Improving Outcomes with Cognitive Data in Typically Developing Learners

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Why We Need Cognitive Skills Data

Objective data on cognitive skills is the best way to help a student learn!

• Cognitive assessments measure the underlying skills required for learning: process and analyze and recall information (e.g. executive functions, memory, complex reasoning, processing speed)

• Difficulty in any single skill can interfere with efficient learning

• Unfortunately, difficulties in these skills are often are NOT observable

• Clear links between addressing cognitive weaknesses and improved academic and life outcomes (100+ years of research)
Why Don’t We Use Cognitive Skills Data?

“Because this is how we’ve always done it…”

• SpEd depends on these assessments to support students with LD

• Traditional assessments too expensive and time consuming to administer to all students
  • ~$2k per student / 5+ hours per student of professional time
  • BUT new accurate online options as low as $20 per student w/no professional administration time required

• All students would benefit, not just struggling learners
Cognitive Skills Data Can Help All Students

- Differentiated instruction is built solely on achievement metrics, not root cause of struggles. Hence, it is often not successful.

- Struggling learners often must work through multiple layers of remediation/RTI before schools ultimately evaluate cognition. Expensive and inefficient.

- Support the “outliers”
  - Under/over performers on standardized tests
  - Reasons for Y-O-Y declines

- Most students need different approaches, not more repetition.
“Which” Cognitive Skills?

*Online assessments allow for accurate measurements of response speed, not just accuracy on every skill.*

<table>
<thead>
<tr>
<th>Speed</th>
<th>Complex Reasoning</th>
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<tbody>
<tr>
<td>Visual Motor Speed</td>
<td>Abstract Reasoning</td>
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<tr>
<td>Processing Speed</td>
<td>Verbal Reasoning</td>
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<tr>
<td>Auditory Processing</td>
<td>Spatial Perception</td>
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<table>
<thead>
<tr>
<th>Executive Functions</th>
<th>Memory</th>
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<tbody>
<tr>
<td>Attention</td>
<td>Verbal Memory</td>
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<tr>
<td>Flexible Thinking</td>
<td>Visual Memory</td>
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<tr>
<td>Working Memory</td>
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Primary Applications

Objective Universal Screening (ages 8+)

- Un-identified learning differences
- Support students without needing to send them to Special Ed (RTI)
- Personal Needs Profiles
- Universal gifted screening (remove bias)

Classroom Management

- Traditional classrooms to differentiate instruction on an as needed basis, e.g. “struggling learners” or gifted
- Effective groupings
- Learning specialists
- Personalized Learning, ongoing individualization

Social-Emotional Learning

- Foundation for self-regulated learning/self-advocacy
- Study skills training
Why Data Matters
2 Kids, Same Class, Both Flagged in Math

<table>
<thead>
<tr>
<th>Skill</th>
<th>Accuracy</th>
<th>Speed</th>
<th>Description*</th>
<th>Accuracy</th>
<th>Speed</th>
<th>Description*</th>
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<tbody>
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<td>Attention</td>
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<td>116</td>
<td>Low End of Expected Range</td>
<td>116</td>
<td>83</td>
<td>Middle of Expected Range</td>
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<td>Working Memory</td>
<td>107</td>
<td>109</td>
<td>High End of Expected Range</td>
<td>97</td>
<td>103</td>
<td>Middle of Expected Range</td>
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<tr>
<td>Flexible Thinking</td>
<td>80</td>
<td>110</td>
<td>Weakness</td>
<td>107</td>
<td>116</td>
<td>Middle of Expected Range</td>
</tr>
<tr>
<td>Verbal Reasoning</td>
<td>109</td>
<td>115</td>
<td>High End of Expected Range</td>
<td>100</td>
<td>112</td>
<td>Middle of Expected Range</td>
</tr>
<tr>
<td>Abstract Reasoning</td>
<td>106</td>
<td>85</td>
<td>Middle of Expected Range</td>
<td>82</td>
<td>118</td>
<td>Weakness</td>
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<tr>
<td>Spatial Perception</td>
<td>100</td>
<td>109</td>
<td>Middle of Expected Range</td>
<td>98</td>
<td>110</td>
<td>Middle of Expected Range</td>
</tr>
</tbody>
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Difficulty is with flexible thinking, not complex reasoning/math. Needs coaching on adjusting and adapting, not math specific issue

Difficulty is a math-specific issue. Specific strategies such as verbal remediation and developing abstraction will help
Support Struggling Learners in GenEd
“Data-Lite, Strategy-Specific”

1. Regular breaks/exercise
2. Visual prompts for text-based materials (draw on visual memory)
3. Provide context and analogies to help with retention (draw on verbal reasoning)
4. Spaced repetition and practice recall

Source: Mindprint Unique Learning Profile
7th grade/124 middle schoolers assessed
- Included 3 ELL and 25 with IEPs/504 Plans
- High performing, suburban district

Project Lead: 7th grade lead teacher

Initial Findings
- Lead teacher summed it up as: “Nailed it in 98+% of the students if not more”
- Learning specialists using Mindprint strategies with her students ongoing
- Teachers reviewed individual results with each student and plenty of “A-ha” moments. “Hard workers most receptive”
- Teachers using as needed for GenEd students
- Measuring results with MSLQ
Metacognition is the most effective learning strategy. However, without an objective understanding of HOW you learn, it is near impossible to effectively use metacognitive strategies.

Metacognition Needs to be Taught

Students have a surprisingly consistent perception of their performance, regardless of how they actually perform. The top quartile thinks they will perform somewhat worse than they actually do. The lowest performing group thinks they will do significantly better than they actually do.
Social-Emotional Learning/Metacognition
Simple approach to classroom integration

Self-Regulated Learning
Adapted from Butler 1997, Pintrich 2000, Winnie & Hadwin 1998

- Step 1: Set Goals
  - Intrinsic motivation
- Step 2: Use Strategies
  - Beliefs about learning
  - Knowing strengths & weaknesses
- Step 3: Reflect/Adapt

See Mindprint Classroom Guide
Social-Emotional Learning/Metacognition

Depends on Growth Mindset and Knowing ALL Strengths and Weaknesses

See Mindprint Classroom Guide
Selected References


**Mindprint Learning FAQs.** Mindprint Learning, LLC. www.mindprintlearning.com

**Post by Former NIMH Director Thomas Insel A Growth Chart for the Mind.** Insel, T. National Institutes of Mental Health website. February 12, 2014.


**Self-Regulation Using Cognitive Data is Key to Personalization.** Weinstein, N. edCircuit, December 15, 2016.

Thank You!

Please contact with any questions:

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