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CORE Reading Expert

Advances in Reading Intervention, Part 1: Comprehension

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In this Fall 2016 issue of the Reading Expert, I present the first in a two-part series on reading interventions, focusing on advances in interventions for reading comprehension.

Many educators struggle to implement an RtI/MTSS model to address reading difficulties. Even with a solid RtI system in place, schools are bombarded with programs and strategies to address a wide range of reading difficulties that children may experience. To support a more nuanced approach to reading intervention, and to help educators sift through the multitude of options, it is helpful to characterize struggling readers according to reading profiles.

In her book, *The Power of RTI and Reading Profiles*, Louise Spear-Swerling (2015) proposes reading profiles that align with the Simple View of Reading model (Gough & Tunmer, 1986). This model views reading comprehension as consisting of two overarching components: word recognition and language comprehension. Thus, students who are struggling can be categorized into three types of reading profiles: those with word recognition difficulties, those with reading comprehension difficulties, and those with a combination of the two (Spear-Swerling, 2015).

With K–2 struggling readers, many children experiencing reading difficulties are challenged by a phonological-core deficit that impacts their ability to decode and read fluently. In addition, many students who are English learners and/or students who are from lower socioeconomic environments enter school with limited language skills that can also impact their ability to comprehend.

Advances in Reading Intervention, Part 1: Comprehension (cont.)

But what about students in third grade and beyond who can decode accurately and read fluently but have difficulty comprehending text? For many students, this pattern of difficulty may go unnoticed until about third or fourth grade when decoding skills are mostly secured. These students have a reading profile that shows weaknesses in some or all of the following areas:

- Vocabulary (i.e., difficulty learning new words and recalling the meanings of learned words)
- Syntax and grammar
- Inferencing
- Figurative language such as idioms or metaphors
- Comprehension monitoring
- Working memory (i.e., holding information in mind while integrating new information with what has come before)

Comprehension difficulties pose challenges because there are so many areas that can be deficient, and determining which areas to target can be difficult. It is hoped that researchers will eventually create efficient assessments to pinpoint the various subtypes of reading comprehension difficulties. These subtypes include oral language, discourse structures and listening comprehension, vocabulary, syntax or grammar, and even working memory, sequencing, and attention (Mele-McCarthy, 2016). We are not there yet; however, new thinking has emerged in comprehension intervention research.

To date, most comprehension research has tested single-strategy interventions—vocabulary, syntax, or comprehension monitoring/strategy instruction. However, a group of researchers in England believed it was important to address multiple components of comprehension in a comprehension intervention. The York Reading for Meaning Project research team performed a randomized control trial (RCT) to compare three comprehension interventions using teaching assistants employed within the partnering school systems. Using teaching assistants is noteworthy because usually university-based research assistants are the teachers for these types of trials. It was expected that using teaching assistants would encourage sustainability of the intervention in the schools after the research was completed and also encourage scalability of the intervention in school settings. In addition, as a reminder to readers, RCTs are the gold standard in intervention research, as it uses random assignment to place students in intervention and control groups. Random assignment ensures that there are no systematic differences between groups other than whether or not they receive the intervention. Therefore, any resulting differences in outcomes can be attributed to the intervention rather than to other factors.

The research team tested two hypotheses for causes of poor reading comprehension: 1) poor comprehension stems from weak oral language processes; and 2) poor comprehension stems from weak text processes, namely inferencing and comprehension monitoring. From these two areas, oral language and text processes, the team developed three 30-minute interventions to test whether oral language training in the spoken language domain, or text-level training in the written language domain, or a combination of both types of training would realize improvements in reading comprehension. All three interventions were delivered over 30 hours during a 20-week period.

The Oral Language Program targeted rich interaction and high-quality contextualized discussion and included four main components. The first component was vocabulary, using a multiple context learning approach modeled after Beck, McKeown, & Kucan, 2002. The second component was reciprocal teaching (Palinscar & Brown, 1984) with spoken language, where children listened to a passage and orally participated in clarification, summarization, prediction, and question-generation activities. The third component explored figurative language, including jokes, metaphors, and idioms, and the fourth component included oral storytelling to develop sequencing, plot building, and character development.

The Text-Level Program targeted gaining meaning from text and also consisted of four main components. The first was metacognitive strategies to support comprehension monitoring. The second was reciprocal teaching (Palinscar & Brown, 1984) with written language, with the same focus on clarification, summarization, prediction, and question generation. The third component was inferencing, so students could learn ways to make links between parts of text and between text, knowledge and experience. Similar to the Oral Language Program, the fourth component included developing written stories that focused on sequencing, plot building, and character development.

Advances in Reading Intervention, Part 1: Comprehension (cont.)

The Combined Oral Language and Text-Level Program incorporated all the components previously described, with each week of the intervention alternating between oral language and text processes. The results demonstrated that all three interventions significantly benefitted children's general reading comprehension compared to the control group. Interestingly, students in the Oral Language Program intervention group made the greatest gains in reading comprehension compared to the two other intervention groups. In addition, when tested 11 months later, the Oral Language Program group's scores had continued to increase in comparison to the text-level and combined groups. In other words, children's language and reading comprehension skills actually grew stronger after the intervention had finished (Clarke, Truelove, Hulme, & Snowling, 2014).

This is an exciting development, as most intervention results fade over time (Willingham, 2016). The authors presumed that daily vocabulary instruction was a possible reason for these sustained gains from the Oral Language Program, but it is rare to realize improvements in general reading comprehension from studies where vocabulary is the sole intervention (Apthorp et al., 2012). However, in this case, it is possible that the combination of vocabulary instruction with other oral language components was the factor that contributed to the general comprehension improvements and sustained increases.

In another, separate RCT (Williams et al., 2009), second grade students in the intervention group received science instruction plus instruction on text structure and reading expository text. Teachers taught students how to use clue words, graphic organizers, summarization, and compare-contrast strategies while focusing on vocabulary development and close analysis of text. The control group received only basic science instruction on the same content. The intervention led to better performance on written and oral response measures than the control group.

These and other recent comprehension interventions are using multicomponent approaches that focus on developing academic language, oral language skills, and strategy instruction with success at achieving statistically significant comprehension gains. Although further studies of interventions of this nature are necessary, these types of multicomponent interventions are showing promise, demonstrating that we are getting better at understanding how to improve students' reading comprehension.

For lesson models of research-based comprehension instructional strategies, see CORE's *Teaching Reading Sourcebook, Updated 2nd Edition* (http://www.corelearn.com/Products/Publications/#Teaching-Reading-Sourcebook-2nd-Edition).

For more information on the York Reading for Meaning Project, go to http://readingformeaning.co.uk/overview1/ and read *Developing Reading Comprehension* (Clarke, Truelove, Hulme, & Snowling, 2014).

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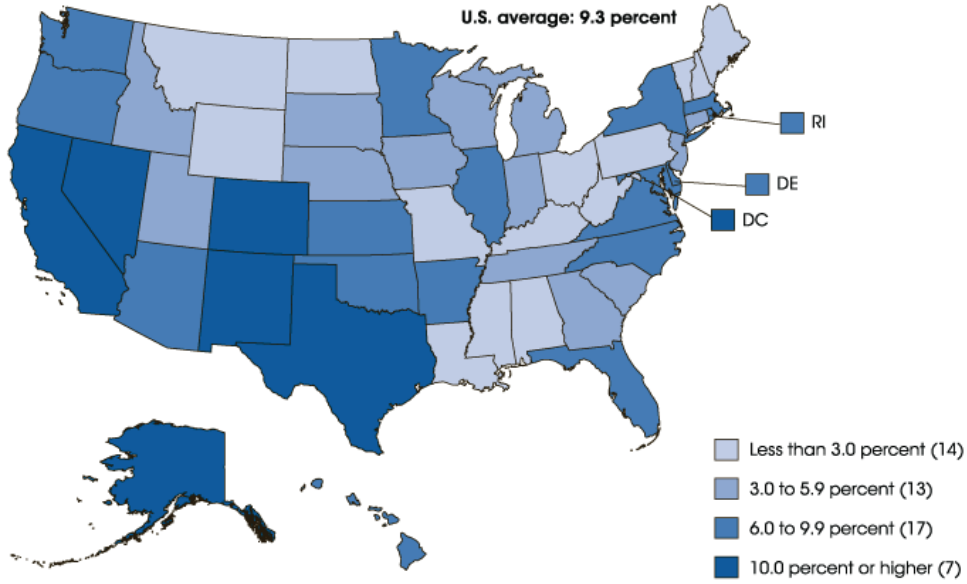
Overcoming Language Barriers in Math for English Learner Students

by Dean Ballard, CORE Director of Mathematics

English learners are one of the lowest performing subgroups within K–12 education. The struggles with language in all classes including mathematics are well documented, and the need for improving our instruction in math especially with regard to meeting the needs of English learners (EL) is greater than ever.

EL Student Data

The following map from the National Center for Educational Statistics shows the relative percentages of EL students within each state. Many states have a high percentage of EL students, such as California, which leads the nation with over 22% of students identified as English learners.



2013-14: **9.3%**
(4.5 million)

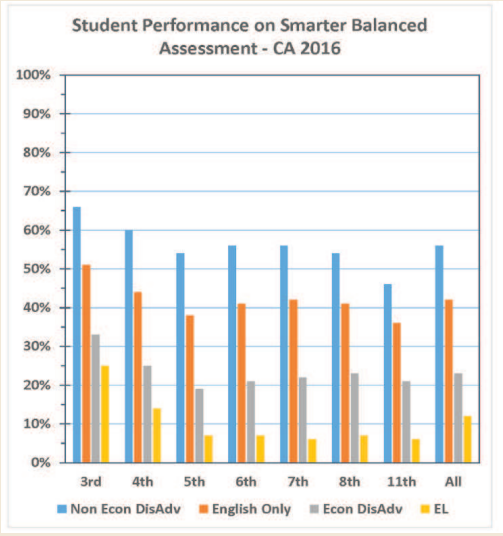
2011-12: **9.2%**
(4.4 million)

2003-04: **8.8%**
(4.2 million)

Calif: **22.7%**
(now at 22.1%)

—From National Center for Educational Statistics (2013-14 data), https://nces.ed.gov/programs/coe/indicator_cgf.asp

We can use California data as one very large sample from which to learn about some worrisome patterns. The data shown in the chart at the right, from California's 2016 Smarter Balanced Assessment results, illustrates the challenges EL students are facing and the gap between them and other subsets of our students. This graph compares EL students as a subset to English-only students, as well as to economically disadvantaged students, and to non–economically disadvantaged students. From this graph, it is evident that EL students are the lowest performing subset in California.



Overcoming Language Barriers in Math for English Learner Students (cont.)

Research on Challenges for EL Students

The Universal Access section of the California Mathematics Framework (2015) provides a research-based list of several key areas of challenges for EL students in mathematics:

- Limited prior and/or background knowledge
- Cultural differences
- Linguistics
- Polysemous words
- Syntax
- Semantics
- Translating words into symbols

Schleppegrell (2007) adds the following list and examples to the syntactic challenges students face in mathematics:

- Long dense noun phrases, such as
  The volume of a rectangular prism with sides 8, 10, and 12 cm
- Classifying adjectives that precede the noun, such as
  Prime *number,* ***rectangular*** *prism*
- Qualifiers that come after the noun, such as
  A number ***that can be divided by one and itself***
- Conjunctions, such as
  if, when, therefore, given, assume

While these challenges are greater for EL students, they represent in part the same list of language struggles with mathematics that ***all*** students must work through. This means time spent adjusting instruction to increase the access and success with math for EL students will do the same for most students.

Recommendations from Research

Moschkovich (2012) provides the following recommendations on how best to address the needs of EL students and apply important strategies for all students:

1. Focus on students' mathematical reasoning, not accuracy in using language.
2. Focus on mathematical discourse practices, not language as words, or grammar—are kids discussing the math ideas and problems?
3. Recognize the complexity of language in math classrooms.
4. Treat everyday language as a resource, not an obstacle. See differences in culture and meanings as opportunities to elaborate, compare, and discuss important math vocabulary and ideas.
5. Uncover the mathematics in what students say and do.

Additionally, many teachers and students have found the following techniques to be effective at making the mathematics more accessible to all students:

- Make vocabulary and concepts explicit and visual.
- Repetition is a good thing.
- Use scaffolds such as sentence frames, partnering, talking in native language first, etc.
- Use engaging activities.
- Create, manage, and process opportunities for students to talk about the math with each other.

Overcoming Language Barriers in Math for English Learner Students (cont.)

Samples of Techniques to Overcome Barriers

This problem, featured in the CORE books *Spend Some Time with 1 to 9* (2014), will be used as an example of several techniques previously listed. In the text box to the right, the part that is above the horizontal line represents the short and simple initial directions for the problem. This engaging problem promotes building number sense while students problem-solve and reason about mathematical relationships. However, the language demands are kept to a minimum, which provides greater access and success for both struggling learners and EL students (Schleppegrell, 2007).

Create Equations with 1 to 9
From *Spend Some Time with 1 to 9* (2014)

Create as many equations as you can with the digits 1 – 9.

- Use some or all of the **digits** in each **equation**.
  - **8 ÷ 4 = 5 – 3**
  - **6 × 7 = 42**
  - **2^3 = 8**
  - **7 × 5 + 8 – (6 + 1) = 29 + 3 + 4**
- Do not use any digit **more than once** within any equation.
  nonexample: **8 ÷ 4 + 3 = 7 – 3 +1**
- Do not use the digit **zero**.
  nonexample: **16 ÷ 2 = 40 ÷ (8 – 3)**
- You may use any math **operation**.
  Add, subtract, multiply, divide, exponents, etc.

When introducing the problem, everything that is shown in the text box below the horizontal line is provided one line at a time and clearly explained. The difference between digits and numbers is explained:

> *When I say* digits *and* numbers, *think of digits like letters and numbers like words. Just as we use letters to create words, we use the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 to create numbers. Some words have only one letter, like* a *and* I, *just like some numbers use only one digit, like 1, 2, 3, etc. Most numbers require multiple digits, such as 29, 435, 14, 269, etc.*

As each example of a correct equation is shown, it is clearly explained and connected to the language in the problem. For example:

> *Here is an example of an equation that uses some of the digits, 8 ÷ 4 = 5 – 3* [point to each number and operation or symbol as it is said]. *This is an equation* [point to the equal sign]. *In this equation we used four of the digits from 1 to 9. We used 8, 4, 5, and 3* [point to each digit as it is said]. *Let's see if the equation is correct. Eight divided by 4 is 2, and 5 minus 3 is 2, so we have 2 equals 2, which is correct [point to the numbers and operation as they are said]. So we have a true equation using four of the digits from 1 to 9.*

Be just as clear, explicit, and demonstrative with all four examples, the nonexamples, and additional language. Do everything you can to be visually, orally, and in writing very clear and **connect all three methods of communication together**.

Review of Explicit Techniques for Demonstrations, Instructions, or Directions

- Try not to go too quickly or drag along too slowly. Take your pacing cues from the class.
- Be interactive, asking students for input along the way.
- Highlight key vocabulary.
- Provide several examples and clearly explain the examples.
- Provide several nonexamples and clearly explain the nonexamples.
- Visually demonstrate that nonexamples are not correct by crossing them out.
- Frequently check for understanding and provide appropriate feedback and adjustments.
- Use gesturing, standing next to the board or screen and pointing to terms, numbers, equations, etc. as you say or refer to them.

Overcoming Language Barriers in Math for English Learner Students (cont.)

The following are several excellent techniques and activities that are used effectively in classrooms to create greater access and success for all learners:

- Sentence frames or starters such as "I think store X has the better deal because ____."
- Graphic organizers such as Frayer Models (Frayer, Frederick, & Klausmeier, 1969)
- Short, focused turn-and-talks
- Sorting, matching, and identification activities

Conclusion

As we examine the spoken, written, and symbolic representations of mathematics in our texts and classrooms, it becomes clear just how confusing mathematical language can be and the challenges this poses for many students learning mathematics. We must continually ask ourselves, "How can I make this clearer to my students?" This is exactly the point of recognizing the potential for confusion, the language challenges, the difficulty with the vocabulary, and other challenges most students—and especially English learners—face in our math classes. Once we recognize the challenges, we can then move on to address them.

Many proven effective techniques have been shared in this article. Work together with your colleagues to try these out, perfect them in your classrooms, and share other great strategies. We would love to hear about your favorite techniques for making math more comprehensible and more accessible for all learners to increase their success with mathematics.

For specific models and other help with any of the techniques shared in this article, contact dballard@corelearn.com. CORE provides explicit modeling and training on-site and in classrooms, working side by side with teachers and instructional leaders to use proven techniques in classrooms so all students succeed.

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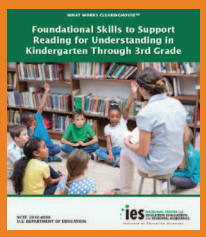
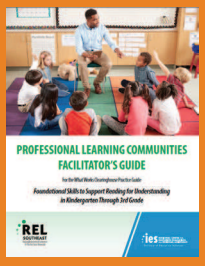
CORE Leadership Corner: New Reading Resources

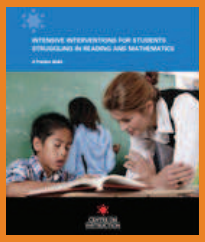


In July 2016, a new IES Practice Guide was released to support improvements in foundational skills instruction. The document, *Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade*, reviews the last 15 years of research since the National Reading Panel report and demonstrates advances in thinking about oral language development and decoding instruction. Go to http://ies.ed.gov/ncee/wwc/PracticeGuide/21 to download this free resource.



In addition, REL Southeast has developed a companion PLC Facilitator's Guide to support implementation of the findings for the new Practice Guide. This Facilitator's Guide has videos and activities in 10 step-by-step sessions that are framed by the Practice Guide's four overarching recommendations. Go to https://ies.ed.gov/ncee/edlabs/projects/project.asp?projectID=4541 to download this free resource.

Two additional resources can help your staff refine intervention practices in both reading and math. The Center on Instruction has a wealth of resources, but you may find these two companion documents particularly useful:



- *Intensive Interventions for Students Struggling in Reading and Math* provides suggestions and examples for ways to improve interventions by implementing three key strategies: intensifying instructional delivery, increasing learning time, and reducing instructional group size. This document can be found at http://centeroninstruction.org/files/Intensive%20Interventions%20for%20Students%20Struggling%20in%20Reading%20%26%20Math.pdf.

- The toolkit for teachers titled *Designing and Delivering Intensive Interventions* is a resource guide for teachers and has example lessons with reflection questions, planning guides, and lesson delivery reflection tools. You can download this document from http://centeroninstruction.org/files/Designing%20%26%20Delivering%20Intensive%20Interventions%20Toolkit.pdf.

Both the PLC Facilitator's Guide and the *Designing and Delivering Intensive Interventions* toolkit are meant to be used in a PLC-type format where teachers are working through the material together over time. For the two Practice Guides, either using a PLC format or as a facilitated whole-staff activity, teachers can look for alignment by comparing/contrasting the recommendations in these guides to what currently exists in their reading and math programs.

Let us know how CORE can help by contacting us at info@corelearn.com.

About CORE

CORE serves as a trusted advisor at all levels of preK–12 education, working collaboratively with educators to support literacy and math achievement growth for all students. Our implementation support services and products help our customers build their own capacity for effective instruction by laying a foundation of research-based knowledge, supporting the use of proven tools, and developing leadership. As an organization committed to integrity, excellence, and service, we believe that with informed school and district administrators, expert teaching, and well-implemented programs, all students can become proficient academically. For more information about CORE, please visit our website at www.corelearn.com.