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Chapter

Screening, Assessment and Identification Tools for Dyslexia

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Abstract

The special education process relies heavily on assessment to ascertain a student's disability. In order to target the areas of need that call for differentiated or specialized education, teachers can target students' strengths through an ongoing process of data collection and analysis. In order to properly diagnose Specific Learning Disability (SLD) or Dyslexia, the student's planning and placement team (PPT), consisting of the parents of the child and trained professionals, must conduct a thorough evaluation process. People who have dyslexia are frequently misdiagnosed or completely overlooked. The assessment of dyslexia presents with difficulties, such as the use of a variety of terms, the inadequacy of current assessment models, and the dependence on phonological awareness as the only linguistic risk factor. This chapter's goal is to address the difficulties associated with diagnosing and screening for dyslexia in children, including the use of a variety of terms, the use of phonological awareness as the single linguistic risk factor for dyslexia. In an effort to give parents, educators, and researchers a consolidated and comprehensive source of information, the chapter examines the accessibility and usefulness of screening and assessment instruments for the diagnosis and identification of dyslexia in children of various age groups.

Keywords: dyslexia, screening, assessment, definitions, linguistic risk

1. Introduction

Reading and other language-based processing difficulties are referred to as dyslexia, a specific learning disability. It is also known as a reading handicap and is the most prevalent reading disorder, accounting for about 80% of all learning disabilities. Reading difficulties start even before learning to read. Children in kindergarten may not be as proficient in letter recognition and letter writing as their peers. Children with dyslexia have trouble relating the sounds of letters to the letters they see on a page. Reading for them thus becomes a lengthy, laborious, and non-fluent process, which can co-exist with other linked problems and affect reading fluency, decoding, reading comprehension, recall, writing, spelling, and occasionally speech. When possible, people with dyslexia may want to avoid tasks that involve reading (e.g., reading for pleasure, reading instructions). They might frequently favor other forms of expression like images, audio, or video.

The neuro-diversity of dyslexia is widespread and prevalent in all societies, ages, and cultures. According to studies, one in ten persons worldwide has dyslexia and it affects between 5 and 17% of school-age children in India, up to 10% of the population in the United States [1, 2], 7% of the population in the United Kingdom [3], and up to 10% of the population in the United States [4]. Reading development for kids happens at their own speed, just like other skill development. It is typical for school pupils to occasionally find reading difficult; however, it is possible that a youngster has dyslexia if learning to read becomes a constant problem that causes them to lag behind their peers [5]. The current research clearly provides evidence for dyslexia as the most widespread type of learning difficulty among people with a learning disability and is two to three times more common in men than in women [6, 7]. Research indicates that reading disability (RD) is strongly familial and heritable. The disorder affects up to 50% of children with RD, and 50% of a child with RD's siblings also have it. Strong concordance rates for RD have been found in twin studies, showing that genetic factors account for 69–87% of the prevalence and environmental factors for 13–30%. Reading disability (RD) is substantially familial and heritable as per the research and about 50% of children with RD are affected by the disorder, and also the chances of a child having siblings with RD is also 50%. Twin studies have demonstrated strong concordance rates for RD, with genetic variables accounting for 69–87% of the prevalence and environmental factors accounting for 13–30% [8].

2. Dyslexia: Definition, causes and types

The most researched and highly reckoned learning disability globally is dyslexia. Although more than 120 years after Pringle Morgan's initial description, there is still only partial agreement on its definition and the diagnostic standards applied in the clinical and scientific domains [9, 10]. As a type of learning disability, dyslexia was described by Kirk in 1963 as “an unexpected difficulty in mastering one or more of one instrumental school talents.” Since Kirk's early work, the concept of “an unexpected difficulty” which has two different interpretations—has affected research and clinical practice [11]. The International Dyslexia Association states that dyslexia are distinguished by problems with accurate and/or fluent word recognition as well as by subpar spelling and decoding skills. This is sometimes caused by a phonological deficiency in language, which is often unexpected considering other cognitive abilities and the efficacy of instruction in a school. Issues with reading comprehension and a diminished reading experience may have downstream effects that hinder the development of background knowledge and vocabulary [12].

Lyon et al., [7], defined the condition in the following manner that is concurred by both practitioners and experts.

After years of discussion, the American Psychiatric Association amended the worldwide diagnostic criteria for learning disabilities in DSM-5 in 2013, which marks a new stage in the study of this condition [13–15]. The newly proposed diagnostic criteria have undergone several significant changes, including the removal of the “Discrepancy Criterion,” a mention of the “Response to Intervention Approach,” and a new perspective that views learning disorders as a subset of the neuro developmental disorders group [13]. The term “dyslexia” is no longer used outside of the clinical setting; instead, the phrase “Specific learning condition with impairment in [...a specific academic ability]” has been used. The umbrella term “specific learning condition” encompasses a variety of learning problems. For reading disorders, it is

specified which reading-related skills (word reading accuracy, reading rate or accuracy, and/or reading comprehension) are wholly or partially disturbed. As a subset of the more comprehensive category of Neurodevelopmental Disorders, dyslexia is classified as a reading disorder (dyslexia) in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; American Psychiatric Association, 2013). Mathematical and written expression impairments are also included in the category of dyslexia [9, 12, 16–18].

For a specific set of learning problems, the following characteristics are the criteria for diagnosis;

- a. The persistence of symptoms for at least six months despite particular therapies; criterion
- b. The impairment of one or more talents with detrimental impacts on academic performance; criterion
- c. The onset in a school-age, even if the disorder may not completely appear for a while;

Last but not least, there are several exclusion standards. Absence of an intellectual handicap is the first exclusion condition. The second concerns the omission of a haphazard and subpar instruction. The third speaks to a student's ability to communicate in the language of academic teaching. The fourth pertains to the absence of sensory issues (visual and auditory sensory issues that are severe enough to account for the learning difficulties [8, 16, 17]).

3. Causes

Dyslexia appears to be a very intriguing and contentious phenomenon that has been extensively examined from different points of view. It includes an interdisciplinary study and consensus of neuroscience, cognitive science, and learning theory. Although the precise causes of dyslexia are still unknown, morphological and brain imaging investigations have revealed abnormalities in how the brains of those who have the condition develop and work. Additionally, it has been discovered that the majority of dyslexics struggle to recognize the many speech sounds that make up a word and/or learn how those sounds are represented by letters, which is a major contributor to their reading difficulties. Dyslexia is not a result of a lack of intelligence or disinterest to study; with the right teaching strategies, dyslexic students may learn well. People of all ages and intellectual abilities can develop dyslexia. Dyslexics can be incredibly intelligent people. In subjects like art, computer science, design, theater, electronics, math, mechanics, music, physics, sales, and sports, they frequently excel or are even found to be naturally talented. Additionally, because dyslexia runs in families, the chance of developing it also rises if one has a parent or sibling who is dyslexic. While some people have dyslexia identified from an early age, others do not find out until they are much older. The past few decades have seen a significant amount of research committed to determining its likely causes; yielding some significant findings from scientific frameworks that were not previously extensively employed to support the nature of dyslexia. Undoubtedly, the remarkable advancements in the disciplines of neuroscience, brain imaging, and genetics have supported a number of intuitively tenable hypotheses that lacked prior empirical validation and have uncovered a number of previously

un-recognized facts highlighting the complexity of dyslexia. In addition, different causes may apply to different children, and last but not least, there may be several causes of dyslexic issues with respect to a certain child. It may be produced by a number of factors functioning independently or interacting with one another to produce the outcome. A distinct brain activity profile shown with magnetic resonance imaging (fMRI) supports the neurological and genetic reasons of dyslexia as the condition's etiology. Three systems are active on the left side of the brain: a left parietotemporal system that analyses written language, a left occipitotemporal system that performs automatic word recognition, and an anterior system in the left inferior frontal region that influences phoneme production (articulating words aloud or silently). Conversely, dyslexic children exhibit higher activity in the left inferior frontal gyrus, right temporal, and tempoparietal regions, as well as decreased activity in both posterior systems (left temporoparietal, left occipitotemporal). People still have trouble reading unexpected words because they rely more on their right-sided posterior brain regions for memorization when they read than on sound-symbol linkages [8, 14, 15].

4. Common characteristics of dyslexia

One or two of these features are present in most persons. It does not follow that everyone has dyslexia from that. A person with dyslexia typically exhibits several of these traits, which last over time and hinder learning [8, 13–15, 18, 19].

4.1 Oral language

- Delayed talk
- Having trouble with word pronunciation, learning new words, or using grammar that is appropriate for their age.
- Errors with understanding of words that refer direction like right/left, before/after, and other terms
- Difficulty picking up songs, nursery rhymes, or the alphabet
- Compatibility issues with concepts and relationships
- A naming issue or difficulty with word retrieval

4.2 Reading

- Problems of linguistic awareness where difficulties with reading comprehension and identifying or creating rhymes can be observe. Also, trouble to come up with or recognizing rhymes, or counting the syllables in words can be found.
- Trouble in knowledge of phonemes which can be identified in children when they find difficulty perceiving and interpreting sounds in speech
- Difficulty in phonetic interpretation where children fail to identify distinct tones inside words

- Having trouble differentiating and learning the phonics of letters
- Unable to recall letters' names, forms, or names rapidly
- Reading or spelling letters in the wrong order
- Misreading or omitting frequently used short words
- Fumbles over longer words
- Poor reading comprehension when reading aloud or silently as a result of inaccurate word reading
- Exasperated and slow reading

4.3 Written language

- Trouble putting ideas on paper
- Makes numerous spelling mistakes
- Spelling errors may occur in daily work even though one performs well on spelling tests
- Trouble in proofreading

4.4 Other common symptoms that occur with dyslexia

- Trouble in sequentially naming colors, objects, and letters quickly
- Poor memory for lists, directions, or facts
- Requires repeated exposure to concepts in order to fully grasp them; easily distracted by visual or auditory
- Repeatedly shows declined trend in school performance
- Inconsistent school work
- Recognized as lazy by teachers

4.5 Dyslexia symptoms in preschoolers

- Speech delay and pronunciation issues
- Difficulties learning rhymes and rhyming phrases
- Find challenging to learn shapes, colors and even in writing their own name
- Narrating a story in the right sequence can be challenging.

- Often show disinterest in playing games that requires language skills like using rhyming words, etc.
- Unable to identify the letters in their own name
- Having problems recalling the names of letters, numbers, or days of the week [5, 8, 11, 16, 17].

5. Screening, diagnosis and early intervention

Reading comprehension is a necessary skill in today's environment for both academic success and full participation in society. Thus, problems with reading can have detrimental effects on both the person and the society as a whole. For students who exhibit the warning symptoms of dyslexia, early detection and intervention are crucial for improved outcomes in the long run. It is now possible to test, identify, and correct reading challenges early on thanks to research that has pinpointed the exact skill deficiencies that predict subsequent reading difficulties. Programs at the kindergarten and first-grade levels, which require roughly 30–45 min each day, can solve problems for the majority of kids.

Prior to the second grade, it is more crucial to concentrate an examination on the reading development precursors. The Simple view of reading represents the definition of reading as the result of decoding and comprehension as the equation: reading = decoding (listening) comprehension [20]. This equation states that reading success requires both decoding and (listening) comprehension. Therefore, decoding issues, more widespread language issues, such inadequate vocabulary, or both may contribute to children's reading difficulties. Developmental dyslexia is the term used to describe sudden decoding difficulties in children.

Young children's linguistic abilities, phonological awareness, memory, and quick naming tests are more indicative of dyslexia risk than tests of word reading, decoding, and spelling. As a result, phonological awareness, memory, and rapid naming measures are frequently included in screening tests for kindergarten and the first few months of first grade in order to help identify students who need specialized instruction in order to develop these crucial abilities so they can achieve grade-level standards [1, 2, 20, 21].

6. Challenges in evaluation and eligibility process

Assessment of dyslexia faces a number of difficulties, including a lack of understanding of various terminologies, reliance on phonological awareness as the only linguistic factor, SES, inappropriate use of assessment models, under diagnosis of exceptional students, co-occurring disorders, and ignorance of reliable psychometric tools. Many people have the misconception that people who write letters backwards all have dyslexia, or that children with dyslexia write letters backwards. In order to detect pupils who have reading issues, including dyslexia, schools and teachers are crucial. Making ensuring that teachers are able to recognize reading issues early and use the information obtained via the assessment process to determine eligibility is a difficulty. Early detection of dyslexia is crucial to minimizing these social and emotional challenges and ensuring that the student not only learns to read but also comprehends why reading is difficult.

As of right now, eligibility assessments can be determined in a variety of ways or by combining different approaches, such as: a difference in the person's ability (typically based on an IQ score) and performance (Usually determined by the results of a norm-referenced or individual achievement tests); A pattern of an individual's strengths and weaknesses, as well as a pattern of symptoms, can be observed among their academic accomplishment and cognitive scores [8, 22–24].

7. Framework for eligibility as a student with a reading disability

Step 1: Gather information on reading proficiency of children from teachers, parents and intervention.

Step 2: Individually administer the norm-referenced achievement and cognitive processing tests, state-wide assessments, and curriculum-based measures can all be used to evaluate reading proficiency to find the evidence that the student is not performing up to grade or age norms.

Step 3: Verify that the exclusionary criteria (limited English proficiency, lack of instruction, emotional disturbance, cultural factors, visual, hearing, or motor disability, intellectual disability, emotional disturbance, or environmental disadvantage) are not the major causes of the student's poor reading performance.

Step 3: Examine the cognitive functioning to see if there are any reading-related impairments in any particular area. Phonological processing, orthographic awareness, quick naming, processing speed, and working memory are specific cognitive processes associated with reading. Rule out executive functioning disorders as a possible source of attention problems associated with reading. Rule out executive functioning disorders as a possible source of attention problems.

Step 4: Indicate the likelihood that the child needs special education and that their learning challenges necessitate particularly tailored instruction due to the impact of their reading disability (in accordance with IDEA, [25]).

Step 5: Indicate the likelihood that the child needs special education and that their learning challenges necessitate particularly tailored instruction due to the impact of their reading disability (in accordance with DSM-5).

The frame work has been asdapted from Lindstrom [22].

8. Battery of assessments targeting language and reading

It is customary to rule out any potential hearing acuity issues before testing. Language, Phonological awareness, rapid naming/word fluency, Reading fluency, Reading comprehension, Spelling, and Writing are the fundamental areas to be examined for a dyslexia diagnosis.

8.1 Language

The foundation for reading and writing is oral language; hence people with oral language issues typically also develop literacy disorders. Because dyslexia inhibits reading over time, which may also unintentionally artificially lower IQ results, language tests that provide information about an individual's receptive and expressive language abilities, language processing, morphological skills, and pragmatic language skills are required. A formal evaluation of language using a standardized test must be

combined with an informal evaluation of a person's pragmatic language abilities, such as a language sample and inquiries to parents and teachers.

8.2 Phonographical awareness

Poor phonological awareness, which emerges in an inability to recognize and combine separate phonemes in words, is the most defining characteristic of dyslexia. People who struggle with phonemic awareness may have trouble making rhymes and recognizing words that rhyme, counting phonemes in a word (a process known as segmenting), adding, removing, or moving sounds around in a word (a process known as elision), and hearing sounds in isolation and blending them together to form words (blending). It had been discovered that a reading disability was strongly predicted by a lack of phonemic awareness.

8.3 Reading fluency

The score of reading accuracy plus the rate (speed) at which one can read is known as reading fluency. Children's reading comprehension can be tested by having them read longer or shorter passages. It represents the typical number of words successfully read each minute. Poor reading fluency may be a sign of issues with vocabulary, comprehension, decoding, or phonemic awareness. Dyslexic children read accurately at a slower rate.

8.4 Reading comprehension

The ability to comprehend printed material is known as reading comprehension. Children with dyslexia may learn just enough information from reading brief paragraphs to perform well on reading comprehension tests.

8.5 Spelling

Spelling tests can offer insightful diagnostic data on phonemic awareness and language in general. Spelling proficiency sheds light on additional knowledge needed for written communication. Poor spelling may be an indication of a hearing deficiency or auditory processing problem. It may also reflect inadequacies in one or more of the following language components: phonemic awareness, orthographic knowledge, semantic knowledge, and morphological knowledge.

8.6 Writing

The most intricate type of language is writing. A child's language problems are frequently most obvious in his or her writing. There could be deficiencies like misspellings, syntactic, semantic, and morphologic problems, deletions of words or word ends, and general inconsistencies.

8.7 Other-multicultural considerations

When evaluating literacy, cultural and linguistic context must be taken into account. The conventions of narrative vary among cultures. When English is not the primary language spoken at home, issues with language and, consequently, reading comprehension may arise. Additionally, some kids can come from households where

neither parent has a college degree, and they might not be exposed to books that help kids learn to read and write.

8.8 Other-school issues

School-related problems can take the form of acting out or behaving extremely quietly in the classroom to avoid being chosen to read aloud. They can also choose books to read that have already been read to them. Being awful is preferable to feeling foolish. Another red signal is when a parent is doing homework or when a youngster takes a long time to complete their assignments. Finally, and most significantly, the youngster is still not learning to read despite the additional support at school.

9. Diagnosis and assessment tools of dyslexia

Dyslexia diagnosis can frequently seem like a daunting, complex task. For parents, educators, doctors, and other professionals working with troubled students, it is truly a multi-step challenge. Finding out “who on earth actually diagnoses dyslexia?” is the first issue faced by parents of struggling pupils. Typically, parents visit the school for the first time when they see their child is having difficulties. If they have done any research or have heard of dyslexia, they question the school staff if that could be the reason for their child’s difficulties. Although they can identify red flags, school personnel are unable to make a diagnosis of dyslexia; hence a competent outside specialist must do so. Clinical psychologists, neuropsychologists, speech-language pathologists, educational diagnosticians, academic learning centres, or medical experts with relevant training in diagnostic evaluations for learning disorders are examples of qualified professionals.

The diagnosis should be made as with any diagnosis, using information from the case history, casual observation and conversation, and the standardized measures. It’s critical to assess for evidence of poor decoding, low reading fluency, poor reading comprehension, spelling, and writing challenges, as well as difficulties with phonological processing like phonological awareness, phonological memory, or rapid automatic naming. Consequently, the diagnosis should call for action on,

9.1 Measures of single-word (real word and nonsense word) reading in both timed and untimed measures

There are several measures of single-word reading that are timed and untimed. Some of them with great options are

- a. Word Reading Efficiency (TOWRE-2)
- b. Wechsler Individual Achievement Test (WIAT-4) real and nonsense word reading, 3. Word Identification and Spelling Test (WIST),
- c. The Phonological Awareness Test (PAT – 2NU)

9.2 Measures of oral reading fluency

It is important to know how students are reading connected text as well as how quickly a child can read and also how accurately they are reading which requires

hearing them reading out loud. The tools which are available to measure oral reading fluency include,

- a. Gray Oral Reading Test (GORT-5), This test places equal favor on how quickly a student reads and also measures student's accuracy as inaccurate reading impacts reading comprehension.
- b. Woodcock-Johnson IV Tests of Achievement (Oral Reading*, Sentence Reading Fluency*)
- c. Test of Word Reading Efficiency-2 (Sight Word Efficiency**, Phonemic Decoding Efficiency**)
- d. Kaufman Test of Educational Achievement, 3rd ed. (Word Recognition Fluency**)
- e. Process Assessment of the Learner, 2nd ed. (RAN-Words**, Morphological Decoding Fluency**, Sentence Sense*)
- f. Wechsler Individual Achievement Test, 3rd ed. (Oral Reading Fluency*)

The tools include tasks like Silently read a series of simple sentences and indicate if they are true or false (timed), read a passage orally as quickly as possible, orally read a list of single words or nonsense words (timed).
(Rate*, Fluency*)

9.3 Measures of reading comprehension versus listening comprehension

The end goal of reading is comprehension as it is important to know how well students comprehend the material they read and that is provided orally. It is important to assess whether students perform better when listening to information or when reading the information or do they struggle with both that requires specific intervention strategies.

- a. Gray Oral Reading Test (GORT-5)
- b. The Wechsler Individual Achievement Test (WIAT-4)
- c. Woodcock-Johnson IV Tests of Achievement (Letter- Word Identification)
- d. Kaufman Test of Educational Achievement, 3rd ed. (Letter and Word Naming)
- e. Wechsler Individual Achievement Test, 3rd ed. (Word Reading/Reading Comprehension)
- f. Process Assessment of the Learner, 2nd ed. (Does It Fit?, Sentence Sense Accuracy score; Sentence Structure)

These tests include reading aloud a passage and responding to questions based on it, reading a passage that has a word or phrases missing and providing the missing word(s), and silently reading three sentences—two of which are illogical because they

contain a silly word. (e.g., “The boy comes [sic] home late”) and circle the sentence that makes sense.

9.4 Measures of spelling

Sometimes students may have a strong visual memory for words while reading but really struggle to apply these rules at a higher level like in writing and it is also important to know students’ single-word spelling ability by making them write single letters and spell words that are dictated, find the correctly spelled word among a group of four words of which three are misspelled.

Common tests used are,

- a. Wechsler Individual Achievement Test (WIAT-4) (Spelling)
- b. The Word Identification and Spelling Test (WIST)
- c. Woodcock-Johnson IV Tests of Achievement (Spelling)
- d. Kaufman Test of Educational Achievement, 3rd ed. (Spelling)
- e. Process Assessment of the Learner, 2nd ed. (Word Choice)

9.5 Measures of written content and grammar usage

Assessing writing at higher levels is equally important as reading to assess reading at higher levels (fluency and comprehension). It is necessary to see how pupils employ linguistic structures and spell in their writing in order to comprehend this one. A variety of exams are available to evaluate written content and grammatical usage.

- a. Wechsler Individual Achievement Test (WIAT-4) Sentence and Essay level writing subtests
- b. The Test of Written Language (TOWL-4)

9.6 Measures of phonological awareness

Measures of phonological awareness helps to identify whether students can break down sentences, syllables, sounds and if they can blend or repeat sentences, syllables, and sounds. Measures available to test phonological awareness are,

- a. Comprehensive Test of Phonological Processing (CTOPP-2)
- b. Phonological Awareness Test (PAT-2NU),
- c. Phonological Awareness Screening Test (PAST)
- d. Woodcock-Johnson IV Tests of Achievement (Word Attack, Spelling of Sounds)
- e. Kaufman Test of Educational Achievement, 3rd ed. (Letter Naming Facility, Letter Checklist)

- f. Wechsler Individual Achievement Test, 3rd ed. (Naming Letters, Letter-Sound Correspondence)

These tests consist of the following tasks: writing single letters and letter patterns delivered verbally, pronouncing nonsensical words of increasing difficulty, identifying individual letters, making sounds for a limited selection of single letters, and spelling gibberish words. Repeat a non-word without including the intended sound. (say stem without saying /t/); blend /c/ /a/ /t/ to form the word cat. Identify specific phonemes in words (e.g., first, middle, last sound); break the word sun into its component sounds: /m/ /a/ /n/

9.7 Measures of orthographic competence

The capacity of a learner to perceive the visual representation of a letter or number and promptly interpret the symbol is known as orthographic competence.. Diagnosis tools include tasks like,

- a. Comprehensive Test of Phonological Processing (CTOPP-2)
- b. Rapid Naming subtests,

9.8 Measures of language processing

Language processing tools assess student's expressive and receptive vocabulary and their listening/oral comprehension ability.

- a. Wechsler Individual Achievement Test (WIAT-4).

9.9 Letter–sound knowledge

Letter-sound knowledge is assessed through writing, production, and recognition exercises which describes how well-versed a pupil is in letter names, forms, and related sounds. To measure letter–name fluency, the student may be given a random list of uppercase and lowercase letters and asked to identify the names of as many letters as possible in 1 min. A random list of capital and lowercase letters and 1 min test to name as many letters as possible can be used to gauge a student's letter-name fluency.

Similar to this, students may be given a random selection of uppercase and lowercase letters on tests of letter-sound fluency, and they have 1 min to identify as many letter sounds as they can. Additionally, a pupil can be required to write individual dictated letters or the letter or combination of letters that matches to an oral sound that is delivered. (e.g., “Write a letter that makes “n” sound”).

Common tests used are

- Letter/Word Recognition (real words) AIMSweb Tests of Early Literacy or Reading for letter naming fluency and oral reading fluency.
- Dynamic Indicators of Basic Early Literacy Skills, 6th Edition (DIBELS)*
- Letter Naming Fluency

- Oral Reading Fluency
- Dynamic Indicators of Basic Early Literacy Skills Next (DIBELS Next)*
- Oral Reading Fluency
- Feifer Assessment of Reading (FAR)
- Isolated Word Reading Fluency
- Gallistel-Ellis Test of Coding Skills
- Gray Diagnostic Reading Tests, 2nd Edition (GDRT-2)
- Letter/Word Recognition
- Reading Vocabulary
- Kaufman Test of Educational Achievement, 3rd Edition (KTEA-3)
- Letter and Word Recognition (both timed and untimed subtests)
- Test of Word Reading Efficiency, 2nd Edition (TOWRE- 2)
- Sight Word Efficiency (timed)
- Wechsler Individual Achievement Test, 3rd Edition (WIAT-III)
- Word Reading(timed)
- Wide Range Achievement Test, 4th Edition (WRAT-4)
- Word Reading
- Word Identification and Spelling Test (WIST)
- Word Identification
- Woodcock Reading Mastery Tests, 3rd Edition (WRMT-III)
- Letter Identification
- Word Identification
- Woodcock-Johnson III Diagnostic Reading Battery (WJ III-DRB)
- Letter-Word Identification
- Woodcock-Johnson Tests of Achievement, 4th Edition (WJ-IV)
- Letter-Word Identification (untimed) [1, 8, 9, 12, 21, 22, 26–35]

10. Description of popularly used tools to diagnose dyslexia

1. Test of Word Reading Efficiency - 2 (TOWRE-2) by Joseph Torgesen, Richard Wagner, Carol Rashotte

The TOWRE-2 is a rapid and accurate method for evaluating how well adults and children between the ages of 6 and 24 recognize sight words and use phonemic decoding. It is a valid and reliable measure for professionals in schools and clinics to measure word-reading skills. It helps to identify children in the early elementary grades who requires more intensive or explicit instruction in word reading skills in order to make adequate progress in learning to read. It is also frequently used and takes only 5–10 min to complete as part of a battery of tests for the diagnosis of particular reading problems in older children and adults.

2. Word Identification and Spelling Test (WIST) by Barbara A. Wilson and Rebecca H. Felton

The WIST can be used to detect specific areas of weakness for struggling readers as well as identify kids who are struggling with basic literacy abilities. It is available in two versions: an elementary version for grades 2–5 and a secondary version for grades 6–12. It evaluates word identification, spelling, and sound symbol knowledge. It can be useful in creating intervention strategies for students and involves both informal and norm-referenced assessments.

3. Process Assessment of the Learner –II (PAL-II) by Virginia Wise Berninger

To evaluate the cognitive processes involved in academic tasks in kindergarten through sixth grade, the PAL-II can be utilized as an individual or group administered tool. It enables the examiner to determine underachievement causes and link these shortcomings to remedies. Two distinct tests are included in the PAL-II: the PAL-II RW for reading and writing and the PAL-II M for math.

4. Kaufman Test of Educational Achievement, Third Edition (KTEA-3) by Alan S. Kaufman and Nadeen L. Kaufman

The Kaufman Test of Educational Achievement, Third Edition (KTEA-3) helps to quickly and easily identify strengths and weaknesses of children to determine the right intervention and provides a deeper understanding of achievement gaps in students and to provide intervention to achieve their potential. It is a thorough, individually conducted assessment of academic achievement that looks at important math, reading, writing, and oral communication abilities. It incorporates two independent, concurrently normed parallel forms (A and B) to correctly measure academic progress and minimize practice effects. It covers a wide variety of achievement and language areas. The age range for it is 4:10 to 25:11.

5. Gray Oral Reading Test (GORT) by Wiederholt, J. Lee Bryant, Brian R

GORT, a norm-referenced test determines children's (6–18 years) oral reading pace, accuracy, fluency, and understanding by objectively measuring growth in oral reading and diagnose oral reading difficulties. It is an appropriate research tool that determines the reading strengths and weaknesses of individual pupils, to identify students who perform less well in oral reading than their peers, and to

track reading development following intervention; can be completed between 15 and 45 min.

6. Phonological Awareness Test-2: Normative Update (PAT-2: NU), Robertson and Salter

PAT-2: NU is a standardized test used to assess children between the ages of 5 and 9 years, 11 months on their phoneme-grapheme correspondence, phonological awareness, and phonemic decoding abilities. The instrument consists of two supplementary subtests (Phoneme-Grapheme Correspondence and Phonemic Decoding) in addition to six core subtests (Segmentation, Rhyming, Deletion, Isolation, Substitution, and Blending). Both standard item analysis and differential analysis will be used to evaluate each item. The Phonological Awareness Index and the Phoneme-Grapheme Index comprise the Total Score.

7. Wechsler Individual Achievement Test-III (WIAT-III), Wechsler, [36]

The WIAT-III is a standardized academic achievement test which assesses previously learned knowledge related to Reading, Mathematics, Written Language and Oral Language of individual whose age ranges from 4:0–50:11. The WIAT-III includes subtests and observations (Early Reading Skills, Word Reading, Pseudo Word Decoding, Reading Comprehension, Oral Reading Fluency, Total Reading, Basic Reading, Reading Comprehension and Fluency, Numerical Operations, Math Problem Solving, Math Fluency, Alphabet Writing Fluency, Spelling, Sentence Composition, Essay Composition, Writing Expression, Listening Comprehension, Oral Expression and Oral Language).

8. Wechsler Individual Achievement Test – IV (WIAT-IV)

The assessment is intended to determine the ability of an individual to utilize cognitive abilities and acquired knowledge to meet grade-level requirements in reading, math, and written and vocal language for people ranging in age from preschoolers to postsecondary students. It can be effectively used in academic placement, diagnoses of SLD and Dyslexia screening and evaluation. Language, Reading, Speaking, Writing and Listening are the major domains of the tool. The sub domains include Language Comprehension; Reading Comprehension; Fluency and Decoding.

9. Woodcock Johnson IV [37]

Woodcock Johnson IV is used to measure academic achievement, oral language, and cognitive abilities. The Woodcock-Johnson IV Tests of Achievement (WJ IV ACH), The Woodcock-Johnson IV Tests of Cognitive Abilities (WJ IV COG), and The New Woodcock-Johnson IV Tests of Oral Language (WJ IV OL) are the three complimentary, independent, and co-normed batteries of this tool. The tests of achievement include 20 tests to measure four broad academic domains: written language, reading, academic knowledge and mathematics. The Woodcock-Johnson IV Tests of Cognitive Abilities tests and clusters draws important diagnostic information which are useful in identifying exceptionalities and disabilities; and it includes 18 tests to measure verbal attention, letter-pattern matching, phonological processing, non-word repetition and visualization. The New Woodcock Johnson IV Tests of Oral Language comprises 12 battery of tests which are useful for oral language

assessment, determination of English (and Spanish) language proficiency, compares strengths and weaknesses in oral language related abilities for a more complete reading, writing, and dyslexia assessment; this also includes distinct clusters for evaluation of Listening Comprehension and Oral Expression.

10. Comprehensive Test of Phonological Processes – 2nd Edition (CTOPP-2) by Richard K. Wagner, Joseph K. Torgesen, Carol A. Rashotte, Nils A. Pearson

The C-TOPP can be used as a measuring tool in phonological processing research studies, to identify people who are significantly perform below the children in their age group in critical phonological skills, identify advantages and disadvantages in phonological processing, and to document pupil's progress as a result of special intervention programs. This tool is intended for use by anyone between the ages of 4 and 24. The CTOPP-2 is a 40-min test with two subtests that produces developmental scores, age and grade equivalents, composite indices, percentile ranks, and subtest scaled scores [1, 2, 8, 9, 12, 13, 15, 17–24, 27, 38].

11. Conclusion

Dyslexia is a specific learning disability which refers to difficulty with reading and related language-based processing skills. It is also known as a reading handicap and is the most prevalent reading disorder, accounting for about 80% of all learning disabilities. Reading difficulties start even before learning to read.

The neuro-diversity of dyslexia is widespread and prevalent in all societies, ages, and cultures. According to studies, one in ten persons worldwide has dyslexia. After years of discussion, the American Psychiatric Association amended the worldwide diagnostic criteria for learning disabilities in DSM-5 in 2013, which marks a new stage in the study of this condition. The newly proposed diagnostic criteria have undergone several significant changes, including the removal of the “Discrepancy Criterion,” a mention of the “Response to Intervention Approach,” and a new perspective that views learning disorders as a subset of the Neurodevelopmental disorders. Although the precise causes of dyslexia are still unknown, morphological and brain imaging investigations have revealed abnormalities in how the brains of those who have the condition develop and work. Young children's linguistic abilities, phonological awareness, memory, and quick naming tests are more indicative of dyslexia risk than tests of word reading, decoding, and spelling. As a result, phonological awareness, memory, and rapid naming measures are frequently included in screening tests for kindergarten.

Assessment of dyslexia faces a number of difficulties, including a lack of understanding of various terminologies, reliance on phonological awareness, SES and inappropriate use of assessment models. In order to detect pupils who have reading issues, including dyslexia, schools and teachers are crucial. Making ensuring that teachers are able to recognize reading issues early and use the information obtained via the assessment process to determine eligibility is a difficulty. Early detection of dyslexia is crucial to minimizing these social and emotional challenges and ensuring that the student not only learns to read but also comprehends why reading is difficult.

To make a diagnosis, data must be triangulated from the case history, informal observation and conversation, and the standardized measures. This will help identify any signs of spelling and writing difficulties, poor decoding, poor reading fluency, poor reading comprehension, or difficulties with phonological processing.

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References

- [1] Bishop DV, Snowling MJ. Developmental dyslexia and specific language impairment: Same or different. *Psychological Bulletin*. 2004;**130**(6):858-886
- [2] Snowling MJ, Melby LM. Oral language deficits in familial dyslexia: A meta-analysis and review. *Psychological Bulletin*. 2016;**142**(5):498-545
- [3] Peterson RL, Pennington BF. Developmental dyslexia. *Lancet*. 2012;**379**:1997-2007. DOI: 10.1016/S0140-6736(12)60198-6
- [4] Siegel L. Perspectives on dyslexia. *Paediatrics & Child Health*. 2006;**11**:581-587. DOI: 10.1093/pch/11.9.581
- [5] Snowling MJ. Early identification and interventions for dyslexia: A contemporary view. *Journal of Research in Special Educational Needs*. 2013;**13**(1):7-14. DOI: 10.1111/j.1471-3802.2012.01262.x
- [6] Rutter M, Caspi A, Fergusson D, et al. Sex differences in developmental reading disability: New findings from 4 epidemiological studies. *The Journal of the American Medical Association*. 2004;**291**(16):2007-2012. DOI: 10.1001/jama.291.16.2007
- [7] Lyon GR, Shaywitz SE, Shaywitz BA. A definition of dyslexia. *Annals of Dyslexia*. 2003;**53**:1-14. DOI: 10.1007/s11881-003-0001-9
- [8] Muktamath V, Hegde P, Chand S. Types of Specific Learning Disability. *IntechOpen*; 2022. DOI: 10.5772/intechopen.100809
- [9] Petretto DR, Masala C. Dyslexia and specific learning disorders: New international diagnostic criteria. *Journal of Child Development Disorder*. 2017;**3**:4-19
- [10] Grunke M, Cavendish W. Learning disabilities around the globe: Making sense of the heterogeneity of the different point of viewpoints. *Learning Disabilities: A Contemporary Journal*. 2016;**14**:1-8
- [11] Kirk SA. Behavioral diagnosis and remediation of learning disabilities. In: *Proceedings of the Conference on the Exploration into Problems of the Perceptually Handicapped Child*. Institutional of educational sciences, Govt. of USA; 1963. pp. 1-7
- [12] Hargreeves H, Rowbotham M, Philips M. *A Handbook on Learning Disabilities*. Ontario's of Children and Youth Services copyright- Integra® Staff; 2009
- [13] IDA. *IDA Dyslexia Handbook: What Every Family Should Know*. Baltimore: The International Dyslexia Association (IDA); 2014 Copyright 2014
- [14] IDA. *Dyslexia in the Classroom: What Every Teacher Should Know*. Baltimore: The International Dyslexia Association (IDA); 2017 Copyright 2014
- [15] Darling D. Book Review: Nijakowska, J. 2010. *Dyslexia in the Foreign Language Classroom*. Bristol: Multilingual Matters. 2012
- [16] APA. *American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders*. Washington DC: APA; 2013
- [17] Tannock R. Provision of evidence-based intervention is not part of the

- DSM-5 diagnostic criteria for specific learning disorder. *Europe Journal of Child and Adolescent Psychiatry*. 2016;**25**:209-210
- [18] Francés L, Quintero J, Fernández A, et al. Current state of knowledge on the prevalence of neurodevelopmental disorders in childhood according to the DSM-5: A systematic review in accordance with the PRISMA criteria. *Child Adolescence Psychiatry Mental Health*. 2022;**16**:27. DOI: 10.1186/s13034-022-00462-1
- [19] Chisom E. Understanding dyslexia. 2016. DOI: 10.13140/RG.2.1.3292.4566
- [20] Gough PB, Tunmer WE. Decoding, reading, and reading disability. *Remedial and Special Education*. 1986;**7**(1):6-10
- [21] Anette A, May BM. Assessment of dyslexia – Why, when, and with what? *Scandinavian Journal of Educational Research*. 2021;**66**:1-13. DOI: 10.1080/00313831.2021.1958373
- [22] Lindstrom JH. Dyslexia in the schools: Assessment and identification. *Teaching Exceptional Children*. 2019;**51**(3):189-200
- [23] Youman M, Mather N. Dyslexia laws in the USA. *Annals of Dyslexia*. 2012;**63**. DOI: 10.1007/s11881-012-0076-2
- [24] Mather N, Wendling BJ. *Essentials of Dyslexia Assessment and Intervention*. New Jersey: John Wiley & Sons, Inc; 2012
- [25] Gartin BC, Murdick NL. Idea 2004: The IEP. *Remedial and Special Education*. 2005;**26**(6):327-331. DOI: 10.1177/07419325050260060301
- [26] Morgan P. A case of congenital word blindness. *British Medical Journal*. 1896;**7**:13-17
- [27] Martinelli V, Camilleri D, Fenech D. Common beliefs and research evidence about dyslexic students' specific skills: Is it time to reassess some of the evidence? *Interdisciplinary Education and Psychology*. 2018;**2**(2):4
- [28] Farrall ML. *Reading Assessment: Linking Language, Literacy, and Cognition*. Hoboken, NJ: John Wiley & Sons; 2012
- [29] National Reading Panel. *Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and its Implications for Reading Instruction*. Washington, DC: National Institutes of Health; 2000
- [30] Spear L. *The Power of RTI and Reading Profiles: A Blueprint for Solving Reading Problems*. Baltimore, MD: Paul Brookes Publishing; 2015
- [31] Catts HW, Petscher Y. Early identification of dyslexia: Current advancements and future directions. *Perspectives on Language and Literacy*. 2018;**44**(3):33-36
- [32] SLD. *Dyslexia assessment resource guide*. 2017. Available from: <http://www.ct.gov/sde/slddyslexia>
- [33] Rao C, Midha R, Midya V, Sumathi TA, Singh N, Oberoi G, et al. *Dyslexia assessment for languages of India (DALI)*. 2015. DOI: 10.13140/RG.2.2.14696.32005
- [34] Szaszkievicz M. *The Experiences of Norwegian Students with Dyslexia Learning English as a Foreign Language*. 2013. Available from: <http://urn.nb.no/URN:NBN:no-37750>
- [35] Chaitra R, Vishal M, Sumathi TA, Geet Oberoi. DOI: 10.13140/RG.2.2.14696.32005

[36] Wechsler D. Wechsler Memory Scale
4th ed. San Antonio, TX: Pearson; 2009

[37] Schrank FA, McGrew KS, Mather N.
Woodcock-Johnson IV tests of cognitive
abilities. *Journal of Psychoeducational
Assessment*. 2014;**33**(4):381-390.
DOI: 10.1177/0734282915571408

[38] The Regents of the University of
Michigan. U-M Gateway. 2022. Available
from: [http://dyslexiahelp.umich.edu/
contact-us](http://dyslexiahelp.umich.edu/contact-us) retrieved on 08.09.2022

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