SLD Identification in an RTI Framework with a Mathematics Focus: Part 3
Adam Scheller, PhD, NCSP
Misty Sprague, M.A., Ed.S

Agenda

- Operationalizing Tier 3
- What is Math LD?
- Case study

Disclosure: Please note that the presenters are employed by Pearson Clinical Assessment. Pearson is the publisher of many RTI and comprehensive Assessment tools, some of which will be discussed in this presentation.
Tier/Level 3 – Intensive Assessment and Intervention

- Reserved for those students who have not responded to the assessments, interventions, and monitoring that has taken place in Levels 1 and 2.
  - allows for the fact that a small percentage of students, despite interventions, will not keep pace with age-mates in physical, emotional, academic, and/or cognitive domains.

Tier/Level 3-

- Draws upon the extensive information from Levels 1 and 2, to develop a customized individual assessment to provide additional information concerning cognitive, academic, social, behavioral, and/or emotional profile.
- Purpose: to obtain specialized data regarding the child's functioning to develop a more effective educational plan.
- Immediate entry into Level 3 may also be appropriate in situations where a youngster's needs dictate that it is the most appropriate course of action.

As needs increase, what does Tier 3 look like?

- Instruction – becomes more differentiated and intense
- Assessment – individualized, comprehensive
- Continued Progress Monitoring
Key Points Regarding Instruction and Assessment

**Tier 3**

- At Tier 3, efforts focus on the needs of individual students who are experiencing significant problems in academic, social, and/or behavioral domains. Thus, the process at this level must be more intensive and individualized than it is at other levels.

- **Instruction/Interventions** - Interventions, accommodations and modifications for Tier III students are more intense than Tier II students.
  - Some Tier III students may have needs that require special education teacher support.
  - Instructional decisions (e.g., modifying/changing instruction when student fails to progress) are based on continuous progress monitoring.
  - When students fail to progress, after multiple documented and monitored attempts to address difficulties, a comprehensive multidisciplinary team evaluation (for initial referrals) or change of program should be considered.
**Tier 3 Intervention**

- Interventions delivered to very small groups of 2-3 students or individual students
- Interventions focused on narrowly defined skill areas identified from the results of frequent progress monitoring and previously gathered diagnostic assessment.
- Interventions implemented with integrity (e.g., number of minutes/day/week, materials used, progress monitoring implemented) tied to an individualized intervention plan

**Tier 3: Service Providers**

- Use of trained support personnel to provide practice opportunities under the direction of the classroom teacher
- School teams, such as literacy team, grade level team, student study team to plan and support Tier 3 instruction
- Curriculum (i.e., reading/math) specialists, special education teacher, speech/language pathologists or other person qualified to teach the students who continue to struggle
- Encouragement of parent-school partnership
- Home practice and support
- Before and after school instructional program
  - Professional development for school personnel

**Assessment at Tier 3**

- Progress monitoring - High risk students are assessed on a weekly basis using progress monitoring 'probes.'
- Diagnostic assessment - Assessments that help to refine the identification of student difficulties (e.g., language, phonological awareness, specific skill deficits, attention, behavioral/emotional difficulties).
- Parents informed of student progress on a regular basis
Assessment at Tier/Level 3-

- Becomes more targeted & specialized within an RTI environment
- Systematic hypothesis testing to evaluate the underlying processes that impact academic, emotional, and behavioral functioning.
  - Careful, systematic observation of how an individual solves problems, rather than a simple interpretation of overall scores
- Consistent with processing strengths and weaknesses approaches and IDEA regulations

What is Math LD?

Math Disorders

- Prevalence on par with Reading LD?
  - About 6%
- Differentiation with other disorders
  - Co-morbid LDs
- RTI decision making
Building Blocks of Math

- Piaget – Concrete Operations
  - One to one correspondence, classification, seriation, and conservation
- Aligns to how math is taught
  - Hierarchical instruction
  - Proceduralized and builds on previous knowledge

Cognitive Skills Associated with Math

- Visual-spatial processing, working memory, and language.
- Semantic and Procedural knowledge
  - Syntax and Visual-Motor
- Planning and Problem Solving
- Cognitive Control (inhibition/disinhibition)

Is Math LD Different across kids?

- Predicting Math LD
- Subtypes of Math LDs
- How do they solve problems?
- What errors are they committing?
Math Error Patterns

- Math fact Error
- Operand Error
- Algorithm Error
- Place Value Error
- Regrouping Error

(Hale & Fiorello, 2004)

Subtypes of Math LD

- Semantic Type
- Procedural Type
- Visual-Spatial Type

(Mazzocco, 2001)

Examples of Assessments for Tier 3 Math

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Math 3</td>
<td>In-depth assessment of math proficiency skills; includes alternate forms and optional intervention materials and generates growth scores for K-12.</td>
</tr>
<tr>
<td>WIAT-III</td>
<td>Wechsler Individual Achievement Test, Third Edition: In-depth assessment of early literacy, reading, written expression, fluency, math and oral language skills for ages 4 to adult. Test software generates error analysis, growth scores and intervention suggestions.</td>
</tr>
<tr>
<td>KTEA-II</td>
<td>Kaufman Test of Education Achievement II: In-depth assessment of early literacy, reading, written expression, fluency, math and oral language skills for ages 4 to 25. Includes alternate forms, error analysis, growth scores and intervention suggestions.</td>
</tr>
<tr>
<td>PAL-II</td>
<td>Process Assessment of the Learner—II: Comprehensive, evidence based assessment and intervention system used to evaluate and remediate the cognitive processes related to the acquisition of reading, writing and math skills for grades K-6.</td>
</tr>
<tr>
<td>NEPSY-II</td>
<td>NEPSY-II provides an in-depth assessment of key processing skills related to learning. A specific battery evaluating abstract visual reasoning, memory, and executive functioning skills, for example, is suggested for the evaluation of math skills.</td>
</tr>
</tbody>
</table>
Case Study: Nick

Background

- 4th grader
- Only child, living with both parents.
- English is only language
- Has asthma and occasional misses school
- Failing grades in math
- Parents report that he is easily frustrated with math
- Decline in motivation/increased frustration
- Attended math summer school 2nd and 3rd grades
- Below the 20th% on both MCAP and MCOMP

Typical Math Class Observation and Interview Info

- Nick appeared engaged during lesson
- Did not volunteer to answer or ask questions
- Students were assigned 5 problems in 10 minutes
- Nick did not complete any of them
- He was not impulsive but was limited by the number of alternative strategies he used.
- He relied on verbal rehearsal to recall information
- He was unable to explain reasoning for strategies, even when response was correct.
Assessment Questions at Tier 2:

- Why has Nick not shown adequate progress to Tier 1 Interventions?
- How do we make intervention more productive?
- Does he have specific needs/strengths that can the focus to improve skill acquisition?

Tier 2 Standardized Testing
KeyMath 3 Diagnostic Assessment

<table>
<thead>
<tr>
<th>Domains</th>
<th>Score</th>
<th>Percentile Rank</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basics Concepts</td>
<td>79</td>
<td>8th</td>
<td>Below Average</td>
</tr>
<tr>
<td>Operations Score</td>
<td>78</td>
<td>7th</td>
<td>Below Average</td>
</tr>
<tr>
<td>Applications Score</td>
<td>83</td>
<td>13th</td>
<td>Below Average</td>
</tr>
<tr>
<td>Total Composite</td>
<td>79</td>
<td>8th</td>
<td>Below Average</td>
</tr>
</tbody>
</table>

Why did Nick not show adequate progress to Tier 1 Interventions?

- He was encouraged to ask questions or receive help for solving problems.
- However, math is NOT just problem solving skills.
  - KeyMath 3 results show weaknesses across a broad range of math concepts and applications
**Linking Assessment to Intervention at Tier 2**

- Assessment results answer a referral question, are interpreted within a context, and guide us to interventions.
- How do we make intervention more productive?
- Does he have specific needs/strengths that can the focus to improve skill acquisition?

**Assessment Questions Driving Tier 3 Assessment:**

- Why has Nick not shown adequate progress to Tier 1 and Tier 2 Interventions?
- Does he have specific needs that can be addressed to improve skill acquisition?
- Does he have a disability that may require more intensive intervention?
Activity

Based on what you know right now, plan next steps for continued work with Nick at Tier 3:

1. What tools would you use?
2. What information are you looking for?

Tier 3 Assessments

• WIAT-III
• WISC-IV (Select Integrated Subtests)
• NEPSY-II
• PAL-II Math

WIAT–III Results

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Standard Score</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Problem Solving</td>
<td>76</td>
<td>5th</td>
</tr>
<tr>
<td>Numerical Operations</td>
<td>79</td>
<td>8th</td>
</tr>
<tr>
<td>Math Fluency</td>
<td>68</td>
<td>2nd</td>
</tr>
</tbody>
</table>
### WISC-IV

<table>
<thead>
<tr>
<th>Domain</th>
<th>Standard Score</th>
<th>Percentile Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Verbal Comprehension (VCI)</strong></td>
<td>99</td>
<td>47th</td>
</tr>
<tr>
<td>1. Similarities = 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Comprehension = 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Vocabulary = 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nonverbal Reasoning (PRI)</strong></td>
<td>86</td>
<td>18th</td>
</tr>
<tr>
<td>1. Block Design = 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Picture Concepts = 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Matrix Reasoning = 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Working Memory (WMI)</strong></td>
<td>86</td>
<td>18th</td>
</tr>
<tr>
<td>1. Digit Span = 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Forward 5 digits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Reverse 3 digits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. L/N Seq. = 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Longest Span 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### WISC-IV and WISC-IV Integrated

<table>
<thead>
<tr>
<th>Domain</th>
<th>Scaled Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digit Span Forward (WISC)</td>
<td>8</td>
</tr>
<tr>
<td>Digit Span Backward (WISC)</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain</th>
<th>Scaled Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Digit Span</td>
<td>7</td>
</tr>
<tr>
<td>Spatial Span Forward</td>
<td>6</td>
</tr>
<tr>
<td>Spatial Span Backward</td>
<td>6</td>
</tr>
</tbody>
</table>

### WISC-IV

<table>
<thead>
<tr>
<th>Domain</th>
<th>Standard Score</th>
<th>Percentile Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing Speed (PSI)</td>
<td>85</td>
<td>16th</td>
</tr>
<tr>
<td>1. Coding = 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Symbol Search = 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cancellation = 7</td>
<td></td>
<td></td>
</tr>
</tbody>
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### Why Give the NEPSY-II?

- Remember cognitive skills associated with Math learning
- More info overall on Nick's learning and memory
### NEPSY-II

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory for Designs</td>
<td>Borderline range: ≤ 25%</td>
</tr>
<tr>
<td>Design Copying</td>
<td>Borderline</td>
</tr>
<tr>
<td>Picture Puzzles</td>
<td>Average</td>
</tr>
<tr>
<td>Geometric Puzzles</td>
<td>Average</td>
</tr>
</tbody>
</table>

### PAL-II Math
- Part-Whole Relationships
- Finding the Bug
- Quantitative Working Memory
- Spatial Working Memory
- Rapid Automatic Switching

What does this all mean with relation to Nick’s Math difficulties?

### Nick’s Assessment Summary
- **Strengths:** verbal fluid reasoning, lexical and semantic knowledge, and oral expression
- **Needs:**
  1. General cognitive weaknesses
  2. Math-related processing deficits
  3. Math-specific skill deficits
  4. Behavior impacting math performance
- **Error patterns**
Questions to Answer from Assessments at Tier 3

• Why has Nick not shown adequate progress with intervention to date?

• Does he have specific needs that can be addressed to improve skill acquisition?

• Does Nick have a disability that may require more intensive intervention?

Next steps

• Nick has compelling evidence to meet the criteria for Specific Learning Disability.

• He needs...?
  – Increased intensity/frequency of intervention
  – Additional Instructional Recommendations

Intervention Recommendations

• Account for Working Memory & Processing Speed
• Enhance Mental Arithmetic
• Improve Visual Imagery and Organization
• Problem Solving Strategies, Sequencing, and Self-Monitoring
• Calculator Use
Our RTI and comprehensive assessment process supports a data-based decision making model

- Information collected:
  - Multiple domains
  - Multiple environments
  - Across time
  - Multiple methods
  - Multiple sources of information
  - Multiple disciplines

What are keys to success?

- Focus on the Student
- Fidelity in Assessment and Intervention
- Follow-up and Teamwork
- Monitoring and changing your team’s approach, as appropriate

Key References
