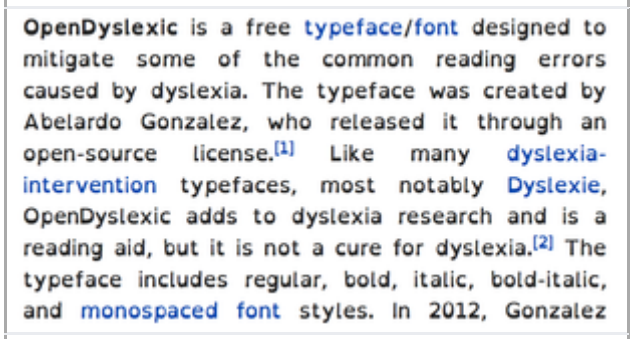
Dyslexia

Dyslexia, also known as **reading disorder**, is characterized by trouble with reading despite normal intelligence.[2][7] Different people are affected to varying degrees.[4] Problems may include difficulties in spelling words, reading quickly, writing words, "sounding out" words in the head, pronouncing words when reading aloud and understanding what one reads.[4][8] Often these difficulties are first noticed at school.[3] When someone who previously could read loses their ability, it is known as "alexia".[4] The difficulties are involuntary and people with this disorder have a normal desire to learn.[4] People with dyslexia have higher rates of attention deficit hyperactivity disorder (ADHD), developmental language disorders, and difficulties with numbers.[3][9][10]

Dyslexia is believed to be caused by the interaction of genetic and environmental factors.[3] Some cases run in families.[4] Dyslexia that develops due to a traumatic brain injury, stroke, or dementia is called "acquired dyslexia".[2] The underlying mechanisms of dyslexia are problems within the brain's language processing.[4] Dyslexia is diagnosed through a series of tests of memory, vision, spelling, and reading skills.[5] Dyslexia is separate from reading difficulties caused by hearing or vision problems or by insufficient teaching or opportunity to learn.[3]

Treatment involves adjusting teaching methods to meet the person's needs.[2] While not curing the underlying problem, it may decrease the degree or impact of symptoms.[11] Treatments targeting vision are not effective.[12] Dyslexia is the most common learning disability and occurs in all areas of the world.[13] It affects 3–7% of the population,[3][6] however, up to 20% of the general population may have some degree of symptoms.[14] While dyslexia is more often diagnosed in men,[3] it has been suggested that it affects men and women equally.[13] Some believe that dyslexia should be best considered as a different way of learning, with both benefits and downsides.[15][16]

Dyslexia	
Other names	Reading disorder, alexia
 An example of OpenDyslexic typeface, used to try to help with common reading errors in dyslexia.[1]	
Specialty	Neurology, pediatrics
Symptoms	Trouble reading[2]
Usual onset	School age[3]
Causes	Genetic and environmental factors[3]
Risk factors	Family history, attention deficit hyperactivity disorder[4]
Diagnostic method	Series memory, spelling, vision, and reading test[5]
Differential diagnosis	Hearing or vision problems, insufficient teaching[3]
Treatment	Adjusting teaching methods[2]
Frequency	3–7%[3][6]

Contents

Classification

Dyslexia is divided into developmental and acquired forms. This article is primarily about *developmental dyslexia*, i.e., dyslexia that begins in early childhood.[17] Acquired dyslexia occurs subsequent to neurological insult, such as traumatic brain injury or stroke. People with acquired dyslexia exhibit some of the signs or symptoms of the developmental disorder, but requiring different assessment strategies and treatment approaches.[18]

Signs and symptoms

In early childhood, symptoms that correlate with a later diagnosis of dyslexia include delayed onset of speech and a lack of phonological awareness.[12] A common myth closely associates dyslexia with mirror writing and reading letters or words backwards.[19] These behaviors are seen in many children as they learn to read and write, and are not considered to be defining characteristics of dyslexia.[12]

School-age children with dyslexia may exhibit signs of difficulty in identifying or generating rhyming words, or counting the number of syllables in words–both of which depend on phonological awareness.[20] They may also show difficulty in segmenting words into individual sounds or may blend sounds when producing words, indicating reduced phonemic awareness.[21] Difficulties with word retrieval or naming things is also associated with dyslexia.[22]:647 People with dyslexia are commonly poor spellers, a feature sometimes called dysorthographia or dysgraphia, which depends on orthographic coding.[12]

Problems persist into adolescence and adulthood and may include difficulties with summarizing stories, memorization, reading aloud, or learning foreign languages. Adults with dyslexia can often read with good comprehension, though they tend to read more slowly than others without a learning difficulty and perform worse in spelling tests or when reading nonsense words–a measure of phonological awareness.[23]

Associated conditions

Dyslexia often co-occurs with other learning disorders, but the reasons for this comorbidity have not been clearly identified.[24] These associated disabilities include:

- Dysgraphia: A disorder involving difficulties with writing or typing, sometimes due to problems with eye–hand coordination; it also can impede direction- or sequence-oriented processes, such as tying knots or carrying out repetitive tasks.[25] In dyslexia, dysgraphia is often multifactorial, due to impaired letter-writing automaticity, organizational and elaborative difficulties, and impaired visual word forming, which makes it more difficult to retrieve the visual picture of words required for spelling.[25]
- Attention deficit hyperactivity disorder (ADHD): A disorder characterized by problems sustaining attention, hyperactivity, or acting impulsively.[26] Dyslexia and ADHD commonly occur together.[6][27][28] Approximately 15%[12] or 12–24% of people with dyslexia have ADHD;[29] and up to 35% of people with ADHD have dyslexia.[12]
- Auditory processing disorder: A listening disorder that affects the ability to process auditory information.[30][31] This can lead to problems with auditory memory and auditory sequencing. Many people with dyslexia have auditory processing problems, and may develop their own logographic cues to compensate for this type of deficit. Some research suggests that auditory processing skills could be the primary shortfall in dyslexia.[32][33]
- Developmental coordination disorder: A neurological condition characterized by difficulty in carrying out routine tasks involving balance, fine-motor control, kinesthetic coordination, difficulty in the use of speech sounds, problems with short-term memory, and organization.[34]

Causes

Researchers have been trying to find the neurobiological basis of dyslexia since the condition was first identified in 1881.[35][36] For example, some have tried to associate the common problem among people with dyslexia of not being able to see letters clearly to abnormal development of their visual nerve cells.[37]

Neuroanatomy

Neuroimaging techniques, such as functional magnetic resonance imaging (fMRI) and positron emission tomography (PET), have shown a correlation between both functional and structural differences in the brains of children with reading difficulties.[38] Some people with dyslexia show less electrical activation in parts of the left hemisphere of the brain involved with reading, such as the inferior frontal gyrus, inferior parietal lobule, and the middle and ventral temporal cortex.[32] Over the past decade, brain activation studies using PET to study language have produced a breakthrough in the understanding of the neural basis of language. Neural bases for the visual lexicon and for auditory verbal short-term memory components have been proposed,[39] with some implication that the observed neural manifestation of developmental dyslexia is task-specific (i.e., functional rather than structural). fMRIs of people with

dyslexia indicate an interactive role of the cerebellum and cerebral cortex as well as other brain structures in reading.[40][41]

The cerebellar theory of dyslexia proposes that impairment of cerebellum-controlled muscle movement affects the formation of words by the tongue and facial muscles, resulting in the fluency problems that some people with dyslexia experience. The cerebellum is also involved in the automatization of some tasks, such as reading.[42] The fact that some children with dyslexia have motor task and balance impairments could be consistent with a cerebellar role in their reading difficulties. However, the cerebellar theory has not been supported by controlled research studies.[43]

Inferior parietal lobule - superior view animation

Genetics

Research into potential genetic causes of dyslexia has its roots in post-autopsy examination of the brains of people with dyslexia.[37] Observed anatomical differences in the language centers of such brains include microscopic cortical malformations known as ectopias, and more rarely, vascular micro-malformations, and microgyrus—a smaller than usual size for the gyrus.[44] The previously cited studies and others[45] suggest that abnormal cortical development, presumed to occur before or during the sixth month of fetal brain development, may have caused the abnormalities. Abnormal cell formations in people with dyslexia have also been reported in non-language cerebral and subcortical brain structures.[46] Several genes have been associated with dyslexia, including DCDC2 and KIAA0319 on chromosome 6,[47] and DYX1C1 on chromosome 15.[48]

Gene–environment interaction

The contribution of gene–environment interaction to reading disability has been intensely studied using twin studies, which estimate the proportion of variance associated with a person's environment and the proportion associated with their genes. Both environmental and genetic factors appear to contribute to reading development. Studies examining the influence of environmental factors such as parental education[49] and teaching quality[50] have determined that genetics have greater influence in supportive, rather than less optimal, environments.[51] However, more optimal conditions may just allow those genetic risk factors to account for more of the variance in outcome because the environmental risk factors have been minimized.[51]

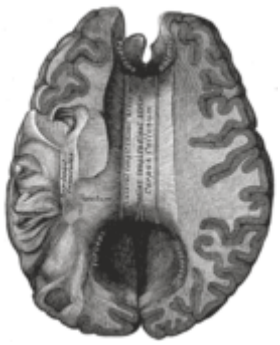
As environment plays a large role in learning and memory, it is likely that epigenetic modifications play an important role in reading ability. Measures of gene expression, histone modifications, and methylation in the human periphery are used to study epigenetic processes; however, all of these have limitations in the extrapolation of results for application to the human brain.[52][53]

Language

The orthographic complexity of a language directly affects how difficult it is to learn to read it.[54]:266 English and French have comparatively "deep" phonemic orthographies within the Latin alphabet writing system, with complex structures employing spelling patterns on several levels: letter-sound correspondence, syllables, and morphemes.[55]:421 Languages such as Spanish, Italian and Finnish have mostly alphabetic orthographies, which primarily employ letter-sound correspondence—so-called "shallow" orthographies—which makes them easier to learn for people with dyslexia.[54]:266 Logographic writing systems, such as Chinese characters, have extensive symbol use; and these also pose problems for dyslexic learners.[56]

Pathophysiology

Most people who are right-hand dominant have the left hemisphere of their brain specialize more in language processing. In terms of the mechanism of dyslexia, fMRI studies suggest that this specialization may be less pronounced or even absent in cases with dyslexia. Additionally, anatomical differences in the corpus callosum, the bundle of nerve fibers that connects the left and right hemispheres, have been linked to dyslexia via different studies.[57]



Corpus callosum view, front part at top of image

Data via diffusion tensor MRI indicate changes in connectivity or in gray matter density in areas related to reading/language. Finally, the left inferior frontal gyrus has shown differences in phonological processing in people with dyslexia.[57] Neurophysiological and imaging procedures are being used to ascertain phenotypic characteristics in people with dyslexia thus identifying the effects of certain genes.[58]

Dual route theory

The dual-route theory of reading aloud was first described in the early 1970s.[59] This theory suggests that two separate mental mechanisms, or cognitive routes, are involved in reading aloud.[60] One mechanism is the lexical route, which is the process whereby skilled readers can recognize known words by sight alone, through a "dictionary" lookup procedure.[61] The other mechanism is the nonlexical or sublexical route, which is the process whereby the reader can "sound out" a written word.[61][62] This is done by identifying the word's constituent parts (letters, phonemes, graphemes) and applying knowledge of how these parts are associated with each other, for example, how a string of neighboring letters sound together.[59] The dual-route system could explain the different rates of dyslexia occurrence between different languages (e.g., the consistency of phonological rules in the Spanish language could account for the fact that Spanish-speaking children show a higher level of performance in non-word reading, when compared to English-speakers).[54][63]

Diagnosis

Dyslexia is a heterogeneous, dimensional learning disorder that impairs accurate and fluent word reading and spelling.[64][65] Typical—but not universal—features include difficulties with phonological awareness; inefficient and often inaccurate processing of sounds in oral language (*phonological processing*); and verbal working memory deficits.[66][67]

Dyslexia is a neurodevelopmental disorder, subcategorized in diagnostic guides as a *learning disorder with impairment in reading* (ICD-11 prefixes "developmental" to "learning disorder"; DSM-5 uses "specific").[68][69][70] Dyslexia is not a problem with intelligence. Emotional problems often arise secondary to learning difficulties.[71] The National Institute of Neurological Disorders and Stroke describes dyslexia as "difficulty with phonological processing (the manipulation of sounds), spelling, and/or rapid visual-verbal responding".[2]

The British Dyslexia Association defines dyslexia as "a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling" and is characterized by "difficulties in phonological awareness, verbal memory and verbal processing speed".[72] *Phonological awareness* enables one to identify, discriminate, remember (working memory), and mentally manipulate the sound structures of language—phonemes, onsite-rime segments, syllables, and words.[73][74]

Assessment

- Strive for a multidisciplinary team approach involving the child's parent(s) and teacher(s); school psychologist; pediatrician; and, as appropriate, speech and language pathologist (speech therapist); and occupational therapist.[75]
- Possess a thorough familiarity with typical ages children reach various general developmental milestones (write first name; draw a square), and domain-specific milestones, such as phonological awareness (recognize rhyming words; identify the initial sounds in words).[76]
- Avoid over-reliance on tests. Careful observation of the child in the school and home environments, and sensitive, comprehensive parental interviews are just as important as tests.[77][78]
- Take advantage of the empirically supported "response to intervention" (RTI) approach,[79] which "... involves monitoring the progress of a group of children through a programme of intervention rather than undertaking a static assessment of their current skills. Children with the most need are those who fail to respond to effective teaching, and they are readily identified using this approach."[80]

Assessment tests

There are a wide range of tests that are used in clinical and educational settings to evaluate the possibility that a person might have dyslexia.[81] If initial testing suggests that a person might have dyslexia, such tests are often followed up with a full diagnostic assessment to determine the extent and nature of the disorder.[82] Some tests can be administered by a teacher or computer; others require specialized training and are given by psychologists.[83] Some test results indicate how to carry out teaching strategies.[83][84] Because a variety of different cognitive, behavioral, emotional, and environmental factors all could contribute to difficultly learning to read, a comprehensive evaluation should consider these different possibilities. These tests and observations can include:[85]

- General measures of cognitive ability, such as the Wechsler Intelligence Scale for Children, Woodcock-Johnson Tests of Cognitive Abilities, or Stanford-Binet Intelligence Scales. Low general cognitive ability would make reading more difficult. Cognitive ability measures also often try to measure different cognitive cognitive processes, such as verbal ability, nonverbal and spatial reasoning, working memory, and processing speed. There are different versions of these tests for different age groups. Almost all of these require additional training to give and score correctly, and are done by psychologists. According to

Mather and Schneider (2015), a confirmatory profile and/or pattern of scores on cognitive tests confirming or ruling-out reading disorder has not yet been identified.[86]

- Screening or evaluation for mental health conditions: Parents and teachers can complete rating scales or behavior checklists to gather information about emotional and behavioral functioning for younger people. Many checklists have similar versions for parents, teachers, and younger people old enough to read reasonably well (often 11 years and older) to complete. Examples include the Behavioral Assessment System for Children, and the Strengths and Difficulties Questionnaire. All of these have nationally representative norms, making it possible to compare the level of symptoms to what would be typical for the younger person's age and biological sex. Other checklists link more specifically to psychiatric diagnoses, such as the Vanderbilt ADHD Rating Scales or the Screen for Child Anxiety Related Emotional Disorders (SCARED). Screening uses brief tools that are designed to catch cases with a disorder, but they often get false positive scores for people who do not have the disorder. Screeners should be followed up by a more accurate test or diagnostic interview as a result. Depressive disorders and anxiety disorders are two-three times higher in people with dyslexia, and attention-deficit/hyperactivity disorder is more common, as well.[87][88][89][90]
- Review of academic achievement and skills: Average spelling/reading ability for a dyslexic is a percentage ranking <16, well below normal. In addition to reviewing grades and teacher notes, standardized test results are helpful in evaluating progress. These include group administered tests, such as the Iowa Tests of Educational Development, that a teacher may give to a group or whole classroom of younger people at the same time. They also could include individually administered tests of achievement, such as the Wide Range Achievement Test, or the Woodcock-Johnson (which also includes a set of achievement tests). The individually administered tests again require more specialized training.[91][92][93]

Screening

Screening procedures seek to identify children who show signs of possible dyslexia. In the preschool years, a family history of dyslexia, particularly in biological parents and siblings, predicts an eventual dyslexia diagnosis better than any test.[94] In primary school (ages 5–7), the ideal screening procedure consist of training primary school teachers to carefully observe and record their pupils' progress through the phonics curriculum, and thereby identify children progressing slowly.[95][96] When teachers identify such students they can supplement their observations with screening tests such as the *Phonics screening check*[97] used by United Kingdom schools during Year One.

In the medical setting, child and adolescent psychiatrist M. S. Thambirajah emphasizes that "[g]iven the high prevalence of developmental disorders in school-aged children, all children seen in clinics should be systematically screened for developmental disorders irrespective of the presenting problem/s." Thambirajah recommends screening for developmental disorders, including dyslexia, by conducting a brief developmental history, a preliminary psychosocial developmental examination, and obtaining a school report regarding academic and social functioning.[98]

Management

Through the use of compensation strategies, therapy and educational support, individuals with dyslexia can learn to read and write.[99] There are techniques and technical aids that help to manage or conceal symptoms of the disorder.[100] Reducing stress and anxiety can sometimes improve written comprehension.[101] For dyslexia intervention with alphabet-writing systems, the fundamental aim is to increase a child's awareness of correspondences between graphemes (letters) and phonemes (sounds), and

to relate these to reading and spelling by teaching how sounds blend into words. Reinforced collateral training focused on reading and spelling may yield longer-lasting gains than oral phonological training alone.[102] Early intervention can be successful in reducing reading failure.[103]

There is some evidence that the use of specially-tailored fonts may help with dyslexia.[1] These fonts, which include Dyslexie, OpenDyslexic, and Lexie Readable, were created based on the idea that many of the letters of the Latin alphabet are visually similar and may, therefore, confuse people with dyslexia. Dyslexie and OpenDyslexic both put emphasis on making each letter more distinctive in order to be more easily identified.[104] The benefits, however, might largely be due to the added spacing between words.[105] In terms of music and any possible positive effects on people with dyslexia, until now there is currently no evidence or data showing that music education significantly improves the reading skills of adolescents with dyslexia.[106]

Prognosis

Dyslexic children require special instruction for word analysis and spelling from an early age.[107] While there are fonts that may help people with dyslexia better understand writing, this might simply be due to the added spacing between words.[1][105] The prognosis, generally speaking, is positive for individuals who are identified in childhood and receive support from friends and family.[2] The New York educational system (NYED) indicates "a daily uninterrupted 90 minute block of instruction in reading", furthermore "instruction in phonemic awareness, phonics, vocabulary development, reading fluency" so as to improve the individuals reading ability.[108]

Epidemiology

The percentage of people with dyslexia is unknown, but it has been estimated to be as low as 5% and as high as 17% of the population.[109] While it is diagnosed more often in males,[3] some believe that it affects males and females equally.

There are different definitions of dyslexia used throughout the world, but despite significant differences in writing systems, dyslexia occurs in different populations.[110] Dyslexia is not limited to difficulty in converting letters to sounds, and Chinese people with dyslexia may have difficulty converting Chinese characters into their meanings.[111][112] The Chinese vocabulary uses logographic, monographic, non-alphabet writing where one character can represent an individual phoneme.[113]

The phonological-processing hypothesis attempts to explain why dyslexia occurs in a wide variety of languages. Furthermore, the relationship between phonological capacity and reading appears to be influenced by orthography.[114]

History

Dyslexia was clinically described by Oswald Berkhan in 1881,[35] but the term *dyslexia* was coined in 1883 by Rudolf Berlin, an ophthalmologist in Stuttgart.[115][116][117] He used the term to refer to the case of a young boy who had severe difficulty learning to read and write, despite showing typical intelligence and physical abilities in all other respects.[118] In 1896, W. Pringle Morgan, a British physician from Seaford, East Sussex, published a description of a reading-specific learning disorder in a report to the *British Medical Journal* titled "Congenital Word Blindness".[119] The distinction between phonological

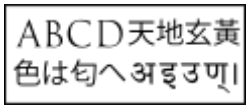
versus surface types of dyslexia is only descriptive, and without any etiological assumption as to the underlying brain mechanisms. However, studies have alluded to potential differences due to variation in performance.[120]

Society and culture

As is the case with any disorder, society often makes an assessment based on incomplete information. Before the 1980s, dyslexia was thought to be a consequence of education, rather than a neurological disability. As a result, society often misjudges those with the disorder.[101] There is also sometimes a workplace stigma and negative attitude towards those with dyslexia.[121] If the instructors of a person with dyslexia lack the necessary training to support a child with the condition, there is often a negative effect on the student's learning participation.[122]

Research

Most dyslexia research relates to alphabetic writing systems, and especially to European languages.[123] However, substantial research is also available regarding people with dyslexia who speak Arabic, Chinese, Hebrew, or other languages.[124] The outward expression of individuals with reading disability and regular poor readers is the same in some respects.[125]



Writing Systems

References

1. de Leeuw, Renske (December 2010). "Special Font For Dyslexia?" (https://web.archive.org/web/20111101034537/http://www.ilo.gw.utwente.nl/ilo/attachments/032_Masterthesis_Leeuw.pdf) (PDF) (in English and Dutch). University of Twente: 32. Archived from the original (http://www.ilo.gw.utwente.nl/ilo/attachments/032_Masterthesis_Leeuw.pdf) (PDF) on 1 November 2011. Retrieved 1 November 2011.
2. "Dyslexia Information Page" (https://www.ninds.nih.gov/Disorders/All-Disorders/Dyslexia-Information-Page). National Institute of Neurological Disorders and Stroke. 2 November 2018.
3. Peterson, Robin L.; Pennington, Bruce F. (May 2012). "Developmental dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3465717). *Lancet*. **379** (9830): 1997–2007. doi:10.1016/S0140-6736(12)60198-6 (https://doi.org/10.1016%2FS0140-6736%2812%2960198-6). PMC 3465717 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3465717). PMID 22513218 (https://pubmed.ncbi.nlm.nih.gov/22513218).
4. "What are reading disorders?" (https://www.nichd.nih.gov/health/topics/reading/conditioninfo/disorders). National Institutes of Health. 1 December 2016.
5. "How are reading disorders diagnosed?" (http://www.nichd.nih.gov/health/topics/reading/conditioninfo/pages/diagnosed.aspx). National Institutes of Health. Archived (https://web.archive.org/web/20150402093505/http://www.nichd.nih.gov/health/topics/reading/conditioninfo/pages/diagnosed.aspx) from the original on 2 April 2015. Retrieved 15 March 2015.
6. Kooij, J. J. Sandra (2013). *Adult ADHD diagnostic assessment and treatment* (https://books.google.com/books?id=JM_awX-mSPoC&pg=PA83) (3rd ed.). London: Springer. p. 83. ISBN 9781447141389. Archived (https://web.archive.org/web/20160430012545/https://books.google.com/books?id=JM_awX-mSPoC&pg=PA83) from the original on 30 April 2016.
7. Siegel LS (November 2006). "Perspectives on dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2528651). *Paediatrics & Child Health*. **11** (9): 581–7. doi:10.1093/pch/11.9.581 (https://doi.org/10.1093%2Fpch%2F11.9.581). PMC 2528651 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2528651). PMID 19030329 (https://pubmed.ncbi.nlm.nih.gov/19030329).

8. "What are the symptoms of reading disorders?" (https://www.nichd.nih.gov/health/topics/reading/conditioninfo/symptoms). National Institutes of Health. 1 December 2016.
9. Sexton, Chris C.; Gelhorn, Heather L.; Bell, Jill A.; Classi, Peter M. (November 2012). "The Co-occurrence of Reading Disorder and ADHD: Epidemiology, Treatment, Psychosocial Impact, and Economic Burden". *Journal of Learning Disabilities*. **45** (6): 538–564. doi:10.1177/0022219411407772 (https://doi.org/10.1177%2F0022219411407772). PMID 21757683 (https://pubmed.ncbi.nlm.nih.gov/21757683).
10. Bishop, DV; Snowling, MJ; Thompson, PA; Greenhalgh, T; CATALISE, consortium. (2016). "CATALISE: A Multinational and Multidisciplinary Delphi Consensus Study. Identifying Language Impairments in Children" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4938414). *PLOS ONE*. **11** (7): e0158753. Bibcode:2016PLoSO..1158753B (https://ui.adsabs.harvard.edu/abs/2016PLoSO..1158753B). doi:10.1371/journal.pone.0158753 (https://doi.org/10.1371%2Fjournal.pone.0158753). PMC 4938414 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4938414). PMID 27392128 (https://pubmed.ncbi.nlm.nih.gov/27392128). "Language impairment frequently co-occurs with other neurodevelopmental difficulties, including... reading difficulties"
11. "What are common treatments for reading disorders?" (http://www.nichd.nih.gov/health/topics/reading/conditioninfo/pages/treatment.aspx). National Institutes of Health. Archived (https://web.archive.org/web/20150402142536/http://www.nichd.nih.gov/health/topics/reading/conditioninfo/pages/treatment.aspx) from the original on 2 April 2015. Retrieved 15 March 2015.
12. Handler, SM; Fierson, WM; Section on, Ophthalmology; Council on Children with, Disabilities; American Academy of, Ophthalmology; American Association for Pediatric Ophthalmology and, Strabismus; American Association of Certified, Orthoptists (March 2011). "Learning disabilities, dyslexia, and vision". *Pediatrics*. **127** (3): e818–56. doi:10.1542/peds.2010-3670 (https://doi.org/10.1542%2Fpeds.2010-3670). PMID 21357342 (https://pubmed.ncbi.nlm.nih.gov/21357342).
13. Umphred, Darcy Ann; Lazaro, Rolando T.; Roller, Margaret; Burton, Gordon (2013). *Neurological Rehabilitation* (https://books.google.com/books?id=lVJPAQAAQBAJ&pg=PA383). Elsevier Health Sciences. p. 383. ISBN 978-0-323-26649-9. Archived (https://web.archive.org/web/20170109173020/https://books.google.com/books?id=lVJPAQAAQBAJ&pg=PA383) from the original on 9 January 2017.
14. "How many people are affected by/at risk for reading disorders?" (http://www.nichd.nih.gov/health/topics/reading/conditioninfo/pages/risk.aspx). National Institutes of Health. Archived (https://web.archive.org/web/20150402101751/http://www.nichd.nih.gov/health/topics/reading/conditioninfo/pages/risk.aspx) from the original on 2 April 2015. Retrieved 15 March 2015.
15. Venton, Danielle (September 2011). "The Unappreciated Benefits of Dyslexia" (https://www.wired.com/2011/09/dyslexic-advantage/). *Wired*. Archived (https://web.archive.org/web/20160805001607/http://www.wired.com/2011/09/dyslexic-advantage) from the original on 5 August 2016. Retrieved 10 August 2016.
16. Mathew, Schneps (August 2014). "The Advantages of Dyslexia" (http://www.scientificamerican.com/article/the-advantages-of-dyslexia/). *ScientificAmerican.com*. Scientific American. Archived (https://web.archive.org/web/20160804232616/http://www.scientificamerican.com/article/the-advantages-of-dyslexia/) from the original on 4 August 2016. Retrieved 10 August 2016.
17. Oxford English Dictionary. 3rd ed. "dyslexia, *n* (https://oed.com/view/Entry/331223). Oxford, UK: Oxford University Press, 2012 ("a learning disability specifically affecting the attainment of literacy, with difficulty esp. in word recognition, spelling, and the conversion of letters to sounds, occurring in a child with otherwise normal development, and now usually regarded as a neurodevelopmental disorder with a genetic component.")

18. Woollams, Anna M. (19 January 2014). "Connectionist neuropsychology: uncovering ultimate causes of acquired dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3866427). *Philosophical Transactions of the Royal Society B: Biological Sciences*. **369** (1634): 20120398. doi:10.1098/rstb.2012.0398 (https://doi.org/10.1098%2Frstb.2012.0398). ISSN 0962-8436 (https://www.worldcat.org/issn/0962-8436). PMC 3866427 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3866427). PMID 24324241 (https://pubmed.ncbi.nlm.nih.gov/24324241).
19. Lilienfeld, Scott O.; Lynn, Steven Jay; Ruscio, John; Beyerstein, Barry L. (15 September 2011). *50 Great Myths of Popular Psychology: Shattering Widespread Misconceptions about Human Behavior* (https://books.google.com/books?id=8DlS0gfO_QUC&pg=PT88). John Wiley & Sons. pp. 88–89. ISBN 978-1-4443-6074-5. Archived (https://web.archive.org/web/20170109130327/https://books.google.com/books?id=8DlS0gfO_QUC&pg=PT88) from the original on 9 January 2017. Retrieved 19 May 2016.
20. "Dyslexia and Related Disorders" (http://idaalabama.org/Facts/Dyslexia_and_Related.pdf) (PDF). *Alabama Dyslexia Association*. International Dyslexia Association. January 2003. Archived (https://web.archive.org/web/20160304124053/http://idaalabama.org/Facts/Dyslexia_and_Related.pdf) (PDF) from the original on 4 March 2016. Retrieved 29 April 2015.
21. Peer, Lindsay; Reid, Gavin (2014). *Multilingualism, Literacy and Dyslexia* (https://books.google.com/books?id=-aoABAAAQBAJ&pg=PA219). Routledge. p. 219. ISBN 978-1-136-60899-5. Archived (https://web.archive.org/web/20170109204808/https://books.google.com/books?id=-aoABAAAQBAJ&pg=PA219) from the original on 9 January 2017.
22. Shaywitz, Sally E.; Shaywitz, Bennett A. (2013). "Chapter 34 Making a Hidden Disability Visible: What Has Been Learned from Neurobiological Studies of Dyslexia" (https://books.google.com/books?id=oakQfUuutVwC&pg=PA647). In Swanson, H. Lee; Harris, Karen R.; Graham, Steve (eds.). *Handbook of Learning Disabilities* (2 ed.). Guilford Press. ISBN 978-1-4625-0856-3. Archived (https://web.archive.org/web/20170109143943/https://books.google.com/books?id=oakQfUuutVwC&pg=PA647) from the original on 9 January 2017.
23. Jarrad, Lum (October 2013). "Procedural learning is impaired in dyslexia: evidence from a meta-analysis of serial reaction time studies" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3784964). *Research of Developmental Disabilities*. **34** (10): 3460–76. doi:10.1016/j.ridd.2013.07.017 (https://doi.org/10.1016%2Fj.ridd.2013.07.017). PMC 3784964 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3784964). PMID 23920029 (https://pubmed.ncbi.nlm.nih.gov/23920029).
24. Nicolson, R. I.; Fawcett, A. J. (September 2009). "Dyslexia, dysgraphia, procedural learning and the cerebellum". *Cortex*. **47** (1): 117–27. doi:10.1016/j.cortex.2009.08.016 (https://doi.org/10.1016%2Fj.cortex.2009.08.016). PMID 19818437 (https://pubmed.ncbi.nlm.nih.gov/19818437).
25. Reynolds, Cecil R.; Fletcher-Janzen, Elaine (2 January 2007). *Encyclopedia of Special Education*. John Wiley & Sons. p. 771 (https://books.google.com/books?id=wdNpBchvdvQC&pg=PA771). ISBN 978-0-471-67798-7.
26. "Attention Deficit Hyperactivity Disorder" (http://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml). *NIH: National Institute of Mental Health*. March 2016. Archived (https://web.archive.org/web/20160723192735/http://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml) from the original on 23 July 2016. Retrieved 26 July 2016.
27. Comer, Ronald (2011). *Psychology Around Us* (https://books.google.com/books?id=ySIc1BcPJu8C&pg=RA1-PA233). RR Donnelley. p. 1. ISBN 978-0-471-38519-6. Archived (https://web.archive.org/web/20160604000711/https://books.google.com/books?id=ySIc1BcPJu8C&pg=RA1-PA233) from the original on 4 June 2016.

28. Germanò, E; Gagliano, A; Curatolo, P (2010). "Comorbidity of ADHD and Dyslexia" (http://pdfserve.informaworld.com/260009__925867416.pdf) (PDF). *Developmental Neuropsychology*. **35** (5): 475–493. doi:10.1080/87565641.2010.494748 (https://doi.org/10.1080%2F87565641.2010.494748). PMID 20721770 (https://pubmed.ncbi.nlm.nih.gov/20721770).
29. Fatemi, S. Hossein; Sartorius, Norman; Clayton, Paula J. (2008). *The Medical Basis of Psychiatry* (https://books.google.com/books?id=RJOy1vy2RKQC&pg=PA308) (3 ed.). Springer Science & Business Media. p. 308. ISBN 978-1-59745-252-6. Archived (https://web.archive.org/web/20170109101234/https://books.google.com/books?id=RJOy1vy2RKQC&pg=PA308) from the original on 9 January 2017.
30. Capellini, Simone Aparecida (2007). *Neuropsycholinguistic Perspectives on Dyslexia and Other Learning Disabilities* (https://books.google.com/books?id=uiEaMQVwyzYC&pg=PA94). Nova Publishers. p. 94. ISBN 978-1-60021-537-7. Archived (https://web.archive.org/web/20170109113545/https://books.google.com/books?id=uiEaMQVwyzYC&pg=PA94) from the original on 9 January 2017.
31. Moore, D. R. (July 2011). "The diagnosis and management of auditory processing disorder". *Language, Speech, and Hearing Services in Schools*. **42** (3): 303–8. doi:10.1044/0161-1461(2011/10-0032) (https://doi.org/10.1044%2F0161-1461%282011%2F10-0032%29). PMID 21757566 (https://pubmed.ncbi.nlm.nih.gov/21757566).
32. Pammer, Kristen (January 2014). "Brain mechanisms and reading remediation: more questions than answers" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3913493). *Scientifica*. **2014**: 802741. doi:10.1155/2014/802741 (https://doi.org/10.1155%2F2014%2F802741). PMC 3913493 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3913493). PMID 24527259 (https://pubmed.ncbi.nlm.nih.gov/24527259).
33. Law, J (2014). "relationship of phonological ability, speech perception, and auditory perception in adults with dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4078926). *Frontiers in Human Neuroscience*. **8**: 482. doi:10.3389/fnhum.2014.00482 (https://doi.org/10.3389%2Ffnhum.2014.00482). PMC 4078926 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4078926). PMID 25071512 (https://pubmed.ncbi.nlm.nih.gov/25071512).
34. Susan J. Pickering (2012). "Chapter 2. Working Memory in Dyslexia" (https://books.google.com/books?id=IoXidOBdNpMC&pg=PA29). In Alloway, Tracy Packiam; Gathercole, Susan E. (eds.). *Working Memory and Neurodevelopmental Disorders*. Psychology Press. ISBN 978-1-135-42134-2. Archived (https://web.archive.org/web/20170109194637/https://books.google.com/books?id=IoXidOBdNpMC&pg=PA29) from the original on 9 January 2017.
35. Berkhan O (1917). "Über die Wortblindheit, ein Stammeln im Sprechen und Schreiben, ein Fehl im Lesen" (https://books.google.com/?id=DmEsAQAAIAAJ&dq=editions%3AUCALB3248710&q=Wortblindheit#search_anchor) [About word blindness, adyslalia of speech and writing, a weakness in reading]. *Neurologisches Centralblatt* (in German). **36**: 914–27.
36. Reid, Gavin; Fawcett, Angela; Manis, Frank; Siegel, Linda (2008). *The SAGE Handbook of Dyslexia* (https://books.google.com/books?id=937rqz4Ryc8C&pg=PA127). SAGE Publications. p. 127. ISBN 978-1-84860-037-9. Archived (https://web.archive.org/web/20170109200307/https://books.google.com/books?id=937rqz4Ryc8C&pg=PA127) from the original on 9 January 2017.
37. Stein, John (2014). "Dyslexia: the Role of Vision and Visual Attention" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4203994). *Current Developmental Disorders Reports*. **1** (4): 267–80. doi:10.1007/s40474-014-0030-6 (https://doi.org/10.1007%2Fs40474-014-0030-6). PMC 4203994 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4203994). PMID 25346883 (https://pubmed.ncbi.nlm.nih.gov/25346883).
38. Whitaker, Harry A. (2010). *Concise Encyclopedia of Brain and Language* (https://books.google.com/books?id=GNcDiRV2jJQC&pg=PA180). Elsevier. p. 180. ISBN 978-0-08-096499-7. Archived (https://web.archive.org/web/20170109173223/https://books.google.com/books?id=GNcDiRV2jJQC&pg=PA180) from the original on 9 January 2017.

39. Price, cathy (16 August 2012). "A Review and Synthesis of the first 20 years of Pet and fMRI studies of heard Speech, Spoken Language and Reading" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3398395). *NeuroImage*. **62** (2): 816–847. doi:10.1016/j.neuroimage.2012.04.062 (https://doi.org/10.1016%2Fj.neuroimage.2012.04.062). PMC 3398395 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3398395). PMID 22584224 (https://pubmed.ncbi.nlm.nih.gov/22584224).
40. Sharifi, S (May 2014). "Neuroimaging essentials in essential tremor: a systematic review" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4110352). *NeuroImage: Clinical*. **5**: 217–231. doi:10.1016/j.nicl.2014.05.003 (https://doi.org/10.1016%2Fj.nicl.2014.05.003). PMC 4110352 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4110352). PMID 25068111 (https://pubmed.ncbi.nlm.nih.gov/25068111).
41. Brandler, William (February 2014). "The genetic relationship between handedness and neurodevelopmental disorders" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3969300). *Trends in Molecular Medicine*. **20** (2): 83–90. doi:10.1016/j.molmed.2013.10.008 (https://doi.org/10.1016%2Fj.molmed.2013.10.008). PMC 3969300 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3969300). PMID 24275328 (https://pubmed.ncbi.nlm.nih.gov/24275328).
42. Cain, Kate (2010). *Reading development and difficulties* (https://books.google.com/?id=FT6RALjOr9QC&pg=PA134&dq=cerebellar+theory+of+dyslexia#v=onepage&q=cerebellar%20theory%20of%20dyslexia&f=false) (1st ed.). TJ International. p. 134. ISBN 9781405151559. Retrieved 21 March 2015.
43. Levav, Itzhak (2009). *Psychiatric and Behavioral Disorders in Israel: From Epidemiology to Mental health* (https://books.google.com/?id=W2RzffMnpg8C&pg=PA52&dq=cerebellar+theory+of+dyslexia#v=onepage&q=cerebellar%20theory%20of%20dyslexia&f=false). Green Publishing. p. 52. ISBN 9789652294685. Retrieved 21 March 2015.
44. Faust, Miriam (2012). *The Handbook of the Neuropsychology of Language* (https://books.google.com/books?id=UEWVqdNFL4cC&pg=PA941). John Wiley & Sons. pp. 941–43. ISBN 978-1-4443-3040-3. Archived (https://web.archive.org/web/20170109200538/https://books.google.com/books?id=UEWVqdNFL4cC&pg=PA941) from the original on 9 January 2017.
45. Benitez, A (November 2010). "Neurobiology and neurogenetics of dyslexia". *Neurology (In Spanish)*. **25** (9): 563–81. doi:10.1016/j.nrl.2009.12.010 (https://doi.org/10.1016%2Fj.nrl.2009.12.010). PMID 21093706 (https://pubmed.ncbi.nlm.nih.gov/21093706).
46. Kere, Julia (September 2014). "The molecular genetics and neurobiology of developmental dyslexia as model of a complex phenotype". *Biochemical and Biophysical Research Communications*. **452** (2): 236–43. doi:10.1016/j.bbrc.2014.07.102 (https://doi.org/10.1016%2Fj.bbrc.2014.07.102). PMID 25078623 (https://pubmed.ncbi.nlm.nih.gov/25078623).
47. Marshall, Chloë R. (2012). *Current Issues in Developmental Disorders* (https://books.google.com/books?id=jHqYP39rI40C&pg=PA53). Psychology Press. pp. 53–56. ISBN 978-1-136-23067-7. Archived (https://web.archive.org/web/20170109103320/https://books.google.com/books?id=jHqYP39rI40C&pg=PA53) from the original on 9 January 2017.
48. Rosen, Glenn D. (2013). *The Dyslexic Brain: New Pathways in Neuroscience Discovery* (https://books.google.com/books?id=ZHBxBEekGSkC&pg=PA342). Psychology Press. p. 342. ISBN 978-1-134-81550-0. Archived (https://web.archive.org/web/20170109143349/https://books.google.com/books?id=ZHBxBEekGSkC&pg=PA342) from the original on 9 January 2017.
49. Friend, A; Defries, J. C.; Olson, R. K. (November 2008). "Parental Education Moderates Genetic Influences on Reading Disability" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2605635). *Psychol. Sci*. **19** (11): 1124–30. doi:10.1111/j.1467-9280.2008.02213.x (https://doi.org/10.1111%2Fj.1467-9280.2008.02213.x). PMC 2605635 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2605635). PMID 19076484 (https://pubmed.ncbi.nlm.nih.gov/19076484).

50. Taylor, J.; Roehrig, A. D.; Hensler, B. Soden; Connor, C. M.; Schatschneider, C. (2010). "Teacher Quality Moderates the Genetic Effects on Early Reading" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2905841). *Science*. **328** (5977): 512–4. Bibcode:2010Sci...328..512T (https://ui.adsabs.harvard.edu/abs/2010Sci...328..512T). doi:10.1126/science.1186149 (https://doi.org/10.1126%2Fscience.1186149). PMC 2905841 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2905841). PMID 20413504 (https://pubmed.ncbi.nlm.nih.gov/20413504).
51. Pennington, Bruce F.; McGrath, Lauren M.; Rosenberg, Jenni; Barnard, Holly; Smith, Shelley D.; Willcutt, Erik G.; Friend, Angela; Defries, John C.; Olson, Richard K. (January 2009). "Gene × Environment Interactions in Reading Disability and Attention-Deficit/Hyperactivity Disorder" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2743891). *Developmental Psychology*. **45** (1): 77–89. doi:10.1037/a0014549 (https://doi.org/10.1037%2Fa0014549). PMC 2743891 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2743891). PMID 19209992 (https://pubmed.ncbi.nlm.nih.gov/19209992).
52. Roth, Tania L.; Roth, Eric D.; Sweatt, J. David (September 2010). "Epigenetic regulation of genes in learning and memory". *Essays in Biochemistry*. **48** (1): 263–74. doi:10.1042/bse0480263 (https://doi.org/10.1042%2Fbse0480263). PMID 20822498 (https://pubmed.ncbi.nlm.nih.gov/20822498).
53. Smith, Shelley D. (December 2011). "Approach to epigenetic analysis in language disorders" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3261263). *Journal of Neurodevelopmental Disorders*. **3** (4): 356–364. doi:10.1007/s11689-011-9099-y (https://doi.org/10.1007%2Fs11689-011-9099-y). ISSN 1866-1947 (https://www.worldcat.org/issn/1866-1947). PMC 3261263 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3261263). PMID 22113455 (https://pubmed.ncbi.nlm.nih.gov/22113455).
54. Paulesu, Eraldo; Brunswick, Nicola and Paganelli, Federica (2010). "Cross-cultural differences in unimpaired and dyslexic reading: Behavioral and functional anatomical observations in readers of regular and irregular orthographies. Chapter 12 in Reading and Dyslexia in Different Orthographies (https://books.google.com/books?id=0vJ5AgAAQBAJ&pg=PA266) Archived (https://web.archive.org/web/20170109135414/https://books.google.com/books?id=0vJ5AgAAQBAJ&pg=PA266) 9 January 2017 at the Wayback Machine. Eds. Nicola Brunswick, Siné McDougall, and Paul de Mornay Davies. Psychology Press. ISBN 9781135167813
55. Juel, Connie (2013). "The Impact of Early School Experiences on Initial Reading" (https://books.google.com/books?id=_chXAQAAQBAJ&pg=PA421). In David K. Dickinson; Susan B. Neuman (eds.). *Handbook of Early Literacy Research*. Guilford Publications. ISBN 978-1-4625-1470-0. Archived (https://web.archive.org/web/20170109162332/https://books.google.com/books?id=_chXAQAAQBAJ&pg=PA421) from the original on 9 January 2017.
56. Snowling, Margaret J; Hulme, Charles (1 May 2012). "Annual Research Review: The nature and classification of reading disorders – a commentary on proposals for DSM-5" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3492851). *Journal of Child Psychology and Psychiatry, and Allied Disciplines*. **53** (5): 593–607. doi:10.1111/j.1469-7610.2011.02495.x (https://doi.org/10.1111%2Fj.1469-7610.2011.02495.x). PMC 3492851 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3492851). PMID 22141434 (https://pubmed.ncbi.nlm.nih.gov/22141434).
57. Habib, Michael (2013). "Dyslexia" (https://www.sciencedirect.com/science/article/pii/B9780444528919000233). *Pediatric Neurology Part I*. Handbook of Clinical Neurology. **111**. pp. 229–235. doi:10.1016/B978-0-444-52891-9.00023-3 (https://doi.org/10.1016%2FB978-0-444-52891-9.00023-3). ISBN 9780444528919. PMID 23622168 (https://pubmed.ncbi.nlm.nih.gov/23622168). Retrieved 19 December 2018.

58. Schumacher, Johannes; Hoffmann, Per; Schmäl, Christine; Schulte-Körne, Gerd; Nöthen, Markus M (2007). "Genetics of dyslexia: the evolving landscape" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2597981). *Journal of Medical Genetics*. **44** (5): 289–297. doi:10.1136/jmg.2006.046516 (https://doi.org/10.1136%2Fjmg.2006.046516). PMC 2597981 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2597981). PMID 17307837 (https://pubmed.ncbi.nlm.nih.gov/17307837).
59. Pritchard SC, Coltheart M, Palethorpe S, Castles A; Coltheart; Palethorpe; Castles (October 2012). "Nonword reading: comparing dual-route cascaded and connectionist dual-process models with human data". *J Exp Psychol Hum Percept Perform*. **38** (5): 1268–88. doi:10.1037/a0026703 (https://doi.org/10.1037%2Fa0026703). PMID 22309087 (https://pubmed.ncbi.nlm.nih.gov/22309087).
60. Eysenck, Michael; Keane, Mark T. (2013). *Cognitive Psychology 6e* (https://books.google.com/books?id=U-IF8PAa_jIC&pg=PA373). Psychology Press. p. 373. ISBN 978-1-134-44046-7. Archived (https://web.archive.org/web/20170109123837/https://books.google.com/books?id=U-IF8PAa_jIC&pg=PA373) from the original on 9 January 2017.
61. Eysenck, Michael; Keane, Mark T. (2013). *Cognitive Psychology 6e* (https://books.google.com/books?id=U-IF8PAa_jIC&pg=PA450). Psychology Press. p. 450. ISBN 978-1-134-44046-7. Archived (https://web.archive.org/web/20170109170422/https://books.google.com/books?id=U-IF8PAa_jIC&pg=PA450) from the original on 9 January 2017.
62. Hulme, Charles; Joshi, R. Malatesha; Snowling, Margaret J. (2012). *Reading and Spelling: Development and Disorders* (https://books.google.com/books?id=MumCCKK4JR8C&pg=PT151). Routledge. p. 151. ISBN 978-1-136-49807-7. Archived (https://web.archive.org/web/20170109141419/https://books.google.com/books?id=MumCCKK4JR8C&pg=PT151) from the original on 9 January 2017.
63. Sprenger-Charolles, Liliane (2011). "Prevalence and Reliability of Phonological, Surface, and Mixed Profiles in Dyslexia: A Review of Studies Conducted in Languages Varying in Orthographic Depth" (https://hal.archives-ouvertes.fr/hal-00733553). *Scientific Studies of Reading*. **15** (6): 498–521. doi:10.1080/10888438.2010.524463 (https://doi.org/10.1080%2F10888438.2010.524463). Archived (https://web.archive.org/web/20170830150246/https://hal.archives-ouvertes.fr/hal-00733553) from the original on 30 August 2017.
64. Boada, Richard; Willcutt, Erik G.; Pennington, Bruce F. (2012). "Understanding the Comorbidity Between Dyslexia and Attention-Deficit/Hyperactivity Disorder" (https://semanticscholar.org/paper/8b68b4ccb6b412d09d5da5b1222ea372fda79cae). *Topics in Language Disorders*. **32** (3): 270. doi:10.1097/tld.0b013e31826203ac (https://doi.org/10.1097%2Ftld.0b013e31826203ac). "... Pennington proposed a multiple deficit model for complex disorders like dyslexia, hypothesizing that such complex disorders are heterogeneous conditions that arise from the additive and interactive effects of multiple genetic and environmental risk factors, which then lead to weaknesses in multiple cognitive domains."
65. Pennington, B (September 2006). "From single to multiple deficit models of developmental disorders". *Cognition*. **101** (2): 385–413. doi:10.1016/j.cognition.2006.04.008 (https://doi.org/10.1016%2Fj.cognition.2006.04.008). PMID 16844106 (https://pubmed.ncbi.nlm.nih.gov/16844106).
66. Peterson, Robin L.; Pennington, Bruce F. (28 March 2015). "Developmental Dyslexia". *Annual Review of Clinical Psychology*. **11** (1): 283–307. doi:10.1146/annurev-clinpsy-032814-112842 (https://doi.org/10.1146%2Fannurev-clinpsy-032814-112842). PMID 25594880 (https://pubmed.ncbi.nlm.nih.gov/25594880). SSRN 2588407 (https://ssrn.com/abstract=2588407).
67. Snowling, Margaret J. *Dyslexia: A Very Short Introduction*. Oxford University Press, 2019. ISBN 9780192550422
68. "6A03.0 Developmental learning disorder with impairment in reading" (https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/1008636089). *International Classification of Diseases and Related Health Problems, 11th rev. (ICD-11) (Mortality and Morbidity Statistics)*. World Health Organization. Retrieved 7 October 2019.

69. *Diagnostic and statistical manual of mental disorders : DSM-5*. DSM-5 Task Force. (5th ed.). Arlington, VA: American Psychiatric Association. 2013. ISBN 9780890425541. OCLC 830807378 (https://www.worldcat.org/oclc/830807378). "Specific Learning Disorder with impairment in reading ... Dyslexia is an alternative term used to refer to a pattern of learning difficulties characterized by problems with accurate or fluent word recognition, poor decoding, and poor spelling abilities."
70. FragaGonzález, Gorka; Karipidis, Iliana; Tijms, Jurgen (19 October 2018). "Dyslexia as a Neurodevelopmental Disorder and What Makes It Different from a Chess Disorder" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6209961). *Brain Sciences*. **8** (10): 189. doi:10.3390/brainsci8100189 (https://doi.org/10.3390%2Fbrainsci8100189). ISSN 2076-3425 (https://www.worldcat.org/issn/2076-3425). PMC 6209961 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6209961). PMID 30347764 (https://pubmed.ncbi.nlm.nih.gov/30347764).
71. Campbell, Robert Jean (2009). *Campbell's Psychiatric Dictionary* (https://books.google.com/books?id=kpIs03n1hxkC&pg=PA310). Oxford University Press. pp. 310–312. ISBN 978-0-19-534159-1. Archived (https://web.archive.org/web/20170109101113/https://books.google.com/books?id=kpIs03n1hxkC&pg=PA310) from the original on 9 January 2017.
72. Phillips, Sylvia; Kelly, Kathleen; Symes, Liz (2013). *Assessment of Learners with Dyslexic-Type Difficulties* (https://books.google.com/books?id=7ZDCAQAAQBAJ&pg=PA7). SAGE. p. 7. ISBN 978-1-4462-8704-0. Archived (https://web.archive.org/web/20170109093024/https://books.google.com/books?id=7ZDCAQAAQBAJ&pg=PA7) from the original on 9 January 2017.
73. Stahl, Steven A.; Murray, Bruce A. (1994). "Defining phonological awareness and its relationship to early reading". *Journal of Educational Psychology*. **86** (2): 221–234. doi:10.1037/0022-0663.86.2.221 (https://doi.org/10.1037%2F0022-0663.86.2.221).
74. Rvachew, Susan; Ohberg, Alyssa; Grawburg, Meghann; Heyding, Joan (1 November 2003). "Phonological Awareness and Phonemic Perception in 4-Year-Old Children With Delayed Expressive Phonology Skills" (https://semanticscholar.org/paper/a32041d158c809e5e4f6a30857dc7fee4847c0df). *American Journal of Speech-Language Pathology*. **12** (4): 463–471. doi:10.1044/1058-0360(2003/092) (https://doi.org/10.1044%2F1058-0360%282003%2F092%29). PMID 14658998 (https://pubmed.ncbi.nlm.nih.gov/14658998).
75. Catherine Christo, John M. Davis, and Stephen E. Brock, *Identifying, Assessing, and Treating Dyslexia at School* (New York: Springer Science+Business Media, 2009), 59.
76. Mather, Nancy and Barbara J. Wendling. *Essentials of Dyslexia Assessment and Intervention*. Hoboken, NJ: John Wiley & Sons, 2012.
77. Reid, Gavin and Jennie Guise. *The Dyslexia Assessment*. London: Bloomsbury, 2017 ("... assessment for dyslexia includes more than tests; it involves comprehensive insights into the student's learning. This requires a full and comprehensive individual assessment as well as consideration of the environment and contextual factors.").
78. M. S. Thambirajah, *Developmental Assessment of the School-Aged Child with Developmental Disabilities: A Clinician's Guide* (London: Jessica Kingsley, 2011), 74.
79. Jimerson, Shane R., Matthew K. Burns, and Amanda M. VanDerHeyden. *Handbook of Response to Intervention: The Science and Practice of Multi-Tiered Systems of Support*. 2nd ed. New York: Springer Science+Business Media, 2016.
80. Snowling, Margaret J. "Early Identification and Interventions for Dyslexia: A Contemporary View." *Journal of Research in Special Education Needs* 13, no. 1, 7–14.
81. "Tests for Dyslexia and Learning Disabilities" (http://dyslexiahelp.umich.edu/dyslexics/learn-about-dyslexia/dyslexia-testing/tests). University of Michigan. Archived (https://web.archive.org/web/20150313000802/http://dyslexiahelp.umich.edu/dyslexics/learn-about-dyslexia/dyslexia-testing/tests) from the original on 13 March 2015. Retrieved 15 March 2015.

82. Peer, Lindsay; Reid, Gavin (2013). *Introduction to Dyslexia* (https://books.google.com/books?id=OTiAAAAAQBAJ&pg=PT35). Taylor & Francis. pp. 35–40. ISBN 978-1-135-37290-3. Archived (https://web.archive.org/web/20170109134343/https://books.google.com/books?id=OTiAAAAAQBAJ&pg=PT35) from the original on 9 January 2017.
83. "Screening and assessment" (http://www.bdadyslexia.org.uk/educator/screening-and-assessment). *British Dyslexia Association*. Archived (https://web.archive.org/web/20150330101403/http://www.bdadyslexia.org.uk/educator/screening-and-assessment) from the original on 30 March 2015. Retrieved 11 March 2015.
84. Fletcher, Jack (2009). "Dyslexia: the evolution of a scientific concept" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3079378). *Journal of International Neuropsychology Society*. **15** (4): 501–508. doi:10.1017/S1355617709090900 (https://doi.org/10.1017%2FS1355617709090900). PMC 3079378 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3079378). PMID 19573267 (https://pubmed.ncbi.nlm.nih.gov/19573267).
85. Schulte-Körne, Gerd (October 2010). "The Prevention, Diagnosis, and Treatment of Dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2967798). *Deutsches Ärzteblatt International*. **107** (41): 718–727. doi:10.3238/arztebl.2010.0718 (https://doi.org/10.3238%2Farztebl.2010.0718). ISSN 1866-0452 (https://www.worldcat.org/issn/1866-0452). PMC 2967798 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2967798). PMID 21046003 (https://pubmed.ncbi.nlm.nih.gov/21046003).
86. Mather, N., & Schneider, D. The use of intelligence tests in the diagnosis of specific reading disability.Goldstein, Sam; Princiotta, Dana; Naglieri, Jack A. (2014). *Handbook of Intelligence: Evolutionary Theory, Historical Perspective, and Current Concepts* (https://books.google.com/?id=ylzEBQAAQBAJ&printsec=frontcover&dq=Handbook+of+Intelligence:+Evolutionary+theory,+historical+perspective,+and+current+concepts#v=onepage&q=Handbook%20of%20Intelligence%3A%20Evolutionary%20theory%2C%20historical%20perspective%2C%20and%20current%20concepts&f=false). Springer. pp. 415–434. ISBN 9781493915620. Retrieved 10 January 2019.
87. Collett, Brent R.; Ohan, Jeneva L.; Myers, Kathleen M. (1 September 2003). "Ten-Year Review of Rating Scales. V: Scales Assessing Attention-Deficit/Hyperactivity Disorder" (https://jaacap.org/article/S0890-8567(09)60999-0/fulltext). *Journal of the American Academy of Child & Adolescent Psychiatry*. **42** (9): 1015–1037. doi:10.1097/01.CHI.0000070245.24125.B6 (https://doi.org/10.1097%2F01.CHI.0000070245.24125.B6). ISSN 0890-8567 (https://www.worldcat.org/issn/0890-8567). PMID 12960702 (https://pubmed.ncbi.nlm.nih.gov/12960702). Retrieved 3 October 2019.
88. Stone, Lisanne L; Janssens, Jan M A M; Vermulst, Ad A; Van Der Maten, Marloes; Engels, Rutger C M E; Otten, Roy (20 February 2015). "The Strengths and Difficulties Questionnaire: psychometric properties of the parent and teacher version in children aged 4–7" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4364334). *BMC Psychology*. **3** (1): 4. doi:10.1186/s40359-015-0061-8 (https://doi.org/10.1186%2Fs40359-015-0061-8). ISSN 2050-7283 (https://www.worldcat.org/issn/2050-7283). PMC 4364334 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4364334). PMID 25815194 (https://pubmed.ncbi.nlm.nih.gov/25815194).
89. Swart, G. T. (2005). "The Clinician's Guide To The Behavior Assessment System For Children" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2542918). *The Canadian Child and Adolescent Psychiatry Review*. **14** (3): 90. ISSN 1716-9119 (https://www.worldcat.org/issn/1716-9119). PMC 2542918 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2542918).
90. Birmaher, B.; Khetarpal, S.; Brent, D.; Cully, M.; Balach, L.; Kaufman, J.; Neer, S. M. (1997). "The Screen for Child Anxiety Related Emotional Disorders (SCARED): scale construction and psychometric characteristics". *Journal of the American Academy of Child and Adolescent Psychiatry*. **36** (4): 545–553. doi:10.1097/00004583-199704000-00018 (https://doi.org/10.1097%2F00004583-199704000-00018). ISSN 0890-8567 (https://www.worldcat.org/issn/0890-8567). PMID 9100430 (https://pubmed.ncbi.nlm.nih.gov/9100430).

91. Lindquist, E. F. (1953). *The Iowa tests of educational development: how to use the test results; a manual for teachers and counselors* (https://books.google.com/?id=yOc9AAAAYAAJ&q=Iowa+Tests+of+Educational+Development&dq=Iowa+Tests+of+Educational+Development). Science Research Associates. Retrieved 3 October 2019.
92. Dell, Cindy Ann; Harrold, Barbara; Dell, Thomas (1 October 2008). "Test Review: Wilkinson, G. S., & Robertson, G. J. (2006). Wide Range Achievement Test—Fourth Edition. Lutz, FL: Psychological Assessment Resources. WRAT4 Introductory Kit (includes manual, 25 test/response forms [blue and green], and accompanying test materials): $243.00". *Rehabilitation Counseling Bulletin*. **52** (1): 57–60. doi:10.1177/0034355208320076 (https://doi.org/10.1177%2F0034355208320076). ISSN 0034-3552 (https://www.worldcat.org/issn/0034-3552).
93. Semrud-Clikeman, Margaret; Ellison, Phyllis Anne Teeter (2009). *Child Neuropsychology: Assessment and Interventions for Neurodevelopmental Disorders, 2nd Edition* (https://books.google.com/books?id=NBGSF9Jyg6AC&pg=PT119#v=onepage&q&f=false). Springer Science & Business Media. p. 119. ISBN 9780387889634. Retrieved 3 October 2019.
94. Catherine Christo, John M. Davis, and Stephen E. Brock, *Identifying, Assessing, and Treating Dyslexia at School* (New York: Springer Science+Business Media, 2009), 56. ISBN 9780387885995
95. Margaret J. Snowling, *Dyslexia: A Very Short Introduction* (Oxford, UK: Oxford University Press, 2019), 93–94.
96. Letters and Sounds: Principles and Practice of High Quality Phonics (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/190599/Letters_and_Sounds_-_DFES-00281-2007.pdf), Ref: DFES-00281-2007 (00281-2007BKT-EN), Primary National Strategy, Department for Education and Skills (United Kingdom), 2007.
97. "Phonics screening check: 2019 materials" (https://www.gov.uk/government/publications/phonics-screening-check-2019-materials). *United Kingdom Department for Education, Standards and Testing Agency*. Retrieved 14 October 2019.
98. Thambirajah, M. S. (2011). *Developmental assessment of the school-aged child with developmental disabilities : a clinician's guide*. London: Jessica Kingsley Publishers. ISBN 9780857003256. OCLC 747410566 (https://www.worldcat.org/oclc/747410566).
99. Bogon, Johana (October 2014). "TVA based assessment of visual attention functions in developmental dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4199262). *Frontiers in Psychology*. **5**: 1172. doi:10.3389/fpsyg.2014.01172 (https://doi.org/10.3389%2Ffpsyg.2014.01172). PMC 4199262 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4199262). PMID 25360129 (https://pubmed.ncbi.nlm.nih.gov/25360129).
100. Brunswick, Nicola (10 April 2012). *Supporting Dyslexic Adults in Higher Education and the Workplace* (https://books.google.com/books?id=suc1o0hueowC&pg=PA115). John Wiley & Sons. pp. 115–. ISBN 978-0-470-97479-7. Archived (https://web.archive.org/web/20131231081312/http://books.google.com/books?id=suc1o0hueowC&pg=PA115) from the original on 31 December 2013. Retrieved 10 April 2012.
101. Schulte-Körne, G (October 2010). "The prevention, diagnosis, and treatment of dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2967798). *Deutsches Ärzteblatt International*. **107** (41): 718–26. doi:10.3238/arztebl.2010.0718 (https://doi.org/10.3238%2Farztebl.2010.0718). PMC 2967798 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2967798). PMID 21046003 (https://pubmed.ncbi.nlm.nih.gov/21046003).
102. Lyytinen, Heikki; Erskine, Jane; Aro, Mikko and Richardson, Ulla (2009). "Reading and reading disorders". In Hoff, Erika (ed.). *Blackwell Handbook of Language Development* (https://books.google.com/books?id=PCy6c9hIL5YC&pg=PA454). Blackwell. pp. 454–474. ISBN 978-1-4051-9459-4. Archived (https://web.archive.org/web/20170109204820/https://books.google.com/books?id=PCy6c9hIL5YC&pg=PA454) from the original on 9 January 2017.

103. van der Leij, Aryan (1 November 2013). "Dyslexia and early intervention: what did we learn from the Dutch Dyslexia Programme?". *Dyslexia (Chichester, England)*. **19** (4): 241–255. doi:10.1002/dys.1466 (https://doi.org/10.1002%2Fdys.1466). ISSN 1099-0909 (https://www.worldcat.org/issn/1099-0909). PMID 24133037 (https://pubmed.ncbi.nlm.nih.gov/24133037).
104. Sawers, Paul (30 June 2011). "Dyslexie: A typeface for dyslexics" (https://thenextweb.com/shareables/2011/06/30/dyslexie-a-typeface-for-dyslexics/). Archived (https://web.archive.org/web/20120413154354/http://thenextweb.com/shareables/2011/06/30/dyslexie-a-typeface-for-dyslexics/) from the original on 13 April 2012. Retrieved 9 April 2012.
105. Marinus, E; Mostard, M; Segers, E; Schubert, TM; Madelaine, A; Wheldall, K (August 2016). "A Special Font for People with Dyslexia: Does it Work and, if so, why?". *Dyslexia (Chichester, England)*. **22** (3): 233–44. doi:10.1002/dys.1527 (https://doi.org/10.1002%2Fdys.1527). PMID 27194598 (https://pubmed.ncbi.nlm.nih.gov/27194598).
106. Cogo-Moreira, Hugo; Andriolo, Régis B; Yazigi, Latife; Ploubidis, George B; Brandão de Ávila, Clara Regina; Mari, Jair J (15 August 2012). "Music education for improving reading skills in children and adolescents with dyslexia" (https://researchonline.lshtm.ac.uk/246986/1/CD009133.pdf) (PDF). *Cochrane Database of Systematic Reviews* (8): CD009133. doi:10.1002/14651858.cd009133.pub2 (https://doi.org/10.1002%2F14651858.cd009133.pub2). PMID 22895983 (https://pubmed.ncbi.nlm.nih.gov/22895983).
107. O'Hare, Anne (2010). "Dyslexia: what do paediatricians need to know?". *Paediatrics and Child Health*. **20** (7): 338–343. doi:10.1016/j.paed.2010.04.004 (https://doi.org/10.1016%2Fj.paed.2010.04.004).
108. "Response to Intervention Guidance - Minimum Requirements of a Response to Intervention Program (RtI) - Instruction Matched to Student Need: Special Education : P12 : NYSED" (http://www.p12.nysed.gov/specialed/RTI/guidance/instruction.htm). *www.p12.nysed.gov*. Retrieved 10 January 2019.
109. Tasman, Allan; Kay, Jerald; Lieberman, Jeffrey A.; First, Michael B.; Riba, Michelle (29 January 2015). *Psychiatry, 2 Volume Set* (https://books.google.com/books?id=6Rp0BgAAQBAJ). John Wiley & Sons. ISBN 9781118845493. Archived (https://web.archive.org/web/20150906081853/https://books.google.com/books?id=6Rp0BgAAQBAJ) from the original on 6 September 2015.
110. Protopapas, Athanassios (2013). "From temporal processing to developmental language disorders: mind the gap" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3866431). *Philosophical Transactions of the Royal Society B: Biological Sciences*. **369** (1634): 20130090. doi:10.1098/rstb.2013.0090 (https://doi.org/10.1098%2Frstb.2013.0090). PMC 3866431 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3866431). PMID 24324245 (https://pubmed.ncbi.nlm.nih.gov/24324245).
111. Zhao, Jing (November 2014). "The visual magnocellular-dorsal dysfunction in Chinese children with developmental dyslexia impedes Chinese character recognition" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4238300). *Scientific Reports*. **4**: 7068. Bibcode:2014NatSR...4E7068Z (https://ui.adsabs.harvard.edu/abs/2014NatSR...4E7068Z). doi:10.1038/srep07068 (https://doi.org/10.1038%2Fsrep07068). PMC 4238300 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4238300). PMID 25412386 (https://pubmed.ncbi.nlm.nih.gov/25412386).
112. Marshall, Chloe (2012). *Current Issues in Developmental Disorders* (https://books.google.com/books?id=5VK_TWsQ3N4C&pg=PA152). Psychology Press. p. 152. ISBN 978-1-84872-084-8. Archived (https://web.archive.org/web/20170109144200/https://books.google.com/books?id=5VK_TWsQ3N4C&pg=PA152) from the original on 9 January 2017.
113. Garralda, Elena; Raynaud, Jean-Philippe (16 January 2012). *Brain, Mind, and Developmental Psychopathology in Childhood* (https://books.google.com/?id=5ujeVaMa9U0C&pg=PA177). Jason Aronson. ISBN 9780765708663.

114. Navas, Ana Luiza Gomes Pinto; Ferraz, Érica de Cássia; Borges, Juliana Postigo Amorina; Navas, Ana Luiza Gomes Pinto; Ferraz, Érica de Cássia; Borges, Juliana Postigo Amorina (2014). "Phonological processing deficits as a universal model for dyslexia: evidence from different orthographies". *CoDAS*. **26** (6): 509–519. doi:10.1590/2317-1782/20142014135 (https://doi.org/10.1590%2F2317-1782%2F20142014135). PMID 25590915 (https://pubmed.ncbi.nlm.nih.gov/25590915).
115. Berlin, Rudolf. [No title.] *Medicinisches Correspondenzblatt des Württembergischen Ärztlichen Landesvereins* [Correspondence Sheet of the Württemberg Medical Association] 53 (1883): 209.
116. Webster's Third New International Dictionary. "History and Etymology for dyslexia", s.v. "dyslexia, noun". Springfield, MA: Merriam-Webster, 1961, rev. 2016.
117. "*Über Dyslexie*" [About dyslexia]. *Archiv für Psychiatrie*. **15**: 276–278. 1884.
118. *Annual of the Universal Medical Sciences and Analytical Index: A Yearly Report of the Progress of the General Sanitary Sciences Throughout the World* (https://books.google.com/books?id=5_IhAQAAMAAJ&pg=PA39). F. A. Davis Company. 1888. p. 39. Archived (https://web.archive.org/web/20170109200623/https://books.google.com/books?id=5_IhAQAAMAAJ&pg=PA39) from the original on 9 January 2017.
119. Brooks, Patricia (2014). *Encyclopedia of language development* (https://books.google.com/?id=mvfSAwAAQBAJ&pg=PR30). SAGE. p. 30. ISBN 9781483346434.
120. Mishra, Srikanta K. (October 2014). "Medial efferent mechanisms in children with auditory processing disorders" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4209830). *Frontiers in Human Neuroscience*. **8**: 860. doi:10.3389/fnhum.2014.00860 (https://doi.org/10.3389%2Ffnhum.2014.00860). PMC 4209830 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4209830). PMID 25386132 (https://pubmed.ncbi.nlm.nih.gov/25386132).
121. de Berr, J (2014). "Factors influencing work participation of adults with developmental dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3913008). *BMC Public Health*. **14**: 77. doi:10.1186/1471-2458-14-77 (https://doi.org/10.1186%2F1471-2458-14-77). PMC 3913008 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3913008). PMID 24460949 (https://pubmed.ncbi.nlm.nih.gov/24460949).
122. Pino, Marco; Mortari, Luigina (1 November 2014). "The Inclusion of Students with Dyslexia in Higher Education: A Systematic Review Using Narrative Synthesis" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4253321). *Dyslexia (Chichester, England)*. **20** (4): 346–369. doi:10.1002/dys.1484 (https://doi.org/10.1002%2Fdys.1484). PMC 4253321 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4253321). PMID 25293652 (https://pubmed.ncbi.nlm.nih.gov/25293652).
123. Reid, Gavin (2012). *The Routledge Companion to Dyslexia* (https://books.google.com/books?id=QrBQAmfXYooC&pg=PA16). Routledge. p. 16. ISBN 978-1-136-61710-2. Archived (https://web.archive.org/web/20170109205019/https://books.google.com/books?id=QrBQAmfXYooC&pg=PA16) from the original on 9 January 2017.
124. Richlan, Fabio (May 2014). "Functional neuroanatomy of developmental dyslexia; the role of orthographic depth" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4033006). *Frontiers in Human Neuroscience*. **8**: 347. doi:10.3389/fnhum.2014.00347 (https://doi.org/10.3389%2Ffnhum.2014.00347). PMC 4033006 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4033006). PMID 24904383 (https://pubmed.ncbi.nlm.nih.gov/24904383).
125. "Reading Difficulty and Disability" (https://report.nih.gov/NIHfactsheets/Pdfs/ReadingDifficultyandDisability(NICHD).pdf) (PDF). *report.nih.gov*. NIH. Retrieved 10 January 2019.

Further reading

- Ramus F, Altarelli I, Jednoróg K, Zhao J, Scotto di Covella L (January 2018). "Neuroanatomy of developmental dyslexia: Pitfalls and promise". *Neuroscience and Biobehavioral Reviews*. **84**: 434–452. doi:10.1016/j.neubiorev.2017.08.001 (http

s://doi.org/10.1016%2Fj.neubiorev.2017.08.001). PMID 28797557 (https://pubmed.ncbi.nlm.nih.gov/28797557).

- Beaton A (14 October 2004). *Dyslexia, Reading and the Brain: A Sourcebook of Psychological and Biological Research* (https://books.google.com/books?id=wMR4AgAAQBAJ&pg=PP1). Psychology Press. ISBN 978-1-135-42275-2.
- Miles TR (4 August 2006). *Fifty Years in Dyslexia Research* (https://books.google.com/books?id=8OywcklCBPkC&pg=PP1). Wiley. ISBN 978-0-470-02747-9.
- Reid G, Fawcett A (12 May 2008). *Dyslexia in Context: Research, Policy and Practice* (https://books.google.com/books?id=szJZ1LDQv7YC&pg=PP1). John Wiley & Sons. ISBN 978-0-470-77801-2.
- Thomson M (18 March 2009). *The Psychology of Dyslexia: A Handbook for Teachers with Case Studies* (https://books.google.com/books?id=7Jbvue2kNdYC&pg=PP1). John Wiley & Sons. ISBN 978-0-470-74197-9.
- Reid G (17 March 2011). *Dyslexia* (https://books.google.com/books?id=EFh4kCrMbK4C&pg=PP1) (3 ed.). A&C Black. ISBN 978-1-4411-6585-5.
- Selikowitz M (2 July 2012). *Dyslexia and Other Learning Difficulties* (https://books.google.com/books?id=K2xdsMJ1MWgC&pg=PP1). Oxford University Press. ISBN 978-0-19-969177-7.
- Ellis AW (25 February 2014). *Reading, Writing and Dyslexia: A Cognitive Analysis* (https://books.google.com/books?id=EgXsAgAAQBAJ&pg=PP1). Psychology Press. ISBN 978-1-317-71630-3.
- Elliott JG, Grigorenko EL (24 March 2014). *The Dyslexia Debate* (https://books.google.com/books?id=4lz2AgAAQBAJ&pg=PP1). Cambridge University Press. ISBN 978-0-521-11986-3.
- Agnew S, Stewart J, Redgrave S (8 October 2014). *Dyslexia and Us: A collection of personal stories* (https://books.google.com/books?id=oXe6BAAAQBAJ&pg=PP1). Andrews UK Limited. ISBN 978-1-78333-250-2.
- Norton ES, Beach SD, Gabrieli JD (February 2015). "Neurobiology of dyslexia" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4293303). *Current Opinion in Neurobiology*. **30**: 73–8. doi:10.1016/j.conb.2014.09.007 (https://doi.org/10.1016%2Fj.conb.2014.09.007). hdl:1721.1/102416 (https://hdl.handle.net/1721.1%2F102416). PMC 4293303 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4293303). PMID 25290881 (https://pubmed.ncbi.nlm.nih.gov/25290881).
- Serrallach B, Groß C, Bernhofs V, Engelmann D, Benner J, Gündert N, Blatow M, Wengenroth M, Seitz A, Brunner M, Seither S, Parncutt R, Schneider P, Seither-Preisler A (2016). "Neural Biomarkers for Dyslexia, ADHD, and ADD in the Auditory Cortex of Children" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4945653). *Frontiers in Neuroscience*. **10**: 324. doi:10.3389/fnins.2016.00324 (https://doi.org/10.3389%2Ffnins.2016.00324). PMC 4945653 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4945653). PMID 27471442 (https://pubmed.ncbi.nlm.nih.gov/27471442).
- Shao S, Niu Y, Zhang X, Kong R, Wang J, Liu L, Luo X, Zhang J, Song R (July 2016). "Opposite Associations between Individual KIAA0319 Polymorphisms and Developmental Dyslexia Risk across Populations: A Stratified Meta-Analysis by the Study Population" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4964335). *Scientific Reports*. **6**: 30454. Bibcode:2016NatSR...630454S (https://ui.adsabs.harvard.edu/abs/2016NatSR...630454S). doi:10.1038/srep30454 (https://doi.org/10.1038%2Fsrep30454). PMC 4964335 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4964335). PMID 27464509 (https://pubmed.ncbi.nlm.nih.gov/27464509).

- Brewer CC, Zalewski CK, King KA, Zobay O, Riley A, Ferguson MA, Bird JE, McCabe MM, Hood LJ, Drayna D, Griffith AJ, Morell RJ, Friedman TB, Moore DR (August 2016). "Heritability of non-speech auditory processing skills" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4872837). *European Journal of Human Genetics*. **24** (8): 1137–44. doi:10.1038/ejhg.2015.277 (https://doi.org/10.1038%2Fejhg.2015.277). PMC 4872837 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4872837). PMID 26883091 (https://pubmed.ncbi.nlm.nih.gov/26883091).
- Mascheretti S, De Luca A, Trezzi V, Peruzzo D, Nordio A, Marino C, Arrigoni F (January 2017). "Neurogenetics of developmental dyslexia: from genes to behavior through brain neuroimaging and cognitive and sensorial mechanisms" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5545717). *Translational Psychiatry*. **7** (1): e987. doi:10.1038/tp.2016.240 (https://doi.org/10.1038%2Ftp.2016.240). PMC 5545717 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5545717). PMID 28045463 (https://pubmed.ncbi.nlm.nih.gov/28045463).
- Fraga González G, Žarić G, Tijms J, Bonte M, van der Molen MW (January 2017). "Contributions of Letter-Speech Sound Learning and Visual Print Tuning to Reading Improvement: Evidence from Brain Potential and Dyslexia Training Studies" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5297299). *Brain Sciences*. **7** (1): 10. doi:10.3390/brainsci7010010 (https://doi.org/10.3390%2Fbrainsci7010010). PMC 5297299 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5297299). PMID 28106790 (https://pubmed.ncbi.nlm.nih.gov/28106790).
- Rudov A, Rocchi MB, Accorsi A, Spada G, Procopio AD, Olivieri F, Rippo MR, Albertini MC (October 2013). "Putative miRNAs for the diagnosis of dyslexia, dyspraxia, and specific language impairment" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3891682). *Epigenetics*. **8** (10): 1023–9. doi:10.4161/epi.26026 (https://doi.org/10.4161%2Fepi.26026). PMC 3891682 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3891682). PMID 23949389 (https://pubmed.ncbi.nlm.nih.gov/23949389).
- Vágvölgyi R, Coldea A, Dresler T, Schrader J, Nuerk HC (2016). "A Review about Functional Illiteracy: Definition, Cognitive, Linguistic, and Numerical Aspects" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5102880). *Frontiers in Psychology*. **7**: 1617. doi:10.3389/fpsyg.2016.01617 (https://doi.org/10.3389%2Ffpsyg.2016.01617). PMC 5102880 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5102880). PMID 27891100 (https://pubmed.ncbi.nlm.nih.gov/27891100).

External links

Classification	**ICD-10**: F81.0 (http://apps.who.int/classifications/icd10/browse/2016/en#/F81.0) (developmental), R48.0 (http://apps.who.int/classifications/icd10/browse/201

	6/en#/R48.0) · **ICD-9-CM**: 315.02 (http://www.icd9data.com/getICD9Code.ashx?icd9=315.02) · **OMIM**: 127700 (https://omim.org/entry/127700) · **MeSH**: D004410 (https://www.nlm.nih.gov/cgi/mesh/2015/MB_cgi?field=uid&term=D004410) · **DiseasesDB**: 4016 (http://www.diseasesdatabase.com/ddb4016.htm)
External resources	**MedlinePlus**: 001406 (https://www.nlm.nih.gov/medlineplus/ency/article/001406.htm) · **eMedicine**: article/1835801 (https://emedicine.medscape.com/article/1835801-overview) · **Patient UK**: Dyslexia (https://patient.info/doctor/Dyslexia) · **Scholia**: Q132971 (https://tools.wmflabs.org/scholia/topic/Q132971)