidence-based nature of specialized instruction needed which can often be provided in general ed with assistance from the special education teachers (see Jeannie Herron in the Interdisciplinary Frameworks) and school psychologists (see Alinta Dunn and Sharon Mississen in the Interdisciplinary Frameworks).
Conceptual Framework and Research Evidence for Other Three Tier Model


- Online Course for Professional Development
  EDPLNC 500A: Professional Learning for Educators. https://canvas.uw.edu/courses/1061787 contact Mona Kunselman - mkunselman@EXTN.washington.edu or enroll at link below

Unit I: Supporting Success for Every Student: A Developmental Model
  Introduction and Overview of the Developmental Model
  Application to K to 3
Unit II: Supporting Success for Every Student: A Developmental Model
  Application to Grades 4 to 6
Unit III: Supporting Success for Every Student: A Developmental Model
  Application to Grades 7 to 9
Unit IV: Supporting Success for Every Student: A Developmental Model
  Application to Diversity Issues

Transition to Tier 1 of the Other Three Tier Model

Tier 1 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.
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

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

Math Screen
PAL II M Numeral Writing first 15 seconds and total legibility and Oral Counting
Forwards items 1 to 5

Math Intervene and Record RTI on Growth Graphs in Each Lesson.
Adapt learning activities in Big Strokes for Little Folks or Manuscript handwriting from
Slingerland®Institute for Literacy for letter writing to numeral writing to learn to write
and name. Numerals 0 to 9 both in counting order and in random order.
1. Watch teacher model numeral writing, Trace over numeral form, Copy numeral
with corresponding number of objects illustrated, Name numeral.
2. Teacher models naming and tracing of numeral; then child names and traces
over numeral and copies it and finally writes it from memory.
NJ: Dale Seymour Publications, Pearson Learning Group

More Kindergarten Math Intervene--
Counting

Oral Counting of Objects:
First, give the child varied counting activities and many opportunities to pair quantity
concepts, quantity names, and concrete objects. One-to-one correspondence for
objects in the external environment needs to be established before the counting is
internalized along the mental number line. For example, children could count crayons
in a box, pennies kept in envelope, lunch money, children in line, number of different
people who spoke over the intercom during the morning message, and so on.

Linking Counting to Number Line with Visual Symbols for Quantity:
Second, introduce a concrete visual aid in the external environment—a number line
taped to the child’s desk or cardboard kept at desk. Arrange numerals along the
number line beginning with 0 on left and ascending numerals to the right to 26. Ask
the child to count forward on the number line touching each numeral as the numeral
is named. Then ask the child to count backwards on the number line starting at 26 and
touching each numeral as the numeral is named. Provide objects or pictures of
quantities 1 to 26 and ask children to count them orally while touching them one at a
time. Then count the same number (quantity) along the masking tape number line.
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.
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

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)

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

Math Screen
PAL II M Numeral Writing (15 seconds, total legibility, and total time), Counting items 1 to 5, Numeric Coding items 1 to 36, Look and Write Math Facts for Addition, Subtraction, Switching Addition and Subtraction

Math Intervene and Record RTI on Growth Graphs in Each Lesson.
Do Counting (see Kindergarten Math Intervene), Do Math Warm-Ups (writing numerals from 1 to 26 in counting order), Numeric Math Coding (adapted orthographic coding for multi-place numbers), and Math Fact Learning Linked to Number Line (see slide that follows for Math Fact Learning).
Addition and Subtraction Math Fact Learning Linked to Number Line

Introduce a number line taped to the child’s desk, for example, made from masking tape on which numerals are written in black non-smear ink. Teach children that when they forget the answer to a math fact they can use these number line strategies.

For addition, teach the “count all” strategy. The child first points to and says the name of each numeral in succession moving in a forwards direction until the numeral is reached that corresponds to the first number in the fact (e.g., 7). Then the child continues to count forward touching and saying one numeral on the line at a time while his or her fingers move forward until the number of numerals touched corresponds to the second number (e.g., 8). The numeral reached (e.g., 15) is the sum, that is, the answer to the addition fact. After the child becomes proficient at this strategy, a new strategy—the “add on” strategy—is taught. The child goes directly to the numeral on the number line corresponding to the first number in the fact and then just counts on from that number in a forward direction until the number of numerals touched corresponds to the second number, which is the sum.

For subtraction, the child first points to on the number line and says the name of the numeral corresponding to the number (minuend) (e.g., 15) from which another number will be subtracted. Then the child continues to point to each numeral and name it in a backwards direction until the number of numerals touched corresponds to the second number in the math fact (subtrahend) (e.g., 8). The numeral reached (e.g., 7) is the difference, the answer to the subtraction problem.

Writing the Fact. For both Addition and Subtraction, after counting along the number line while touching and naming letters, the child writes the numbers and sum or difference.

Tier 1 of the Other 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.

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.

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-overview.html
Tier 1 of the Other Three Tier Model:

**Second Grade Math**

**Math Screen**

PAL II M Numeral Writing (at 15 seconds, total legibility, total time), Counting items 1 to 5, Numeric Coding items 8 to 40, Look and Write Math Facts for Addition, Subtraction, Switching Addition and Subtraction, Computation Operations (not Task B), Place Value (items 1 to 20), and Part Whole (concepts 1 to 10; fractions and mixed numbers 1 to 10; time items 1 to 5)

**Math Intervene—record RTI on Growth Graphs in each lesson.**

Multi-modal practice of math facts (Listen-Say, Listen-Write, Look-Say, Look-Write) (see Math Translation Tips); Computation—Say orally the steps in the procedures, and use graph paper to place numerals correctly in columns and rows; Use concrete aids such as beads on wire and cuisenaire rod to refine understanding of multi-place numbers to 7 places; and introduce part-whole relationships related to measurement. See first grade for numeral writing and numeric coding and math translation tips for part-whole concept.

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**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 R IT? 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**


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

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**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.**


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
Tier 1 of the Other Three-Tier Model:

Third Grade Math

Math Screen
PAL II Numerical Writing (at 15 seconds, total legibility, total time), Counting items 1 to 10, Numeric Coding items 8 to 40, Look and Write Math Facts for Multiplication, Division, Place Value (items 1 to 30), and Part Whole (concepts 1 to 10); fractions and mixed numbers 1 to 10; time items 1 to 9)

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

See first grade for numeral writing and numeric coding and math translation tips for place value;
Multi-modal practice of math facts (Listen-Say, Listen-Write, Look-Say, Look-Write)
See Math Translation Tips—Grade 2 but expand from addition and subtraction only to multiplication and division;
Use concrete aids such as beads on wire and cuisinaire rod to refine understanding of multi-place numbers to 7 places;
Computation—Say orally the steps in the procedures, and use graph paper to place numerals correctly in columns and rows; and
Continue working on part-whole relationships related to measurement

For all the math intervene see Interdisciplinary Framework for Schools and companion websites.

Tier 1 of the Other Three-Tier Model:

Grades 4 to 6 Reading

❖ Reading Screen PAL II RW Are They Related? Items 1 to 40 morphological awareness
❖ Find the True Facts Tasks A, B, and C morphological awareness
❖ Expression Coding Tasks orthographic awareness
❖ Pseudoword Reading—scored for accuracy and time word decoding
❖ Morphological Decoding Fluency sets 1, 2, 3, 4 word decoding
❖ Word Order—Items 1 to 30 scored for accuracy and time word-specific spelling
❖ Does It Fit? Items 1 to 10 morphological and syntactic awareness
❖ Sentence Sense—Items 1 to 20 integrating words and syntax in reading comprehension

Reading Intervene Lesson Sets 12, 15, and 16 in PAL Research Supported Reading and Writing Lessons (2003) and associated Reproducibles and Teaching Ladder Cards. Cross-Code Mapping the silent as well as oral reading directions for different word origins (Anglo-Saxon, French/Latinate, Greek).

Tier 1 of the Other Three-Tier Model:

Grades 4 to 6 Writing

❖ Writing Screen PAL II RW
❖ Subword Letter Writing
   Alphabet Writing (automatically at 15 sec, total legibility, total time) and Copy Paragraph (50sec, 60sec, 90 sec)
❖ Word Specific Spelling
   Expression Orthographic Coding
   Word Choice accuracy and time
❖ Test Composing
   Narrative Fluency (scored for number of words, number of correctly spelled words, and handwriting)
   Expository Note Taking and Writing

Writing Intervene and Record RTI on Growth Graphs in Each Lesson

Lesson Sets 6, 10, and 14 in PAL Research Supported Reading and Writing Lessons (2003), associated Reproducibles, and Teaching Ladder Cards. Cross-Code Mapping the written spelling direction for words of different word origins (Anglo-Saxon, French and Latinate, Greek).

www.teachercreated.com

Handwriting Tune-Ups for cursive in grade 4 and in grade 5 and above for writer’s preferred format through classmates’ exchange and feedback regarding legibility

Begin explicit instruction in touch typing (looking at screen and not the keyboard).
Tier 1 of the Other Three-Tier Model:
Grades 4 to 6 Math

Math Screen from PAL II M

- Writing Numerals and Math Place Numbers and Coding Them in Working Memory
  - Numeral Writing (15 seconds, total legibility, and total time)
  - Numeric Coding Items 1 to 30

- Qualitative Concepts
  - Counting Items 1 to 18
  - Part-Whole Concept Items 1 to 30
  - Fractions and Mixed Numbers Items 1 to 10
  - Time Items 1 to 9

- Math Facts and Computations
  - Look and Write Math Facts for Multiplication and Division and Mixed
    - Multiplication and Division

- Mathematics Problem Solving and Self-Monitoring
  - Multi-Step Problem-Solving

Math Interventions
See Chapter 5 in Interdisciplinary Frameworks for Schools APA Books and associated websites with Math Resources and Readings, Also


Write on Question Sheet Any Questions about Tier 1 of the Other Three Tier Model Along with Your Email Address—Hand In at End of Session for Reply from Presenter

Transition to Tier 2 of the Other Three Tier Model
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
Tier 2—Examples of School-Implemented Problem Solving Consultation cont’d

• 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

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Write on Question Sheet Any Questions about Tier 2 of the Other Three Tier Model Along with Your Email Address—Hand In at End of Session for Reply from Presenter

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Transition to Tier 3 of the Other Three Tier Model
Tier 3 Differential Diagnosis of Specific Learning Disabilities (SLDs)
See Silliman & Berninger (2011), Berninger (2015), and Berninger & Wolf (2016)

1. **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.

2. **Identify** a student’s Learning Profile and Associated Working Memory Phenotype Profile
   for Dysgraphia, Dyslexia, Oral and Written Language Learning Disability (OWL LD), or Dyscalculia or none of the above; compare to developmental, educational, medical, and family histories

Interdisciplinary Team:
Psychologists (Cognition, Social-emotional, Attention/Executive Function), Speech and Language Specialists (Language), Occupational/Physical Therapists (Sensorimotor)

**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.
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**

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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 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

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**UNIVERSITY OF WASHING MULTIDISCIPLINARY LEARNING DISABILITIES CENTER**

NORMAL RANGE In
1) Cognition and memory
2) Social emotional
3) Attention and executive functions
4) Sensory and motor
5) Oral language: (for SLDs identify specific language impairment SLI but overall language development not fully outside the normal range)

Special thanks to Nickola Wolf Nelson who prepared and shared this slide and the next three.


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**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)
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


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

Recent Research Showing Different Brain Bases for Different SLDs Prior to Intervention

- Children without dysgraphia or dyslexia have more white matter integrity (related to structural connections) and less gray matter functional connectivity during letter writing and spelling tasks than children with dysgraphia or dyslexia; but children with dysgraphia or dyslexia also differ from each other in structural and functional connections (Richards et al., 2015; Richards and Berninger, 2013).
- Children with dysgraphia, dyslexia, and OWL LD differ from typical language learners on a fMRI word-specific spelling task; but their brain profiles for the same behavioral spelling task differ (Berninger, Richards, & Abbott, 2015).
- Children with dysgraphia and typical language learners differ from children with dyslexia in eye movements during sentence reading comprehension task (with and without word-specific spelling foils); evidence supports Rayner’s selective attention dyslexia hypothesis (distractibility from nearby letters during eye movements when reading words in sentences (Richards et al., 2017).
Tee Shirt for Participants:
My Brain Has Structural Connections for Language as shown by Diffusion Tensor Imaging
Purple = Corpus callosum tracts
Blue = Language tracts
Green = Visual tracts

Recent Research Showing Different Brain Bases for Different SLDs
Prior to Intervention

- Children with dyslexia differed from students with OWL LD in ERPs during a sentence reading comprehension task requiring word-level and syntax-level processing (Richards et al., in press). Not all reading disabilities are totally the same!
- Of children with dysgraphia, dyslexia, or OWL LD, those with dysgraphia are most likely to have co-occurring ADHD; but the brain activation on writing tasks differs for those with dysgraphia plus ADHD and those with dysgraphia without ADHD (Richards, Abbott, & Berninger, 2016).
Recent Research Showing Different Brain Bases for Different SLDs
Prior to Intervention

• Children with dyslexia or dysgraphia shared the same unique fMRI connectivity activation across adjacent levels of language during reading as the typical language learners; but those with dyslexia showed additional unique functional activation across levels of language (over engaged) and those with OWL LD did not show some of the unique functional activation across levels of language (under engaged) as the typical language learners (Richards, Nagy, Abbott, & Berninger, 2016). This pattern of results suggests that these SLDs are inefficient in integrating the different cascading levels of language in the functional reading system.

Genetic Variation—Individual Differences among Learners

No two human beings are exactly identical genetically. Even monozygotic twins do not have exactly the same fingerprints!

Genes in Human Genome and Brain Expression

Transcription of Nuclear DNA and Translation of nuclear DNA and mtDNA in Each Neuron of Brain

Double code
(Adenine-Thymine AT or Cytosine-Guanine CG)
in stair steps of 2 strands of double helix of Nuclear DNA

Mitochondrial DNA (mtDNA) from mother plays role in translation too
Brain Function Regulated by Genetic Mechanisms (heterogeneous across specific learning disabilities) May Be Influenced by Environmental Variables Like Teaching Which May Alter Behavioral Expression of Genetic Variations through Transcription and Translation (Epi-Genetics)

Nuclear DNA

Given Biological Variations Reframe What Works with What Works for Whom When Where?

Excerpt from article adapted from testimony given by Dr. Reid Lyon before the Committee on Education and the Workforce in the U.S. House of Representatives on July 10, 1997:

Clearly teachers instructing youngsters who display reading difficulties should be well versed in understanding the conditions that must be present for children to develop robust reading skills, and be thoroughly trained to assess and identify problem readers at early ages...

...the real question is which children need what, when, for how long, with what type of instruction, and in what type of setting.

PLEASE NOTE THAT OUR RESEARCH TEAM HAS FOUND THAT ORTHOGRAPHIC, MORPHOLOGICAL, AND SYNTACTIC AWARENESS, HANDWRITING, WORD-SPECIFIC SPELLING, COMPOSITION, LISTENING COMPREHENSION, AND ORAL EXPRESSION SHOULD ALSO BE INCLUDED in addition to phonological awareness and phonological decoding of nonwords in answering this question for individual students.

Defining Specific Learning Disabilities

Math Lesson from Algebra: We start by defining the variables in the equation (let x = ). We should also start by defining SLDs. Also, there is more than one variable in the equation. A single variable does not explain everything or solve the problem to identify the unknown.

Language Lesson: Specific is an adjective that implies there are different kinds of learning problems. Specific Learning Disabilities is a plural word. This inflectional suffix also implies that there is more than one kind of learning disability. If there is more than one kind, it follows that we should define each SLD on the basis of what it is + what it is not so the SLDs can be differentiated from each other. Different SLDs may benefit from different kinds of specialized instruction.

Science Lesson (based on brain and behavioral assessment research): Not all SLDs are the same. Not all reading disabilities are the same. Not all writing disabilities are the same. Not all aural or oral language disabilities are the same.
Teaching Students with SLDs: Biological Bases but Educational Solutions

Math Lesson from Calculus: What is on the left can be transformed into something new on the right. Numerous brain and behavioral studies have shown normalization and/or behavioral improvement. Genetics research is documenting epigenetic change in which behavioral expression can change in response to environmental variables. With appropriate instruction children with dysgraphia, dyslexia, and OWL LD can learn to read and write and understand academic register of language.

Whether instruction that changed the brain was done by human teacher (see Berninger & Wolf, 2016) or computer teacher (Berninger et al., 2014; Tanimoto et al., 2015), it was grounded in teaching the multiple levels of one or more functional language systems close in time supported by working memory and included HOPE Themes (see Berninger & Wolf, 2009, Lesson Plans from UW Research) as well as COMPASSIONITIVITY (a term coined by Saturday Night Live, see Berninger & Richards, 2002, Brain Literacy for Psychologists and Educators). Significant improvement at the individual student level was documented (Berninger et al., 2014; Tanimoto et al., 2015).

Despite Biological Bases, SLDs are Treatable Educationally: As Shown in Center for Oral and Written Language Learners (OWLs)

- Computerized lessons use Multi-Modal Language by Ear (Earphones), by Mouth (Oral production), by Eye (Visual Cues with Motion), and by Hand (Written Production)
- Teach across All Levels of Language (subword, word, syntax, and text) Close in Time covering those that are hallmark impairments of specific SLDs and multiple oral and written language skills all students need to create functional reading and writing systems—Taking into Account Cognitive, Social Emotional, and Attention Executive Functions

But IF Students with SLDs Respond to Differentiated Instruction WHY are Persisting SLDs DISABILITIES and Not Just Learning Differences?

- Unlike those with visible disabilities who use total communication and/or assistive hearing technologies, or visual assistive technology or braille, or ambulatory assistance, SLDs are invisible disabilities inside the head that often interfere with language learning and use. Substantial, cross disciplinary research for over 3 decades shows that specific learning disabilities (in at risk families and students with persisting SLDs in grades 4 and above) are related to specific phenotype (genetic and brain markers) of impairments in the invisible multi-component working memory system supporting language learning: storing and processing aural/oral words, read/written words, bases and fixes, accumulating words in syntax, phonological loop, orthographic loop, focused attention (inhibition), switching attention (flexibility), sustaining attention (staying on task), and self-monitoring.
- But individuals differ in which language skills in their learning profile or phenotypes in their phenotype profile are impaired and whether and to what degree they respond to instruction and emotional correlates at behavioral and brain levels of analyses. Importantly, prior to intervention grounded in differential diagnosis, students with persisting SLDs in grades 4 and above showed differences in BASC 3 PRS ratings and fMRI amygdala connectivity. Students with persisting SLDs may experience internal emotional distress due to their invisible learning disabilities affecting different levels of language, which should be addressed along with their language learning needs in their educational programs (Nielsen et al., in press).
Important Questions To Think About: Do You Agree with the Answers? (See Berninger & Wolf, 2016)

- If there are brain and behavioral differences among dysgraphia, dyslexia, and OWL LD, is it best professional practices to diagnose them and provide evidence-based, individually tailored instruction for the learning profiles and phenotype profiles for individuals with these SLDs? **YES**

- Should law govern civil rights, but best professional practice, based on translation of science (research into practice and practice informed by teacher voice), guide the work of schools in educating students with SLDs and other educational handicapping conditions? **YES**

- Should language, cultural, and SES differences be inclusion criteria rather than exclusion criteria for individually tailored, culturally sensitive, evidence-based instruction for ALL students, that is, FAPE for ALL? **YES**

- Should FAPE include as a goal building more positive home-school relationships in place of adversarial relationships (lawsuits and threats of lawsuits)? **YES**

- Should financial penalties for students not meeting standards be replaced with proactive professional development to help schools implement evidence-based screening/assessment links based on developmental steppingstones and individual differences? **YES**

- Should parents mount a massive letter writing campaign to congress requesting mandatory professional development be put into place for translation of science into educational practice not only for interdisciplinary teams including teachers who work with the 1 in 5 students with diagnosable SLDs but ALSO for the educational policy makers, government officials, and legislators who write the standards? **YES**

- Do we need to introduce course work in the interdisciplinary foundations of learning and instruction (genetics and neuroscience, developmental science—across the five domains cognitive, language, sensori—motor, social emotional, and attention/executive functions) into the preparation programs for educational professionals across disciplines, much as medical education requires in biology and organic chemistry? **Yes**

- Do we need to stop bashing teachers and schools and Colleges of Education and instead adopt innovative no-fault approaches in which the public and educational professionals collaborate in accomplishing one of the most challenging and important tasks in the 21st century—to optimize the learning of ALL students. **Yes**
Main Message of the Other Three-Tier Model

It is going to take a team of multiple disciplines and contributions of many educational professionals and researchers, like the ones featured in this presentation but others as well, AND professionals from many disciplines attending this conference, to prevent, address problems as they arise, and overcome biologically based specific learning problems through specialized instruction for the nature of the specific learning disabilities.

Thinking Time—Reflecting on Learning Objectives

• What did you learn about the five domains of development?
• What did you learn about the four functional language systems that have to learn to work together?
• What did you learn about levels of language?
• What did you learn about teaching to all levels of language close in time and writing as well as reading?
• What did you learn about the academic register of language?
• What did you learn about working memory and the language learning mechanism?
• What did you learn about screen-intervene, problem solving consultation, and differential diagnosis of SLDs?
• What will you take back to share with your own professional communities? How will you keep learning?

Write on Question Sheet Any Questions about Tier 3 of the Other Three Tier Model Along with Your Email Address—Hand In Questions about All 3 Tiers for Reply from Presenter and Keep Learning—See Resources That Follow
Draw on Multiple Evidence-Based Resources for the Other Three Tier Model to Describe Developmental Profiles, Learning Profiles, and Working Memory Phenotype Profiles depending on Tier

1. SLS and TILLS (Nicole Nelson) for screening for language learning and literacy problems
2. Slingerland (Leveled Language Instruction) for written as well as oral language (Bev Wolf)
3. Teaching Academic Register of Language Learning distinct from the Informal Register of Conversation (Elaine Silliman)
4. Screen for the multiple levels of language in working memory for storing and processing language in the language learning mechanism (H. Lee Swanson)
5. Screen for 3 or 4 grade appropriate skills shown in research to predict response to intervention (RTI) and provide for those below criterion evidence-based instruction, to bring them up to grade or age level in PAL Reading and Writing Lessons and Interdisciplinary Frameworks for Schools (Virginia Berninger and team at the University of Washington)
6. Interdisciplinary team participates in weekly problem solving consultation meetings for students as issues arise in the general education classroom (see PAL II User Guides CD)
7. PAL II Reading and Writing Diagnostic and Math Diagnostic and Evidence-Based Diagnosis and Instruction for Specific Learning Disabilities (SLDs) such as dysgraphia, dyslexia, oral, written language learning disability, and dyscalculia (resources at end of this power point presentation including books co-authored by V. Berninger and B. Wolf with numerous other instructional resources as well as other assessment tools)

Interdisciplinary Team Work in School Settings For Biological and Environmental Diversity


Situating Assessment and Intervention in Deep Understanding of Language Development

Learning to Pay Attention to Instructional Talk (Academic Register)

Screen aural and oral language: Use multiple resources featured in this presentation and send home parent questionnaire annually and work with classroom teacher to assess students’ attention to teacher talk and during classwork (focus on task, switch between tasks, stay on task, and monitor work). Also read the many resources provided by Silliman.

Intervene: For students exhibiting listening or oral language concerns, intervene (see Silliman resources and Berninger & Wolf (2016) for other resources.


Translating Instructional Research into Lesson Plans


Handwriting Resources

Other Assessment-Instructional Tools that have research support for use in the Other Three Tier Model:


The Zaner-Bloser Handwriting Program provides instruction materials by grade, pre-K to grade 6. www.zanerbloser.com/fresh/handwriting-overview.html (Also see for spelling programs)

Teach manuscript in grades 1 to 2 (Wolf et al., 2016) and Cursive in grades 3 to 4 (Alstad et al., 2015).

Evidence-Based Word-Level Instruction Requires Multivariate Knowledge and Integration Relevant to Both Writing and Reading


Further Reading—Brain Bases for Different SLDs

Further Reading—Brain Bases for Different SLDs
Emotional Correlates of SLDs


Further Reading—Combining Diagnostic Assessment and RTI


Dissemination to Parents, Educators, and Policy Makers


