

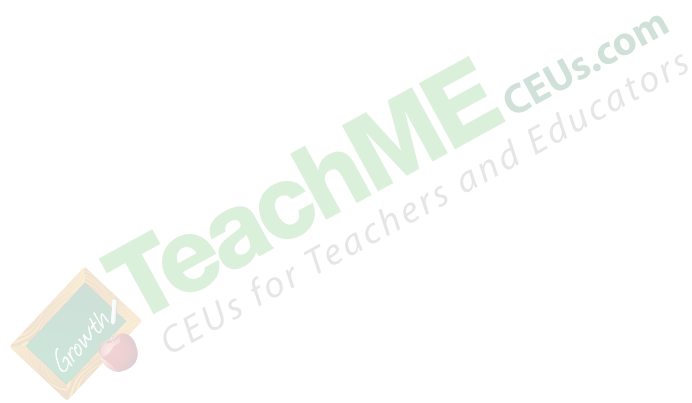
Helping Students with Learning Disabilities Read Effectively



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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 child 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 [NASSET] (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 (NASSET)

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” (NASSET). 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 (NASSET, 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 (NASSET, 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 $\frac{2}{3}$ 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).

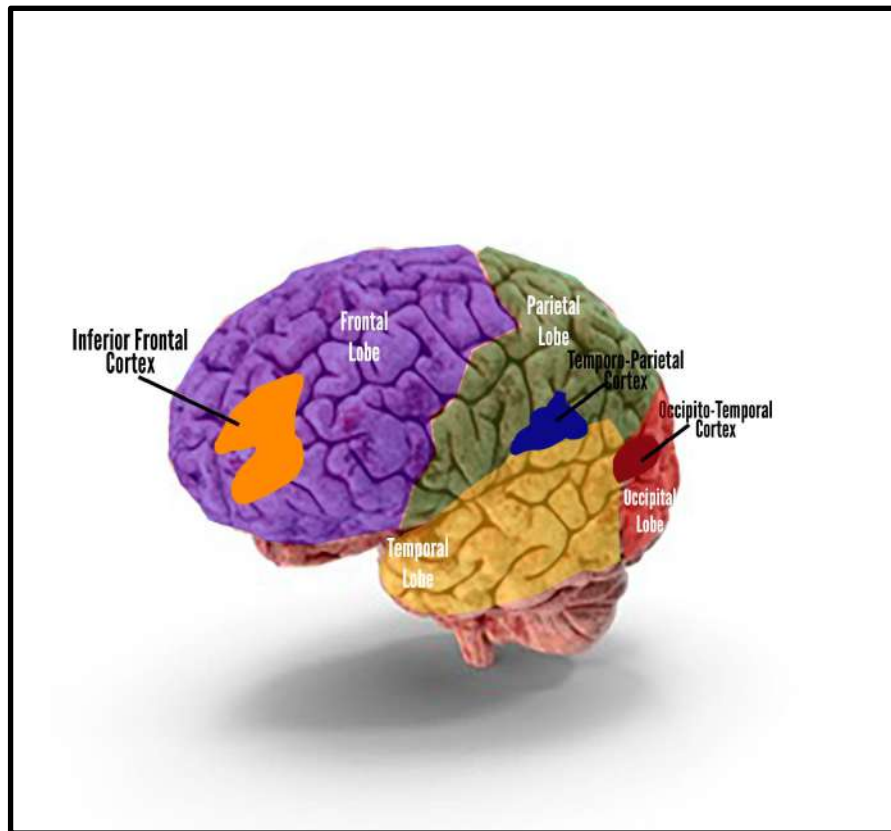
How the Brain Learns to Read

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).



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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? EBPs 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.). EBPs 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.

<u>Purpose</u>	Clarifying	Making Inferences	Synthesizing
<u>Stem</u>	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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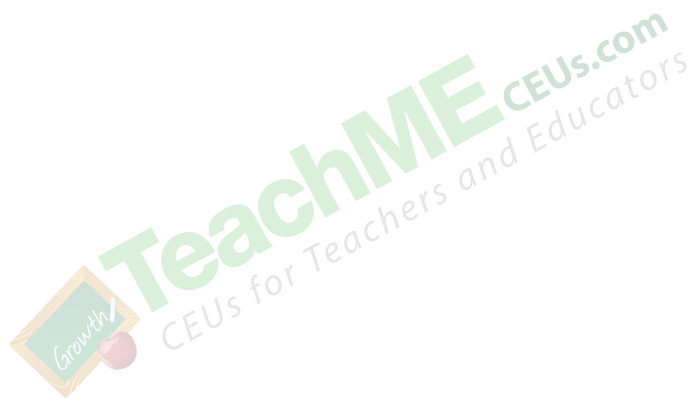
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