TeachME PROFESSIONAL DEVELOPMENT

CEUs for Teachers and Educators

Assisting Students with Learning Disabilities in and Beyond School

Part 1:

Introduction

If you're a teacher in modern America, you are likely already aware of the differing levels of abilities among your extremely varied cohorts of students. To teach these young people effectively, you may have already adapted your teaching style to reach students with differing talents, learning modalities, personalities, and more.

However, when a student who has a learning disability walks into your classroom, you may or may not feel prepared to support that student - along with every other student in your classroom - as he or she needs. Moreover, you may be working with students who have undiagnosed learning abilities. As a teacher, you stand in a unique position to assist children with both diagnosed and undiagnosed learning challenges, if you can recognize them and realize what that child may uniquely need.

In this course, we will detail some ways to recognize common learning disabilities as well as some ways you can work to support the children who need it most. First, we shall look at a few case studies of educational programs that have done this correctly, to great success for all involved.

Case Studies

To begin this course on how best to support students with learning disabilities, we explored Internet resources to seek evidence of teachers, schools, and other academic programs that have done so properly. The following three case studies illustrate the difficulties three students with learning disorders have faced, as well as actions that were taken by the various schools entrusted with their care.

Case Study #1

One school recently welcomed a 7th-grade student with special needs who had previously attended three different schools. He'd, unfortunately, experienced difficulties in each institution, and no one had yet found a way to support him in a way that his disorder required. He was bright and had a great memory, but he was not able to read or write at the level normally attained by his peers. After deeming that the student had not only academic but social and emotional struggles, the school decided to prioritize gaining the student's trust. His teachers patiently taught the student the value of attainable goals in the short-term and designed a curriculum to reach out to him specifically. They gave him accommodations such as oral testing and dramatic role-

playing to help him understand concepts, and helped him reframe his way of thinking to emphasize the progress he was making (instead of his ruminating constantly on his seeming failures.) His teachers also assisted him with intensive reading and writing remediation, but consistently presented this education in a positive light. As a result of all this support, the student is now able to keep himself motivated. He is also sufficiently grounded to recognize and advocate for others who experience similar struggles. He has even had the initiative to take on leadership roles in his school and in his community.

Case Study #2

Another student was referred to the same school by the student's social worker. Previous schools had tried to offer the student accommodations and modifications based upon his disability. However, despite all of this, the student was not able to keep up with his peers. This resulted in many struggles for the student. In his new academic setting, the school first spent a considerable amount of time working with the student to understand what he specifically needed. In past schools, the student had exhibited a hard time understanding social situations. This had resulted in his being an easy mark for bullies. In addition, he often had to go to the nurse because he felt unwell or unsafe. After working with the student, the school found that the student had high reading abilities but lower comprehension than, perhaps, might be expected for one of his age. Emotionally and socially, he tended to rank as developmentally a little behind his peers. The school decided to help support the student with thorough, empathetic instruction and modeling for better organization and executive function, and clearly laid out expectations. The student's teachers helped clarify for the student important information, laid out expectations for classroom behaviors, tasks, and expectations, and ensured that other students did not take advantage of the student as he learned better to engage with those around him. As a result, the student stayed in the same school successfully for three years and enjoyed much stronger relationships with his peers.

Case Study #3

A third student enrolled in the same school after a referral by a previous school's guidance counselor. She had previously not responded well to interventions utilized by public school teachers. The student exhibited a poor understanding and comprehension of phonetics when compared to her peers, which adversely affected her ability to understand verbal instructions as well as normal conversations. Because of this, she distanced herself from her classmates, began to fall behind academically, and was not able to relate very well to her teachers. Her new teachers began to incorporate her into their classrooms with individual instruction as well as engagement with other students.

They decided on a multi-sensory learning approach, targeting ways to pass along information in many different ways. The student was invited to classes that used visual enrichment techniques as well as hands-on, very active student participation in normal academic presentations. In addition, her teachers decided to give this student as much extra time as was needed, particularly in the beginning, to allow this student to fully learn one skill before another was presented. As a result, this student learned how to be fully present and participatory in the classroom activities and discussions she had previously avoided. She became more confident, more capable, and more engaged with her fellow classmates (JCOS, 2020).

Summary: Lessons Learned from Case Studies

As these case studies illustrate, students who suffer from learning disabilities are often very smart and capable individuals; however, they often need creative, constructive, and compassionate coaching in order to progress at similar paces as their peers. While taking the time to experiment empathetically with the affected student takes patience and initiative, the results for the student can be profound (and life-altering). Many times, students who are affected by reading, writing, or phonetic disorders simply need more time, more individualized instruction, and out-of-the-box learning approaches in order to meet them where they are.

In this course, we will delve into a brief synopsis of the different types of common learning disabilities you may see in your classroom. After that, we'll talk about a few substantive, specific practices you can adopt while teaching in order to support your students who may need more specialized attention. Finally, we'll wrap up by talking about ways you can help your student's parents be more engaged and included parts of your student's educational team.

Section 1: Common Types of Learning Disabilities - What You Need to Know

While listing every student's disability entirely would be impossible, we can here introduce the most common disabilities you may need to be able to recognize and support. We've sourced the eight most recurring learning disabilities based on information from the Learning Disabilities Association of America.

Dyscalculia

Dyscalculia is a learning disability that specifically affects the ability of the student to understand what numbers are and what they mean. This necessarily impacts a student's abilities to perform math-related activities and memorize mathematics-related facts.

Occasionally referred to as 'math dyslexia' or 'number dyslexia', dyscalculia does seem to affect approximately 11 percent of children who also exhibit symptoms of ADHD. More than just affecting a child's ability to memorize the timetable, dyscalculia also makes difficult any daily situation which depends upon numbers. Students who have dyscalculia may have a difficult time with counting money, performing mental calculations, and even telling time.

The estimated number of school-age children with dyscalculia is between 3 and 6 percent (Frye, 2020).

How to tell if a student may have dyscalculia

Students may have some level of dyscalculia if they:

- Have difficulty with recalling basic equations and facts about numbers, such as easy sums like 5 + 6 = 11.
- Use their fingers to count instead of feeling comfortable using mental math for basic calculations
- Exhibit misunderstanding of math symbols (such as + or -), or variables when used in algebra
- Struggle to realize how to solve extremely simple math problems (such as 4 + 27 - 27)
- Do not know how to begin to strategize to solve a more complex math problem, even if they have just been shown how
- Do not seem to understand place value (e.g., they switch up tens' and hundreds' places, for example)
- Frequently mix up numerical or quantity-related phrases in the common lexicon (such as 'less than' and 'greater than')
- Are not able to easily keep score when watching a game or sporting event
- Run out of money because they have a hard time calculating the final bill of items

- Avoid playing any kind of game which requires them to keep track of score or numbers during the event
- Struggle to understand any information which you are showing them on a chart
- Have trouble with simple measurements, such as completing a recipe and having to weigh and portion out ingredients

Students who exhibit these signs are not unintelligent, and they can master these higher concepts in time. They will simply need accommodations and help in order to do so without excess frustration (Singh, 2018).

Dysgraphia

Dysgraphia is a learning disability that may adversely affect your student's ability to write neatly, along with the management and mastery of other fine motor skills. As a neurological disorder, it can affect both children and adults. If one has it, it likely affects all aspects of the typical writing process. This includes spelling, word spacing, word sizing, creative expression, and written legibility.

Experts estimate that somewhere between 5 and 20 percent of all children have a writing deficit—if not dysgraphia, then something like it. Dysgraphia is also common in children who have ADD or ADHD. Typically, if a student has dysgraphia, it will be diagnosed when children first learn how to write (Frye, 2020).

How to tell if a student may have dysgraphia

You may be able to tell that one of your students has dysgraphia if the following is exhibited:

- A consistent difficulty when they attempt to form numbers and letters while writing
- Markedly slower handwriting development when compared to their peers and classmates
- Inconsistent or illegible writing
- Writing that is consistently a mixture of upper and lower-case letters
- A difficulty thinking and writing at the same time - or writing while doing other activities, such as taking notes
- Any ongoing spelling difficulties that persist even after correction

- Very slow speed of writing
- A need to look at what they are writing while they are writing it at all times
- A lack of nuanced spatial skills, which may result in uneven spacing in their writing
- A reluctance to articulate thoughts or skills through writing
- Physiological barriers to long bouts of writing, such as pain or cramps in the fingers
- A very awkward grip on their pen or pencil
- Unusual positioning while writing
- A lot of fatigue, confusion, and frustration after they have finished writing

Just as with dyscalculia, a diagnosis (or suspected diagnosis) of dysgraphia does not mean that such students are ignorant or that it is impossible to help them learn to write well. Alternatively, deciding to support students with dysgraphia using non-written methods of teaching and learning may help them learn to express themselves in differing ways (Cheshire, 2017).

Dyslexia

Dyslexia is a learning disability that tends to affect children of a young age with their reading, writing, and all related processing skills which pertain to language retention, use, and performance.

The main method by which dyslexia affects a person's learning ability is by an affectation of the way the brain processes the visual information it sees and the audible information it hears. For example, graphic symbols and the groupings of sounds into words can often be confused by people who suffer from dyslexia. Typically, those with dyslexia may have a difficult time with word recognition, the ability to match sounds and letters, and spelling.

As opposed to dysgraphia and dyscalculia, dyslexia is comparatively common. Experts disagree on the specific prevalence but suspect it is anywhere between 5-17% of people (Brazier, 2020).

How to tell if a student may have dyslexia

Different students may present with dyslexic tendencies very differently, but some signs may include the following:

- A postponed timeline during which the student learns how to speak correctly
- A lengthened rate at which the student learns new words
- A difficulty forming words in expected ways (for example, if the student reverses specific sounds in words, or tends to confuse words that sound similar)
- Difficulties with remembering verbal or numerical facts, such as numbers, letters, or even more abstract concepts like colors
- A difficulty learning lyrics to songs, learning nursery rhymes or acronyms, or playing rhyming games (such as hand-clapping games, either in class or on the playground)
- Struggles with learning or becoming familiar with reading at the competency which is expected for their age
- Significant and recurrent issues processing what the student hears
- An exhibited difficulty finding the words for what the student wishes to express
- Difficulties remembering the specific way in which items are ordered
- Exhibited difficulties with figuring out that different letters and words have differences and similarities
- Difficulties figuring out how new words are pronounced based upon their spelling
- Problems with learning how to spell new words (or spelling words that should be familiar)
- The student takes a very long time to complete any task which may involve writing or reading
- A specific avoidance of any activity that involves reading or writing

Even though dyslexia is considered a neurological disorder, it has nothing to do with how intelligent your student is. A diagnosis can simply help you know how best to support your student precisely where he or she already is (Mayo Clinic, 2017).

Non-Verbal Learning Disabilities

A non-verbal learning disability is any in which the affected student has any difficulties interpreting the nonverbal cues which make up much of human discourse. Such examples of these misinterpreted or unacknowledged nonverbal cues include facial

expressions and body language. As a result of these non-verbal cues missed, the affected student may suffer from poor coordination.

This disability, as opposed to (for example) dyslexia, is relatively unknown. However, experts believe that it impacts more persons than the general populace may imagine. It does cause very real difficulties for the person who has it—who finds it very confusing and troubling.

Often abbreviated as NLD or NVLD, this disability is frequently misunderstood, overlooked, and under-diagnosed. It is regularly characterized by extremely poor organizational, spatial, and visual skills—skills that are extremely prioritized by modern society.

That same modern society tends to pass on the vast majority (approximately 93 percent!) of its information outside of verbal communication, through facial expressions, vocal tones, and body language. Students with NLD may miss this 93% of the critical (but unspoken) information. (Frye and Karanzalis, 2019)

Experts believe that NLD may be as prevalent as dyslexia, and is as common in girls as it is in boys (Frye and Karanzalis, 2019).

How to tell if your student may have a non-verbal learning disability

This disability may be more difficult to notice than dyslexia or dyscalculia. However, you may be able to have a good idea - or enough of an idea to talk to an expert - if your student exhibits any of the following symptoms:

- Talking a lot, but not really saying very much of consequence
- Is able to see details, but not the big picture - or, in other words, the trees but not the larger forest
- When learning new information, the student tends to focus on tiny details while missing the larger idea or concept
- Is unable to read facial expressions, hand gestures, or other cues which are nonverbal
- Tends to miss the more nuanced or subtle aspects of learning new information
- Generally speaking, exhibits social awkwardness
- Perhaps due to this social awkwardness, a lack of friends among peers of the same age

- Exhibits a tendency towards processing new information in a very sequential, linear manner - instead of in a multifaceted or multidimensional way
- Tends to confuse complicated or more abstract concepts, but has a proclivity towards recalling exact sequences
- When faced with the pressure to perform, tends to shut down instead of exhibit vulnerability
- Writes poorly, especially when by hand
- Exhibits poor abilities with visual-spatial tasks
- Exhibits poor abilities with visual discrimination
- Does not have the ability to naturally organize things well
- When asked to infer or follow abstract logical processes, does not show the ability to do so well
- On the other hand, tends to see things in a very one-dimensional, logical, black-and-white framework
- Has issues with reasoning things out mathematically
- Has poorly developed motor skills

Much as is the case with students who have dyslexia, dysgraphia, and dyscalculia, students who have non-verbal learning disorders can and likely will grow to be productive members of society. However, they will require your help in order to do so. Learning to support students with NLD will help them flourish through their awkward years (Psychology Today, 2017).

Oral/Written Language Disorder and Specific Reading Comprehension Deficit

These types of writing and reading disorders often have an adverse or frustrating effect on a student's understanding of things that they hear, see, read, or attempt to write. Students who have these disorders and deficits may have a hard time expressing themselves orally.

Underneath the umbrella of oral/written language disorder and specific reading comprehension deficit are three more specific difficulties which you may observe in your affected students. These are:

1. **A phonological deficit.** This indicates a fundamental problem with the way that your student processes the types of sounds that are endemic in the way language is spoken aloud.

2. **An orthographic processing deficit.** This can also be known more simply as a 'processing speed' deficit. Sometimes the way in which students can grasp printed or vocalized words comes down to whether they can accurately interpret the sounds and letters as quickly as they come. If they can't, they may have a deficit in this area.

3. **A comprehension deficit.** This type of deficit often happens at the same time as a phonological or orthographic processing deficit. It means that an affected student may simply have difficulties understanding that which he or she hears or reads.

As with other similar disorders, students who exhibit a specific reading comprehension deficit are not unintelligent. They may merely require extra support, tools, guidance, and attention in order to read and operate at the same level as their peers (Lang Linguist Compass, 2017).

How to tell if your student may have an oral/written language disorder or a specific reading comprehension deficit

For better or for worse, this type of learning disorder may be easier to notice and diagnose than others. Students who have a specific reading comprehension deficit or a related disorder will have a more difficult time reading than their peers. They may shy away from tasks that involve reading because of this fact. They may be brushed off or teased by their peers as being weak readers; they may avoid classroom discussions or become anxious when called upon in classroom debates, as they may have a more difficult time with reading materials to prepare for such activities (Driscoll, 2019).

ADHD

ADHD is a learning disorder that has a few different ramifications for a student's attention span. These include a difficulty for students staying focused as well as the student exhibiting a hard time paying attention. Often, students with ADHD channel excess energy into hyperactivity. They can have a hard time controlling their own behavior.

All children may have issues behaving or focusing at times; that's part of being a child. However, a child who has ADHD will do this more often than not - perhaps even all of the time.

There are a few different ways that ADHD can present itself in a young individual, loosely defined by the symptoms which the individual experiences or exhibits most strongly:

- **The Predominantly Inattentive Presentation:** With this type of ADHD, it can be difficult for the affected student to be able to finish a task once it's begun or focus on organizing the different steps or components effectively. These students may also have difficulties paying attention to small details, or following the gist of what's going on in detailed instructions or long conversations. The student who presents with predominantly inattentive ADHD can be distracted easily. These students may also forget how to go about their daily routines.
- **The Predominantly Hyperactive-Impulsive Presentation:** The student who presents with this form of ADHD may fidget or speak much of the time, seemingly unable to stay still. Because of this, it can be very difficult for affected students to sit for the duration of a meal, or long enough to finish their homework. Young children may even climb furniture, run around, or jump in the air constantly, with seemingly never-ending bouts of energy. Internally, students who present with ADHD feel restless. They may have problems with impulse control. Because of this, they may interject and interrupt in conversation, take things away from other persons, or speak up when they shouldn't. They may have a hard time taking or waiting for directions. As a result, those individuals who present with heightened impulsiveness may injure themselves a lot.
- **The Combination Presentation:** As with many other learning disorders, the symptoms likely exist on a spectrum. Therefore, students will often present with aspects of both typical presentations of ADHD.

As it is possible for symptoms to change over time, it's important to note that a child's presentation of ADHD may evolve similarly (CDC, 2020).

How to tell if your student may have ADHD

If your student has ADHD, he or she may:

- Often exhibit difficulties with paying attention in class or during long conversations, or even just listening appropriately

- Require many reminders to complete even simple tasks
- Have a hard time keeping their attention on any specific topic, instead often getting distracted easily
- Come across as absent-minded
- Exhibit poor organizational skills (perhaps often to the point where the student often loses personal belongings)
- Be unable to 'wait one's turn' or otherwise exhibit normal levels of patience for one's age
- Complete homework without care and as fast as possible, just to get it over with quickly
- Interrupt others without any seeming attention to the subject matter or the feelings of a speaker
- Feel fidgety, as if unable to can't keep still; student may also complain of boredom or frustration

As noted above, many of these signs and symptoms are also seen in children who are simply tired, don't have interesting projects or assignments, or may have other complaints. A diagnosis of ADHD generally comes after one has noticed these symptoms or signs in the individual for a long time, and these issues tend to happen most of the time (Lyness, 2017).

Dyspraxia

Dyspraxia is a little-known disorder that tends to cause issues with a student's coordination and muscle or body movement. As a downstream effect, a student with dyspraxia may have difficulties with normal or easy language and speech habits and functionalities.

Dyspraxia can be more than just a neurological disorder, as many of the other disabilities on this list may. In particularly severe cases of dyspraxia, the affected student's immune system and nervous system can also have adverse effects.

Those suffering from dyspraxia have only recently begun to come into the limelight. Until very recently, children suffering from dyspraxia were simply labeled as 'clumsy.' Others wondered whether those with dyspraxia actually had minor brain damage.

Needless to say, it's more nuanced than that! While an affected individual's ability to complete fine motor tasks can be affected and sometimes children with dyspraxia might take longer to learn complicated subjects, it does not affect your student's intelligence (Medical News Today, 2017).

How to tell if your student may have dyspraxia

Your affected student may exhibit any of the following signs, symptoms, or tendencies:

- **Poor muscle strength** (especially in the child's core): Students who suffer from dyspraxia may tend to slide out of their chairs, slump or slouch their shoulders, or consistently lean to one side because they just don't have the same innate core strength that other students of similar ages may have. They also do not gain this strength in the same way, over time, that others do. As a result, the mere act of sitting up for hours can truly exhaust them. Some children with dyspraxia even fall over toward the end of the day, because the normal activities of their day have completely tapped their strength.
- **Trouble with fine motor skills:** Students who have dyspraxia also suffer from weakness in other parts of their bodies, not just their core. Children with dyspraxia may not have the strength in their fingers necessary to grip writing implements or small objects. Because of this, activities involving writing or other fine motor skills can be completely draining for affected individuals.
- **Irregular or consistent clumsiness:** Although we have realized in recent years that dyspraxia is about far more than simply being clumsy, watching for a pattern of clumsiness in a child may help with a diagnosis. Many typically abled persons do not realize that so-called simple movements (such as packing a day bag, writing, putting papers away, and other administrative and daily tasks) actually require a whole litany of fine motor movements. For normally abled children, learning how to do these things may take a few tries to be able to do them correctly. However, for students who have dyspraxia, these simple tasks may take as many as one hundred repetitions to become proficient with these basic skills.
- **Behavioral and social difficulties:** Perhaps because of the heightened difficulties students who have dyspraxia often encounter, these students may get very frustrated simply over the course of everyday events. Because of this frustration and requisite exhaustion, these students may act out or (alternatively) naturally be less inclined to take part in normal, social activities. Their disability can also make them very visible, natural targets for those who are looking for victims to bully.

Dyspraxia may be more difficult to diagnose than other similar disabilities, but a diagnosis can give you the chance to support a child when he or she needs it most. Keeping an eye out for these signs and symptoms is one of the ways you can help support these children (Thomas, 2019).

Executive Functioning

Students who have an executive functioning disorder may have difficulty planning and using their time well. Executive function commands a student's attention to detail and ability to strategize; therefore, students who have a difficult time with executive functioning may have issues with managing their space and time.

Executive functioning is an attribute that often suffers along with the disorders mentioned above, but it can also be a standalone diagnosis. The hallmark of an executive functioning disorder is a marked difficulty with organizing and planning. The best of us often have issues in these areas, but a student who has an executive functioning disorder will often exhibit related difficulties to a debilitating degree.

There are seven general executive functions. They are as follows:

1. Self-awareness
2. Inhibition
3. Non-verbal working memory
4. Verbal working memory
5. Emotional self-regulation
6. Self-motivation
7. Planning and problem solving

A student who is suffering from an executive functioning disorder (or a combination of an executive functioning disorder and a related disability, such as ADHD) will have chronic issues in at least one of these areas. Fortunately, there are ways that you can help your child learn how to flex these muscles and grow in these areas. While the child is growing, there are specific support systems you can foster and encourage to help the child thrive (Barkley and Saline, 2019).

Section 1: Summary

These eight learning disorders are not an exhaustive list of the disorders you may see in your classroom; however, they are the most common. While many of these disorders may present necessary obstacles to learning, none completely precludes a student's access to an enjoyable, efficient, and effective education. Your support will have to be specially designed for each student. In the following section, we'll discuss specific ways in which you as a teacher can support students who have these (as well as other) learning disabilities.

Section 1: Key Takeaways

- Learning disorders can take many different forms. Most do not affect a student's intelligence; they just require special accommodations to help the child learn.
- Many learning disorders affect executive function and reading comprehension.
- As a teacher, you have an opportunity to both assist with a diagnosis and make a plan going forward to alleviate any symptoms of common learning disabilities.

Section 2: Teacher Approaches to Supporting and Helping Students with Learning Disabilities

As a teacher, you have several resources you can utilize to ensure that all students in your classroom, no matter their natural abilities, feel fully supported. In this section, we'll delve into specific ways to help students with learning disabilities grow.

Inside the Mind of a Student with Learning Disabilities

The best way to understand what students with learning disabilities are going through is simply to ask them, or their parents, so that those closest to the situation can best describe your students' specific challenges.

However, recent forays in childhood psychology can give us a few clues as to what students with learning disabilities may be experiencing.

1. **Students with disabilities often fear losing the respect of others.** There are many psychologists who believe that students with learning disabilities battle primarily with the prospect of learning the respect of their peers, their families, and their teachers. They believe that this respect will be lost if it becomes widespread knowledge that

they struggle with the same activities which come so naturally to everyone around them. Due to this fear, they naturally try to keep their hard work and struggles secret - which greatly exacerbates the problem itself (LD @School, 2016).

2. **Students with learning disabilities also tend to downplay their personal strengths because they tend to focus so exclusively on how difficult they find their weaknesses.** Perhaps logically, they also tend to downplay the positive aspects of school. Students with learning disabilities tend to put themselves at fault for situations that are usually far beyond their control. Often, to help these children feel like they can have any say or control in what goes on with their time, these children try to avoid situations that cause them pain or difficulty. This 'avoiding' technique can cause the student frustration, resentment, and shame, or even anxiety. The anxiety may then become the central problem — or at least the most visible problem. In order to help those children who are suffering from anxiety secondary to a disability, the triggers for both their anxiety and their disability need to be documented. Once the student and his or her family, peers, and teachers are aware of these triggers, the student can work on reducing anxiety and working to ameliorate the main difficulty at hand (LD @School, 2016).

Wondering what signs might manifest themselves in a student who is manifesting anxiety secondary to a larger learning disorder? The following signs may help indicate a student who may be in need of your support:

- Difficulty performing tasks, especially ones which come more easily to others of a similar age;
- Difficulty sitting or staying still (or fidgeting, etc)
- Difficulty remembering details, concentrating on what's in front of them, or focusing on anything for more than a few minutes
- Difficulty approaching any new or unfamiliar task without trepidation or dragging feet
- Dependence upon a specific routine or schedule, to the point where any sudden or unnecessary change in that routine can confuse or stress the student to a debilitating level
- Perhaps because of the above, an innate reluctance to deviate from any normal schedule or routine

- Any physical signs of distress or discomfort when asked to complete a novel task, including palpitations, perspiration, and trembling
- Speaking without listening to him or herself
- Overly detailed adherence to perfectionism, to the point where the student moves much more slowly than is proper for the student to move
- Asking similar questions repetitively without seeming to understand that they are related and the base question has already been answered

Researchers have noted that the anxiety that students with learning disorders often display tends to be of an internal nature. This can readily manifest on the outside as awkwardness or stress — not always in obvious ways. These students might not tell their parents or classmates about this internal stress, either, because they may not realize that it is different or important (LD @School, 2016).

It's, therefore, our job as teachers to help these students heal — often, whether they realize that they are in need of healing or not. By paying attention to the signs of anxiety and learning disabilities in young students, by prioritizing allocations of needed resources for these students, and being proactive about meeting these students where they are, it is entirely possible for teachers to play a large role in changing these students' lives for the better.

How to Boost Executive Function

Following these tips can help boost the seven hallmarks of executive functioning in students who are struggling with this set of skills:

1. **Help your students be accountable for their own actions.** Many people wonder just how much students with ADHD should be held accountable for what they do. According to some experts, we absolutely should focus on accountability - for the good of the student's own growth. We have to be careful to do this with kindness and mercy, but this type of follow-through can be very fundamentally important for a student with ADHD. Many times, students who have ADHD don't fail to understand that consequences exist. The issue is that the timing of these consequences don't often fall in a window that is conducive to helping the student with ADHD understand what's going on. Boosting accountability in your students can help make your student's path forward clear, especially to him or her. It will also increase self-confidence (if done realistically, and with tact and support) by showing the students

you have faith in their abilities. This can help alleviate the anxiety which many students with learning disabilities experience (Wexellblatt, 2019).

2. **Help your student out with written reminders.** If your student suffers from a working memory deficit, make the things they need to remember very difficult to forget! You can use sticky notes, taped-up note cards, a gifted journal, or just a series of to-do lists to help your student be more accountable and productive. If your students are able to see this information easily laid out, they won't forget it - and this act of remembering will actually help them build their working memory (Zeigler Dendy, 2020).

3. **Emphasize time-telling skills for your student.** 'Time blindness' is a real thing that students with learning disorders often struggle with. Students with ADHD (for example) often don't have an innate sense of how much time has passed or how much time they have left to complete a task. Go overboard with the number of timers, clocks, or counters you let your student have access to, and remind him or her to check the clock frequently. By doing this, you can help your student build a sense of the natural passage of time (Reynolds, 2017).

4. **Incentivize progress with frequent rewards.** Students with learning disabilities often struggle with interior motivation - as do many of those of us who are more regularly abled. If a specific executive function is very difficult for your student, the student will naturally try to avoid it. Create an external framework for their motivation like a reward or report-card system so they can see continued progress. If you're able to reinforce less tangible long-term goals with shorter-term rewards, you'll be able to help increase your student's own interior motivational skills (Additude, 2019).

5. **Emphasize more hands-on methods of learning.** Students with learning disabilities often struggle with conceptualizing abstract concepts or paying attention to lessons that mostly consist of reading, watching, or listening. If you can find ways to put objects into their hands that represent what they are learning (for example, numbered blocks to help with basic math problems, or magnetic letters or words to assist with spelling or sentence structure), they'll have to rely less on conceptualization to understand the lesson you're teaching (Zeigler Dendy, 2020).

6. **Allow yourself and your student to take frequent breaks.** The types of executive function that many students struggle with (motivation, self-control, etc) often naturally come in short supply. When your student has to concentrate very hard to stay focused or work hard on a problem set, his or her internal stores of willpower will

get depleted extremely quickly. However, if you're able to take a quick break to allow your student to refuel, you may find that you both experience much more success after your break. Structure your day with your students with learning disabilities so they're able to take short (5 minutes or so) breaks throughout the day, and see if that helps their symptoms and their progress (Meyer and Lasky, 2017).

7. **Help your student out with encouraging or motivational speeches.** Before big games, coaches tend to give athletes motivational pep talks. For a student with learning disabilities, every day is a big game. Your student may therefore need a motivational speech or pep talk every day - or even more often than that! More than simply hearing motivational speeches from you, however, students with learning disabilities need to learn how to motivate themselves. If you're able to teach your students how to pump themselves up, you'll be giving them a tool they can surely benefit from their whole life long! Simply helping your students learn how to say "I can do this, I've got this!" may be transformative for them. If you can assist your students with learning how to visualize their own success and their own way forward, you'll get them one step closer to learning how to complete their own goals (LaVoie, 2019).

8. **Teach your student the benefits of daily exercise.** There are many documented benefits to getting your blood pumping every day. For students with learning disabilities, the benefits may be even greater! It's been shown that routine physical activity can boost students' executive functioning. It can also help them sleep better, and teach them motivational practices that they can extrapolate outside of the gym. It doesn't have to be formal or organized physical activity, however. Simply help your child find a sports team to play with or help the child pick up an active hobby, and the rewards of consistent physical activity should be realized in no time at all (Brain Balance, 2017).

9. **Be compassionate toward your student with learning disabilities.** This may sound like an obvious point to remember, but learning to be there for someone who struggles with everyday tasks can be frustrating for all involved. You need to remember that children who suffer from ADHD or similar learning disorders are as smart as their fellow students; they just need support, sometimes, to realize it. Students who suffer from learning disorders often experience higher than normal changes in their educational strategies, and their environments may also change more than they might for a differently-abled student. Helping your students learn to navigate these changes will set them up for success in the long term, but you need to remember that this can be very difficult. Therefore, if a student with learning

disabilities makes a mistake or expresses frustration with a project, try to empathize and help the individual understand what is wrong instead of showing frustration yourself. Taking frequent breaks, as noted above, may help with the experience for all concerned (Barkley and Saline, 2019).

Specific Ways to Support Students With Learning Disabilities

To alleviate the two specific fears that students with learning disabilities often exhibit, strategies to assist these students often focus on managing expectations, assisting with compensation, and lowering anxiety.

Wondering what action to take when your student with learning disabilities is obviously having a hard time? The following tips may help. We'll discuss specific symptoms or types of behavior you may notice as well as a few expert tips for alleviating the behavior or mitigating the responsible situations.

If Your Student Exhibits Anxiety or Related Behaviors:

- It may be a good idea to realize that you'll need the help of a larger team to help your student face his or her anxiety. Enlist the help of parents and other teachers your student may interact with.
- Find ways to reward your students whenever they show brave or calm behavior, to help them realize that there's a benefit to taking a quick breather.
- More literally speaking, taking deep breaths does still the body's fight-or-flight anxiety response. Teach your student to take a few minutes to steady his or her breathing when he or she feels anxious.
- Nature can have a calming effect on people. When your student feels anxious, invite him or her to take a quick walk outside.
- Treating anxiety as if it's the elephant in the room will do no one any favors. Instead, be very frank and forthright about the fact that your student may experience difficulties in this arena.
- Similar to going outside and deep breathing, physical exercise can help your student relax. Talk to your student and his or her parents about investing in a consistent exercise regimen to help calm your student's nerves.
- Whenever students experience a particularly severe bout of anxiety while in the classroom, invite them to take a walk with you to talk it out. Doing so will very literally

remove the students from a stressful environment. It will also give them the much needed time to explain everything they're feeling and experiencing about the situation, which may give you the clues you need to best help them through it.

- If your students exhibit consistent anxiety, it may be a good idea to give them a gratitude journal and ask them to use it consistently. This way, for at least a few minutes every day, they'll be concentrating on how things are going well—during which activity it's very difficult to be fully anxious.

- If appropriate, perhaps when you're on a walk with your student, tell the student about a time that you felt anxious, and what you did to overcome the negative associated feelings. One of the horrible things about anxiety is that when you're in the midst of these particularly severe feelings, you do tend to feel like you're all alone. By helping to eliminate this sense of isolation, you'll give your student one less thing to worry about (Nelson, 2019).

If Your Student Exhibits Perfectionism:

- Normalize mistakes. Tell your student that perfectionism is not a realistic goal, because all humans - even very successful humans - make mistakes. You can do this partially by telling your student about times when you've made mistakes or other students have tripped up; you can also take care to present every time your perfectionist student makes a mistake as an opportunity for your student to learn a little more.

- Prioritize rough drafts and brainstorming hours. To help your students understand that having a perfectly shiny facade on all of their work is not the goal of learning, ask your students specifically to turn in projects at the 75% completed stage, or work with your students as a project is progressing. This may be scary or uncomfortable for your students, but it will help them understand that the end goal is not the most important part of learning.

- Help your student realize that understanding is the goal, not completion of an arbitrary milestone. Instead of memorizing endless flashcards or striving towards a perfect grade, ask your student to tell you stories about what is being learned.

- Help your student develop a growth mindset. In short, a growth mindset prioritizes change and progress toward a goal, instead of mastery of a goal in and of itself. By prioritizing true learning, with all of its challenges and pitfalls, instead of scores or

grades, your student will have a better educational experience - and learn to appreciate that one poor grade is an opportunity, not a catastrophe (Busch, 2016).

If Your Student Exhibits Test Anxiety:

- Start by sitting down with your student and having a conversation about the different accommodations you may be able to assist with. Depending on the specific nature of your subject and the way your student's anxiety manifests itself, you might be able to give your student an adaptation or modification of the parameters of the test (for example, more time to take a test).
- State the expectations of the test clearly. Tell your student (or students) precisely what material they will need to know before the test and any other information you can give without being unfair for the purposes of the assessment. Simply knowing whether to expect multiple choice questions or essay questions, for example, can allay the anxiety of many students. Print the instructions for the test at the top of the test, and make it clear to your students that if they need help with anything on the test itself, they can come to you with questions (as long as they are ones you can answer without being unfair for purposes of assessment).
- Have your students free-write before the test about their anxiety regarding the test itself. By writing down their worries, and perhaps comparing their worries prior to the test to other times in their life that they have experienced nervousness, the students may experience a cathartic effect of simply writing down their stressors. They may often gain a little perspective by noticing the pattern stress takes on in their lives, and this may be very beneficial going forward.
- Remind your students that many of the physiological effects of nervousness - for example, a higher heart rate, heavier breathing - may actually help them perform well on the test. These types of heightened body responses are geared towards helping your students focus more and think more quickly, which will aid with performance in an assessment scenario.
- Take ten minutes before every test to give your students a chance to get up, get their blood moving, air any anxieties they may be having, and ask you any last-minute questions. If you're able to give them any reassurances about your merely seeking to get an idea of where they are instead of giving them life-altering grades, then do so - it may give them the tiny bit of relief they may need immediately before heading into a test (Terada, 2019).

If Your Student Exhibits Anxiety about Details:

- If your students have a hard time seeing the forest for the trees, aim to help them learn about perspective in their everyday life. While they're at school, encourage a focus on one task at a time. When your students attempt to multitask, they're allowing their brain to run from one subject to the next and they are getting their mind filled with an overstimulating number of details. If you're able to promote unitasking, with breaks in between tasks to allow your student's mind to transition calmly, that may help your student have a healthier project processing mindset.
- Similarly, many students who suffer from learning disabilities, anxiety, or disorders relating to executive function may naturally try to run through their work as quickly as is humanly possible. Instead of encouraging your students to complete their work quickly, try to set a premium on doing the opposite. Perhaps you could incentivize ways for them to sit down, slow down, and appreciate a written passage - or give them quests, games, or puzzles to solve that require concentration and comprehension, and can not be completed by flying through the task on a superficial level (Chandler, 2016).

If Your Student Exhibits an Intolerance of Uncertainty:

Remember that even a little uncertainty can trigger symptoms of anxiety, especially in children who have learning disabilities. Help your students with these scenarios by providing the following measures of support:

- Make sure that your child has a daily schedule or to-do list. Simply enabling students to have an idea of what to expect will help erase much of their experience of uncertainty. If students begin to appear anxious, reroute them to their schedule. Making it hard to lose and easy to read (for example, a laminated copy, with bright colors) could help with this process and help them feel more confident.
- Whenever you are aware that your student will have to deviate from their comfortable routine, take your student to the side and explain exactly what is going to happen. If you can come up with a silly or goofy way to signal that your student is going to have to be flexible and brave, this can help break your student out of paranoia or anxiety spiraling.
- Make sure that your students know that you are there for them at all times. When you are figuring out ways to teach them, whenever your students get great or poor grades, or on days when nothing at all seems to be happening - a quick reminder (in

person or via email) that you are ready to help your students with anything they need will enforce in their mind that they have a safety net. This can be very helpful to alleviate fear of uncertainty.

- When you do have to shift your schedule, make sure that you can sit down with your students and tell them exactly why it is happening. Understanding the rationale behind apparently confounding actions will help your student.

- Both academically and otherwise, feel free to repeat things occasionally for your student. A sense of repetition and ritual will help your student feel grounded. That way, when something else inevitably changes in your classroom experience, your student will have something to cling to. When you talk to your student, rely on this shared past often in regular conversation. The simple act of saying things like 'remember when we learned this?' helps enforce continuity, as well as a dependable cause and effect, for your student.

- Similarly, using language that presumes a successful and happy future helps create something for your student to look forward to. Students with anxiety, and particularly those with learning disorders, can often have a difficult time conceptualizing a happy outcome - instead preferring instinctively to mull over more paranoid projections. Just saying things like 'next time, we'll have a chance to do this,' or 'later, I'm so excited that we get to do that,' will help put events in perspective.

- If you have more than one student exhibiting signs of anxiety, put them into contact with each other after you've helped coach them with more positive examples of ways to think. The fear of isolation or suffering alone often contributes a lot to uncertainty or anxiety. Make sure that your students aren't going to feed off each other's fears, of course; but, properly done, these students may be able to help each other naturally.

- Be open and honest with your students about their anxiety and fears around uncertainty. If they can put a name to it, it'll be far easier for them to face it. Just as your students should be aware of their specific learning disabilities, they should be aware that their difficulties with excessive worry may be a logical downstream effect. This way, when they know that they're having anxious thoughts, they may be better equipped to compartmentalize them in a helpful way.

- Finally, just make a point to ask your students how you can best help them. There may be some occasions where your students do not know what, precisely, they need. There may be other cases in which your students are very truly the experts in what would make them feel the most comfortable. Either way, it's often useful information,

even if it's just something that you may need to pass along to your students' care teams. Asking your students will also help them feel more confident, capable, and involved in their own care. This sense of control can go a long way toward helping students face and combat uncertainty (Nelson, 2019).

If Your Student Exhibits Social Anxiety:

- When you're working with your entire class, try to prioritize the creation of an entire accepting atmosphere in your classroom - a community of people who all work to make everyone feel included. This will be great for all of your students, including your student who may exhibit social anxiety.

- It may be easy or even feel kind to allow your student to avoid participating in community events, such as plays or after-school activities, or even daily social interactions with his or her peers. This might be intuitive, because your student with social anxiety may show particular discomfort if asked to participate in a conversation (or another similarly low-key activity. Try to avoid doing this. Although forcing a student who has social anxiety into social situations may seem cruel, it's the only way that the child will be able to learn how to accommodate these types of circumstances. Keep a close eye on the student so you can aid if necessary, but otherwise, allow the student to experience normal school events.

- Students who suffer from social anxiety often suffer a lack of self-esteem. You can work to increase this by offering small amounts of praise for any small accomplishments the student may be able to exhibit. Don't be overly or obviously excited, as that might look overblown, but just showing gratitude and happiness whenever the student willingly participates may be enough approval to help the child build up a little bit of self-esteem.

- Don't exacerbate an existing issue. When you speak to the student, speak calmly and softly. Doing otherwise might needlessly startle your student, which won't help feelings of anxiety.

- If you know an activity is coming up that your students will have a hard time confronting, go out of your way to stand next to the anxious children and gently encourage them through it. Don't give them an opportunity to just ignore or run away from the situation - but don't make them feel like they're confronting it alone.

- When you're getting ready to teach an activity that requires the students in your class to be paired up, consider pairing the students in advance for the activity—instead of

expecting everyone to choose and pair up themselves. It's a little bit of extra work for you, but it prevents a common social-anxiety nightmare. Students with social anxiety tend to fear that they will be left out or the last one picked. Prevent that from happening if you possibly can.

- If you have a younger student that has social anxiety, consider making him or her a helper or assistant in your classroom. Give this student papers to pass out, for example. This will give the individual a clearly-defined role in your classroom, which might help alleviate some of the fears and worries.
- If your student with social anxiety needs help finding calm in a crowded or chaotic situation, brainstorm with the child to find a 'safe place' that he or she can go to when feeling overwhelmed. Make sure the student knows that you need to be told before going to this safe place. For example, you could create a secret signal that your student will employ if he or she needs to go to this place to calm down.
- Finally, consider setting up a defined weekly meeting with this student - either with yourself or with a special needs or student counselor. During that meeting, make it clear that the student can and should speak openly about the struggles being facing and the anxieties that are being experienced. Use the time to brainstorm solutions, but mostly allow the student to speak. The power of getting these types of things off one's chest is sorely underestimated (Cuncic, 2020).
- By following these simple guidelines, it is entirely possible to assist children with difficulties responding to new or charged situations to learn new coping mechanisms, embrace the support and opportunities they are given, and figure out how to live a productive life. These are precisely the tools these children will need to grow as happy members of society with their learning disabilities. By helping children learn and utilize these tools, you are helping them become the people they need to be.

Section 2: Summary

Fortunately for everyone involved, there are many ways that you can help students with learning disabilities comprehend more information, enjoy their learning experience, and keep up with their peers. These strategies may take a little more effort on your part, but they can change the life of your student with a learning disability for the better.

Section 2: Key Takeaways

- Students with learning disabilities often suffer from anxiety. Incorporating solutions to alleviate anxiety in your classroom may go a long way toward helping your student.
- Similarly, many learning disabilities affect comprehension and executive function. You may find that strategizing to help your student understand better and work in a more organized fashion will help everyone in your classroom!

Section 3: Helping Parents Become Advocates of Children with Learning Disabilities

As your students' teacher, you have a unique opportunity to help your students grow in an educational setting. You may be in a position to give your child the support he or she needs, and you may even be best suited, in some cases, to recognize first that your student needs additional help.

Whether your student has a known disability when first he or she steps into your classroom or you play a part in discovering this fact, you need to realize that you alone cannot constitute full support of any student with learning disabilities. Their parents need to be advocates for their learning and support as well.

In this section, we'll discuss the importance of parents as advocates for their children who experience learning disabilities. We'll talk about the ways that you as a teacher can help parents grow in this aspect, and we'll present the ways that you, your student's other teachers, and your student's parents can all work together in the best interest of your student with special needs.

The Important Role Parents Play in Their Child's Special Education

Parents may underestimate their own importance, playing up instead of the integral role their children's teachers play instead. However, your student's parents are the ones who have the most time with these children. They make the most direct decisions, and they know their children the best. Even if you have to convince your students' parents of their importance, it's vital that you do so. Here are just a few reasons why parents have a crucial role to play in the support of their child with learning disabilities:

- Your student's parents are a vital part of your student's IEP team. As a part of the Individualized Education Program team, the parents will have to make educational

decisions that will impact your student's path. It can be easy for parents to get overwhelmed by the paperwork-laden process. It can also be easy for parents to feel intimidated when working with special needs professionals and educational experts (such as yourself). They need to remember that their sole job is to advocate for the student—and that really is the most important job of all.

- Parents are a source of critical inside input for their child's well-being. Even if parents don't feel like they have much insight into their child (for example, if they work long hours and don't get to spend much time with the child), they do. They've known their child and their child's specific learning disabilities for the longest amount of time. Even if they don't feel their contributions are important, they are.

- Beyond past or background information that your student's parents may be able to provide, parents need to recognize that they are the ones with the best (and most) opportunity to work with their children long-term. Even if they don't have official training in special needs, they remain the most important caregivers for their child's long-term success. Think of it this way: Even though you as a teacher are certainly very invested in each individual student's success, at the end of the day, you have many students to care for, and a limited number of hours in each day to do so. Your student's parents, on the other hand, even if they work full-time or have odd shifts, should have at least some opportunity to give their child their undivided attention. Parents can therefore more directly assist with homework and other assigned learning activities.

More than just being able to help with the success of any at-home assignments, parents can also more closely monitor their child's health and performance at home. If health or special needs professionals give parents signs and symptoms to look out for, for example, the parents of your student are almost certainly the ones in the best position to do so.

Because of their intimacy with the student, it's vital that parents realize their importance as part of their child's caregiving team. If you, as the teacher, can help them be more confident in their assessments and help them realize that their attendance at IEP team meetings is far more than just token, parents may be more willing to step up and make a huge difference in their child's life.

Parents can also act as a check for school teachers and administration. While parents can be less-versed in their child's disability than professionals, they can also be incredibly aware of their child's disability and the rules and regulations of your state. Be prepared

for either end of the spectrum, and make sure that (regardless of the parent's preparation) you impress upon them the importance of working together for the sake of their child.

You can let parents that you're working with know that there are four steps they can take, as parents of a child with a learning disability, to support them best. These four steps will help them fulfill the vital role they play as part of their child's caregiving team:

- The parents should learn as much as they can about their child's disability. The resources we have linked here are good jumping-off points, as are any special needs professionals in your community or special needs educators who work at your school.
- The parents should observe the learning styles their child exhibits. Remind the child's parents that learning styles often have nothing to do with academia. The parents should watch as their child learns how to tie their shoes, as their child meets new people, as their child watches TV or reads or cleans up their room. Any behavioral idiosyncrasies or patterns which the parents can report will add to the overall picture of their prognosis—which will help health and special needs professionals to provide more accurate support and guidance.
- The parents should keep very careful records of all medication, education, activities, and health evaluations that their child takes, experiences, or accrues. Various institutions will likely also have detailed records of these events and data, but these records will all exist in differing locations. Parents are the only ones who will have copies or records of all of their student's information and data. Having all of this information in one place is often a great way to put puzzle pieces together (per se) regarding their child's care.
- The parents need to contribute to any ongoing communication chains about their child's education or well-being. When educators or healthcare professionals request information about their child's status, the parents need to be able to respond, even if they don't believe their response is necessary or value-driven.

Parents are a crucial part of their student's caregiving team. However, parents often undervalue the contributions they can give—which can result in a lapse of responsibility or ownership of their child's academic and other life experiences. You can assist by reminding the parents of their intrinsic and irreplaceable value to their child's welfare, and by helping them find specific ways they can bring value to an IEP team or to their child (Morin, 2020).

Seven Ways Parents Can Advocate for Their Children

Parents usually want to do everything they can for their children. Often, they will be the true experts in their child's disorder and will be able to help you more understand how to be a part of their child's care team. Other times, you may be the one helping with the discovery of their child's learning disability. Regardless of how everyone is informed of the student's struggles, parents are an integral part of ensuring that a student with learning disabilities has a uniform and truly effective education.

Here, we'll list seven specific ways that parents can advocate for their children.

1. Realize that being a true advocate for their child with learning disabilities will take a long time. Sometimes, parents hope that a teacher can pretty much take over for their child's education and related support. This won't work with a student who is more traditionally abled, and it certainly won't be a viable solution if their student requires a large amount of individualized support. Advocacy for a child with a learning disability requires research, communication, and meetings between all involved, including the student's parents and teachers. One of the first things that parents and teachers need to realize is that if the true goal is to support the child as the child needs it, the required advocacy will take a large time commitment.

2. Parents need to become informed about their child's learning disability. So do all of the teachers who interact with the student in question. The more that a student's care team knows about his or her disability, the more comfortable you will be able to be in both supporting the child and helping others to be more comfortable around the student. This information may be difficult to come by. It will require a great deal of research, something that parents who haven't been in school for a while may not be familiar with. However, there's no way around it. Parents and teachers who are working to support a student with special needs need to read a lot of material on the student's specific learning disability, and you may need to assist parents with this research. There are conferences that parents can attend, which are great avenues for more information and there are also ways to network with other parents who are facing similar courses of action. Finally, the parents of your students with special needs are going to have a lot of questions. Even if they are already intimately familiar with their child's condition, they're going to want to know your plans as to how to make the education experience an enjoyable and efficient process. You'll need to make it clear early on that you are committed to working with their child in an empathetic, engaging manner - and then communicate frequently with the parents while working with their child.

3. You and your student's parents will need to familiarize yourselves with the various regulations and rules of your student's special education classes and programs. Each state will have different expectations for the student, and you'll need to be an expert on the specific subtleties of your student's situation. A good first resource is your state's Department of Education. If your student has a specific special education teacher (or if your district or school has such an expert), this would be a good resource as well. Contacting someone in the community who is familiar with both your student's specific disability and the state's programs and accommodations under these circumstances is definitely a good thing for both you and the student's parents to do.

4. If your student has an assigned team of care professionals, work closely with each of them. Over-communication between every individual - parents, teachers, and special needs professionals - who works with the student will be key. Everyone will bring nuanced and essential information to the table. Positive and comprehensive communication will make it easy to take advantage of the differing perspectives when working to support the child. At the very least, make sure that everyone has each care professional's contact information. If you are able to take the initiative in getting in touch with these individuals on a regular basis to benefit the student, do so. This could be as simple as setting up an ongoing email chain, to which you send occasional updates regarding the child's performance in school. If you feel the need to have an in-person meeting, or if something happens that either you or the parents need to run past a professional, you'll already have the network in place to make that easily accessible.

5. Ensure that you have a centralized location for all paperwork regarding the student's education. Special education often requires (and produces) large amounts of official forms and other types of documentation. Parents and teachers alike can consider this a nuisance. It may fall to you to make sure that everything is organized, and that there are backup copies of essential forms. All paperwork regarding the student's IEP (Individualized Education Program) needs to be in one place, as does information relevant to a student's 504 Plan. If you need assistance with the way this information should best be organized, talk to a special education director at your school. For better or for worse, your student's parents will likely assume that you are more on top of this information than they are, and may request related information from you at any time.

6. When it's time for you to meet with your student's parents, don't forget that they have a lot on the line. They are extremely invested in their 's child's future, and they have a more emotional attachment to the case than you do. They may be very protective; they may be scared. If you are meeting with your student's parents and other professionals at the same time, you might have to function as a bridge, or as a support system for the parents while you are all learning how best to support the student. Remember that you can offer insight to the parents and the professionals, and you also need information from the parents. Ensuring that everyone is treated as an integral part of your student's care team will result in more powerful support for the student.

7. Make sure that the child, if appropriate, is kept apprised of the relationship and communications between his or her parents, teachers, and other professionals. As one of the goals of education, special or otherwise, is to produce students who are capable of taking care of themselves and becoming valuable and productive members of society, your student with a learning disability needs to know how best to take care of him or herself. This does not include keeping your student uninformed or keeping him or her out of the loop. As best as you can, or as is appropriate, let your student know what is happening in meetings that concern his or her care or future. In return, ask your student if he or she has questions that need answers from the care team, or if he or she has any frustrations, hopes, successes, or disappointments that he or she would like the team to know. Some students may feel comfortable sharing this with their parents on their own. They may not. One of your roles is to function as a facilitator of these types of conversations. Embrace it.

When you're partnering with a children's parents to form a team to support their success, you may find that you need to stand up for the child in ways you might not need to apply for other children. In these cases, it's important to be confident in your role, compassionate to the needs of others, and to stand up for the child's rights and needs as much as you possibly can (Protected Tomorrows, 2016).

Section 3: Key Takeaways

- Parents often underestimate their importance to their child's educational team. Their importance is, however, paramount. As a teacher, you can help parents understand and appreciate this.

- Parents need to be informed about their child's learning disability.

- Parents can assist with helping their child learn at home, observing a child's symptoms, helping finetune treatment, and more.
- As a teacher, one of your goals is to support both the parent and child so that they can support each other.

Conclusion

Ultimately, when you are working to support a student in your classroom who needs special accommodations, you need to remember that that student is scared, but smart. When you're designing your curriculum, when you are managing your classroom, and when you are working with that student one-on-one, there are things you can do to ensure that the student is learning and having a good experience. Helping mitigate your student's anxiety, prioritizing parental support, and simply being observant so you can identify when a student may be struggling: These are all ways that you can assist your students with learning disabilities so that they experience a stellar education while under your care.

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Part 2:

The Identification of Specific Learning Disabilities: A Summary of Research on Best Practices

Specific learning disability (SLD) is the most common eligibility category through which students receive special education services under the Individuals with Disabilities Education Act (IDEA). In Texas alone, more than 150,000 students received special education services in the 2016–2017 school year due to an identified SLD (Texas Education Agency, 2017). The rules and procedures by which students are identified with SLD affect an even greater number of students. As a result, the validity of these rules and procedures for identification must be considered as not just a legal and scientific question, but also as a question of fairness and access.

In this report, we summarize research on the identification of SLD and make recommendations for practice. The report begins with a summary of the legal requirements for SLD identification and what constitutes a comprehensive evaluation. It then discusses the attributes of SLD according to different conceptual frameworks and reviews research on the reliability and validity of different methods for SLD identification that emanate from these frameworks. The report concludes with recommendations for best practice, regardless of the specific identification methods employed.

Legal Requirements for SLD Identification

SLD in IDEA 2004

IDEA 2004 defines the term "specific learning disability" as "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations." This definition has been unchanged since the initial legislation that is now IDEA 2004 was passed in 1975, Public Law 94-142. However, this consistency in the federal statute belies a significant shift in how SLD is conceptualized in federal regulatory guidance. When regulations for Public Law 94-142 were released in 1977, SLD was identified by a significant discrepancy between an intelligence quotient (IQ) and achievement (IQ-achievement discrepancy method). Additional criteria were designed to ensure that low achievement was not primarily due to another factor: sensory or motor disabilities, intellectual disabilities, emotional or behavioral disorders, economic disadvantage, cultural factors, or limited English proficiency. Each state then defined its own specific criteria for SLD identification following this guidance.

In Texas, a significant discrepancy was defined as a score in one of the seven academic domains of SLD (derived from the original statutory definition) that was 16 points lower than the student's IQ score. A comprehensive evaluation under this method included the administration of IQ and achievement tests, as well as data gathered by other procedures, such as through observations of the child and evaluation of the exclusionary factors. Consistent with current standards, the assessment procedures were determined by the Admission, Review, and Dismissal (ARD) team to be necessary for a determination of eligibility for special education services as a student with SLD.

The special education legislation has been reauthorized several times since 1975. Through the last revision, in IDEA 2004, the statutory definition of SLD has not changed. However, with each revision, there were changes in the regulations and guidance, although the use of IQ-achievement discrepancy criteria remained constant until the 2004 revision. The 2004 committee recommended movement away from

IQ-achievement discrepancy criteria because of a lack of evidence for the validity of such procedures. In addition, the commission recommended that states permit use of methods based on response to intervention (RTI). In IDEA 2004, Congress indicated that states (1) could not require districts to use IQ tests for the identification of students for special education in the SLD category and (2) had to permit districts to implement identification models that incorporated response to scientifically based instruction (IDEA 2004, 34 CFR §300.309). In addition, the statute indicated that children could not be identified for special education if poor achievement was due to lack of appropriate instruction in reading or math or due to limited proficiency in English.

IDEA 2004 Revised SLD Eligibility Criteria

A state must adopt…criteria for determining whether a child has a specific learning disability … In addition, the criteria adopted by the state:

- Must not require the use of a severe discrepancy between intellectual ability and achievement for determining whether a child has a specific learning disability …
- Must permit the use of a process based on the child's response to scientific, research-based intervention; and
- May permit the use of other alternative research-based procedures for determining whether a child has a specific learning disability…

—U.S. Department of Education, 2006, p. 46786

In its 2006 regulations, the Department of Education indicated that states must allow districts to make choices about procedures for SLD identification if the decisions were consistent with state rule-making processes. States had to permit the use of RTI criteria but did not have to make rules that permitted other methods of identification.

2006 Regulations for IDEA 2004

(1) The child does not achieve adequately for the child's age or to meet State-approved grade-level standards in one or more of the following areas when provided with learning experiences and instruction appropriate for the child's age or State-approved grade-level standards:

(i) Oral expression.

(ii) Listening comprehension.

(iii) Written expression.

(iv) Basic reading skill.

(v) Reading fluency skills.

(vi) Reading comprehension.

(vii) Mathematics calculation.

(viii) Mathematics problem solving.

(2)

(i) The child does not make sufficient progress to meet age or State-approved grade-level standards in one or more of the areas identified in paragraph (a)(1) of this section when using a process based on the child's response to scientific, research-based intervention; or

(ii) The child exhibits a pattern of strengths and weaknesses in performance, achievement, or both, relative to age, State-approved grade-level standards, or intellectual development, that is determined by the group to be relevant to the identification of a specific learning disability, using appropriate assessments, consistent with §§ 300.304 and 300.305; and

(3) The group determines that its findings under paragraphs (a)(1) and (2) of this section are not primarily the result of

(i) A visual, hearing, or motor disability;

(ii) Mental retardation;

(iii) Emotional disturbance;

(iv) Cultural factors;

(v) Environmental or economic disadvantage; or

(vi) Limited English proficiency.

Texas Guidelines for SLD

Texas essentially adopted these criteria for SLD eligibility when it wrote its rules for special education, with some modifications. Consistent with the federal guidelines, the Texas guidelines require formal documentation of the provision of adequate general education instruction. The Texas guidelines are also flexible, permitting either a process based on RTI or one based on a discrepancy model. Under the latter, additional clarifications were provided on what constituted inadequate achievement and how to establish a discrepancy based on a pattern of strengths and weaknesses.

Texas Guidelines for SLD Identification

(9) Learning disability.

(A) Prior to and as part of the evaluation described in subparagraph (B) of this paragraph and 34 CFR, §§300.307-300.311, and in order to ensure that underachievement in a student suspected of having a specific learning disability is not due to lack of appropriate instruction in reading or mathematics, the following must be considered:

(i) data that demonstrates the student was provided appropriate instruction in reading (as described in 20 United States Code (USC), §6368(3)), and/or mathematics within general education settings delivered by qualified personnel; and

(ii) data-based documentation of repeated assessments of achievement at reasonable intervals, reflecting formal evaluation of student progress during instruction. Data-based documentation of repeated assessments may include, but is not limited to, response to intervention progress monitoring results, in-class tests on grade-level curriculum, or other regularly administered assessments. Intervals are considered reasonable if consistent with the assessment requirements of a student's specific instructional program.

(B) A student with a learning disability is one who:

(i) has been determined through a variety of assessment tools and strategies to meet the criteria for a specific learning disability as stated in 34 CFR, §300.8(c)(10), in accordance with the provisions in 34 CFR, §§300.307-300.311; and

(ii) does not achieve adequately for the student's age or meet state-approved grade-level standards in oral expression, listening comprehension, written expression, basic reading skill, reading fluency skills, reading comprehension, mathematics calculation, or mathematics problem solving when provided appropriate instruction, as indicated by performance on multiple measures such as in-class tests; grade average over time (e.g., six weeks, semester); norm- or criterion-referenced tests; statewide assessments; or a process based on the student's response to scientific, research-based intervention; and

(I) does not make sufficient progress when provided a process based on the student's response to scientific, research-based intervention (as defined in 20 USC, §7801(37)), as indicated by the student's performance relative to the performance of the student's peers on repeated, curriculum-based assessments of achievement at reasonable intervals, reflecting student progress during classroom instruction; or

(II) exhibits a pattern of strengths and weaknesses in performance, achievement, or both relative to age, grade-level standards, or intellectual ability, as indicated by significant variance among specific areas of cognitive function, such as working memory and verbal comprehension, or between specific areas of cognitive function and academic achievement.

The Texas criteria parallel the federal regulations in providing a number of options for determining inadequate achievement. The criteria also specify ways of determining patterns of strengths and weaknesses, which can include "significant variance among specific areas of cognitive function, such as working memory and verbal comprehension, or between specific areas of cognitive function and academic achievement." In the federal regulations, like the Texas regulations, districts adopt either a framework based on an RTI service delivery model or a framework based on a discrepancy of achievement with age, grade-level standards, IQ, or a pattern of strengths and weaknesses in cognitive skills. Generally, both criteria should not be required because the frameworks are different and the application of both would result in more testing than is needed for SLD identification. The regulations explicitly indicate that a choice should be made between RTI and discrepancy methods, but both frameworks have common requirements, including ensuring the adequacy of general education instruction, requirements for a comprehensive evaluation, and interdisciplinary team decisions.

Comprehensive Evaluation

Regardless of the SLD identification framework a district chooses to implement, a comprehensive evaluation is required. IDEA 2004 specified eight criteria for a comprehensive evaluation. These criteria help to ensure that the evaluation addresses all possible explanations for the student's academic difficulties and that multiple criteria are met for identification. The regulations for IDEA 2004 defined a comprehensive evaluation as a "data-gathering process." The regulations also indicated that eligibility could not be established based on a single criterion, reflecting concern about some states' rigid use of formulae for SLD as the primary eligibility criterion and to reduce concerns that some districts would use only RTI as the primary criterion. The sidebar "Eight Components of a Comprehensive Evaluation" is a summary of these requirements; the specific federal guidelines should be consulted as authoritative. The criteria reviewed above for SLD identification are in addition to these criteria. Additionally, note that a comprehensive evaluation does not require standardized testing and that the use of a formula as the primary requirement for eligibility, such as a specific index of inadequate response to instruction, a fixed discrepancy threshold, or a fixed low-achievement threshold, would represent the use of a single criterion and would not meet requirements for a comprehensive evaluation.

Eight Components of a Comprehensive Evaluation

1. Use a variety of assessment tools and strategies to gather relevant functional, developmental, and academic information about the child, including information provided by the parent (comprehensive data-gathering process)
2. May not use any single measure or assessment as the sole criterion
3. Must use technically sound instruments that are
   - racially and culturally fair, administered in native language;
   - used for purposes for which they are reliable and valid;
   - administered as designed by trained and knowledgeable personnel; and
   - tailored to area of educational need, adapted to physical and sensory disabilities
4. The child is assessed in all areas related to the suspected disability (i.e., it's a data-gathering process)
5. The evaluation is coordinated with assessments of other [local education agencies] (e.g., when the student comes to a new school district with a previous evaluation and [individualized education program], these data must be considered)
6. The evaluation is sufficiently comprehensive to identify the child's special education and related service needs, whether or not commonly linked to the identified disability category (i.e., interventions may be provided that reflect the child's individual needs regardless of the eligibility category)
7. Assessment data directly assist persons in determining the educational needs of the child (e.g., IQ scores are composites and not indicators of intervention goals)
8. Additional requirements: Review existing relevant evaluations and data and determine what additional data are needed (e.g., formal testing may not be needed)

Overview of SLD

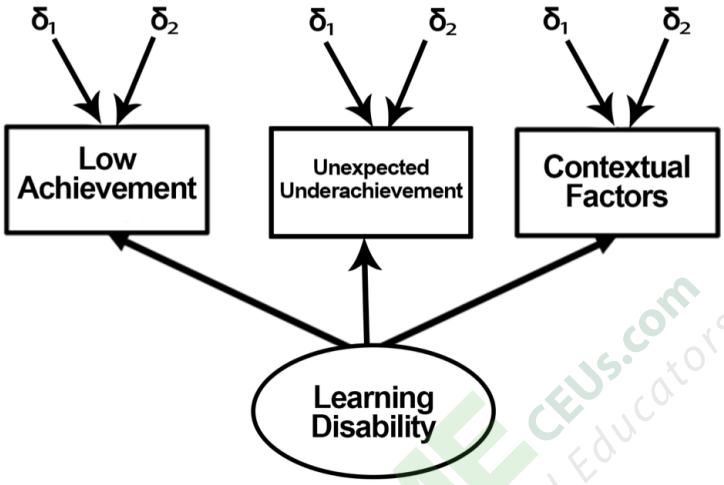
Classification Versus Identification

The methods used to implement a comprehensive evaluation often involve standardized tests, and the specific tests vary depending on the method chosen. The tests also vary in reliability and validity, but contemporary tests generally are well-constructed and strong in reliability. However, a small amount of unreliability inherent to a test can dramatically affect the reliability of SLD identification decisions for individual students. There are also varying degrees of validity for the identification methods themselves. There is no litmus test for SLD, a construct that can be known only by virtue of how it is measured. In this respect, SLD is like other constructs, such as IQ. IQ is known through measurement, and different theories lead to different approaches to measurement, yielding different assessments of IQ in an individual.

This issue is illustrated in Figure 1, which shows SLD as a construct indicated by how it is measured (δ

= a measured data point). As Figure 1 shows, we can implement different methods, which may include an evaluation of achievement, cognitive skills, and the exclusionary factors. The latter are contextual factors, like emotional functioning or economic disadvantage, or other disorders that may explain low achievement, like an intellectual disability or sensory disorder. For these indicators of SLD, our measures are inherently imperfect indicators not only because of the small degree of unreliability of the tests and observations, but also because of the validity of the underlying conceptual model of SLD.

Figure 1. The Measurement of SLD



To understand how to assess the reliability and validity of different methods for SLD identification, it is important to consider the relation of classification and identification. When different methods for identification are used, a set of attributes are proposed that are considered essential characteristics of the disorder. Among the attributes we discussed above are IQ, low achievement, cognitive discrepancies, and instructional response. These attributes are combined based on a theory of what does and does not constitute a particular disorder, like SLD. They then form a classification that specifies subgroups with and without the proposed characteristics of SLD. When we test a person for SLD, we give tests and consider other factors to identify members of the group with SLD. This process, **identification**, is a decision made about whether the individual meets criteria for SLD. The underlying classification must be valid for identification to be valid. In addition, the method must have adequate coverage. For example, if the prevalence of LD is 5% to 10%, as is widely believed, the method should identify 5% to 10% of the population as having SLD. The validity of classifications is evaluated by comparing the subgroups (e.g., low achievers vs. SLD) on variables like other cognitive skills, brain activation profiles, intervention response, or prognosis. If the classification is valid, the subgroups should show meaningful differences and the coverage should be adequate.

Identification is a reliability issue. If identification is reliable, different measures of the same attribute should show agreement that the person meets criteria for SLD. For IQ-achievement discrepancy, for example, two sets of IQ and achievement tests should agree that the person has SLD or two measures of word decoding should lead to the same decision about which individuals are impaired in basic reading skills.

Attributes of SLD

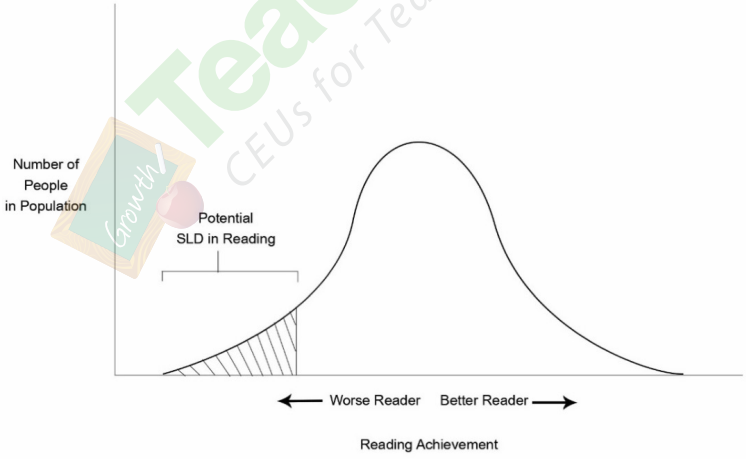
Regardless of the framework by which we wish to classify SLD, inherent characteristics of SLD make reliable identification difficult, create uncertainty, and possibly foment scientific disagreement.

The Attributes of SLD Are Dimensional

Generally speaking, there are two types of disorders: categorical and dimensional. Categorical disorders are binary conditions. An individual has the condition or doesn't. For example, pregnancy is a binary condition. You are either pregnant or not. Most cancers and viruses are categorical disorders. However, not all disorders are categorical; some represent a division of a continuous distribution with no natural demarcation, like high blood pressure. There is no natural threshold that separates an individual with hypertension from one without. Instead, clinicians draw artificial thresholds to identify individuals with hypertension based on empirical evidence of outcomes for individuals with elevated blood pressure. Interestingly, these thresholds are usually expressed as ranges, not single values, and take into account other factors, such as family history, dietary factors that increase risk for cardiovascular events, and the individual's history of blood pressure assessments.

The attributes of LD are similar. Although researchers once thought that a bimodal distribution was indicative of a categorical disorder, more rigorous evaluations find that the attributes of LD are continuously distributed, as illustrated for one dimension (reading achievement) in Figure 2. For example, no natural demarcation in reading comprehension separates students with SLD in reading from students without SLD. As a result, rigid cut points (e.g., performance greater than one grade level below grade expectation) are inherently problematic. A student who scores .9 grade levels below grade-level expectations in reading and a student who scores 1.1 grade levels below expectations are very similar, and the difference is likely measurement error if based on a single assessment. Further, it is likely that the educational needs of these students are highly similar. As a result, it is important that school psychologists and diagnosticians think about a range of scores, as expressed by confidence intervals, and do not apply rigid cut points.

Figure 2. A Continuous, Normal Distribution of Reading Achievement



SLD Is a Latent, or Unobservable, Construct

A latent construct is theoretical and cannot be directly observed. SLD is not directly observable outside of attempts to measure hypothesized attributes. However, no test perfectly measures the latent construct of interest; no reading test perfectly measures a child's ability to understand what she reads and no math test perfectly measures math ability. Thus, it is important to remember that all test scores, observations, or rating scales include uncertainty and error. This fact has important implications for the reliability of SLD identification decisions at the individual level.

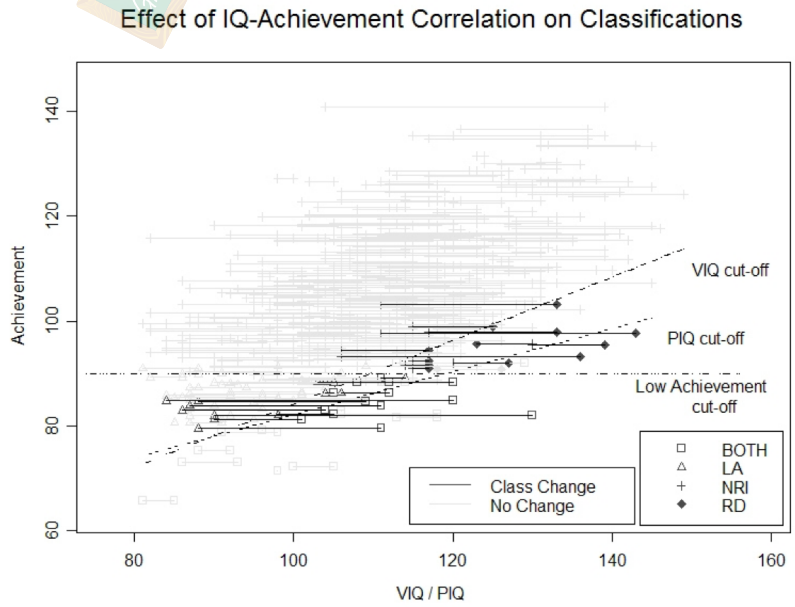
The Reliability of Identification Is a Universal Problem

All SLD identification methods have problems with reliability. If a formula or firm threshold is used, a student identified with one method may not be identified with SLD using another method or even another set of tests. The issue of low agreement is a universal concern when identifying learning disabilities using psychometric tests with fixed cut points. In addition, different measures are correlated, and the measures themselves are slightly unreliable, so it becomes difficult to assess exactly where an individual resides relative to a fixed cut point. This is true whether the cut point is the score on an achievement test, such as everyone who reads below the 15th percentile has SLD. It is also true if we use a 16-point IQ-achievement discrepancy or a threshold of 60 words read correctly on an oral reading probe in an RTI method. Our ability to assess precisely where the student's true score is relative to this firm threshold is not reliable. Even with the same student, different tests or the same tests on different measurement occasions will generate a range of scores around the 15th percentile, a 16-point discrepancy, or reading 60 words per minute. If we have multiple tests of the same type of achievement and they are consistently below these thresholds, we can be more confident that the student's true score is below the threshold. Even better, we could express the unreliability of the test as the standard error of measurement and specify a confidence interval, so that a range of scores could indicate the presence of SLD. We could also incorporate other data supports that might inform the judgment of the ARD team, such as previous academic and classroom performance, grades, observations of the child, and the parents' and teacher's perceptions of the student's performance.

Examples of the Reliability Issue

Figure 3 illustrates the effects of rigid cut points and correlated variables on the reliability of identification decisions using an IQ-achievement discrepancy method. In the figure, two sloped lines differentiate those with SLD based on an IQ-achievement discrepancy measured with a verbal IQ score or a performance IQ score. The line is steeper for verbal IQ because it is more highly correlated with reading (r = .69) than performance IQ (r = .40) Changing the IQ measure shifts the individuals' IQ score right or left on the x-axis but does not move their achievement score up or down because the achievement measure is the same. That simple difference in IQ measures shifts individuals at the edges of the regression cut point on one IQ measure to either a discrepant SLD or low-achieving subgroup when the other IQ measure is used.

Figure 3. Illustration of the Reliability of Identification for SLD (Francis et al., 2005)



These shifts are displayed by a horizontal line that connects pairs of observations. An observation that does not change in the identified group has the same symbol connected by a faint horizontal line; observations that change groups have two different symbols (reflecting the different identification decisions) connected by a dark horizontal line. As Figure 3 illustrates, observations with IQ scores that are most different and near the cut point are most likely to shift in their SLD identification decision, reflecting both measurement error and differences between how the construct of aptitude is assessed by verbal and performance IQ. Recall, though, that each of the dark lines in the figure denotes a single student who would change SLD category based on the test or criteria applied—not because the child or her educational needs have changed, but due to the inherent limitations of methods that rely on firm thresholds or use different methods or criteria. Further, one may observe in the figure that the distribution of students who shift categories results in a sloped area of uncertainty, in which identification decisions are most unstable. Students whose scores fall close to or within this area of uncertainty are likely very similar to those highlighted in the figure as shifters. What is different about these students, even if they are somewhat more stable in our illustration? Their educational needs and assessment results will be highly similar.

We will discuss how to deal with these reliability issues in the last section. But these examples show why firm thresholds and formulae are problematic for SLD identification. Methods are not interchangeable and different tests will give different answers, especially if identification is based on a firm threshold.

Frameworks for Understanding SLD

Embedded in the IDEA 2004 statutes and 2006 regulations are controversies about the most valid framework for understanding classification for SLD and the methods for identification that would emanate from those frameworks. These classifications are inherent in the regulations, but many districts have sought guidance in making decisions about these frameworks. Two general frameworks are relevant for IDEA 2004: cognitive discrepancy frameworks and instructional frameworks that emanate from RTI. Because these regulations were published more than 10 years ago, additional research has emerged on the reliability and validity of these different identification frameworks. In the sections that follow, we discuss the evidence base for different implementations of these frameworks and the identification methods embedded in each framework to provide guidelines and best practices.

Cognitive Discrepancy Frameworks

Most school psychologists and special educators are familiar with cognitive discrepancy frameworks for understanding SLD because of the 1977 regulations that introduced the IQ-achievement discrepancy method as a necessary inclusionary criterion for operationally defining SLD. Cognitive discrepancy frameworks for SLD hold that academic deficits among children with SLD are unexpected because of the presence of average or strong cognitive abilities or due to the presence of specific cognitive strengths and weaknesses. Within this framework, the discrepancy between cognitive processing ability and academic achievement represents one of the defining features of SLD and differentiates it from "garden variety" low achievement, which is low achievement that is commensurate with low overall ability and is therefore not unexpected.

Over the ensuing decades, concerns about the reliability and validity of IQ-achievement discrepancy methods emerged. As a result, new proposals for cognitive discrepancy frameworks began to be put forth, which we refer to as patterns of processing strength and weaknesses (PSW) methods. These

methods hypothesize that low academic achievement is unexpected because of the presence of cognitive processing strengths, in combination with specific cognitive weaknesses that provide a potential explanation for specific academic weaknesses. These methods draw a distinction between expected underachievement, which can be attributed to commensurate aptitude and achievement, and unexpected underachievement, which is by marked an intraindividual pattern of strengths and weaknesses, the latter representing an inclusionary criterion. Thus, methods based on this framework feature a comprehensive assessment that includes an extensive evaluation of achievement and cognitive processes.

Instructional Frameworks

An alternative hypothesis is put forth by advocates for an instructional framework for understanding SLD. Instructional approaches represent a different classification hypothesis concerning the intrinsic nature of SLD. These approaches hypothesize that unexpected underachievement is due to inadequate RTI interventions that are generally effective with most students. Thus, operational definitions and measurement models within an instructional framework attempt to document inadequate instructional response as a key inclusionary criterion, a major contrast with frameworks in which cognitive discrepancy is the major inclusionary criterion. Instructional approaches do not recognize a cognitive discrepancy as an intrinsic attribute of students with SLD. Therefore, the comprehensive assessment need not incorporate assessment of cognitive functioning, except to rule out other disabilities or disorders (e.g., intellectual disabilities).

How Can Competing Frameworks Be Compared?

Empirical Research

School psychology and special education are wide-ranging fields with foundations in empirical research. Among other topics, this research addresses (1) the nature of cognition and learning; (2) effective intervention practices for all learners, but particularly those who struggle to master basic foundational skills; (3) the relations between cognition, attention, and executive control processes, and academic achievement; and (4) the cognitive profiles of students who experience academic difficulties. Such studies are important and can identify potential intervention targets and inform proposals for SLD identification methods. However, prior to widespread adoption, proposed practices in school psychology and special education should be directly investigated in empirical research. SLD identification methods should be evaluated by applying the proposed criteria to form subgroups and comparing those resulting subgroups. Reliability for the proposed method should be evaluated by comparing decisions across differences in measures, measurement occasion, cut points, or specific criteria to determine agreement for identification decisions. The reliability of different methods is expressed at the level of individual decisions. For validity, groups that meet and don't meet the method-generated criteria can be compared on measures that are not used for group formation, such as other assessments of academic achievement, subsequent intervention response, cognitive functioning, or neuroimaging. If the proposed groups differ on these external dimensions, the underlying classification accrues validity. This process of validation through empirical research defines evidence-based practice in education and school psychology.

Data Simulation

Data simulation can also help inform valid decision-making from psychoeducational assessments. In this context, data simulation refers to a procedure in which datasets are constructed and used to evaluate the reliability and/or validity of specific methods or statistical analyses or to evaluate the effects on outcomes of changes in some of the relevant variables. When evaluating methods for SLD identification, data simulations are particularly valuable. First, data simulations allow researchers to investigate complex

methods that rely on multiple data points and would be expensive to investigate with real children. Second, data simulation allows researchers to evaluate how well the application of proposed methods parallel a "known" underlying structure. For example, a researcher could create a "true" SLD status, based on a priori criteria and evaluate whether unreliable test data would accurately identify children as having SLD or not, an impossible task in the real world, in which all data are unreliable. Third, data simulation permits manipulation of specific variables (e.g., test reliability, different cut points) to evaluate the effect of these changes on identification decisions. Finally, data simulation allows researchers to draw conclusions about the universality of underlying psychometric properties across a full range of possible correlations between tests and test reliabilities. For these reasons, a careful evaluation of the results of data simulation studies can help address important questions about whether proposed methods to identify SLD can ever achieve high enough reliability to warrant consideration for widespread adoption.

Fairness and Coverage

Finally, it is important to note the consequential nature of SLD identification procedures. The SLD identification decision may result in the provision or denial of procedural safeguards, as well as accommodations and modifications to instruction and assessment. Due to these significant consequences, it is critical that the identification process demonstrate an underlying fairness and that it be rooted in a response to educational need, rather than theoretical definitions of what SLD is. In addition, the method should identify a reasonable number of children with SLD. Macmann, Barnett, Lombard, Belton-Kocher, and Sharpe (1989) summarized this imperative as a need to root our classification systems in a "coherent psychology of helping" (p. 145). We echo this call in a humble assertion that the best method for the identification of SLD is the one that helps the most children learn to read, write, and do math well.

Validity Research on Cognitive Discrepancy Methods

IQ-Achievement Discrepancy

The key attributes of an IQ-achievement discrepancy method are aptitude and achievement, as illustrated in Figure 4. Aptitude is a **capacity** measure that indicates how much children should be able to learn. Although many have questioned this idea, it is important to recognize the meaning of aptitude as an indicator of the capacity to achieve. We have referred to these methods throughout this report as IQ-achievement methods because IQ scores are the most common measure of aptitude. However, IQ is not the only potential indicator of aptitude. For example, in the past, some have proposed that tests of listening comprehension or language might be used, but there has been little research into the reliability or validity of this use. Additionally, these methods may rely on different IQ tests or scores. Thus, one school psychologist may use a full-scale composite IQ, another might use performance IQ, and a third might rely on verbal IQ.

Figure 4. Illustration of IQ-Achievement Discrepancy

Fletcher, Lyon, Fuchs, and Barnes (2019) reviewed the evidence for the validity of aptitude-achievement methods using the most commonly employed approach: IQ-achievement discrepancy. Within the school psychology and special education research communities, there is broad consensus that these methods lack validity because it is hard to find meaningful differences between students with low achievement who meet and don't meet IQ-achievement discrepancy. This research is summarized below.

What's Wrong With IQ-Achievement Discrepancy

1. The classification lacks validity. IQ-discrepant students and students with low achievement consistent with IQ who do not meet criteria for an intellectual disability do not differ practically in behavior, achievement, cognitive skills, response to instruction, and neurobiological correlates once definitional variability is controlled (Stuebing et al., 2002).

2. Although it is not an intuitive finding, IQ is not a strong predictor of intervention response when the initial level of academic development is included (Stuebing, Barth, Molfese, Weiss, & Fletcher, 2009).

3. Brain activation profiles of these students are not meaningfully different (Simos, Fletcher, Rezaie, & Papanicolaou, 2014; Tanaka et al., 2011).

At the time when IQ-achievement discrepancy methods were adopted, initial research seemed to support the validity of the discrepancy criteria based on a "hump" in the distribution of reading achievement, which the authors hypothesized represented a subgroup with SLD, although they did not use this term at the time (Rutter & Yule, 1975). However, subsequent studies have questioned these findings because no exclusionary criteria were applied. Many of the poor readers who represented the subgroup without an IQ-achievement discrepancy were brain-injured and/or had intellectual disabilities (Fletcher et al., 1994). Since this study, most efforts to validate these differences in IQ-discrepant and low-achieving poor readers have yielded no meaningful differences.

Figure 3 is based on a data simulation by Francis et al. (2005) that found that about 30% of students tested twice would change status from SLD to not-SLD and another 30% would change from not-SLD to SLD. This type of finding has been demonstrated in other data simulations (Macmann & Barnett, 1985; Shepard, 1980).

Two empirical syntheses evaluating the differences between poor readers who demonstrate an IQ-achievement discrepancy and poor readers who do not demonstrate a discrepancy have been completed. Empirical syntheses are systematic summaries of all of the research in a specific area. Often, the results are combined statistically in a process called meta-analysis to evaluate a specific research question across many research samples. In the first of these empirical syntheses, Hoskyn and Swanson (2000) identified 69 studies conducted between 1975 and 1996 with results that could be used to address the validity of the IQ-achievement discrepancies. They found negligible to small differences on several measures of reading and phonological processing but larger differences (IQ-discrepant > low achievement) on measures of vocabulary and syntax. Importantly, there was no evidence of practical differences in reading and measures most closely related to reading, like phonological awareness.

In a second empirical synthesis, Stuebing et al. (2002) evaluated 46 studies from a sample of more than 300 from 1973 to 1998. The synthesis sought to compare poor readers who were discrepant in IQ and achievement and poor readers who were not on external dimensions, like achievement, behavior, or cognitive functioning. The two groups were clearly not different in behavior or achievement. Cognitive

abilities closely related to reading, such as phonological awareness, rapid naming, verbal memory, and vocabulary, also demonstrated no differences. Nonverbal measures of spatial processing and concept formation indicated small, but higher scores for the IQ-discrepant group, reflecting their relation with the IQ test. The average difference in cognitive ability in these areas was about 0.3 standard deviations, despite a difference of 1 standard deviation in IQ (which had been used to form the groups). This finding means that the application of IQ-achievement discrepancy criteria required an IQ-achievement difference of 15 points, but the difference between the groups in other cognitive abilities was 4 to 5 standard score points.

Other studies found little evidence that validity evidence would emerge if researchers used different or better aptitude and achievement measures, although these differences in measures would affect who is identified with SLD at the individual level. Further, no differences were found in the long-term development of reading skills in poor readers with and without IQ-achievement discrepancies (Flowers, Meyer, Lovato, Wood, & Felton, 2001; Vellutino, Scanlon, & Lyon, 2000). Over time, these two groups develop reading skills similarly. This is true even when evaluating how groups of poor readers with and without an IQ-achievement discrepancy respond to specific reading interventions. To address this question, several studies have examined whether IQ alone or the existence of an IQ-achievement discrepancy predicted how well a student would respond to an intensive reading intervention. In an empirical synthesis summarizing research addressing these questions, Stuebing et al. (2009) found that IQ accounted for almost no unique variance in intervention outcomes. This finding means that although some students showed good response and others demonstrated little response to intensive reading interventions, IQ (and therefore IQ-achievement discrepancy) was not meaningfully related to these differences and could not be used to predict who would respond and who would not. Finally, in functional neuroimaging studies, Tanaka et al. (2011) and Simos et al. (2014) found no differences in the activation patterns associated with word reading in groups of poor readers divided by the presence or absence of an IQ-achievement discrepancy.

What Do These Findings Mean?

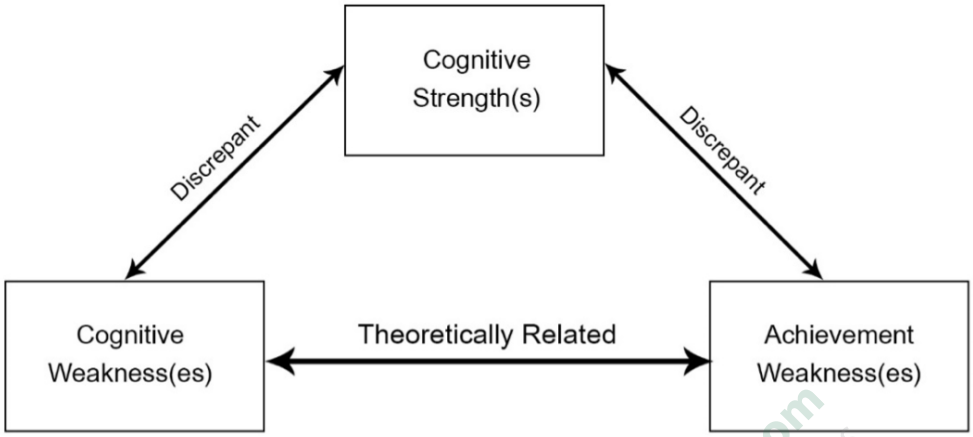
When multiple studies show weak validity, indicated by no practical differences between groups produced by the identification criteria, the validity of the underlying approach to identification must be questioned. At a superficial level, it may appear that aptitude-achievement methods represent a valid identification process because the methods identify the lowest-achieving students at each level of IQ. However, that does not represent the most critical comparison; aptitude-achievement methods are not valid because there is not sufficient evidence to demonstrate that low-achieving students with and without an aptitude-achievement discrepancy are different in any educationally meaningful way. This creates an issue of fairness because their educational needs are similar. Coverage is not an issue because that would depend on the threshold for low achievement that was set; the method will generally identify the number of children at the threshold.

Processing Strengths and Weaknesses

Identification methods based on PSW are commonly proposed and discussed in the professional school psychology literature and are frequently implemented in Texas and many other states. However, there is considerable controversy about the reliability and validity of these models. As Figure 5 illustrates, PSW models generally require the identification of a cognitive strength and weakness, in addition to an academic weakness. The cognitive weakness must be theoretically related to the achievement weakness. Proponents argue that the related academic and cognitive weaknesses can identify the cause of academic difficulties, but such conclusions are not possible from limited test data at one time point. Described with terms such as "concordance-discordance" and "cross-battery," PSW methods are often

treated as interchangeable, independent of the tests used to operationalize the methods, and facilitating of intervention. While appealing logically, there is little evidence for the reliability and validity of these approaches.

Figure 5. Illustration of PSW for SLD Identification Conceptual Model

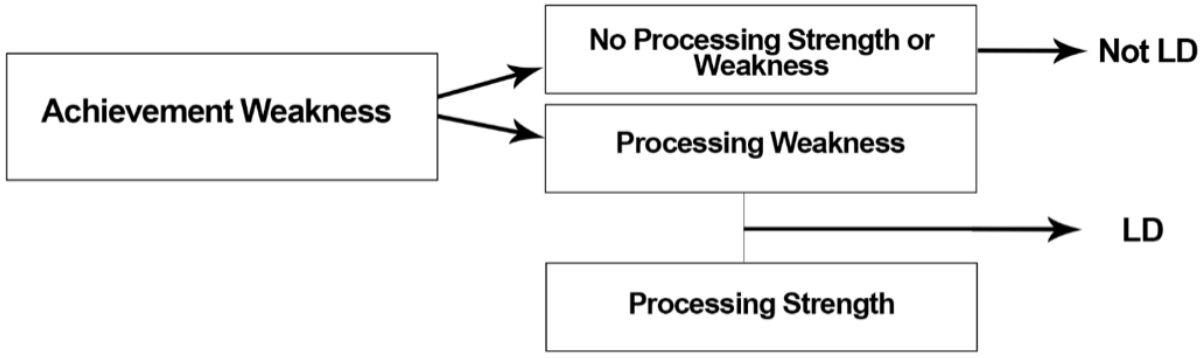


Multiple approaches have been proposed to identify SLD with a PSW approach and are in use in Texas: (1) the concordance/discordance method (C/DM; Hale & Fiorello, 2004); (2) the dual discrepancy/consistency criteria (DD/C; Flanagan, Ortiz, & Alfonso, 2013), a method that emanates from the cross battery assessment (XBA) approach to comprehensive evaluation; (3) the discrepancy/consistency method (D/CM; Naglieri, 1999); (4) the core-selective evaluation process (C-SEP; Schultz & Stephens, 2015, 2017); and (5) the psychological processing analyzer (PPA) method (Dehn, 2013). Figure 6 illustrates the inclusionary criteria that must be documented across these PSW methods.

However, these methods differ in several ways, including how low achievement is established, how a profile of PSW is defined, and how exclusionary factors are considered. For example, in C/DM, cognitive scores are used to identify a within-person PSW without consideration of normative expectations. In contrast, DD/C, C-SEP, and D/CM use both normative and within-person comparisons. The methods also differ in how they apply cognitive theory and what tests are specified. For example, DD/C and C-SEP are closely linked to XBA and use the Cattell-Horn-Carroll theory of intelligence. D/CM uses the planning, attention, simultaneous, and successive factors of intelligence measured by the Cognitive Assessment System only (Naglieri & Das, 1997). In contrast, C/DM emphasizes flexibility across different tests and theoretical orientation. Finally, all PSW methods are used in a broader context that permits application of exclusionary criteria and clinical judgement. Our focus is on the reliability and validity of the inclusionary criteria (i.e., the complex statistical algorithms used to identify the patterns outlined in Figure 6).

These methods share common shortcomings, including problems with the algorithms and formulae that have the same unreliability problems outlined for IQ-achievement discrepancy methods because of the use of firm cut points and discrepancy scores. None of the methods has convincing evidence of validity (Beaujean, Benson, McGill, & Dombroski, 2018; Benson, Beaujean, McGill, & Dombroski, 2018; Fletcher & Miciak, 2017). All have been understudied (Schneider & Kaufman, 2017). They are not interchangeable, and the same individual might be identified as having SLD by one method and not having SLD by a different method (Fletcher et al., 2019).

Figure 6. Illustration of the Identification Criteria of PSW Methods



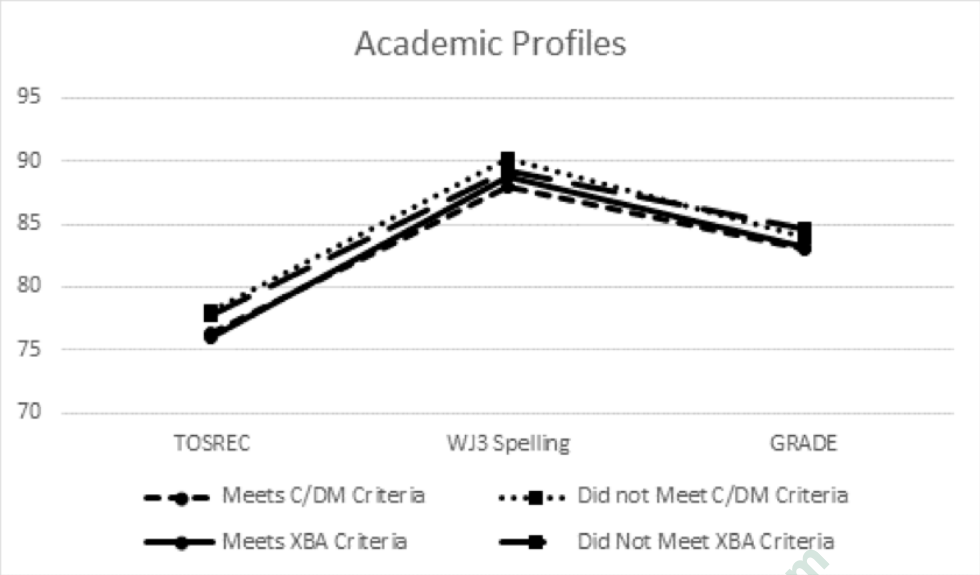
Validity of PSW Methods

Some proponents of PSW methods argue that IDEA 2004 requires cognitive assessments for identification. In fact, the statute defines SLD as "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations." This definition indicates that the manifestations of these cognitive difficulties in academic achievement are critical, not the psychological processes themselves. Academic difficulty is the defining feature of SLD, and the statute explicitly defines the areas in which these difficulties may occur. This conclusion is clearly supported by the regulations accompanying IDEA 2004: "The Department does not believe that an assessment of psychological or cognitive processing should be required in determining whether a child has an SLD. There is no current evidence that such assessments are necessary or sufficient for identifying SLD. Further, in many cases, these assessments have not been used to make appropriate intervention decisions" (Individuals with Disabilities Education Act Regulations, 2006, p. 46651).

A decade later, there remains very little evidence that assessments of psychological or cognitive processing are necessary or sufficient for the identification of SLD (Beaujean et al., 2018). Few empirical or simulation studies have investigated the validity of PSW methods for SLD identification. Proponents of PSW methods generally cite four types of supporting evidence, including studies that investigate (1) the structure of cognitive functioning, (2) the relations between cognitive functioning and academic achievement, (3) whether neuropsychological profiles can be established from test data, and (4) potential aptitude by treatment interactions (e.g., Dehn, 2013). However, such studies do not represent direct evidence of the validity of SLD identification decisions that require the documentation of a PSW profile. Comparatively few peer-reviewed studies have directly compared groups formed on the basis of PSW profiles on external dimensions. Thus, we cannot rely on meta-analyses and must look instead to simulations and the few empirical studies that have been completed.

Miciak, Fletcher, Stuebing, Vaughn, and Tolar (2014) compared low-achieving children with reading problems identified with SLD using either C/DM or DD/C (called XBA in Figure 7) and those identified as slow learners who were not identified with SLD based on these PSW criteria. The groups were compared on achievement tests that were not used to define the groups. As Figure 7 shows, there was little difference in the shape or elevation of the achievement profiles generated by four different operationalizations of PSW methods.

Figure 7. Achievement Profiles for Students Who Meet and Do Not Meet PSW Criteria



In another study, Miciak et al. (2016) examined a large intervention database with extensive assessments of cognitive functions to determine SLD status of a large group of struggling readers using procedures recommended by C/DM or DD/C. The results demonstrated little evidence for value-added increments relative to pretest assessments of reading skills. The individual cognitive assessments and application of PSW SLD identification methods did not help predict who would respond and who would not respond to the intensive interventions.

PSW methods continue to be proposed and recommended, despite the fact that the basic psychometric issues and shortcomings are well understood and have been documented for many years. In studies of profile analysis based on the Wechsler intelligence scales, little evidence has emerged linking SLD to specific cognitive PSW. In a simulation, Macmann and Barnett (1994) evaluated differences in verbal IQ and performance IQ factor index scores and ipsative profile patterns on the Wechsler Intelligence Scale for Children, reporting that the reliability was poor and that practitioners should not use the results for making identification decisions. The measurement issues make any method based on cognitive discrepancies unlikely to achieve reasonable levels of reliability (Beaujean et al., 2018).

Finally, advocates of PSW methods for SLD identification argue that academic interventions can be tailored to specific cognitive profiles (revealed through the PSW assessment process) and that a full understanding of the student's cognitive profile is necessary to design an effective intervention for the student. This argument rests on the assertion that cognitively tailored interventions will improve academic outcomes. However, little evidence supporting the effectiveness of interventions based on cognitive-process profiles has emerged, much less interactions of cognitive processes and interventions to influence treatment outcomes (Fletcher et al., 2019). In a recent meta-analysis, Burns et al. (2016) examined the role of cognitive tests in relation to intervention. Across different uses (screening, intervention design), the effect of cognitive tests and outcomes (g = .17) was much smaller than the effect of reading fluency (g = .43) and phonological awareness (g = .48). To the extent that academic interventions should be tailored to individual students' strengths and weaknesses, the results of Burns et al. suggest that it is considerably more effective to tailor interventions based on patterns of academic strengths and weaknesses, rather than more weakly related cognitive processes.

PSW Methods Are Not Interchangeable

Proponents of PSW methods have implied that the four primary methods are research based and interchangeable. This is not the case. In two nonoverlapping samples, Miciak and colleagues (Miciak et al., 2014; Miciak, Taylor, Stuebing, & Fletcher, 2018) compared the SLD identification decisions emerging from two PSW methods: the C/DM and the DD/C approaches. When similar cut points were employed, agreement for SLD identification decisions did not exceed what would be expected by chance, raising significant questions about the comparability of the methods.

Even when the method used to identify SLD is held constant, identification decisions fluctuate due to differences in test selection. In a third nonoverlapping sample, Miciak, Taylor, Denton, and Fletcher (2015) compared the identification decisions emerging through an application of the C/DM criteria using two test batteries that were theoretically equivalent but used distinct academic measures. Results demonstrated low agreement, particularly for positive SLD identification decisions (i.e., who is identified as having SLD). Taylor, Miciak, Fletcher, and Francis (2017) completed a simulated replication of Miciak et al. (2015) to evaluate whether those findings could be generalized beyond the sample and measures used. Across a broad range of potential relations between academic weakness, cognitive weakness, and cognitive strength, percent positive agreement was low to moderate, ranging from .33 to .59 across all scenarios, meaning that in the most optimal scenarios, slightly more than half of all students identified as having SLD with one test battery would be identified by both batteries. These results suggest that within complex PSW methods that rely on specific patterns of difference scores between tests, changes in test selection will have significant, deleterious effects on agreement for SLD identification.

The low reliability for SLD identification decisions highlighted above are not likely to be ameliorated with more or better tests. Miciak et al. (2018) conducted a simulation to investigate whether classification accuracy was improved within C/DM through the use of multiple measures, rather than a single indicator within each domain. A second test of each construct (e.g., reading, verbal knowledge) was incorporated under two scenarios: (1) a recursive test-retest procedure in which a positive SLD identification decision was confirmed through a second assessment and (2) a mean score procedure. When the test-retest procedure was used, accuracy in positive SLD identification decisions was diminished, reflecting a trade-off in error types—fewer students were identified as having SLD, and correspondingly more students who "truly" had SLD were identified as not having SLD. When mean scores were used, modest improvements in classification accuracy were observed. However, these improvements in accuracy must be understood in a context of limited resources and time. In the most favorable scenario, a 3% increase in correct classifications was observed. To achieve this 3% increase, the total amount of testing had to be doubled (two tests were given within each domain instead of one). These results demonstrate that the inherent psychometric limitations of PSW methods are not likely to be corrected through the addition of tests to more accurately measure the construct. Instead, the results of this simulation illustrate how the greater complexity of PSW methods premised on finding an intraindividual PSW across multiple domains exacerbate the reliability issues highlighted in the prior sections.

Fairness and Coverage

A related issue concerns the fairness and coverage of PSW methods for SLD identification. SLD identification is a relatively high-stakes decision affecting educational programming and civil rights protections. It is therefore important that the application of SLD identification methods allow for the provision of these programs and protections for students who need them. Recent research suggests that PSW methods fail this critical test. Stuebing, Fletcher, Branum-Martin, and Francis (2012) used simulated data to evaluate the identification rates and classification accuracy of the C/DM, DD/C, and DC/M. Across methods, identification rates for SLD were quite low (1% to 2%). Further, results indicated that the

methods were particularly unreliable in identifying "true" SLD cases, with many false-positive identification decisions. Kranzler, Floyd, Benson, Zaboski, and Thibodaux (2016) obtained similar results for the DD/C methods used in XBA in a study using normative data from the Woodcock-Johnson III cognitive and achievement tests. SLD identification rates were low across multiple scenarios. Thus, DD/C was relatively good at detecting "true" cases of students without SLD. However, the method was less accurate for detecting "true" SLD. On average, the method detected only 21% of the "true" SLD cases and only 34% of the participants identified as SLD were "true" SLD cases. These results highlight fundamental questions of coverage and fairness for PSW methods.

Problems With PSW Approaches to SLD Identification

1. Federal statutes do not mandate that cognitive skills be assessed—just their manifestations.
2. There is little empirical research on how PSW methods actually work and how these methods may inform instruction.
3. Arguments for PSW methods are frequently premised on a straw-person critique of other SLD identification methods, particularly RTI. There is no standalone RTI SLD identification method, and a comprehensive evaluation is always required, regardless of the identification method.
4. Reliability issues associated with the use of discrepancy scores of any kind are well known, especially the use of rigid cut points and profile interpretation of difference scores.
5. Simulation and empirical studies suggest that PSW methods identify very few students with SLD and are unreliable at detecting "true" SLD cases, raising issues of coverage and fairness.

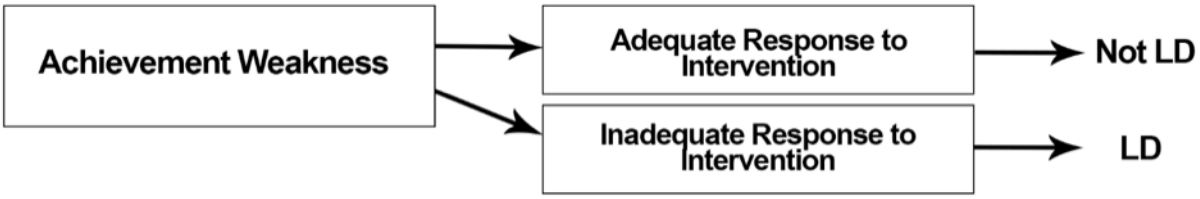
What Do These Findings Mean?

As with IQ-achievement discrepancy, PSW methods fail to show meaningful differences between low-achieving groups that meet and don't meet the identification criteria. Little evidence supports PSW methods or many of the assumptions on which the methods are premised. Like all methods to identify SLD, PSW methods have inherent problems with reliability for individual identification decisions. The complexity of PSW methods and use of difference scores on multiple, correlated tests exacerbate these problems. Of particular concern is the fairness and coverage of PSW methods, where very low numbers of individuals are identified with SLD, and evidence suggests even those decisions are unreliable.

Instructional Discrepancy (RTI) Approaches

In a method based on instructional response, inadequate response to instruction is the key attribute of the classification. Most methods based on instructional response have three components: low achievement, inadequate instructional response, and consideration of other disorders and contextual factors that indicate the absence of SLD (see Figure 8). Intervention response, like all attributes of SLD, is unobservable outside of attempts to measure it. Additionally, research suggests that intervention response lies on a continuum, with no naturally occurring demarcations that would separate adequate from inadequate responders, similar to other attributes of SLD. As a result, students whose measured performance lies near the cut point(s) for inadequate response (however it is defined) will be similar and individual identification decisions will demonstrate some level of unreliability.

Figure 8. Illustration of the Inclusionary Criteria for Instructional Discrepancy Approaches

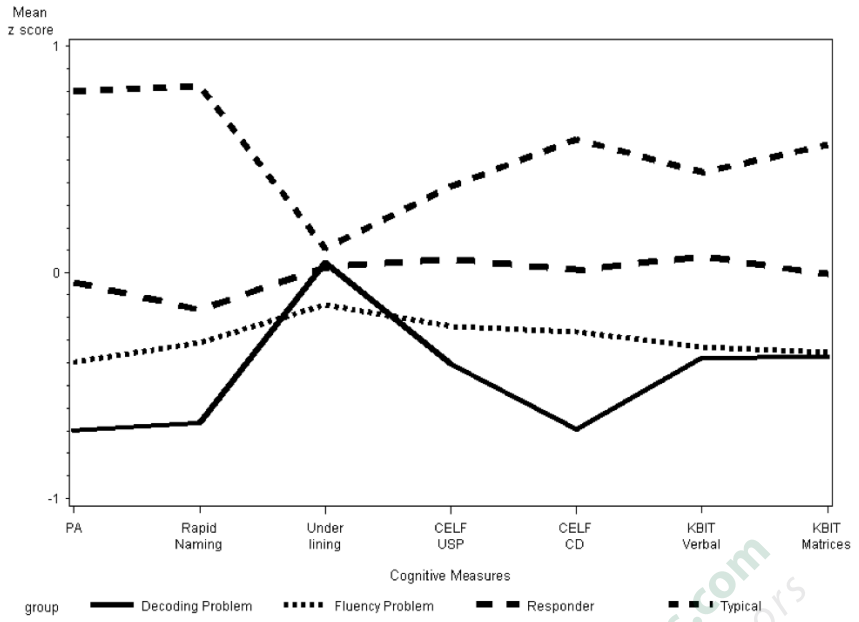


There is no universally agreed-upon criterion for operationalizing inadequate instructional response. How it is operationalized varies across states and districts, as well in research investigating RTI. In broad terms, inadequate response can be based on three types of data: (1) student growth over time (slope), (2) postintervention performance (final status), or (3) both (dual discrepancy). However, none of these methods overcomes the inherent unreliability that emerges when we apply arbitrary cut points on imperfect, continuous data that are normally distributed. Many critics of RTI methods focus on the use of curriculum-based methods for assessing progress, but many proposed operationalizations of RTI methods also use traditional norm-referenced tests of achievement as a final status method. A debate on the relative merits of the many different ways in which inadequate instructional response has been defined is beyond the scope of this practice guide, except to note that all attempts to operationalize inadequate instructional response are subject to the same challenges confronting all psychometric approaches for the identification of SLD.

To evaluate the validity of classifications based on intervention response, inadequate and adequate responders should be compared on domains not used to identify responder status, similar to how other methods for SLD identification have been evaluated. These domains could be highly related attributes, such as reading or writing, or could include other domains like behavior, attention, or neuroimaging. It is in these comparisons that key differences in the research support for methods based on instructional discrepancies and cognitive discrepancies emerge. Unlike for methods based on cognitive discrepancies, empirical research consistently demonstrates that classifications based on how students respond to intensive interventions create subgroups who differ on a number of theoretically related attributes, including academic level, cognitive characteristics, behavior, and even brain-activation patterns (Fletcher et al., 2019).

These data are evidence for the validity of intervention response as a classification attribute because they suggest that subgroups demonstrate different characteristics beyond those differences on which the groups were formed. These comparisons are the critical validity test for any proposed classification. However, these differences between groups are not evidence for a categorical disorder. Instead, these differences lie on a continuum reflecting the severity of academic difficulty. Students who are most severely impaired in reading are most likely to demonstrate cognitive deficits or abnormal brain-activation patterns. For example, Fletcher et al. (2011) investigated the academic and cognitive profiles of adequate and inadequate responders to a reading intervention. Inadequate responders were identified using fluency or decoding measures at posttest and example of the application of final status response criteria. This method resulted in four groups, including students with (1) deficits in decoding **and** fluency, (2) deficits in fluency only, (3) adequate response to the intervention, and (4) no reading difficulties (typically achieving children). Across a range of cognitive measures, a clear stepwise progression was evident, with the typically achieving and adequate responder groups outperforming both inadequate responder groups. Comparisons of both inadequate responder groups with the typically achieving and adequate responder groups were statistically significant, providing evidence for the difference between these groups formed on the basis of intervention response.

Figure 9. Illustration of Cognitive Differences Based on Responder Status



What Do These Findings Mean?

Methods that emanate from RTI show validity because groups formed on the basis of intervention response are different on a number of theoretically related attributes. Importantly, this evidence for validity is the same as what would accrue for a definition based on simple low achievement. If an achievement distribution is subdivided and groups of students in one part of the distribution (e.g., below 20th percentile) are compared to groups selected from another part (e.g., above the 20th percentile), differences will be seen on other external variables because of the correlation with the achievement variable used to create groups.

Recommendations for SLD Identification

Summary of Reliability and Validity Issues

All identification methods for SLD show low reliability, especially in terms of agreement across methods, for individual decisions if implemented as formulae with firm thresholds. These problems are inherent in IQ-achievement discrepancy methods. At least in an IQ-achievement discrepancy method, the lowest achievers are selected at each point in the distribution of IQ scores. Although the classification is not valid and the decisions may lack fairness and potentially reduce coverage, most students identified with this method will meet reasonable criteria for SLD as long as there is a low achievement threshold. The same cannot be said for PSW methods, which under-identify students with SLD, thus demonstrating coverage and fairness problems. There are formulae and thresholds, but the user is often encouraged to go through a multistep process that allows the clinician to make decisions that override the algorithms.

Both of these methods require testing that is not clearly related to achievement or instructional planning. IQ scores are weak predictors of intervention response in the absence of an intellectual disability. And there is little evidence that training cognitive processes leads to better academic achievement or that having IQ or cognitive assessments improves the reliability of individual identification. Because

discrepancy scores are involved between two correlated domains, cognitive discrepancy methods actually reduce the reliability for individual decisions. There is little validity evidence for both cognitive discrepancy frameworks, and different methods are clearly not interchangeable. In fact, specific achievement tests from different batteries are not interchangeable because of differences in how they are constructed, the items, the reliability, and the normative basis. Even in statistical simulations, different decisions about where a student scores relative to a threshold will vary with the selected test and its normative basis. It is for this reason that IDEA 2004 defined the comprehensive evaluation as a data-gathering process. Cognitive testing is not required as part of this comprehensive assessment. Additionally, federal regulations mandate that the ARD team use multiple criteria and consider the exclusionary factors.

Methods that include RTI have promise, as demonstrated by strong evidence for the validity of classifications based on intervention response. This body of research clearly establishes that intervention response is educationally meaningful and is strongly related to a number of educationally relevant domains (e.g., achievement, cognitive functioning, behavior). However, these methods are not a panacea and successful implementation requires a fully implemented multitier system of supports. These methods do not solve the reliability problem if the primary criterion is an assessment of intervention response that is set to a strict threshold (e.g., curriculum-based measurement [CBM] with a firm grade-level benchmark). It is inherently difficult to reliably assess the position of a student relative to a firm threshold. Additionally, methods based on RTI must adhere to IDEA 2004 requirements for a comprehensive evaluation. This evaluation must include multiple criteria, exclusionary factors, and observations of the student to meet special education eligibility requirements and to plan effective treatment plans.

Recommendations for Improving the Reliability of Identification

With these issues in mind, we first address approaches to dealing with the reliability problem, regardless of the identification framework employed.

1. **Use multiple data points.** SLD identification decisions should never be based on a single data point, whether a single test or the documentation of a single criterion. The use of multiple indicators meets statutory requirements for a comprehensive assessment. Additionally, the use of multiple data points allows for (1) greater sensitivity in identifying potential academic problems, (2) assessment of a full range of component academic skills, and (3) the collection of data that might inform future academic interventions.

2. **Avoid fixed cut points.** Any cut point applied to test data that is continuous and normally distributed is inherently arbitrary. There is no natural demarcation between scores indicative of SLD and scores not indicative of SLD; students close to the cut point will be very similar. Thus, diagnosticians should avoid applying methods that rely on the strict application of cut points. Districts should not use formulae or strict thresholds as a gatekeeper for SLD.

3. **Use confidence intervals.** Confidence intervals reflect the degree of uncertainty associated with a test score by providing a range of possible values. Instead of adopting a firm threshold, the standard error of measurement should be applied to the threshold to generate an interval in which there is a high probability that the true score will reside. Diagnostic decisions in other disability categories have moved toward the incorporation of confidence intervals and clinical judgment. For example, determining levels of IQ for an intellectual disability typically requires application of the standard error of measurement to create a 95% confidence interval. Because IQ scores 2 standard deviations below the average of 100 are usually required (i.e., 70 or below), this is expressed as a score between 65 and 75.

4. **Employ high thresholds for treatment planning.** When possible, ARD teams should error in the direction of providing necessary academic interventions, particularly in the context of early intervention efforts in basic academic skills in which small amounts of intervention can have a relatively large impact on academic outcomes. This recommendation reflects the relatively low cost of treatment and the highly consequential impact of untreated academic difficulties. Misidentifying a student in need of services (false-negative error) is a costlier error than identifying a student as needing services who does not have SLD (false-positive error). In the latter example, the child can be pulled out of any interventions, which is why continuous monitoring of students in an intervention is important. With a false-negative error, the student continues to languish when it is well-known that early intervention is critical for the successful treatment of SLD.

5. **Use tests with the same normative basis.** One source of unreliability across different tests is due to norm scores based on comparisons to different norming populations. This misalignment can be controlled by using tests that were normed on the same population, thereby reducing a significant source of variability in score comparisons and allowing for more reliable decision-making.

A Treatment-Based Approach to the Comprehensive Evaluation

Regardless of the method for SLD identification, practitioners should adhere to the recommendations above for implementing a more reliable process. However, maximizing reliability does not necessarily result in a valid process. To ensure a valid identification process, we must consider aspects beyond test selection and decision-making. Modern validity theory posits that validity is not an inherent attribute of a test or procedure. Instead, validity must be considered holistically as an evaluation of the procedures and decisions we make, as well as the consequences of those decisions (Messick, 1986). With this in mind, the discussion must move beyond classification and eligibility and toward processes that improve the lives of children. These recommendations often accompany discussions of best practices for methods based on RTI but in fact represent a best-practice approach to SLD identification overall. This is because the primary goal of identification is not simply eligibility. The primary goal is improved treatment of persistent academic difficulties. Funds spent on eligibility subtract from funds available for intervention. Therefore, the amount of testing administered as part of the identification process should be limited to only those that inform future intervention (i.e., the formulation of an effective individualized education program). This approach to identification lends itself to a comprehensive evaluation that is less time consuming and gives priority to intervention because of its focus on the assessment of academic skills and instructional response.

A consensus group convened by the Office of Special Education Programs in the Department of Education recommended three essential criteria for SLD (Bradley, Danielson, & Hallahan, 2002). The comprehensive evaluation must document the following:

1. The student demonstrates low achievement.
2. There is insufficient response to effective research-based interventions.
3. The team considered and ruled out exclusionary factors, including intellectual disabilities, sensory deficits, serious emotional disturbances, a lack of opportunity to learn, and language-minority status where low achievement is due to lack of proficiency in English.

Role of Norm-Referenced Achievement Tests

A comprehensive assessment of current academic functioning in all areas of suspected difficulties with a norm-referenced assessment provides valuable information not only for eligibility, but also for treatment. Current achievement levels, as well as individual strengths and weaknesses in reading, math, and writing, can help instructors individualize an intervention plan and determine the necessary level of intensity. Proponents of cognitive assessments often argue that achievement tests are not helpful because the student has already been assessed on numerous occasions. However, the comprehensive evaluation is often the first formal evaluation of achievement for the student across all domains and subdomains. Proponents of methods based on RTI often argue that CBMs are sufficient. In fact, CBMs may be slightly less reliable than many norm-referenced tests, represent only a single criterion, and do not provide a comprehensive picture of the student's skills within a specific domain (e.g., basic reading, reading fluency, comprehension). Even in methods based on RTI, more reliable identification result from the use of both CBM and norm-referenced test data, which is required in many states.

Norm-referenced achievement tests should be targeted to the academic domains of potential SLD identified in IDEA. These assessments should include a brief assessment of foundational skills involved in basic reading, math calculations, and basic writing, such as spelling and the higher-order skills of reading comprehension, math reasoning, and writing composition. These assessments necessarily take more time, as they assess more complex skills, but they provide valuable information about the child's current functioning. In addition, it is always important to assess automaticity because the inability to work quickly may require adaptations in classroom instruction. The goal is always to minimize time spent testing and, to the extent possible, assess with tests that have the same normative basis.

The sidebar "Assessment of Major Academic Domains by Norm-Referenced Tests" presents the major achievement domains of SLD and how they are assessed within the three major norm-referenced assessment batteries: the Woodcock-Johnson IV, the Wechsler Individual Achievement Test-III, and the Kaufman Tests of Educational Achievement. We do not address the issues of oral expression and listening comprehension because they really represent domains of language functioning and are better dealt with through the speech and language impairment category of IDEA 2004. In the sections that follow, we provide a description of each domain and its importance to academic success.

Assessment of Major Academic Domains by Norm-Referenced Tests

Construct	Woodcock-Johnson IV	Wechsler Individual Achievement Test-III	Kaufman Tests of Educational Achievement
Core Tests			
Word recognition	Word identification	Word reading	Letter and word recognition
Phonetic decoding	Word attack	Pseudoword decoding	Nonsense word decoding
Reading fluency	Word reading sentence reading	Oral reading	Silent reading
Reading comprehension	Passage comprehension	Reading comprehension	Reading comprehension
Math computations	Calculation	Numerical operations	Computation
Math problem-solving	Applied problems	Problem-solving	Concepts and applications
Written expression	Spelling	Spelling	Spelling
Supplemental Tests			
Math fluency	Math facts	Math fluency	
Writing fluency	Sentence writing	Alphabet writing	Writing fluency
Written expression	Writing samples	Essay composition	Written expression

Reading

In IDEA 2004, students can be identified with SLD in three reading domains: basic reading (dyslexia), reading fluency, and reading comprehension. Basic reading represents a problem with word-recognition accuracy and fluency (and usually spelling). Some children read accurately but slowly (reading fluency). Both of these problems are often referred to as dyslexia, an SLD that involves the ability to read single words accurately and fluently. Still other students do not show problems with reading words or text accurately and fluently but struggle to understand what they read (reading comprehension).

Word-Recognition Accuracy

Most normative assessments include subtests that require the untimed oral reading of isolated real words and pseudowords. These tests measure students' sight word knowledge and capacity for sounding out words. These tests are typically the best single predictor of overall levels of academic achievement and they are vital for the identification of dyslexia, which is defined by problems reading and spelling words accurately and fluently in isolation.

Reading Fluency

There are many quick, affordable measures of reading fluency. The achievement batteries outlined in the sidebar "Assessment of Major Academic Domains by Norm-Referenced Tests" include timed reading fluency measures. Some reading fluency assessments require the student to read single words aloud fluently and accurately; others require the student to read connected text. Other fluency measures are hybrid fluency/comprehension measures and require the student to fluently read text and process for meaning, such as the Woodcock-Johnson Sentence Reading Fluency subtest and the Wechsler Individual Achievement

Test Oral Reading subtest. Quick alternatives are the Test of Word Reading Efficiency-2, which involves oral reading of real words and pseudowords from a list, and the Test of Reading Fluency, which requires text reading. Grade-appropriate CBMs are also appropriate. The key to assessing reading fluency is for the student to read text aloud quickly and accurately, so that fluency can be measured in terms of words read correctly per minute.

Reading Comprehension

Reading comprehension is difficult to assess with a single measure, and different comprehension tests will give slightly different scores because of differences in how they assess reading comprehension. As a result, it is important to note the nature of the material the person reads as well as the response format. For example, reading comprehension varies according to what the child reads (sentences, passages, genre), how the child demonstrates understanding (cloze, open ended, multiple choice, think-alouds), how much the child must remember (answering questions with and without the text available), and the complexity of the text and the ideas within (vocabulary elaboration vs. knowledge, inferencing, activation of background knowledge). If a test contains text beyond the child's word recognition or fluency skills, it is unlikely to isolate comprehension skill and multiple measures that assess reading comprehension in different ways may be needed.

A good assessment of reading comprehension requires reading complex text. If a student has completed group assessments of reading comprehension, such as state-mandated assessments of reading, the results can be reviewed as part of the evaluation. However, it is important to also evaluate levels of effort.

Planning for Reading Interventions

To the extent possible, evaluating relative skill levels in word recognition and reading comprehension can help to differentiate intervention programs. Students with severe reading difficulties need a comprehensive reading program that includes systematic instruction in foundational reading skills. Students with specific deficits in comprehension may require more text- and language-focused interventions. These determinations can be made by planning an assessment that incorporates tests listed in the sidebar "Assessment of Major Academic Domains by Norm-Referenced Tests."

Mathematics

IDEA 2004 identifies two domains of SLD involving calculations (dyscalculia) and problem solving. Calculations are problems with basic math skills, including fact retrieval and other components of accurate computation. Problem solving usually involves procedural knowledge and is assessed with word problems.

Math Calculations

Measures of math calculations typically include items that range from basic arithmetic to algebra and geometry. Unlike reading, which develops in a more linear fashion, low performance on math computation tests could reflect problems in many areas, including fact retrieval, procedural knowledge, and attention difficulties. This is especially apparent for students with attention-deficit/hyperactivity disorder (ADHD). Math computations typically rely on a paper-and-pencil format with computational problems presented in isolation, making it particularly useful for isolating potential math difficulties in the presence of potential reading and language problems.

Math Problem Solving

A second domain of mathematics is problem solving. Most norm-based assessments include a measure of problem solving, and several are listed in the sidebar "Assessment of Major Academic Domains by Norm-Referenced Tests." These tests typically involve solving real-life math problems or "word problems." These sorts of problems are frequently difficult for children with reading difficulties, especially if they have to read the problem. Additionally, because many children with reading problems have language difficulties, children with reading problems often struggle with math problem solving even when the problems are read to them.

Math Fluency

Unlike reading, there is little evidence of SLD involving math fluency, but fact retrieval is slow for many students who struggle in math. The batteries highlighted in the sidebar include three timed assessments of computational skills that help identify students who lack automaticity in basic arithmetic skills, which can lead to difficulties in mastering more advanced mathematics.

Planning for Math Intervention

Basic math computation and fact retrieval difficulties are best addressed through comprehensive math programs that teach procedural knowledge through word problems. A comprehensive assessment can assist in intervention planning by providing data to guide the amount of time devoted to practicing fact retrieval and basic arithmetic during the problem-solving intervention.

Written Expression

IDEA 2004 specifies a broad category for written expression, which in the research literature involves either transcription (the mechanical act of putting together letters to make words) or composition (essay or story writing). The two are closely linked because automaticity of transcription is important for composition.

Handwriting and Spelling

Difficulties with handwriting and spelling can affect essay composition, highlighting the complex and interrelated nature of the writing task. Most norm-referenced tests include a measure of spelling, which may represent the primary source of difficulty in written expression for many children with word reading difficulties. An analysis of spelling errors may help identify whether the spelling problem is related to underdeveloped phonological awareness or with the student's knowledge of English orthography. Spelling tests, like any writing task, can also be used as an informal assessment of handwriting.

Written Expression

Norm-referenced assessments also typically include an assessment of written expression. These tests vary in their composition requirement, but all are designed to evaluate how well the student is able to express himself in text. This sort of assessment is typically needed only for students who do not demonstrate significant problems with basic writing skills. Students who struggle to transcribe or who have motoric difficulties associated with ADHD and other disorders will struggle with this task, and their score might not be a true reflection of their ability to create a written composition if they were to use a keyboard, for example. For students who demonstrate higher-level composition difficulties, writing a composition is key, which is required by the Essay Composition subtest of the Wechsler Individual Achievement Test. An alternative is the Spontaneous Writing subtests of the Test of Written Language.

Writing Fluency

Automaticity in writing and typing skills is critical for writing success. Therefore, assessing writing fluency with tests like the Sentence Writing Fluency subtest of the Woodcock-Johnson, the Alphabet Writing Fluency subtest of the Wechsler Individual Achievement Test, or the Writing Fluency subtest of the Kaufman Tests of Educational Achievement may be useful. However, such tests are meaningful only for students who do not have problems with the basic motor task.

Planning for Writing Intervention

There are well established methods for teaching transcription (handwriting and spelling). The strongest evidence for programs involving composition is self-regulated strategy development, which teaches strategies for compositing and editing, along with organizational components. A comprehensive assessment of constituent writing skills can help in planning the amount of instruction focused on transcription versus composition skills.

Assessing and Building Automaticity

Across all academic domains, a student must develop automaticity, or fluency. The need for fluency is easily illustrated in reading development, in which some students overcome initial word reading difficulties but continue to struggle with fluency. Automaticity is critical for cognitive efficiency, but also because it allows for greater opportunities to practice academic tasks in reading, writing, and math. Many children with SLD struggle to achieve automaticity because of difficulties with basic skills—difficulties that are compounded because these students have fewer opportunities to access print, complex math, or composition writing. This effect highlights the need for interventions to include multiple quality opportunities for practice and engagement. Automaticity in all academic skills should be assessed and discussed to determine the degree to which practice and engagement need to be incorporated into the intervention and because automaticity is an excellent indicator of progress.

Evaluating Instructional Response

IDEA 2004 stipulates that students cannot be identified with SLD without evidence that they have received adequate instruction in reading and math and data demonstrating inadequate progress. These data are most efficiently collected in a schoolwide RTI framework, but other forms of assessment can meet this requirement, such as grades, the State of Texas Assessments of Academic Readiness, assessments completed in general education, progress monitoring with CBMs that are not part of an RTI framework, or even screening with norm-referenced assessments that are repeated as part of the eligibility process. Although a formal assessment of instructional response is not required, evidence of adequate instruction and insufficient progress must be documented and is an essential part of any SLD eligibility determination.

The most common method of assessing instructional response involves CBMs in reading, math, and spelling. These measures are given as serial probes and are usually time constrained. In reading, a student may be asked to read word lists or stories as quickly as possible every 1 to 4 weeks during an instructional period. Cloze or maze tasks are more closely related to comprehension but are moderately to highly correlated with word reading accuracy and fluency. In math, grade-appropriate calculations are given in a time-limited fashion. In written expression, timed spelling tests, alphabet writing tests, and other procedures are used. As previously noted, normed-referenced assessments can also be used. The critical component for identification is the student's level at the end of an intervention period or another point in the instructional period. For identification, the end point is more important than the slope or amount of change because the information on growth is contained in the end point. For modifying instruction, the slope is important.

Exclusionary Criteria

Academic difficulties may be due to other disabilities, such as a sensory problem, intellectual disability, or another pervasive disturbance of cognition, like autism spectrum disorder. These disorders have specific identification criteria and require interventions that address a much more pervasive impairment of adaptation that contrasts with the narrow impairment in adaptive skills that characterizes SLD. Additionally, contextual factors that may interfere with achievement, such as limited English proficiency, comorbid behavioral problems, and economic disadvantage, should be considered. The goal of this part of the assessment is to determine whether such a condition is a primary cause of low achievement, a comorbid condition, or a result of low achievement.

These considerations can also assist in planning for effective interventions. For example, children with ADHD who are receive interventions to address their attention and academic difficulties achieve better outcomes. Anxiety might also limit the effectiveness of standalone academic interventions. If a child struggling to read exhibits high levels of anxiety, a treatment program that addresses both reading and anxiety is critical.

Limited English proficiency is another issue that must be considered, particularly in Texas, where many children come from homes in which English is not the primary language spoken. Children who grow up in households where the language at home is different from the language of instruction are at greater risk for academic difficulties, primarily due to the difficulties associated with mastering academic content while learning a second language. Yet no clear criteria or assessments differentiate a child with achievement difficulties due to SLD from a child who demonstrates limited English proficiency. One assessment strategy is to include assessments of oral language proficiency and achievement in both languages. However, these results must also be considered in context, as many English learners attend English-only classrooms and have not received academic instruction in their first language. Parsing the interconnected issues of academic difficulties and language proficiency takes careful consideration to ensure that students are not identified with SLD simply because they lack the English proficiency to perform well on achievement tests in English.

To address all potential exclusionary factors and better plan for treatment, the comprehensive assessment should routinely include parent and teacher rating scales of behavior and academic adjustment, along with parent-completed developmental and medical history forms. These scales may identify behavioral comorbidities and historical factors (e.g., history of brain trauma) that are important to screen. If there is evidence for behavioral comorbidity, the guidelines for identifying these disorders in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) should be followed. Simply referring a child for educational interventions without identifying and treating these factors will increase the probability of a poor intervention response.

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Part 3:

Introduction

Specific Learning Disabilities (SLD) in reading affects approximately 1 in 5 students in a classroom, which means that most teachers have, at some point, worked with a student with an SLD (DyslexiaHelp, 2022). Students with SLD in reading struggle with understanding the relationship between sounds, letters and words, and with learning the meaning of words, sentences, and paragraphs, adversely affecting their comprehension of a text. In addition, many students with SLD have accompanying attention or processing issues that make reading very difficult. Research in the science of reading informs educators how students learn to read, provides strategies that are effective to help students with SLD build reading skills, and provides teachers with instructional strategies that are driven by research.

Section 1: Learning Disabilities & Reading

What is a Specific Learning Disability?

The terms Learning Disability (LD) and Specific Learning Disability (SLD) are sometimes used interchangeably but there is a technical difference between the two: LDs are *diagnosed* by licensed medical professionals (e.g. psychologist, neuropsychologist), while SLD is a term defined in the Individuals with Disabilities Education Act (IDEA) of 2004 and used by educators to *identify* students who are eligible for special education services. LD is defined from a medical perspective in the Diagnostic and Statistical Manual for Mental Disorders (DSM-5), while SLD is not. Essentially, LD and SLD refer to similar learning issues and "considerable overlap in the definition of LD used by professionals in educational and medical settings can be observed," but the terms are used in different contexts (Muktamath et al., 2021).

IDEA is the federal law that guarantees students with disabilities receive a Free Appropriate Public Education (FAPE) and special education services tailored to meet their needs. Specific Learning Disability (SLD) is one of 13 eligibility categories identified in IDEA and is defined as follows:

> (i) General. Specific learning disability means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions

such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.

SLDs do not include learning problems that are the result of intellectual disabilities, visual, hearing, or motor disabilities, emotional disturbance, or environmental, cultural, or economic disadvantage (IDEA).

Causes

SLDs are neurodevelopmental. Researchers don't know exactly what causes SLDs but they do know that "brain structure and function are different in people who have learning disabilities," and that heredity plays a role (Kaufman, 2022). Kaufman reports that people are four to ten times more likely to have a learning disability if "they have a parent or sibling with a learning disability." Researchers study brain differences between people with learning disabilities and people without by comparing brain scans. In addition, they have identified multiple genes that might play a role in causing learning disabilities, and those are continuously being studied.

Identification Best Practice

Prior to the reauthorization of IDEA in 2004, federal law required districts to use the IQ-achievement discrepancy model to determine eligibility under SLD. The IQ-achievement discrepancy model is "a calculation of the difference between a student's academic performance and IQ" (Whittaker & Burns, 2019). Legislative requirements did not require a specific approach to identify the discrepancy, so states were left to determine their own criteria. Typically, states calculated a discrepancy threshold based on age and other identifying information, and evaluators would administer both an IQ test and standardized reading or math test; the standardized test would be compared to the IQ test against the discrepancy threshold, and an eligibility determination would be made.

The reauthorization of IDEA still allows the IQ-achievement discrepancy model to be used but it is no longer advised, nor encouraged. Sometimes referred to as the "wait to fail" model, the U.S. Department of Education (USDE) explains that the "IQ-discrepancy criterion is potentially harmful to students as it results in delaying intervention until the student's achievement is sufficiently low that the discrepancy is achieved" (as cited in Wright & Wright, 2019). As such, IDEA still leaves it up to the states to set criteria for identification but such criteria:

- “Must permit the use of a process based on the child’s response to scientific, research-based intervention
- May permit the use of other alternative research-based procedures for determining whether a child has a specific learning disability.”

Interventions are put in place when students are making inadequate progress in the general education classroom. This means that the students’ academic progress is discrepant from their same-aged peers, and is not remediated with extra help, extra time, or other reasonable supports that can be utilized in a general education classroom.

Response to Intervention (RtI). “Scientific, research-based intervention '' refers to what is commonly known as Response to Intervention (RTI) and is considered best practice by the USDE in identifying students with SLD (Wright & Wright). RTI is a “multi-tier approach to the early identification and support of students with learning and behavior needs'' (Kurczak, 2019). RTI addresses a student’s response to increasingly intensive instruction, beginning with instruction in the general education classroom. USDE describes effective RTI as a model that uses “a process based on systematic assessment of the student’s response to high quality, research-based general education instruction… that incorporates response to a research-based intervention” (as cited in Wright & Wright). RTI is meant to be used as a proactive and preventative strategy, rather than one that waits for a child to fail.

The main components of RTI include 1) research-based instruction and intervention in the general education classroom, 2) progress monitoring in response to instruction and intervention, and 3) instruction and educational decisions based on progress monitoring data (Kurczak, 2019). RTI is typically composed of three tiers, with tier 1 being “Universal High-Quality Classroom Instruction, Screening, and Group Interventions” in the general education classroom, tier 2 being small-group, targeted intervention, and tier 3 being “intensive interventions and comprehensive evaluation often delivered 1:1 or 1:2” (Kurczak).

In tier 1, universal screening refers to standardized assessments meant to identify at-risk students, typically given three times per year. Universal screening is meant to aid in early identification of students with SLD. In a “direct route” model, when students are identified as at-risk, they immediately receive tier 2 instruction; in a “progress monitoring” model, their progress is monitored for several weeks and their entrance into tier 2 is dependent on their growth (Jenkins & Johnson, 2022). Jenkins and Johnson compare the direct route and the progress monitoring route: The progress monitoring

route has “marginally better identification accuracy than the direct route, but it also postpones intervention during the PM phase . . . The direct route leads to earlier intervention, but without PM to catch screening errors more students are mistakenly identified as being at risk.”

Students in tier 2 receive the additional targeted intervention, and are progress monitored for a given set of time (e.g. 6 weeks, 8 weeks, etc.). If they do not make adequate progress within that time frame, then intensive tier 3 instruction is necessary. If students do not make the intended progress in response to tier 3 interventions, they are typically referred for a comprehensive evaluation to determine if they are eligible for special education services. It is important to note that RTI is a timely process and cannot be used to delay a special education evaluation. Also, in some RTI models, tier 3 is considered special education, while in others there are three tiers of instruction, and special education is considered the 4th. This can vary from school to school.

Alternative Research-Based Procedures. Alternative research-based procedures used by states examine “pattern of strengths and weaknesses (PSW)” (Whittaker & Burns, 2019). The procedures are 1) Functionality across cognitive domains, and 2) Comparison of achievement across academic areas (Whittaker & Burns). The first type evaluates a student’s strengths and weaknesses across cognitive domains related to academic achievement, using models such as “dual discrepancy/consistency criteria and the concordance/discordance method” (Whittaker & Burns). The logic behind these assessments is that students with SLD will have comparable patterns of cognitive functioning, which then supports the presence of an SLD. The second type basically compares scores across academic areas and if students tests at or above grade-level in a certain number and below grade-level in a certain number, they may be eligible for services. The comparison of achievement across academic areas is a similar process to the IQ-achievement discrepancy.

Exclusionary Factors. For a child to be found eligible for special education services for an SLD, districts must confirm that the primary cause or causes of learning difficulties are NOT due to one of the exclusionary factors. Exclusionary factors listed in IDEA (2004) include learning issues as a result of “visual, hearing, or motor disabilities, of intellectual disability, of emotional disturbance, or of environmental, cultural, or economic disadvantage.” Whittaker and Ortiz (2019) adds that the USDE has since included Limited English Proficiency as an exclusionary factor. Including exclusionary factors as a requirement for identification was “intended to prevent schools and [Local Education Agencies] LEAs from disproportionately identifying students of color and low-income

students" (Whittaker & Ortiz). While no race or ethnicity is more likely to have a learning disability, "African American and Hispanic students are overrepresented among students receiving special education services within the SLD category" (Whittaker & Ortiz). Therefore, the special education team must take into account whether a child's culture or environment might be the root cause for low academic achievement. States can also add exclusionary factors into their questionnaire, such as that learning issues are not the result of inadequate instruction or chronic absenteeism.

SLD in Reading

Dyslexia

IDEA (2004) categorizes Dyslexia under Specific Learning Disability. Dyslexia primarily impacts reading, including decoding and fluency, caused by a deficit in phonological processing (Literacy How, 2020). Since people with Dyslexia struggle to connect letters to sounds, it not only affects all areas of reading, but also writing and spelling. Dyslexia occurs at all levels of intelligence, and is often identified due to the discrepancy between a children's ability and their achievement in reading. It is estimated that around one in five children struggle with Dyslexia, and that "80 to 90 percent of kids with learning disorders have it" (Martinelli, 2022). Dyslexia is the most common SLD yet many children go undiagnosed because "struggles in school are incorrectly attributed to intelligence, level of effort or environmental factors" (as cited in Martinelli).

Evaluations & Diagnosis. Dyslexia is diagnosed using a comprehensive body of evidence that determines a deficit in reading ability, and "rules out other possible causes for the deficit, such as hearing problems, or social, environmental or cognitive factors" (Martinelli, 2022). Since there is not one specific assessment tool used to measure all reading skills, multiple assessments "measuring different discrete skills," standardized questionnaires, and other objective evaluative measures should be carried out by a multidisciplinary team, including but not limited to a school psychologist and a learning specialist or special education teacher (Colorado Department of Education [CDE], 2021). Parents can also choose to seek out private evaluations by a psychologist, neuropsychologist, or speech-language pathologist. However, just because a child comes in with a clinical dyslexia diagnosis, this does not mean the chlld will be eligible for services at school. IDEA only requires a school to "consider the results" of a private evaluation, but still must complete their own evaluation to see if the child meets the criteria for SLD (CDE).

Dyslexia is usually diagnosed in school-aged children, once they have had formal reading instruction. This usually occurs when a child is struggling and not meeting benchmarks in reading. However, there are also preschool evaluations available that "look at the child's awareness of the sounds that make up words, and ability at word retrieval" (Martinelli, 2022). Schools sometimes suggest that parents wait until the end of third grade to get their child evaluated to ensure that intervention is really needed, but waiting can be detrimental to the child. Dr. Sally Shaywitz - neuroscientist, Yale Professor of Pediatric Neurology, and author of *Overcoming Dyslexia* - says "that as soon as a gap between intelligence and reading skills is apparent — and evidence shows it can be seen in first grade — it's a good idea to get help," not only for the sake of early intervention, but also because learning struggles can damage a child's self esteem (as cited in Martinelli).

Symptoms. Warning signs of Dyslexia can begin as early as preschool age, with speech delays, problems with pronunciation, trouble with word retrieval, trouble learning rhymes, trouble recognizing letters in their own name, trouble remembering names of letters and numbers, and difficulty telling a story in the right order of events (Muktamath et al., 2021). At this age, a child will most likely not be diagnosed with Dyslexia but could be considered at-risk for Dyslexia, and can receive supplementary support in preschool or through Early Intervention (EI) if qualified. In elementary school, symptoms of Dyslexia include difficulty connecting letters and sounds, trouble hearing individual sounds, difficulty reading familiar words, substituting words while reading aloud, avoiding reading, problems remembering sequences, and difficulty with spelling (Muktamath et al.). In elementary and middle school, reading becomes very frustrating and tedious for children with Dyslexia, particularly if they are not receiving help for it. Dyslexia in high school students looks different than it does in younger students because by this age, students have probably learned to compensate for some of their deficits. For older students, Dyslexia might present itself as slow reading, poor spelling, limited vocabulary, poor grammar, struggles with word retrieval, bad grades, and writing that is discrepant from oral skills (ExceptionalLives, 2021).

Common Comorbidities. It is not uncommon for children with Dyslexia to have other conditions as well. This "co-occurrence of two or more different disorders in the same individual" is referred to as comorbidity (CDE, 2020).

Attention Deficit Hyperactivity Disorder (ADHD) and Dyslexia are common comorbid conditions. Approximately 30-40% of children with Dyslexia, or another SLD, also have ADHD, and approximately 50-60% of children with ADHD also have a learning disability (IDA, 2020a; Olivardia, 2022). ADHD is a developmental disability characterized by

“inattention, distractibility, hyperactivity and impulsivity” (IDA). ADHD and Dyslexia have many overlapping symptoms, including slow information-processing, working memory deficits, word retrieval difficulties, and motor skill deficits, which sometimes makes it difficult to distinguish between the two (Olivardia).

“ADHD symptoms are exacerbated by Dyslexia, and vice versa,” causing increased difficulties for children with both conditions (Olivardia, 2022). Both ADHD and Dyslexia respectively can cause problems with attention and difficulty with reading but for different reasons. Children with Dyslexia often have concentration and attention issues when it comes to reading but not with other tasks; the reason for this is because “reading is so demanding that it causes them to fatigue easily, limiting the ability to sustain concentration” (CDE, 2020). For a child with ADHD, paying attention and concentrating is challenging for any unstimulating activity. Children with Dyslexia struggle with reading fluency due to issues with phonological processing, while children with ADHD might struggle with reading fluency because they “may skip over punctuation, leave off endings, and lose his or her place” (IDA, 2020a). As a result, both ADHD and Dyslexia can negatively impact children’s ability to understand what they are reading, and can make reading a frustrating and tedious task. When children have both dyslexia and ADHD, the conditions negatively impact each other.

It is unclear exactly why ADHD and Dyslexia comorbidity is so common. Researchers do know that both ADHD and Dyslexia can run in families. “Genetics play a role in about half of the children diagnosed with AD/HD. For the other half, research has yet to identify a cause,” and for Dyslexia, “about one third of the children born to a dyslexic parent will also likely be dyslexic” (IDEA, 2020). Recent research has also shown that executive function deficits, which are commonly associated with ADHD, are also associated with Dyslexia: If individuals have both ADHD and Dyslexia it “means they have the broad executive function impairments (problems focusing, using working memory, etc.), as well as an impairment of the particular skills needed for reading, for example, processing symbols swiftly” (Sinfield, 2020).

Mental Health. Children with Dyslexia are reported to have “internalizing conditions on the order of two to five times greater than their non-dyslexic peers” (CDE, 2020). CDE explains that internalizing conditions are “inward-facing difficulties that occur in an individual and tend to not be overtly obvious to others,” often characterized by anxiety, depressive, and somatic symptoms. In addition to comorbidity with anxiety, “students (children and adolescents) with dyslexia exhibit higher rates of depression,” with research showing a “correlation between severe dyslexia and greater depression in

younger children" (CDE). The connection between Dyslexia and mental health issues is typically a causal relationship, meaning that negative experiences related to Dyslexia cause anxiety and depression in children. Children, adolescents, and even adults often do not understand their disability and as a result, incorrectly blame themselves for being stupid or lazy. "Years of self-doubt and self recrimination may erode a person's self-esteem, making them less able to tolerate the challenges of school, work, or social interactions and more stressed and anxious" (IDA, 2020b).

Characteristics of Students with Learning Disabilities in Reading

Children with learning disabilities are a heterogenous group, with diverse skills and deficits. While no two children with disabilities are exactly the same, there are some common characteristics that children with disabilities often share. The National Association of Special Education Teachers [NASET] (2022) explains, "Understanding the characteristics of children with learning disabilities is absolutely essential as a future educator in developing prereferral interventions, in making appropriate referrals, and in identifying effective adaptations and intervention strategies." Common characteristics of children with learning disabilities include:

- Academic achievement deficits
- Reading deficits
- Math deficits
- Written expression deficits
- Language deficits
- Disorders of attention
- Achievement discrepancy
- Memory deficits
- Cognition deficits
- Meta-cognition deficits
- Social-emotional problems
- Motivational and attribution problems (NASET)

It's important to note that not all children with SLD will exhibit these characteristics, and a single student will typically not exhibit all of these characteristics; however, it is a non-exhaustive list of common characteristics that educators can use to support students and make decisions in their practice. Because this course focuses specifically on reading, the explanations below will cover only the characteristics that affect reading.

Academic Achievement Deficits & Achievement Discrepancy

Children with SLD often struggle in their academic achievement in the subjects of reading, math, or writing. Some students struggle in just one subject, while others struggle in all three. This is especially true if the child has not yet been identified as having a learning disability, or is not receiving the appropriate support and accommodations. SLD is easily mistaken for a lack of interest in learning, low intelligence, or laziness, which often coexist with low academic achievement. In some cases children with SLD get so frustrated with their deficits that they become disengaged; this is why it is so crucial that children with SLD are identified and provided with support.

In elementary years "a discrepancy between ability and achievement begins to emerge in students with learning disabilities . . . [T]hese students seem to have strengths similar to their peers in several areas, but their rate of learning is unexpectedly slower" (NASET, 2022). One of the fundamental characteristics used to identify students with SLD is the "specific and significant achievement deficits in the presence of adequate overall intelligence" (NASET). Students with learning disabilities in reading perform much lower than they would be expected to based on their intelligence, and often based on their performance in other academic areas; this low achievement in relation to their same-age peers is often unexpected. In early elementary years "youngsters with LD may find themselves two to four years behind their peers in level of academic achievement, and many fall even further behind as they continue in the educational system" (NASET). This can lead to poor outcomes for students, including dropping out of high school or completing high school without proficiency in skills like reading, math, and writing.

Reading Deficits

Reading is "most prevalent type of academic difficulty for students with learning disabilities. It is estimated that as many as 90% of students with learning disabilities have reading difficulties, and even the low estimates are approximately 60%" (NASET, 2022). Reading issues for children with SLD are usually caused by issues with phonological

awareness - the ability to identify and manipulate sounds in oral language, from parts of words to syllables and phrases - which is a prerequisite skill for learning to read (Berrill, 2018). NASET cites the following research findings:

> (1) the most severe reading problems of children with learning disabilities lie at the word, rather than the text, level of processing (i.e., inability to accurately and fluently decode single words), and (2) the most common cognitive limitation of these children involves a dysfunction in the awareness of the phonological structure of words in oral language.

The fact that the most severe reading problems are at the foundational level is concerning, as the skills at this level are necessary to become a fluent reader. As such, it is pertinent that teachers can identify such deficits and provide early intervention to remediate the skills. Learning disabilities in reading can affect oral reading, reading comprehension, word recognition skills, and reading habits (NASET).

Attention Difficulties

Learning and attention issues are not uncommon, impacting one in five children (National Center for Learning Disabilities [NCLD], 2017). Deficits in attention typically include a short attention span, excessive daydreaming, and high distractibility (NASET). Attention skills are a critical component of reading, as students "must be able to initiate attention, direct their attention appropriately, sustain their attention according to the task demands, and shift attention when appropriate" (as cited in NASET, 2022). As such, deficits in attention impact reading at the decoding level and comprehension level. While there is a high comorbidity rate of ADHD and SLD, attention deficits are also a symptom of a child with just SLD and not ADHD. For a child with SLD, academic tasks like reading require so much effort - struggling to sound out words while simultaneously trying to make meaning of them - that it is physically and mentally exhausting. This can cause children to get distracted, engage in off-task behavior, or just zone out because the task is too cognitively demanding.

Memory Deficits

Typically, students with SLD struggle with short term memory (STM) and working memory (WM). WM refers to "the capacity to store information for short periods of time while engaging in cognitively demanding activities," while STM is the ability to recall information after a short period of time (Peng et al., 2018). This is important because

working memory lends itself to both word recognition, a basic skill, and comprehension, the ultimate goal of reading. Research indicates "links between children's working memory capacity and word reading ability . . . [and] found that children with reading difficulties . . . had pervasive deficits in . . . working memory capacity . . . compared to similarly matched typical readers" (Slattery et al., 2021).

WM is involved in reading comprehension because "one needs to store previously read text in mind while simultaneously manipulating words and their meanings to create a coherent representation of the text" (Slattery et al., 2021). Comprehension requires multiple mental processes working at the same time and is cognitively demanding. Children with learning disabilities struggle with phonological awareness, making decoding and word recognition difficult. As such, the recognition process requires so much working memory that there is not enough left to also comprehend the text. In essence, "inefficient word recognition lessens the amount of additional information that can be maintained in WM to aid comprehension during reading" (Peng et al.). Further, comprehension involves short term memory to remember details from the beginning of the text to the end and to put it all together and find meaning in the text. Oftentimes, this task goes beyond "capacity of their short-term memory," as "they are unable to store the information long enough to remember what they have read" (Bainbridge, 2020).

Although there is no definitive answer as to why students with SLD have memory deficits, researchers theorize "that a working memory deficit is not entirely a capacity deficit.

Rather, for some children with learning disabilities, a working memory problem is primarily a strategy deficit" (Gupta & Sharma, 2017). In other words, it is not necessarily that children with SLD have less WM capacity, but rather they are not equipped with efficient memory strategies, or they do not use strategies in such a way that optimizes WM. On a positive note, when children with SLD are taught "a memory strategy, they perform memory tasks as well as non learning-disabled students" (NASET). Therefore, memory deficits can be remedied by teaching and repeatedly practicing effective memory strategies with students.

Metacognitive Deficits

Metacognition is thinking about one's own thinking. Students with SLD often have deficits in metacognitive skills, which impacts their academic performance. When children use metacognition in their reading, they think about their thinking as they are

reading, which is a critical component of comprehension monitoring. Metacognitive strategies enhance understanding and comprehension of reading. "Children without learning difficulties develop individual strategies that enhance text comprehension . . . Conversely, children with learning disabilities require special support, either because they do not develop them or because they use strategies that are ineffective" (Paolo et al., 2018).

An important component of metacognition is evaluating one's own behavior and/or understanding and making adjustments to be more successful with the given task. Sometimes children with SLD do not identify that they're not understanding the text, so they don't make necessary adjustments, such as slowing down or rereading confusing paragraphs (NASET, 2022). As a result, their understanding of what they read is disorganized and incomplete. Various studies have found that students with SLD were "unable to solve problems they encountered while reading, nor did they have plans or strategies for making sense of the text being read," and their overall metacognitive awareness is much lower than their non-disabled peers (Girli & Ozturk, 2017).

Social-emotional & Motivational Problems

Neither social-emotional nor motivational problems are present in all children with SLD but they do run a higher risk of developing these problems than their nondisabled peers (NASET, 2022). Social-emotional issues can result in internalizing behavior, such as anxiety and depression, as well as externalizing behavior like acting out and bullying.

Internalizing Behavior

Some signs of internalized struggles include low self esteem, increased anxiety, increased sadness or irritability, acting out, somatic symptoms like stomach aches and headaches, and reduced motivation (Ehmke, 2021). When young people experience repeated academic struggles or failure, it has a negative impact on their confidence and self esteem. Low self esteem and lack of self confidence "serve to further interfere with learning and academic success and can reinforce a cycle of failure and negativity . . . For many, strong feelings of frustration, anger, sadness, or shame can lead to psychological difficulties such as anxiety and depression" (Ehmke). Negative emotions can exacerbate academic struggles, which also leads to decreased motivation. "It's unclear whether social-emotional difficulties are caused by the same deficits that affect information processing or if these difficulties arise as a consequence of the stress of repeated failure" (NCLD, 2017).

Externalizing Behavior

Struggles with Peer Relationships. Students with SLD often feel a lack of belonging amongst their peers and are at a greater risk of experiencing bullying (Ehmke, 2021). Bullies sometimes target children with learning disabilities because they act differently, attend a special education classroom, have difficulty communicating, and because they don't feel confident enough to stand up for themselves (Ehmke). Studies show that students with SLD are 31% more likely to experience a high level of bullying than students without (NCLD, 2017). Further, many children with SLD do not have the tools to effectively respond to bullies and may become bullies themselves. As a result, they "receive bullying interventions from teachers, rather than what they really need, which is social and communication skill instruction" (NCLD). Even if bullying is not an issue, children with SLD often have difficulty making friends. This is because they often miss social cues, have trouble expressing themselves, don't pick up on jokes, or just struggle overall in social situations (Miller, 2021). Social interactions are effortless for some children, but very cumbersome for others. For a social interaction to be reciprocal, "you have to understand what's been said, organize your thoughts about it, prioritize the response you want to give, retrieve the words to express it" (Miller). Children with an SLD in reading often have slower processing speeds, as well as difficulty with word retrieval, making this multi-step process very difficult; as a result, they might come off as less intelligent or awkward (or they might be self conscious that they come off this way).

Behavioral Issues. Learning disabilities can lead students to engage in behaviors like acting out, avoidance, and emotional outbursts (Haddad, 2020). Behavior is a means of communication and is often used by children with SLD to express their feelings of frustration or embarrassment. For example, students with a learning disability might be engaged and on-task when they are listening to a text read aloud to them, but may put their head down, talk to peers, or otherwise disengage when they are asked to read independently or aloud. Students behave this way because 1) it distracts from their reading difficulties, 2) it might get them removed from the activity (avoidance), or 3) they don't know how to express their anxiety, embarrassment, frustration, etc., in a productive manner. Sometimes externalized behaviors actually mask a disability because "kids who exhibit behaviors are sometimes seen as troublemakers, which can lead to their learning problems going unrecognized" (Haddad). Haddad shares other behaviors that can mask a learning disability such as impulsivity, inattention, not following directions, mood swings, disorganization, temper tantrums, and defiance. Unfortunately, many children would rather be considered the bad kid than the dumb kid, and exhibit negative behaviors to fulfill that role.

Behavioral issues can have a lasting effect on a students' education, particularly as they get older and the behavior intensifies. Research shows that students with learning disabilities are more than twice as likely to be suspended than students without" (NCLD, 2017). One study showed that out of 2.8 million K-12 students who received out of school suspensions (OSS) in 2013-2014, 700,000 had Individualized Education Programs (IEPs), and almost ⅔ of total disciplinary removals among students with IEPs involved students with SLD or Other Health Impairments (OHI) (NCLD). Further, the disproportionate rate of OSS for students with disabilities "increases dramatically for students of color who have disabilities," with one in four black males with IEPs receiving OSS compared to one in ten white males (NCLD). OSS does not only cause students to miss important instructional time but it also has long-term effects "including increased risk of repeating a grade and dropping out" (NCLD). For this reason, teachers must understand learning disabilities and be able to recognize when adverse behaviors are a manifestation of a student's learning issues.

Social-Emotional Support. It is imperative that teachers help students with SLD develop resilience by recognizing areas of strength, teaching communication and social skills, building a student's "self-concept," and focusing on cooperative learning rather than competition (Ehmke, 2021). With the help of dedicated and supportive teachers, students with SLD are less likely to experience negative social-emotional experiences. Teachers can be advocates for students with SLD by understanding learning disabilities, as well as being familiar with IDEA and the rights that it guarantees students with disabilities.

Teachers can provide social-emotional support for students with learning disabilities by helping them understand their disability and letting them know that it has no correlation with intelligence. When students have a greater understanding of their learning disability, including symptoms and deficits, it not only helps them to not feel stupid when they struggle, but it builds self-advocacy skills. Further, all teachers - special education and general education - should be cognizant of how a disability is affecting children emotionally. For example, neuropsychologist Dr. Phillips says, "When a child is very anxious about reading . . . wait for him to raise his hand and offer to read instead of calling on him blindly" (Ehmke). Teachers can also help students by setting them up for success, with "modest, achievable goals that children can work towards meeting" (Ehmke). When children see that they are making progress, even if it is minor, it increases their self esteem and motivates them to continue trying. Setting up bi-weekly, monthly, or quarterly goal-setting meetings with individual students is an excellent way to present and celebrate progress, and work toward bigger goals.

Progress Monitoring Students with SLD in Reading

Students who have been identified as having SLD receive progress monitoring to ensure that they are making progress toward their annual goals in their Individualized Education Programs (IEPs). For students with SLD in reading, progress monitoring usually includes standardized reading probes that assess fluency and/or comprehension. However, it is up to the IEP team to determine what specific measure (standardized tests, leveled texts, etc.) is used, and how frequent the progress monitoring is done. "The most appropriate progress monitoring systems are those in which objective numerical data are collected frequently, graphed, analyzed, and then used to make instructional decisions" (Vanderbilt University, 2022a). "Anecdotal data" and "subjective procedures" aren't appropriate for progress monitoring, as the results are not objective, and cannot be compared to non-disabled peers (Vanderbilt). Progress monitoring data must be reported to parents at given intervals, usually at the same time as progress reports go out for other students.

Section 1 Key Terms

Attention Deficit Hyperactivity Disorder (ADHD) - a developmental disability characterized by "inattention, distractibility, hyperactivity and impulsivity"

Comorbidity - The "co-occurrence of two or more different disorders in the same individual" (CDE, 2020)

Dyslexia - A SLD characterized by reading difficulties, typically due to deficits in phonological awareness and decoding.

Externalizing Behavior - Outward actions that are problematic, disruptive, and often violate social norms (e.g. bullying, shouting in the middle of class, hitting someone)

Individuals with Disabilities Education Act (IDEA) - Legislation that ensures students with disabilities have access to Free Appropriate Public Education tailored to their individual needs

Internalizing Behavior - Negative inward actions that harm one's self, characterized by anxious and depressive symptoms

Metacognition - Thinking about one's own thinking

Phonological Awareness - The ability to identify and manipulate sounds in oral language, from parts of words to syllables and phrases

Progress Monitoring - Evidence-based practice used to assess a child's academic progress

Short Term Memory - The ability to recall information after a short period of time

Specific Learning Disability (SLD) - Special education category in IDEA (2004) defined as "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia"

Working Memory - "The capacity to store information for short periods of time while engaging in cognitively demanding activities" (Peng et al., 2018)

Section 1 Reflection Questions

1. Think about a "problem student" that you have had in your class in the past. Looking back on it, can you identify possible underlying learning issues that the student might have been experiencing? If so, what were they and how could you have better supported them?
2. Besides following the exclusionary factors in IDEA, what can teachers do to prevent African Americans and Hispanic students from being disproportionately identified as SLD?
3. Think about a student with a learning disability that you have worked with. Which characteristics discussed above did you notice the most in this student? What did you do to support the student?
4. Do you think the "direct route" or the "progress monitoring" route makes more sense in terms of identification of students with SLD? Explain your reasoning.
    a. What are the pros and cons of each approach?

Section 1 Activities

1. Consider a child with moderate Dyslexia in an inclusion setting. The IEP team has determined that the general education classroom, with support from a Special Education teacher, is the Least Restrictive Environment (LRE) for this student. Create a list of ways you can support that student's learning without singling the individual out. You can include both academic and social-emotional supports.
2. Familiarize yourself with IDEA (2004) by reading about the history, specific statutes, and updates. Start by going to https://sites.ed.gov/idea/ and:
    1. Create an infographic or research guide on SLD in IDEA; this should be something that you would share with other educators to "summarize" the main components of the law regarding SLD. You can use the following website to get exact text from the law: (https://sites.ed.gov/idea/files/Identification_of_SLD_10-4-06.pdf)
3. Create a visual of some metacognitive strategies that students with SLD (or any student) can keep with them to remind them to use while reading.
4. Familiarize yourself with your school's process for identifying students with SLD, as well as your school's RTI process. Create a folder (physical or digital) of any forms, paperwork, or templates that you might need to carry out any necessary evaluative measures.

Section 2: Essential Components of Reading

National Reading Panel: Five Essential Components of Reading

In 2000 the National Reading Panel (NRP) was assembled by the U.S. National Institute of Child Health and Human Development (NICHD) to assess the effectiveness of various instructional approaches to teaching reading. They released their findings in 2000 in a report titled *Teaching Children to Read*. NRP's report "identified five essential (though not exhaustive) components of reading instruction, the importance of which has been validated by subsequent research (Colorado Department of Education [CDE], 2018). The components identified by the NRP are *Phonemic Awareness, Phonics, Reading Fluency, Vocabulary, and Reading Comprehension*. The five components

are not isolated skills and must be used in combination in order to help students be effective readers. Therefore, while teachers might focus on different components at different times, an integrated approach to reading instruction is essential (CDE, 2018). The five essential components are discussed below and evidence-based instructional strategies used to teach these components will be discussed in great detail in section 4.

Phonemic Awareness

Phonological Awareness is the "ability to identify and manipulate sounds in oral language, from parts of words to syllables and phrases," and is the umbrella term for a wide range of related skills (Berrill, 2018). Phonemic awareness is one component of phonological awareness, referring to "the ability to hear, identify, and manipulate *individual* sounds (or phonemes) in spoken language (Berrill). Phonemes are the smallest units of sound that distinguish one word from another in spoken language. There are 44 phonemes, or sounds, in the English language because some letters make more than one sound (e.g. /a/ in bat vs. /a/ in plate), and some letter combinations form new sounds (e.g. /sh/ or /ch/).

Why Phonemic Awareness is Important. Numerous studies have confirmed that phonemic awareness, along with letter recognition, are "two of the best early predictors of reading success, and more recent studies have demonstrated that phonemic awareness skills influence children's broader academic success throughout most of their schooling" (as cited in Berrill, 2018). Phonological awareness skills, including phonemic awareness, are foundational skills for reading and are necessary to acquire before phonics skills can be mastered. Children who struggle with phonological awareness have more difficulty learning "alphabetic coding," and thus have difficulty decoding and recognizing words (CDE, 2018). If students are unsure of the 44 phonemes in the English language, they will not have a road map when it comes to converting print to speech. MacPhee explains, "Without securing their sound system by learning to automatically recall the 44 sounds of the English language, students rely on inefficient decoding methods and coping strategies like memorization." While rote memorization and three cueing might aid students in reading beginner texts, it is not an efficient method as texts get more complex.

Phonemic Awareness in the Classroom. Phonemic awareness should be mastered before more advanced skills are taught. Phonological and phonemic awareness are " learned through singing, tapping syllables, rhyming, and dividing words into individual sounds" (International Literacy Association, 2018). Many students with SLDs struggle to

develop phonemic awareness skills. Since phonological awareness tasks vary in levels of difficulty, teachers must be prepared to work with students at all different levels of expertise. This is particularly important because "educational research has proven that phonological awareness is one of the few factors that teachers are able to significantly and effectively influence through instruction" (as cited in CDE, 2018).

Although not every student requires explicit instruction in phonemic awareness, children with less exposure to language in early grades, as well as children with "differences or deficiencies in phonological ability, will not discover the connections between print and speech on their own" (CDE). For these students, explicit and intensive instruction in blending, manipulating, and deleting phonemes can make all of the difference in developing reading skills.

Phonics

Phonics is the relationship between phonemes and graphemes, or more simply put: sounds and letters. Thus, phonics instruction "helps students to learn the written correspondences between letters, patterns of letters, and sounds," which is foundational for fluent reading skills (International Literacy Association, 2018). Phonics instruction includes decoding, which is basically converting written words to spoken words. Readers develop phonics skills "beginning with letter/sound correspondences, to pronounce words and then attach meaning to them," and as they further develop as readers, "they apply other decoding skills, such as recognizing word parts (e.g., roots and affixes) and the ability to decode multisyllable words" (Read Naturally, 2022). Eventually, students also learn to apply decoding skills to read tricky, irregular words.

Though phonemic awareness and phonics instruction will overlap to an extent, phonemic awareness skills should be acquired before explicit phonics instruction begins. Some of the prerequisites to phonics instruction include "language development . . . [which includes] an ability to recognize and produce speech sounds, use language structures (syntax), engage with meaning systems (semantics), and use language appropriately (pragmatics)" (International Literacy Association, 2018). Once students know the alphabet and are able to connect the sounds with the letters, they will be able to blend and manipulate letter sounds to read printed words.

Why Phonics is Important. A large body of research shows that in order to be fluent readers, students need to be able to decode words "accurately and automatically" (Read Naturally, 2022). Students who are able to decode words more quickly read more fluently, while students who take longer to process phonemes tend to struggle more

with comprehension (MacPhee, 2018). The reason for this is because when students have to exert so much energy to decode words, they are unable to focus on what is actually being said in the text. When young people have strong phonemic awareness skills, they are able to dedicate more brain power to comprehending what they are reading. When students do not have phonics skills, they rely on strategies like memorization, using context clues, or using pictures.

Phonics in the Classroom. Studies show that children with SLDs in reading "have exceptional difficulty decoding words. In fact, their level of performance falls below that of younger non-disabled readers who read at the same grade-equivalent level, indicating a serious deficit in decoding skill" (Berrill & LeBlanc, 2018). Explicit, systematic phonics instruction can remedy these deficits for students with SLDs, but teachers must be cognizant of struggling students; oftentimes, struggling readers will compensate for lack of decoding skills by memorizing words or patterns. However, as texts get more complex, memorization will no longer work. Therefore, it is the teacher's responsibility to take note of students who skip difficult words or avoid reading aloud.

Reading Fluency

Fluency is characterized by reading quickly, accurately, and with prosody. Prosody encompasses all of the components of expressive reading: "volume, pitch, and phrasing that reflects and enhances meaning of the text when reading orally" (Rasinski et al., 2017). Fluent readers exhibit automaticity in their word recognition, allowing them to focus on the meaning. The Children's Literacy Initiative (2020) identifies four elements of fluency: accuracy, rate, phrasing, and expression. Accuracy refers to the student's ability to effortlessly read the words as they are written on the page; rate is the speed in which the student reads and can vary based on the nature of the text; phrasing refers to the ability to group words together like normal speech, including appropriate pausing and grouping of phrases; expression is "reading with feeling," using appropriate tone and intonation (Children's Literacy Initiative). It is important to note that because fluency is so closely related to word recognition and expression, it is often context-specific. Students might show great fluency when reading a short fictional story, but struggle when they are reading a scientific text, due to lack of exposure to that specific context. When this occurs, teachers should explore the components of the reading process to determine what is causing the disfluency (Children's Literacy Initiative).

Why Reading Fluency is Important. Reading fluency is directly related to reading comprehension. Whether children are reading aloud or silently, when they read "with

speed, accuracy, and proper expression, they are more likely to comprehend and remember the material than if they read with difficulty and in an inefficient way" (as cited in CDE, 2018). The reason for this is because when students have to stop and think about every letter, sound, or word, rather than reading words automatically, their working memory is consumed with decoding and cannot focus on comprehension. It is difficult to find meaning in a text when so much energy is going toward trying to decode the words. Thus, disfluency causes frustration, as reading becomes a "labored, tedious task that is almost completely devoid of meaning, satisfaction, and enjoyment," which results in a lack of motivation to read at all (Children's Literacy Initiative, 2020). Reading Fluency in the Classroom. Students become fluent readers by reading, but this must be done under guidance. Sustained silent reading (SSR) is frequently used in the classroom and might have other benefits, but it does not increase reading fluency, particularly for struggling readers. Giving at-risk readers a book and simply encouraging them to read may not actually result in them reading more. Struggling readers "may get a book with mostly pictures and look at the pictures, or they choose a difficult book so they will look like everyone else and then pretend to read" (Read Naturally, 2022). Likewise, even if a struggling reader does engage in reading, the student reads a lot slower than a fluent reader, making this time not as useful in supporting fluency. At-risk readers do need to read more but they also require explicit instruction to develop these skills. To support reading fluency, "instruction should target word reading as well as sentence and passage reading" (Berrill & LeBlanc, 2018).

Vocabulary

Vocabulary is word knowledge, and it plays a key role in reading comprehension and in everyday life. Author and professor Steven Stahl said, "Vocabulary knowledge is knowledge; the knowledge of a word not only implies a definition, but also implies how that word fits into the world" (as cited in Read Naturally, 2018). Vocabulary is the words needed to communicate with other people. Young children acquire vocabulary naturally, by listening when others speak and read to them, and then by talking; as children learn to "read and write, they acquire more words through understanding what they are reading and then incorporate those words into their speaking and writing" (Read Naturally). Vocabulary knowledge varies greatly amongst children and depends on factors including but not limited to exposure to language at home, exposure to books, life experiences, language or learning deficits, and/or learning English as a second language. Research indicates that "vocabulary knowledge is one of the factors that directly determines reading comprehension ability" (Berrill & LeBlanc, 2018).

Why Vocabulary is Important. Readers cannot understand what they are reading if they don't know what the words mean; it would be equivalent to knowing how to decode words in a foreign language but having no sense of what the words mean. Early readers struggle to comprehend words that are not in their oral vocabulary, even if they can decode the words. This means that "a child's inability to read a word may be caused as much by their lack of oral understanding of the word as their inability to decode the word" (Berrill & LeBlanc, 2018). Increased vocabulary knowledge improves reading comprehension because children are better able to understand what they are reading. "Students with low vocabulary scores tend to have low comprehension and students with satisfactory or high vocabulary scores tend to have satisfactory or high comprehension scores" (Read Naturally, 2018).

Vocabulary in the Classroom. There is not one specific research-based method for acquiring vocabulary, but rather a "a variety of indirect (incidental) and direct (intentional) methods of vocabulary instruction" (Read Naturally, 2018). Indirect methods include exposure to language at home and in school through listening and talking, as well as through listening to or reading books being read. "Extensive reading provides students with repeated or multiple exposures to words and is also one of the means by which students see vocabulary in rich contexts" (Read Naturally). Direct methods include intentionally and systematically teaching vocabulary instruction. In the early grades, emphasis on reading goes progressively from decoding words to comprehending texts. As students progress through grade levels, vocabulary instruction should include the following:

- "oral definitions and oral use of new words
- word retrieval strategies (for instance, use of mnemonics or a classroom word wall)
- semantic knowledge, and
- syntactical features of the sequence of words and phrases" (Berrill & LeBlanc, 2018).

Berrill and LeBlanc explain that the strategies listed above predict reading comprehension in grade 2 and up. Students with SLDs often have difficulty with word retrieval, so providing them with multiple strategies to use is essential.

Some vocabulary needs to be taught explicitly to all students but this is especially true for students with SLDs. Berrill and LeBlanc (2018) identify two methods of direct

instruction for vocabulary: 1) Directly teaching specific words and 2) teaching phonological and morphological strategies for acquiring new words. Directly introducing key vocabulary before reading a text will support a student's understanding of the text. This can be done through previewing the text with students, allowing them to pick out difficult words. Providing student-friendly definitions of words is also helpful, as dictionary definitions are sometimes difficult to understand. Providing student-friendly definitions means characterizing the "word and how it is typically used" and explaining "the meaning using everyday language" (as cited in Read Naturally, 2022).

Reading Comprehension

Reading comprehension refers to understanding and making meaning of a text. Comprehension begins before a child can actually read, by listening to books being read aloud and looking at pictures. Comprehension is typically the ultimate goal of reading, but it is no easy feat. Even if students can decode words accurately, they are not efficient readers unless they can also comprehend what they are reading. Reading comprehension "relies on the reader's prior knowledge and their active engagement to construct meaning from the words and grammatical structures while they read" (Berrill & LeBlanc, 2018). While comprehension skills are largely dependent on reading fluency when reading independently, teachers can still help students who are not yet fluent to build their comprehension skills.

Why Comprehension is Important. Whether reading for school, work, or pleasure, the reader wants to understand the text. Reading a text without comprehending will not be a meaningful experience for the reader. Further, as students progress through their academic careers, their comprehension of subject matter texts will affect not only their grades, but their overall experience in the course. Postsecondary school and the workforce are also largely reliant on the ability to comprehend technical or other job-related texts. Comprehension skills are life skills.

Comprehension in the Classroom. Comprehension is often difficult for students with SLDs because it is reliant on so many other components, including phonological skills, fluency, and vocabulary. However, research shows "that strategies employed by effective readers can be explicitly taught to improve reading comprehension" to struggling readers as well (CDE, 2018). The National Reading Panel identified eight research-based strategies for explicitly teaching reading comprehension: 1) Comprehension Monitoring, 2) Cooperative Learning, 3) Graphic Organizers, 4) Story Structure, 5) Question answering, 6) Question generating, 7) Summarization, and 8)

Multiple-strategy teaching (CDE, 2018). Specific details of these strategies will be discussed in section 5 of this course.

Section 2 Key Terms

Comprehension - Understanding and making meaning of a text

Morphological Awareness - An understanding of how words can be broken down into smaller units of meaning such as roots, prefixes, and suffixes

Morphology - Meaningful word parts in a language

Phoneme - Smallest unit of sound that distinguish one word from another in spoken language

Phonemic Awareness - The ability to hear, identify, and manipulate individual sounds (or phonemes) in spoken language

Phonics - The relationship between letters and sounds

Vocabulary - The knowledge of words

Section 2 Reflection Questions

1. In your practice, which component of reading do you think most strongly influences whether or not a student is motivated to read? Why do you think this is?
2. Which component of reading do you see students with SLDs struggle with the most? What, if any, accommodation or support helps them the most?
3. While explicit reading instruction and strategies are necessary for students with LDs, do you find that they are also beneficial to students who are not struggling readers? Why or why not?

Section 2 Activities

1. Using key vocabulary from a recent unit or reading in your class, design a worksheet/activity that has students determine meanings of unknown words using morphological awareness. Use the objective below to guide your design.

Objective: Students will use their knowledge of morphemes to determine the meaning of unfamiliar words.

2. Using the internet or hard copy resources, create a collection of graphic organizers that serve different purposes (e.g. vocabulary acquisition, comprehension strategies, etc.), that you can distribute to students in your class. You can modify or create your own as well, but only include graphic organizers that you can actually use. Note: Remember to save the collection in Google Drive or on your laptop!

Section 3: The Science of Reading

The Science of Reading (SoR) is an interdisciplinary body of research about reading, including how children learn to read, why some struggle to read, and best practices for effective reading instruction. SoR is not a program or specific pedagogy; in fact, effective pedagogy should be based on the SoR. The research behind SoR explains "the specific cognitive processes essential for reading proficiency: which skills are involved and what parts of the brain are at work in the process" (Gear, 2021). SoR research is now being discussed amongst parties in the Reading Wars, which is the decades old debate over which method of reading instruction is the most effective.

Background & History of Reading Instruction

Whole Word Approach. During the 1960s and 1970s children were taught to read with the whole word approach. The books used "were very repetitive and were compiled of an intentional sequence of simple sight words" (Gear, 2021). The main purpose of these basal (meaning basic or foundational) books were to learn, drill, and memorize sight words. Each page had a picture illustrating the text, so children were encouraged to use the picture to help figure out unfamiliar words. These books were "based on then-current Behaviorist theories of how children learned, often repeating a word on a page multiple times, along with a picture illustrating its meaning," which relied on the look-say or whole word method of reading (Jeferys, 2017). During the 60s and 70s, 70% of North American and British schools used Dick and Jane and similar basal readers to teach reading, using the whole word approach (Gear). Basal readers might be effective for teaching certain skills to certain groups of students but the rigidity of the books and accompanying programs are not deemed so effective for teaching children with SLDs.

Whole Language Approach. By the mid 1970s, Dick and Jane books were considered outdated due to a lack of diversity in their stories, and new research was "being developed on how children learn to read better when engaged with 'real' stories rather than the artificial, contrived stories found in basal readers" (Gear, 2021). Thus, in the late 1970s, "Whole Language" instruction was developed, "a 'top down' approach to reading where readers construct meaning of a text based on personal connections and experiences" (Gear). In this approach, children were exposed to real literature and rich reading experiences, focusing on comprehension and making meaning from the texts. Whole language instruction also emphasized writing and encouraged students to write using inventive spelling. The problem with this approach was that "phonics and the systematic teaching of code and sound-symbol correspondence was suddenly rejected," and was only addressed in passing through word study, rather than taught explicitly and systematically (Gear). An unfamiliar word was defined either by asking someone for the definition, or by using context clues. Whole language instruction was built around the idea that learning to read is a natural process, like learning to speak. Although there was no real scientific basis for the whole language approach, it was widely used across the United States.

Balanced Literacy Approach. After over a decade of using the Whole Language approach, which was basically reading instruction that didn't teach children how to actually read, many students still struggled with reading. Researchers realized that reading is not a natural process and "immersing students in print and literature alone will not teach them how to read" (Gear, 2021). As a result, the Balanced Literacy approach was born in the 1990s, and was believed to be a middle ground between a Whole Language and phonics based approach. Balanced Literacy uses literature to provide meaningful reading experience, but it also aims to include "explicit, targeted instruction" in phonics and phonemic awareness (Gear). Balanced literacy programs combine several components of reading, including phonics, but there is not enough explicit instruction of phonics to make it effective for struggling readers (Miller, 2022). Balanced Literacy uses a leveled text system, which allows students to advance to more complicated texts as they develop new skills. DRA and Benchmarks are used as reading assessments to determine a child's level, and then they are given books that correspond with that level. The texts "focus on 'meaning' and repeatedly use 'high frequency' words (said, where, out) and syntactic patterns," and are read in shared, guided, partner, and independent reading groups (Gear). These texts are used in lieu of decodable texts.

In the Balanced Literacy approach, students are taught the cueing system, which "promotes attempting to read unfamiliar words by drawing from semantics (context

clues, pictures, background knowledge), syntax (use of language patterns), or graphophonic cues (sounding out words)" (Gear, 2021). The Balanced approach emphasizes that word reading is often a guessing game, so students should be taught effective strategies to "deduce unfamiliar words by drawing from meaning, knowledge of the alphabet, and knowledge of how English works" (Gear). Balanced Literacy was popular during the 1990s and 2000s, and is still popular in classrooms today, despite it being ineffective for many students, including those with SLD (Miller, 2022).

Research-Based Reading Instruction in the 2020s. Current research shows that "reading is not a guessing game and teaching young children to look at pictures, skip over words, or guess at words based on context may not develop appropriate strategies necessary for reading proficiency" (Gear, 2021). These methods might work for early readers but as texts get more complex, it is no longer effective. SoR research shows that the foundational steps of becoming a fluent reader are phonemic awareness and phonics, and these should be taught explicitly and systematically. "Performance is best when children are, from the very beginning, directly taught the mapping of letters onto speech sounds. Regardless of their social background, children who do not learn this suffer from reading delays" (as cited in Gear). Finally, SoR shows that in addition to receiving systematic phonics instruction, kids need to practice using decodable texts. Like Balanced Literacy, SoR confirms the importance of phonological awareness, vocabulary, and comprehension, but differs in the focus of the explicit phonics instructional component. The structured literacy (SL) approach, which is discussed in great detail in section 4, utilizes instructional strategies consistent with the SoR.

The Simple View of Reading

An important model supported by the SoR is the Simple View of Reading (SVR), developed by Gough and Tunmer in 1986. SVR's validity has been confirmed and supported by decades of research studies, and is the basis for how we can understand reading development, instruction, and assessment" (Peltier, 2019). SVR offers a formula for the skills needed to become a proficient reader: Decoding (D) x Language Comprehension (LC) = Reading Comprehension (RC), with "each of the factors working like a percentage, ranging from 0 (no proficiency at all) to 1 (100%, perfect proficiency)" (Farrell et al., 2019; Jiban, 2017). D refers to phonemic awareness, phonics, and overall word recognition, while LC refers to the ability to make meaning of the words, including vocabulary knowledge, sentence structure, and other discourse (Farrell et al.). The variables are multiplied to get RC, rather than added because "when one is weak, you can't just compensate with a heavier dose of the other" (Jiban).

For RC to be strong, both D and LC must be strong. Farrell et al. explains, "When one variable is strong, RC will be equal to the weaker variable . . . A student with excellent decoding skills will achieve reading comprehension equal to his language comprehension skills in the subject area being tested." Therefore, if D is 100% (1) and LC is 65% (.65), RC will be 65% (.65), as the formulaic equation would be 1 * .65 = .65. If both variables are weak then RC will be less than either individual variable; for example, if D is 50% (.5) and LC is 45% (.45), the formula would be .5 * .45= .225 or 22.5%. Thinking about this from a practical standpoint, it makes complete sense: If children are only able to read some of the words in each sentence, and they have a limited vocabulary and lack of subject knowledge, then they are going to struggle with comprehension.

Practical Uses of SVR

SVR claims that reading difficulties fall into one of three categories: 1) weak LC, 2) weak D, or 3) weaknesses in both areas (Farrell et al., 2019). Intervention for a struggling reader will only be effective if it addresses the student's specific weakness; for example, if a student struggles with phonics but is strong in LC, the intervention must specifically target phonics, as well as necessary prerequisite skills for phonics, rather than build on the strengths in LC. RC, LC, and D scores can often be found in results from high stakes assessments, or progress monitoring assessments. Calculating these scores should help to inform instruction and assessment, but like any other data, it should not be the sole source. "RC score does not provide enough information to determine whether the underlying weakness is D or LC, or both . . . Diagnosis of either D or LC is needed to identify the area of reading weakness and to identify instruction that will be most beneficial" (Farrell et al.).

Limitations of SVR

The SVR is an excellent model to emphasize the importance of explicit instruction in both decoding and language comprehension skills, which covers many of the difficulties that struggling readers face. However, SVR has some limitations, as there are components of reading not addressed: difficulties beyond word recognition and language comprehension and executive functioning (EF) skills (Duke & Cartwright, 2021). All students might experience difficulties in these other areas but students with SLD in particular, frequently struggle specifically with EF skills.

Difficulties Beyond D & LC. The SVR does not provide guidance for helping students who struggle with reading comprehension despite having strong decoding and language comprehension skills, and it is also limited in the broadness of its variables. Duke and Cartwright (2021) point out that the broad terms of "decoding / word recognition" and "language comprehension" are limited in what they identify; for example, "is the difficulty with word recognition primarily due to core phonological processing issues, limited orthographic knowledge, or some combination?" Language Comprehension is also a broad term, not taking into consideration the impact of "cultural and other content knowledge," which research has shown to be critical in reading comprehension (Duke & Cartwright). "Knowledge goes beyond just knowing specific word meanings to include knowledge of concepts, objects, and experiences (often discussed as script/ scenario knowledge or schemata)" (Duke & Cartwright). When a child has knowledge about a subject, he or she is going to better understand a text about that subject. As a result, teachers should take a child's background into consideration, "highlighting that reading difficulties are sometimes context dependent, occurring when there is a mismatch between the knowledge assumed by the author/text (and teacher) and the knowledge of the reader" (Duke & Cartwright). Thus, the SVR formula can provide guidance on whether to target general D or LC skills, but further assessment will be necessary to discover exactly which skills within those areas need intervention.

Executive Functioning Skills. In addition to having D and LC skills, "readers must learn to regulate themselves, actively coordinate the various processes and text elements necessary for successful reading, deploy strategies to ensure reading processes go smoothly, maintain motivation, and actively engage with text" (Duke & Cartwright, 2021). All of these components require executive functioning (EF) skills, specifically self-regulation, as well as sustained attention abilities. EF skills are a critical component to reading, so much that studies show that deficits in EF can actually be the primary cause of reading difficulties (Duke & Cartwright).

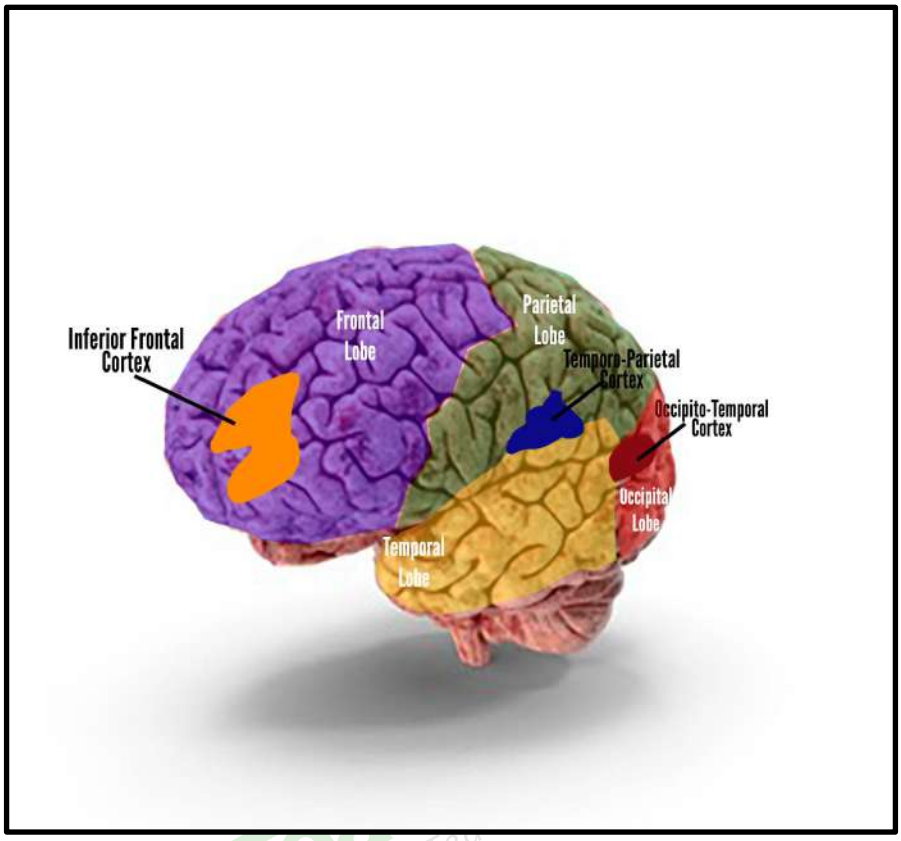
Self-regulation skills also encompass motivation and engagement, as well as strategy use. Studies on the impact of approaches "to enhancing reading motivation, including instruction in self-regulation, instruction to foster students' reading interests and sense of the value of reading, and instruction designed to shift students' mind-sets around reading success and difficulty," revealed positive effects on word reading, reading fluency, and reading comprehension (Duke & Cartwright, 2021). Reading strategies "are deliberate, goal-directed attempts to control and modify the reader's efforts to decode text, understand words, and construct meanings of text" (Duke & Cartwright). As discussed in Section 1, students with SLD have difficulties independently applying

reading strategies, and must be explicitly taught which ones to use in what contexts. Extensive research shows that teaching comprehension strategies improves reading, even for young students and students with disabilities, and should be an important component of reading instruction (Duke & Cartwright).

How the Brain Learns to Read

While the brain is naturally hardwired to learn to speak, learning to read is not a natural process. Surrounding children with spoken language will almost always teach them how to talk (with the exception of neurological differences or sensory impairments); surrounding children with books will not teach them how to read. This is because there are areas of the brain specifically dedicated to "producing and understanding" speech, due to hundreds of thousands of years of evolution of the human brain surrounding language; reading and writing, on the other hand, were only invented by humans around 5,000 years ago, to "record and pass on information," and is considered an "artificial" skill, since it wasn't required before (Cherodath, 2022). As a result, there is no specific area of the brain dedicated to reading, but instead requires several regions to work together to activate the cognitive skills necessary to read. "In order to read, the brain has to learn to repurpose brain functions that were developed over thousands of years for other, more basic needs" (Sedita, 2020).

Parts of the Brain Involved in Reading



Brain imaging technology allows researchers to view brain anatomy, as well as the parts of the brain that are activated when reading. "The reading brain can be likened to the real-time collaborative effort of a symphony orchestra, with various parts of the brain working together, like sections of instruments, to maximize our ability to decode the written text in front of us" (Burns, 2017). For an efficient reader, multiple regions of the brain's left hemisphere, called the cerebral cortex, will be activated when reading. The cortex is divided into four parts: the frontal lobe, parietal lobe, temporal lobe, and occipital lobe. Interestingly enough, the areas of the brain involved in reading are the same regardless of the language, and "differences in these areas are found in the brains of people with dyslexia all around the world" (Eden, 2022).

Occipital Lobe. The brain's visual system, the part that receives and processes what we see, is in the occipital lobe (A word-trick to remember this is that "ocular" relates to eyes and vision, which has the same beginning as occipital). Part of the visual system that specializes in object recognition has been "repurposed" for reading, specifically for "orthographic processing — the ability to recognize written letters and words" (Trafton, 2020). This area of the brain, which was designed to distinguish between different

shapes and objects, aids in recognizing letters and words. Brain imaging shows that this area of the brain is activated “when the brain processes a written word” (Trafton).

Temporal Lobe. The left temporal lobe is responsible for “understanding language, learning, memorizing, forming speech and remembering verbal information” (Evans, 2021). The temporal lobe houses the brain’s auditory system, which processes auditory input, especially “important in processing the semantics in language and vision” (Evans). *(A word-trick to remember this is that “tempo” relates to music or sound, which has the same beginning as **temporal**).* While the temporal lobe is primarily responsible for auditory processing, the right hemisphere temporal lobe also plays a role in visual processing and assigning meaning to visuals (Spinalcord.com, 2020). Within the left temporal lobe is Wernicke’s area, the region of the brain responsible for understanding and processing spoken language (Evans). With sound being its specialty, the temporal lobe plays a role in “phonological awareness and decoding/discriminating sounds” (Burns, 2017).

Temporo-parietal cortex. The Temporo-parietal cortex is where the temporal lobe meets the parietal lobe. This area aids in phonological awareness and word meanings. The parietal-temporal cortex is responsible for decoding, “linking letters and sounds within words, as well as linking to meaning” (IDA Ontario, 2022). The temporo-parietal cortex plays a role in word analysis and sounding out unfamiliar words by breaking a word up into individual sounds (Sedita, 2020). Basically, the temporo-parietal region is responsible for the processing of speech sounds as we read, playing an important role in phonological awareness.

Occipito-Temporal Cortex. The occipito-temporal cortex is where the occipital lobe meets the temporal lobe. This area helps the brain to recognize faces and objects, and helps readers recognize words by sight (Eden, 2022). Since this cortex stores the “appearance and meaning of words,” it aids in automatic letter and word recognition, and language comprehension (Sedita, 2020). This visual component is critical in developing word reading automaticity, so that students do not have to sound out every single word. Simply put, the occipital lobe is responsible for visual recognition of familiar letters, words, and meanings, and plays a critical role in automatic decoding. The more words that a child can recognize by sight (through automatic decoding, not rote memorization), the faster and more fluent they will be able to read.

Frontal Lobe. The frontal lobe has a number of functions, two of which include language processing and executive functioning skills. Broca’s area is in the frontal lobe, and is responsible for “production of speech and written language, as well as with the

processing and comprehension of language" (Evans, 2021). The left frontal lobe "stores information about the sounds in words and sequencing of these sounds" (IDA Ontario, 2022). This area is active when reading silently or reading aloud, and also processes speech sounds while speaking and listening. This part of the brain also helps with pronunciation of written words, which is important for reading fluency. Essentially, the frontal lobe "handles speech production, reading fluency, grammatical usage, and comprehension" (Burns, 2017). Since the frontal lobe is concerned with speech sounds, it also plays a role in phonological processing, and sounding out words.

Inferior Frontal Cortex. The inferior frontal cortex helps to "form speech sounds," and helps with determining how to pronounce written words (Eden, 2022). This area aids in phonological awareness and sounding words out.

Pathways. Pathways in the cortex link together the different areas in the brain to execute the act of reading. Connecting the lobes and cortices allows the brain to connect that the letter symbols /b/ /a/ /t/, form the word "bat," and can be read aloud as such. The Dorsal Pathway, which runs through the frontal lobe and the parietal lobe, is responsible for decoding unknown words; the Ventral pathway, which runs through the occipital, temporal, parietal, and frontal lobes, is responsible for reading "familiar words that have been stored in long-term memory" (IDA Ontario, 2022). Beginning readers use the Dorsal Pathway more because their reading is largely dependent on decoding, while more advanced readers use the Ventral pathway to read words more automatically.

The System in Typically Developing Brains. While different areas of the brain are responsible for different functions of reading, all the areas must work together for effective reading to occur. When the system functions together correctly, children will learn to recognize letters and words automatically and without difficulty. As children become better readers, the brain actually changes, anatomically and functionally, and becomes "specialized for reading, even though they did not evolve naturally to recognize print — highlighting how our brains can be adapted for new learning" (Miller, 2022)."

How the Brain Works Differently in Students with SLD

Brain imaging shows "functional and structural differences" in the parts of the brain used for reading in individuals with SLD, specifically Dyslexia, compared to normal readers (IDA Ontario, 2022). In children with Dyslexia, the occipito-temporal and temporo-parietal cortices that are responsible for automatic decoding and word reading

are less active while reading, so they "over-rely on the frontal areas, sounding out each word time and again, even when they have practiced" reading that word several times (IDA Ontario; Eden, 2022). Less effective parietal and occipital areas make decoding less efficient and more tedious. Students with Dyslexia "depend on different brain regions and pathways that require greater mental effort, and, as they learn to sound words out, they take more time in doing so" (Miller, 2022). Rather than using the parts of the left hemisphere that are meant for language processing, struggling readers use different areas of the right hemisphere, which is inefficient (Sedita, 2022).

There are notable structural differences in the brain of a person with Dyslexia as well. The brain is made up of white and gray matter, which have different functions. Studies of brain scans show that children with dyslexia have less white matter, which "connects different parts of the brain and relays information quickly," and more connectivity in the gray matter, "where thinking and language processing take place" (NCLD, 2017). This implies that children with dyslexia have to work a lot harder to complete reading and written language tasks because there is less connectivity between the parts of the brain wired for automaticity.

IDA Ontario (2022) reports that reading difficulties, particularly decoding, can be remediated with the appropriate reading instruction, and "studies have shown that effective remediation/instruction is associated with increased activation or normalization of regions that typically show reduced or absent activation in dyslexia." Neuroplasticity in the human brain allows for it to change to accommodate new learning, and acquiring reading skills is no exception. Brain imaging shows that when struggling readers are given appropriate instruction and sufficient practice to develop automaticity "their brains create new circuits that connect the language processing parts of the brain with the visual processing part – the same as brains of non-dyslexics" (Sedita, 2022). Imaging studies have also shown actual changes in the brain once a child has received intervention that targets these deficits (Sedita). While intervention can work for both young readers and older struggling readers, instruction must intensify the older the student is. The next section will cover specific strategies and methods of instruction to teach students with SLD to read effectively.

Section 3 Key Terms

Balanced Literacy - Theory of teaching reading that includes components of both whole language instruction and phonics-based instruction

Decoding - Translating printed words into speech

Dorsal Pathway - Runs through the frontal lobe and the parietal lobe, is responsible for decoding unknown words

Inferior Frontal Cortex - Helps to "form speech sounds," and helps with determining how to pronounce written words (Eden, 2022)

Neuroplasticity - The brain's ability to change in response to experiences

Occipito-Temporal Cortex - Area of the brain that recognize faces and objects, and helps readers recognize words by sight (Eden, 2022); focuses on recognizing words by sight through automatic decoding

Science of Reading (SoR) - An interdisciplinary body of research about reading, including how children learn to read, why some struggle to read, and best practices for effective reading instruction

Simple View of Reading (SVR) - Theory developed in 1986 providing a formula for the skills needed to become a proficient reader: Decoding (D) x Language Comprehension (LC) = Reading Comprehension (RC)

Temporo-parietal cortex - Part of the brain that aids in phonological awareness and word meanings; responsible for decoding, "linking letters and sounds within words, as well as linking to meaning" (IDA Ontario, 2022); focuses on the sound of words

Ventral Pathway - Runs through the occipital, temporal, parietal, and frontal lobes, is responsible for reading "familiar words that have been stored in long-term memory" (IDA Ontario, 2022)

Whole Language Approach - Method of teaching children to read by recognizing whole words, rather than breaking words down into letters and letter combinations

Whole Word Approach - Teaches kids to read by sight and relies on memorization

Section 3 Reflection Questions

1. Which instructional approach have you used the most in your practice? Have you found it to be effective? Why or why not?

2. Did your teaching certification program cover the science behind how children learn to read, or any specific instructional approaches? Discuss what you learned in your pre-service program about reading instruction.

Section 3 Activities

1. Using the brain diagram in the section *Parts of the Brain Involved in Reading*, write a brief description that describes what each part does. Use the diagram to explain how children with SLD have different brain activities/functions during reading. This can be done in Slides or on paper.

Section 4: Evidence-Based Strategies to Use in the Classroom

An evidence-based practice (EBP) refers to a practice that "has a record in success in improving reading achievement and is both trustworthy and valid," and when it is used with specific groups of students, "they can be expected to make gains in reading achievement" (Morrow & Gambrell Eds., 2019, p. 5). What makes an EBP trustworthy and valid? EBP are distinguished in two ways: "by data collected according to rigorously designed studies and by expert consensus among practitioners who monitor student outcomes as part of their practice" (as cited in Morrow & Gambrell Eds.). EBP cannot be established by only one study, but must be supported by a wide array of research and results.

Structured Literacy Approach

Structured literacy (SL) is not a specific program but rather an approach that is "based in science, uses evidence-based strategies and, most importantly, is effective" (CDE, 2020). An SL approach works especially well for children with SLD because it "directly addresses their core weaknesses in phonological skills, decoding, and spelling," and extensive research shows that it is also more effective than other approaches for all readers (IDA, 2020b; Swerling, 2018). Further, if general education classrooms utilized an SL approach, it would provide consistent, high-quality, tier 1 reading instruction that would meet a wide range of needs. Structured literacy focuses on the essential components of reading discussed earlier, including phonemic awareness, phonics, vocabulary (and morphology), fluency, and comprehension. Research-based instructional strategies of a

structured literacy approach, discussed in detail below, include: *direct and explicit instruction*, *systematic and cumulative teaching*, *diagnostic teaching*, *and multisensory instruction*.

Explicit Instruction. "Direct" or "explicit" instruction is often used interchangeably. Explicit instruction requires "the deliberate and purposeful teaching of all concepts with continuous student teacher interaction" (CDE, 2020). Explicit instruction is necessary for students who struggle to read. Direct/explicit instructional approaches should be used to teach students with disabilities at the word reading level, as well as to teach comprehension strategies. Further, the strategies discussed below should be used for instruction, but also taught to students so that they may use the same strategies independently. Explicit instruction in reading, as described from the perspective of the SoR, includes the following five evidence-based instructional strategies:

- "Segmenting complex skills into smaller manageable tasks [AKA chunking]
- Modeling or thinking-aloud to address the important features of the content;
- Promoting successful engagement using faded supports and prompts;
- Providing feedback;
- Creating purposeful practice opportunities" (Vaughn & Fletcher, 2022).

Explicit instruction is geared toward individual student needs and requires sound instructional judgment from the teacher. Some programs that use explicit instruction are scripted but that is not a requirement, as long as the instruction is logically organized, and receptive to individual needs. Explicit instruction is "a broad construct that represents a set of instructional routines that specify tasks and behaviors in a continuously defined manner. It is also a way to make instruction clearer, more responsive to learners' needs, and success oriented" (Vaughn & Fletcher).

Segmenting (Chunking) Complex Skills. Segmenting, also referred to as chunking, is an instructional technique that breaks complex concepts into smaller, more manageable ones, and then integrates them so that each component builds upon the one before (Vaughn & Fletcher, 2022). "This process requires an analysis of a complex task in order to isolate the multiple components into smaller units, which has the effect of making instruction more explicit" (Vaughn & Fletcher). Chunked tasks are organized in such a way that students must have a solid understanding of the first task before moving onto the next one, "reviewing and integrating until the more complex skill is readily achieved" (Vaughn & Fletcher).

Chunking can be used at the word reading level by first ensuring "that students know the sounds of the letters needed to read the words. They then integrate multiple sounds that include a consonant and a vowel, and then move to reading c/v/c words (e.g., man, fun, sit)" (Vaughn & Fletcher, 2022). Chunking can also be used at the comprehension level; for example, if the task is to identify the main idea of the paragraph, teachers might provide students with a list of prerequisite questions, such as who, what, and how. Once they have those questions answered, the next step is to integrate the answers to form a response using keywords from the text. Once they have used keywords from the text and have a good understanding of that, teachers can have students put the main idea into their own words.

Chunking is an evidence-based instructional strategy that should be taught to children for independent use during complex reading tasks. At the word reading level, chunking can be used to divide words into familiar parts. For example, children might separate words into syllables for easier decoding, such as in the word "sister," which when chunked is sis-ter. Chunking can also be done by finding the root word and then separating the prefix and suffix. For instance, the word disengaged, chunked in this way would be dis-engage-d. Chunking words can aid in decoding and also defining unfamiliar words. Chunking can also be done at the comprehension level, which typically consists of breaking up a longer text into smaller, more manageable parts. Teachers can scaffold this skill by chunking texts for students at the beginning; this might be drawing lines between sections, numbering paragraphs, or highlighting text, to refer to chunk 1, 2, 3, 4, et cetera. With the use of this type of segmenting, the goal is for students to be able to complete comprehension tasks independently.

Modeling or Think-Alouds. Modeling/think-alouds, or "showing students in an organized and clear manner how to do something (e.g., read sentences to figure out the meaning of a word)," is an effective way to ensure that students can "reproduce and then apply the same practice" (Vaughn & Fletcher, 2022). Teachers often model think-alouds, which means that they basically talk through their cognitive process when reading, writing, or solving a problem. Modeling should include the following characteristics: "clarity of words, brevity of words, demonstrations when possible, describing misunderstandings and how to fix them, and using consistent key language" (Vaughn & Fletcher). Modeling can be used to present strategies for sounding out words, and it can also be used to monitor comprehension. Below is an example think aloud for rereading when something is unclear:

Teacher: I finished this paragraph and noticed that I am unsure of the "who" and the "what." I am going back to the beginning of the paragraph and this time I am going to underline the "who." Here it is, Abraham Lincoln, Now that I know who we are talking about, I am going to underline the main action going on in this paragraph. There it is, this paragraph is discussing how Abraham Lincoln was the president during the Civil War. I reread this paragraph because I was not sure what the gist was and wanted to make sure I knew before moving on.

Research shows that different forms of teacher modeling can also improve fluency: teacher-assisted reading, peer-assisted reading, and audio-assisted reading (Read Naturally, 2022). Teacher modeling does not mean that students are simply listening to the teacher read. During modeling, students must be "actively involved 100 percent of the time and in a multisensory way" (Read Naturally). Teacher modeling teaches "word recognition in a meaningful context, demonstrates correct phrasing, and gives students practice tracking across the page," as well as appropriate rate of reading (Read Naturally). Modeling allows students to hear what strong, fluent reading sounds like, and gives them an example to emulate in their own reading.

Particularly for struggling students, it helps to provide sentence stems to complete while doing a think aloud. Some sentence stem options for word reading and reading comprehension include: *I am unsure of this word, so I will break it up by syllable; I predict that ___ will happen next; I was confused by; this reminds me of; the (person or character) did this action because; I wonder why.* Providing sentence stems is a useful scaffold for helping students learn to use think-alouds on their own. Vaughn and Fletcher express that modeling think-alouds is like providing students with a "mind script" so that "they can borrow that mind script for their own learning."

Prompts and Fading Supports. Using prompts and fading supports to promote engagement and independence is commonly known as the Gradual Release of Responsibility model. Teachers "gradually and systematically reduce cues and supports" so that responsibility is eventually released to "students when they are able to perform the complex task without scaffolds, modeling, think-alouds, or other supports from the teacher" (Vaughn & Fletcher, 2022). Students practice with the task at hand as supports are reduced in intensity and quantity, and this leads to students applying and using skills independently. The rate at which supports are released must depend on student learning and should not be done preemptively.

Providing Feedback. Effective feedback "is clear, focused, directly related to the learning task, and guides the student to continue and/or to adjust learning practice" (Vaughn &

Fletcher, 2022). Feedback should also be immediate, rather than waiting until a child is done reading. Likewise, feedback should reflect "goals of instruction and the characteristics of the learner" (Swerling, 2019). For example, if the goal is to help students with decoding weaknesses to improve reading unfamiliar words, then "feedback focused on phonetic characteristics of words would be most helpful" (Swerling). This type of ongoing feedback is an essential component of explicit instruction. Some programs, particularly the heavily scripted ones, provide the teacher with the exact language to use for correcting an error, as well as for providing praise. "Teachers' feedback is determined by closely monitoring students' responses," including specific praise, and corrective feedback (Vaughn & Fletcher). When giving specific praise, teachers should explain exactly what the student did well so that the individual can repeat the action. For example, a teacher might say, "Great job using morphological analysis to figure out the meaning of that word." The same goes for corrective feedback so that children know what to adjust for next time.

Purposeful Practice Opportunities. Practice cannot be overdone, as practice makes permanent, literally. Neurology shows that when people "review or use information while learning or practicing a skill, the stronger and more powerful it becomes," due to neuroplasticity in the brain (Willis, 2018). Thus, the more a child practices effective reading skills, the more permanent the skills will become. It is important that teachers use a great deal of scaffolding and gradual release of responsibility before providing independent practice opportunities to ensure that students are using the skills correctly -- because practice makes permanent, this can have an adverse effect if students are practicing the skills incorrectly. Effective practice procedures include: "(a) distributing practice (e.g., practicing learned words . . . sounds, and strategies over time to ensure retention); (b) problem solving or worked solutions for practice (e.g., applying reading strategies to . . . texts); and c) retrieval practice (e.g., using . . . activities to test and apply what has been previously learned)" (Vaughn & Fletcher, 2022). These practice activities promote retention and generalization of skills to other settings.

Systematic and Cumulative. Systematic means "the organization of the material follows the logical order of language," and cumulative means that each new concept is based on previous concepts learned (CDE, 2020). Lessons should begin with the easiest concepts and build up to more difficult ones, using previously learned skills to help with understanding the new ones. Systematic instruction is especially important when teaching students to read; this is true for typical young students, and especially true for students with SLD at any age.

Systematic Phonics-Based Instruction. Students with SLD need an explicit, systematic phonics-based approach in order to learn to read efficiently. What exactly does explicit and systematic mean specifically in relation to learning to read? Explicit means "the direct teaching of a set of letter-sound relationships," requiring teachers to "show the students the letter symbol and tell the students the letter sound (as cited in Seger, 2019). When learning to read, systematic instruction means "moving step-by-step through a progression of phonics skills, from learning to recognize the most common and consistent letter-sound patterns to harder and less consistent letter-sound patterns" (Miller, 2022). This might start with single letters and corresponding sounds, moving onto digraphs, and so on. The order of "letter-sound relationships are taught in order of utility . . . giving the new reader immediate opportunities to use what they are learning to decode words in isolation and in connected text" (Seger). This lends itself to the inclusion of purposeful practice opportunities discussed above, which is an integral part of systematic phonics-based instruction. Reading and practice materials should be matched to the phonics lessons taught using decodable texts. Decodable texts are books, articles, or paragraphs in which "at least 98% of the words contain the phonics patterns that kids have been taught so far" (Miller).

Systematic phonics instruction does not mean ignoring vocabulary and reading comprehension, or eliminating the reading of rich literature; it just means that it should be taught separately for children in K-2, as well as for struggling students with SLD. The reason for this is because as a student gets older, often starting in third grade, "emphasis shifts from 'learning to read' to 'reading to learn,'" so the goal by this time is for "children [to] have sufficient reading fluency — which requires automatic word recognition, rather than having to consciously decode letter by letter" (Miller). It is very important for children with SLD to have these skills because their decoding struggles will extend to comprehension and beyond if they cannot access the text. Phonics instruction must be thought of as "a bridge to meaning, reasoning that they're a necessary step toward being able to read any word," which is the foundation for reading and finding meaning in texts (Schwartz & Sawchuk, 2019). If children don't master phonics, they will never be able to develop as truly skilled readers, nor are they likely to develop a love for reading. However, phonics instruction does not have to be boring! Using multi-sensory approaches, such as songs and movement, and reinforcing concepts through games or artwork, makes instruction more engaging.

Determining if a Program is Phonics-Based. When adopting a new literacy program or trying to determine the effectiveness of a current program, teachers can look for certain characteristics to see if the program is phonics-based. It's important to note that while

there might be some research behind components of “whole language” or “balanced literacy” programs, they are “ineffective for many children, including those with dyslexia,” and are NOT phonics-based (Miller, 2022). Considering these programs have certain characteristics, teachers can use the following information to determine if a program is indeed phonics based:

- *It is SYSTEMATIC -- logical order, building on previous skills;* Starts with single letter sound-correspondence, moves on to digraphs (e.g. sh, ch, th), and then more advanced grapheme units (e.g. -igh, -eigh, -air)
- Lessons cover words in the same word family (e.g. hit, mit, lit) to work on decoding skills, rather than high frequency words (e.g. the, of, that)
- Strategies for decoding unfamiliar words are taught and do not encourage guessing or using clues (pictures, context, etc.)
- It contains meaningful, repetitive practice opportunities (e.g. decode the word, write the word, and use it in a sentence -- using the word in multiple ways to reinforce learning)
- Reading material matches specific phonics lessons and are decodable
- *Strategies* introduced for reading high frequency words with unusual grapheme-phoneme correspondence, not rote memorization
- Includes multisensory approaches
- Word walls are organized by sound and letter patterns (sometimes called a sound wall), and not alphabetically (Miller, 2022; five from five, 2022).

Arguments Against Explicit Phonics Instruction. Arguments against explicit, systematic phonics instruction often state that the English language is too inconsistent to rely on decoding skills, and that students should learn strategies that utilize context and visual clues instead. While the English language does have some irregular words, “84% of English words are phonetically regular” and “many of the irregular words are only often irregular by one phoneme only” (Bottari, 2020). When students have strong decoding skills, they can potentially read any word regardless of the difficulty because they are equipped with systematic strategies to conquer challenging words. When using context clues, “only 25% of words can be predicted through context . . . [and] as readers move on to more content-focused texts, only 10% of words can be predicted by context” (Bottari). Arguments against systematic phonics instruction are not grounded in science

and leave children with a deficit of key skills. While not all students require explicit instruction in phonics, the majority of students still benefit from it, and students with SLDs, struggling readers and English Language Learners (ELLs) usually do need it. Reading instruction should not be designed for students who learn to read easily, but rather designed in a way that reaches struggling readers and also enhances learning for skilled readers.

Diagnostic Teaching. Diagnostic teaching refers to differentiation and meeting the specific needs of individual students. This is particularly important for students with SLD because their needs will not fit into "one size fits all" instruction. Instruction must be based on "careful and continuous assessment — both informal (e.g., observation and all types of formative assessment) and formal (e.g., normed and standardized measures)" (CDE, 2020).

Multisensory. While there is less research on the benefits of multisensory instruction compared to the other components of structured literacy, there is strong research on "the effectiveness of simultaneous use of visual, auditory, tactile-kinesthetic, and articulatory motor strategies during instruction," particularly for students with dyslexia (CDE, 2020). Research shows that when an "activity engages multiple areas of the brain, it can help students develop stronger memories around how to do it," helping them to remember in the future (Waterford.org, 2019). Multisensory instruction can also be more engaging, especially for struggling readers. Some effective multisensory reading activities include saying sounds or words aloud while writing, tapping individual sounds or syllables, tracing letters or words in sand, listening to parts of an audiobook or "watching a clip of a storyteller performing" a story or novel, using letter magnets to build vocabulary, using a graphic novel for visuals of a class novel, and teaching students to "sound out words while pointing at each letter to solidify a link between sounds and print letters" (Waterford).

Additional Comprehension Strategies

Teachers should present evidence-based comprehension strategies to improve reading comprehension for all students, but especially students with SLD and attention issues. These comprehension strategies require "students to engage in *self-questioning*, a process in which students ask themselves and then answer questions about what they have read," encouraging active engagement with the text, "before, during, and after reading, and in turn improving their ability to process that information" (Vanderbilt University, 2022b).

Graphic Organizers. Graphic organizers provide students with visual support to increase their comprehension. Graphic organizers can be in the form of webs, diagrams, story maps, or any other systematic visual structure. CDE cites "that teaching readers to use systematic, visual graphs in order to organize ideas benefited readers in remembering what they read and improved comprehension and achievement in social studies and science." Likewise, graphic organizers are particularly helpful for students who struggle with working memory, as it reduces the cognitive load of having to remember each component without writing it down.

Cooperative Learning. Cooperative Learning requires students to work in a group to read and practice different strategies. Group members "help each other increase their knowledge by explaining material they are working on in their own words" (CDE). Studies have shown that "teachers who give students choices, challenging tasks, and collaborative learning structures increase their motivation to read and comprehend text" (as cited in CDE).

Activate Background Knowledge. Activating background knowledge means making connections between previously learned topics and new ones (Vanderbilt, 2022b). Activating background knowledge enables all students, particularly those with SLD, to better comprehend a text. "Readers who have a strong knowledge of a particular topic, both in terms of quantity and quality of knowledge, are more able to comprehend a text than a similarly cohesive text for which they lack background knowledge" (Poch & Lembke, 2018). Typically, activating background knowledge is done BEFORE reading, but there are some strategies that include some during reading as well. Building background knowledge can be done in a variety of engaging ways, and need not be limited to KWL charts or having students write what they know about a topic (though both of those can be effective methods as well). Activating background knowledge is important but it has to be done carefully, as to peak interest without revealing too much. Knight and Reed (2017) of the Iowa Reading Research Center explains, "Teachers need to provide just enough background to set a purpose for reading and really entice students to read on, thus ensuring that they will learn more."

Text Sets. "Multiple texts on the same topic build vocabulary and background knowledge" (Barrett, 2019). Utilizing a variety of formats and genres, including picture books, articles, graphic novels, and even images or short videos, builds background knowledge from multiple "entry points" (Barrett). Websites like Newsela even have pre-made text sets for numerous popular books and topics, and allow teachers to create and share their own text sets.

Anticipation Guides. Anticipation guides are twofold, as "the objectives of the strategy are to activate students' prior knowledge before reading and to aid in scaffolding students' comprehension of text" (Poch & Lembke, 2018). Anticipation guides are used before reading and typically ask students to agree or disagree on thematic statements, leading them to "engage in activities that promote discussion about differences in interpretation and beliefs, allowing students to experience and confront alternative viewpoints that may challenge their own, and which they will encounter within the text selection" (Poch & Lembke). Anticipation guides can be taken a step further by allowing students to revisit them after they have read the text, and confront their initial statements, based on the reading and class discussions.

Background Knowledge Stopping Points. Sometimes building all of the background knowledge before a text results in information overload. This is particularly true for students with SLD with limited knowledge about a topic, as overwhelming them with a ton of new information might be difficult to remember and distract from the text. Knight and Reed (2017) suggests "targeted activation of background knowledge during reading," in which "the teacher could provide stopping points in the text to pose targeted questions." For example, when reading about cloud formations, teachers can have students turn and talk to a partner about their observations of clouds before certain weather events, and how they think those observations are connected; "then, students can continue reading with the purpose of looking for information to confirm or refine the knowledge they just shared with their partners" (Knight & Reed).

Teach About Text Organization. Readers that understand how a text is organized will better "understand what they are reading, identify important points, monitor their comprehension, and make connections among different aspects of the text" (Wanzek, 2022). One example of text organization is using a story structure map. The majority of literature has similar elements, such as characters, setting, a problem, climax, and solution. If students know these story elements "they can make predictions before and during reading, as well as identify the elements during reading" (Wanzek). Further, there are a variety of story map graphic organizers available, which adds a visual component to this strategy. "Using story structure helps the reader develop a deeper understanding of the story by being able to answer the questions of, who, what, why, when, and how. It also helps the reader to construct more coherent memory representations of the story" (CDE, 2018). Teaching students text features of informational texts, such as using headings, captions, and informational graphics, can aid students in comprehension and identifying main ideas.

Metacognitive Strategies. Metacognition refers to "thinking about one's thinking," and is used in phonics instruction "to train them regarding when and why to use various segmentation and blending strategies to decode new words" (Berrill, 2018). This metacognitive awareness is important because if "those strategies don't work with a particular word, the child can purposefully choose a different strategy," rather than getting stuck while reading (Berrill). Metacognitive strategies are also used for monitoring comprehension. It is not enough for students to just know specific strategies but they must know when and why to use a particular strategy.

Comprehension Monitoring. Comprehension monitoring is a metacognitive strategy done during reading, consisting of students checking their own understanding of a text as they read. Comprehension monitoring is important because "young readers and less skilled readers demonstrate weaknesses in detecting inconsistencies within a text," so they must "be able to monitor and use fix-up strategies when comprehension breaks down" (Poch & Lembke, 2018). Fix-up strategies include (but are not limited to) rereading, using context clues to determine the meaning of unknown words, slowing down, reading aloud, or using text features. "Modeling asking and answering questions throughout interacting with a text is a first step in this process" (Wanzek, 2022). At first, teachers can model their own comprehension monitoring by reading and asking the questions aloud, allowing students to answer. With consistent practice, students will begin to monitor their own comprehension and be able to apply strategies for different comprehension goals.

Question Generation. Question generation can be done before, during, or after reading, and is meant to help with comprehension monitoring. "The process of answering self-generated questions makes students aware of whether they understand what they have read" (Vanderbilt University, 2022b). Questions can be generated to make predictions, demonstrate knowledge, or identify key ideas, and range from level 1 "right there" questions, level 2 "putting it together" questions, and level 3 "making connections" questions (Vanderbilt). Level 2 requires students to find information in multiple parts of the text, and level 3 requires students to not only use information from the text but also to connect with their own ideas. "Teachers should directly teach and model for students how to use their textbooks and other materials to generate and answer a particular level of question" (Vanderbilt).

Question Answering. Question answering is a strategy that involves the teacher providing questions for students to answer during or at the end of a text. Students will not automatically know how to do this but teachers can provide instruction on how to

answer questions, as well as how to find answers within the text. "Asking the questions before the reading and modeling for students how to find the answers while they are reading helps improve students' comprehension and recall of information" (CDE, 2018). Modeling this strategy is important because teachers can demonstrate that comprehension questions are not always answered entirely from the text, and students will need to use their own background knowledge and ideas to provide complete answers.

Paraphrasing & Summarizing. Paraphrasing and summarizing are done after reading a text, whether it is a whole text, a paragraph, or even a sentence. Paraphrasing means students take an idea, concept, or paragraph from a text and put it in their own words. "Paraphrasing requires students to process information, which in turn enables them to store that information in long-term memory" (Vanderbilt University, 2022b). Paraphrasing also requires a deeper understanding of the information, as to be able to articulate a sentence in different words. One paraphrasing strategy acronym is RAP: "Read a paragraph; Ask yourself, "What was the main idea and two details?"; Put the main idea and details into your own words" (Vanderbilt). Summarizing builds on paraphrasing. "Teachers begin by teaching students how to identify a topic sentence, disregard irrelevant information, and find the main ideas within paragraphs. Then, students can move to finding the main ideas within a multiple paragraph passage" (CDE, 2018). Summarizing helps students determine the main idea of a text, and helps them to process and remember what they have read.

Vocabulary Strategies. "Typically only 5% to 10% of instructional time is devoted to vocabulary instruction, yet students, especially struggling students and English Language Learners (ELLs), need between 12 and 14 exposures to words and their meanings to fully learn them" (Texas Center for Learning Disabilities, 2022). Teaching children the keywords before jumping into a new text not only creates background knowledge, but prepares them for better comprehension. Researchers say that vocabulary instruction should be direct and explicit, must include multiple practice opportunities, and should be taught schoolwide and across content areas (Center for Learning Disabilities). Below are vocabulary teaching strategies that are especially useful for students with SLD.

Semantic Mapping. Semantic maps are visual representations, such as a web or graphic organizer, that allow students to explore a new word by connecting it to related words, phrases, or ideas. With the use of semantic mapping, students "develop connections among words and increase learning of vocabulary words" (Read Naturally, 2022). Semantic mapping is done with a graphic organizer, which can be self-made, or

downloaded from the internet (there is an abundance of different options). Semantic mapping activities will help students, "especially struggling students and students with learning disabilities, recall the meanings of words and understand how multiple words or concepts 'fit together'" (Texas Center for Learning Disabilities). Providing students with different options for the visual representation can also help to meet diverse needs. Teaching students morphological strategies to determine word meanings gives them the tools to practice this independently. If students are familiar with the affix or root of a word, they can use that knowledge to determine the meaning of the whole word. Read Naturally (2022) explains, "Explicit instruction in word parts includes teaching meanings of word parts and disassembling and reassembling words to derive meaning." For example, if students were to come across the word "unstoppable" in their writing, they could break it down into the prefix un-, the root word "stop," and the suffix -able. Most students will be familiar with the root word "stop," and the prefix un-, and can then determine that unstoppable means "impossible to stop," or "unable to stop."

Morphological Analysis. Morphological awareness/analysis (MA) refers to "the process of using affixes (prefixes and suffixes), base words, and word roots to infer the meanings of words," and to aid in decoding (Manyak et al., 2018). While phonemes are the smallest unit of sound in language, morphemes are the smallest unit of meaning in a language. For example, the word "unplugged" has three morphemes: the prefix un- meaning not; the root or base word plug; and the suffix -ed, which indicates past tense. For students who struggle with phonological awareness, using MA strategies can complement phonics instruction because it does not rely on the ability to "hear" the sounds, but instead focuses on recognizing and understanding the meaning of root words and affixes (Berrill, 2018). Studies show that MA leads to "rapid word recognition and written word pronunciation," leading to improved decoding skills, as well as "understanding of vocabulary . . . [which supports] text comprehension" for students with and without SLD (Wolter & Collins). Students can use MA to chunk words into smaller parts, making decoding more manageable. MA is not only beneficial for students with learning disabilities but it can improve reading ability for all students. For example, typically achieving students will benefit from learning morphological awareness because it provides them with another strategy to use when they come to a difficult word. Berrill explains, "Knowing root words, prefixes and suffixes helps readers gain control over decoding and improves reading success as well as broader success at school." Knowledge of morphemes also helps with spelling, as well as building vocabulary. Morphological awareness can be utilized across the content areas and not just in a reading class. Regardless of the subject matter, teaching common affixes and root words should be included when introducing new vocabulary words and topics.

There are different ways to practice MA in the classroom, including word sorts and word hunts. Word sorts are an excellent way to practice morphological awareness, as "students sort individual words into separate columns based on particular commonalities and thereby 'discover' a particular pattern or rule" (IDA, 2017). Word hunts are used for practice after students have completed guided MA activities; in a word hunt, students "locate words that share the same roots or affixes contained in the words targeted for instruction" (Wolter & Collins). Word hunts can be quite engaging, as teachers can find high-interest texts or texts that relate to instructional units for these activities.

Section 4 Key Terms

Alphabetic principle - Letters and letter patterns represent spoken language

Evidence-based practice - Refers to a practice that "has a record in success in improving reading achievement and is both trustworthy and valid," and when it is used with specific groups of students, "they can be expected to make gains in reading achievement"

Morphological analysis - "The process of using affixes (prefixes and suffixes), base words, and word roots to infer the meanings of words" (Manyak et al., 2018)

Morphology - The meaningful part of words

Orthography - The set of conventions for a writing system including spelling, capitalization, punctuation, etc.

Phonology - The study of sound patterns and their meanings

Semantics - Word meaning and relationships among words

Syntax - The structure of sentences

Section 4 Reflection Questions

1. What are some reading strategies that can be explicitly taught with think alouds? These can be word reading or comprehension activities.
2. What do you think are the benefits and drawbacks of a structured literacy approach? Explain your thinking.

3. Does your school currently use a structured literacy approach or a different approach to literacy instruction?
4. Do you think that a child can have meaningful reading experiences (including complete comprehension of a text) without adequate phonics skills? Why or why not?

Section 4 Activities

1. Take a deep dive into the literacy program that your school uses. Look through the scope and sequence, activities, and determine if the program is systematic and phonics-based, or based on another approach.
2. Build a text set. Consider a book or short story that you will read with your class this school year and find resources that can build background knowledge for the text. Using Google Docs, create a hyperdoc for your text set. Your text set can include articles, graphics, videos, and other short texts.
3. Create a list of comprehension monitoring sentence stems for different reading purposes that you can distribute to your students. See below for an example.

Purpose	**Clarifying**	**Making Inferences**	**Synthesizing**
Stem	I had to go back and reread . . . because . . .	Based on (text evidence) and what I know, I think . . .	Before reading, I thought . . . Now I think . . .

Case Study

Mrs. Grand is a special education teacher co-teaching a 4th grade English Language Arts (ELA) class with Mr. Romano. Mr. Romano has been teaching 4th grade for several years but has little experience working directly with students with SLDs. Ability-wise, Mrs. Grand and Mr. Romano's class is very diverse, with most students reading at grade-level, and just a few outliers in either direction. Scotty is a bright boy in the class who recently transferred from another district. He understands everything when it is read aloud to him but struggles with comprehension when he is reading independently. Scotty's previous district identified him as at-risk after the beginning of the year screening and

had begun tier 2 instruction. However, there are no detailed records about Scotty's specific areas of struggle, interventions used, progress monitoring data. Mrs. Grand and Mr. Romano do not want Scotty to fall behind in the class and are eager to determine the root of his difficulties, and to provide him the support that he needs.

Conclusion

Students with SLD struggle with understanding the relationship between sounds, letters and words, and with grasping the meaning of words, phrases, and paragraphs, ultimately inhibiting their comprehension of a text. In addition, they may have accompanying attention or processing issues that make reading very difficult. Research in the science of reading informs educators how students learn to read, provides numerous strategies that are effective to help students with SLD build reading skills, and teaches instructional strategies to teachers to work most effectively with struggling readers.

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