I'm not a bot

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Some emerging readers will be ready to independently read books with simple language and pictures. GROWING READERS: Ages 5–8 Growing readers are making strides in their learning and development with increases in both reading fluency and comprehension. Our collection includes books with simple language, early chapter books with engaging characters, picture books with light-hearted stories, and nonfiction texts that provide informational graphics to support understanding. The collection also includes many Read to Me books to support readers in developing listening comprehension. INDEPENDENT READERS: Ages 9–10 Independent readers select books based on their interests, and they actively engage with what they read. Comprehension is essential as they shift from “learning to read” to “reading to learn.” This collection offers a wide range of genres and styles, including nonfiction, realistic fiction, fantasy, poetry, and much more! 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Anywhere. 100% safe and kid-friendly environment Popular titles and characters that children know and love Guided Reading Levels available for 1,000+ books Accessible on computers, tablets, and smartphones All titles carefully curated for readers 10 and under Book recommendations for every child based on his or her level Up to 3 children per account Ability to monitor your child’s progress Ability to preview the content your child is exploring More than 1,000 professionally voiced titles From Reading Experts: “Children who read more than 10 pages per day score 10% higher in reading proficiency.” Source: National Assessment of Education Progress (NAEP), (2000). The Nation’s Report Card—Fourth Grade Reading Highlights. Fun characters, engaging topics, exciting new worlds to explore—the 1,000+ titles in the ReadingIQ library have been carefully selected by reading experts to ignite your child’s imagination. From popular childhood classics to exclusive original titles, a complete digital learning library is always at your fingertips! ReadingIQ is the complete digital library that your child can access at any time. With 1,000+ books to choose from, your child will be continuously engaged as he or she is guided from one level to the next and develops confidence as a reader. Our leveling feature takes the guesswork out of selecting books at your child’s reading level. Using standards widely adopted by schools, this unique feature ensures that every book on your child’s recommended reading list is age-appropriate and matches his or her reading level. ReadingIQ makes it easy to track and monitor your child’s progress as he or she reads and learns. You can view detailed reports on how many books your child is reading, the level he or she is reading at, and more. ReadingIQ is completely safe for your child to explore. All titles have been thoroughly reviewed and approved by early learning experts, so you can trust that everything your child discovers is always a safe and high-quality reading experience. Picture Books • Graphic Novels • Chapter Books • Wordless Stories • Informational Books Earth & Space Science • Biology • Engineering & Technology • Math Concepts • Mythology How-To Books • Biographies • Historical Fiction • Jokes & Riddles • Rhymes & Songs Picture Books • Graphic NovelsChapter Books • Wordless StoriesInformational Books • Earth & Space ScienceBiology • Engineering & TechnologyMath Concepts • Mythology • How-To BooksBiographies • Historical FictionJokes & Riddles • Rhymes & Songs From Reading Experts: “Reading for just 10 minutes per day increases the number of words a child reads in a year by more than half a million.” Source: Adams, M. J. (2006). The promise of automatic speech recognition for fostering literacy growth in children and adults. In M.C. McKenna, L.D. Labbo, R. D. Kieffer, & D. Reinking (Eds.), International Handbook of Literacy and Technology, Volume 2. Mahwah, NJ: Lawrence Erlbaum Associates. The names of other companies and their associated copyrights, trademarks, logos, products, and services are the property of their respective owners. We use cookies to deliver the best possible experience on our website and to analyse usage.Our Cookie Policy provides further information on our cookie uses and how to amend your cookie settings. If you continue to use our website we will assume you are ok with our use of cookies. Students and DeAngela Huggins: [background noise] DeAngela Huggins: ... All set and we are ready! Our next listening game, we're going to segment or break the word apart into sounds. So I'm going to give you the entire word, and then you're going to help me tap out the sounds. What are we going to do? Students and DeAngela Huggins: Tap out the sounds ... DeAngela Huggins: And then you're going to show me on your fingers how many sounds were in that word. Okay. So let's use my mystery word cat again. If we said /k/, /a/, /t/. Let's tap it. Students: /k/, /a/, /t/ DeAngela Huggins: How many sounds are in that word? Students: Three. DeAngela Huggins: Three. So you're going to just show me so I can see that everyone is hearing all of these sounds okay. So you ready? All right. First word, we're going to segment it. The first word is far. Students: far DeAngela Huggins: Tap out the sounds. Students: /f/, /ar/ DeAngela Huggins: How many sounds? [Students hold up two fingers.] There are two sounds in that word. Next word. Let's listen. Listen, very carefully. Chart. Students: chart DeAngela Huggins: Let's tap it. Students: /ch/, /ar/, /t/ DeAngela Huggins: How many sounds? Three. Very good. The next word ... listen ... has a blend ... start. Students: start DeAngela Huggins: start Students: [students count the phonemes with their fingers] /s/, /t/, /ar/, /t/ DeAngela Huggins: How many sounds? Students: Ooh. DeAngela Huggins: How many sounds Felix? [students hold up four fingers] Four. There are four sounds. You guys are doing so good! All right. Next word is block. Students: block DeAngela Huggins: Say the word block. Students: block DeAngela Huggins: All right. Let's tap the sounds. Students and DeAngela Huggins: [Students count the sounds with their fingers.] /b/, /l/, /o/, /ck/ Students: block DeAngela Huggins: How many sounds? Four [students hold up four fingers]. Very good. In our last one, because you guys are so smart, the word's going to be smart. What's the word? Students: smart DeAngela Huggins: Let's tap all those sounds. Students: [Students count out the sounds with their fingers.] /s/, /m/, /ar/, /t/ DeAngela Huggins: Smart. How many sounds? [Students hold up four fingers.] Good job you guys give your brains a big kiss. Narrator: For more information, please visit ReadingUniverse.org. Special thanks to Burgess Peterson Academy and Atlanta Public Schools. Reading Universe is made possible by generous support from Jim and Donna Barksdale, the Emily Hall Tremaine Foundation, and two anonymous donors. Reading Universe is a service of WETA, Washington DC, the Barksdale Reading Institute, and First Book. DeAngela Huggins: This is Reading Universe. Taking in the meaning of letters or symbols For the town in England, see Reading, Berkshire. For the article on literacy, see Literacy. For other uses, see Reading (disambiguation). This article may be too long to read and navigate comfortably. Consider splitting content into sub-articles, condensing it, or adding subheadings. Please discuss this issue on the article's talk page. (September 2024)Part of a series onReading Learning to read Reading readiness Vocabulary development Vocabulary learning Scientific theories and models Dual route theory Simple view of reading Science of reading Scarborough's Reading Rope The active view of reading model Cognitive processes Comprehension Phonemic awareness Phonological awareness Subvocalization Word recognition Reading instruction Analytic phonics Basal reader Concept-oriented Directed listening and thinking activity Guided reading Independent reading Literature circle Phonics Reciprocal teaching Structured word inquiry Sustained silent reading Synthetic phonics Whole language Reading rate Fluency Slow reading Speed reading Words per minute Readability Automatic assessment Legibility Readability test Reading differences and disabilities Dyslexia Hyperlexia Reading disability Reading for special needs Language Alphabetic principle Braille Dolch word list Grapheme History of printing Language Morpheme Orthography Phoneme Sight word Vocabulary Written language Writing Writing system Literacy Literacy rate Critical reading Close reading Distant reading Family literacy Functional illiteracy Great books Literary criticism Literature Children's vte Reading is the process of taking in the sense or meaning of symbols, often specifically those of a written language, by means of sight or touch.[1][2][3][4] For educators and researchers, reading is a multifaceted process involving such areas as word recognition, orthography (spelling), alphabetics, phonics, phonemic awareness, vocabulary, comprehension, fluency, and motivation.[5][6] Other types of reading and writing, such as pictograms (e.g., a hazard symbol and an emoji), are not based on speech-based writing systems.[7] The common link is the interpretation of symbols to extract the meaning from the visual notations or tactile signals (as in the case of braille).[8] A reading muse There is a growing body of evidence which illustrates the importance of reading for pleasure for both educational purposes as well as personal development.[9] Photo: Reading a newspaper in Catania, Sicily. Volunteer reads to a girl at the Casa Hogar de las Niñas in Mexico City. Woman reading on a train ride to pass the time, Oklahoma, U.S., June 1974 Reading is generally an individual activity, done silently, although on occasion a person reads out loud for other listeners; or reads aloud for one's own use, for better comprehension. Before the reintroduction of separated text (spaces between words) in the late Middle Ages, the ability to read silently was considered rather remarkable.[10][11] Major predictors of an individual's ability to read both alphabetic and non-alphabetic scripts are oral language skills,[12] phonological awareness, rapid automatized naming and verbal IQ.[13] As a leisure activity, children and adults read because it is enjoyable and interesting. In the US, about half of all adults read one or more books for pleasure each year.[14] About 5% read more than 50 books per year.[14] Americans read more if they: have more education, read fluently and easily, are female, live in cities, and have higher socioeconomic status.[14] Children become better readers when they know more about the world in general, and when they perceive reading as fun rather than as a chore to be performed.[14] Reading is an essential part of literacy, yet from a historical perspective literacy is about having the ability to both read and write.[15][16][17][18] Since the 1990s, some organizations have defined literacy in a wide variety of ways that may go beyond the traditional ability to read and write. The following are some examples: "the ability to read and write ... in all media (print or electronic), including digital literacy"[19] "the ability to ... understand ... using printed and written materials associated with varying contexts"[20][21][22] "the ability to read, write, speak and listen"[23] "having the skills to be able to read, write and speak to understand and create meaning"[24] "the ability to ... communicate using visual, audible, and digital materials"[25][26] "the ability to use printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential".[27] It includes three types of adult literacy: prose (e.g., a newspaper article), documents (e.g., a bus schedule), and quantitative literacy (e.g., using arithmetic operations in a product advertisement).[28][29] In the academic field, some view literacy in a more philosophical manner and propose the concept of "multiliteracies". For example, they say, "this huge shift from traditional print-based literacy to 21st century multiliteracies reflects the impact of communication technologies and multimedia on the evolving nature of texts, as well as the skills and dispositions associated with the consumption, production, evaluation, and distribution of those texts (Borsheim, Meritt, & Reed, 2008, p. 87)".[30][31] According to cognitive neuroscientist Mark Seidenberg these "multiple literacies" have allowed educators to change the topic from reading and writing to "Literacy". He goes on to say that some educators, when faced with criticisms of how reading is taught, "didn't alter their practices, they changed the subject".[32] Also, some organizations might include numeracy skills and technology skills separately but alongside of literacy skills.[33] In addition, since the 1940s the term literacy is often used to mean having knowledge or skill in a particular field (e.g., computer literacy, ecological literacy, health literacy, media literacy, quantitative literacy (numeracy)[29] and visual literacy).[34][35][36][37] Main article: Writing system In order to understand a text, it is usually necessary to understand the spoken language associated with that text. In this way, writing systems are distinguished from many other symbolic communication systems.[38] Once established, writing systems on the whole change more slowly than their spoken counterparts, and often preserve features and expressions which are no longer current in the spoken language. The great benefit of writing systems is their ability to maintain a persistent record of information expressed in a language, which can be retrieved independently of the initial act of formulation.[38] Senior reading a newspaper in Nepal Reading for pleasure has been linked to increased cognitive progress in vocabulary and mathematics during adolescence. [39][40][41]Sustained high volume lifetime reading has been associated with high levels of academic attainment.[42] Research suggests that reading can improve stress management,[43] memory,[43] focus,[44] writing skills,[44] and imagination.[45] The cognitive benefits of reading continue into mid-life and the senior years.[46][47][48] Research suggests that reading books and writing are among the brain-stimulating activities that can slow down cognitive decline in seniors.[49] See also: Reading achievement: national and international reports Reading has been the subject of considerable research and reporting for decades. Many organizations measure and report on reading achievement for children and adults (e.g., NAEP, PIRLS, PISA PIAAC, and EQAO). Researchers have concluded that approximately 95% of students can be taught to read by the end of the first or second year of school, yet in many countries 20% or more do not meet that expectation.[50][51] A 2012 study in the U.S. found that 33% of grade three children had low reading scores – however, they comprised 63% of the children who did not graduate from high school. Poverty also had an additional negative impact on high school graduation rates.[52] According to the 2013 Nation's Report card in the United States, 32% of grade four students failed to perform at or above the Basic Reading Level. By 2019 this had increased to 34%. There was a significant difference by race and ethnicity (e.g., black students at 52% and white students at 23%). See more about the breakdown by ethnicity in 2019 and 2022 here. Following the impact of the COVID-19 pandemic, this increased to 37% in 2022, and by 2024 it was at 40%.[53] It is believed that students who read below the basic level lack sufficient support to complete their schoolwork.[54][55] According to a 2023 study in California, only 46.6% of grade three students achieved the English reading standards.[56][57] Another report states that many teenagers who've spent time in California's juvenile detention facilities get high school diplomas with grade-school reading skills. "There are kids getting their high school diplomas who aren't able to even read and write." During a five-year span beginning in 2018, 85% of these students who graduated from high school did not pass a 12th-grade reading assessment.[58] Between 2013 and 2024, 37 US States passed laws or implemented new policies related to evidence-based reading instruction.[59] In 2023, New York City set about to require schools to teach reading with an emphasis on phonics. In that city, less than half of the students from the third grade to the eighth grade of school scored as proficient on state reading exams. More than 63% of Black and Hispanic test-takers did not make the grade.[60] Globally, the COVID-19 pandemic created a substantial overall learning deficit in reading abilities and other academic areas. It arose early in the pandemic and persists over time, and is particularly large among children from low socio-economic backgrounds.[61][62] In the US, several research studies show that, in the absence of additional support, there is nearly a 90 percent chance that a poor reader in Grade 1 will remain a poor reader.[63] In Canada, it was reported that, in the province of Ontario 27% of grade three students did not meet the provincial reading standards in 2023.This increased to 29% in 2024.[64] Also in Ontario, 52% of grade three students with special education needs (students who have an Individual Education Plan), were not meeting the provincial standards in 2022. This increased to 55% in 2024.[65][66] The province of Nova Scotia reported that 32% of grade three students did not meet the provincial reading standards in 2022.[67] The province of New Brunswick reported that 43.4% and 30.7% did not meet the Reading Comprehension Achievement Levels for grades four and six respectively in 2023.[68] The Progress in International Reading Literacy Study (PIRLS) publishes reading achievement for fourth graders in 50 countries.[69] The five countries with the highest overall reading average are the Russian Federation, Singapore, Hong Kong SAR, Ireland and Finland. Some others are: England 10th, United States 15th, Australia 21st, Canada 23rd, and New Zealand 33rd.[70][71][72] The Programme for International Student Assessment (PISA) measures 15-year-old school pupils scholastic performance on mathematics, science, and reading.[73] Critics, however, say PISA is fundamentally flawed in its underlying view of education, its implementation, and its interpretation and impact on education globally.[74][75][76] Many older students also lag behind in reading skills and are "hidding in plain sight". The RAND Corporation reported that 44% of teachers in grades 3-12 say their students always or almost always have difficulty reading the content in their class. Ninety-seven percent of teachers modify their teaching to accommodate this concern.[77][78] The reading levels of adults, ages 16–65, in 39 countries are reported by the Programme for the International Assessment of Adult Competencies (PIAAC).[79] Between 2011 and 2018, PIAAC reports the percentage of adults reading at-or-below level one (the lowest of five levels). Some examples are Japan 4.9%, Finland 10.6%, Netherlands 11.7%, Australia 12.6%, Sweden 13.3%, Canada 16.4%, England (UK) 16.4%, and the United States 16.9%.[80] According to the World Bank, 53% of all children in low-and-middle-income countries suffer from 'learning poverty'. In 2019, using data from the UNESCO Institute for Statistics, they published a report entitled Ending Learning Poverty: What will it take?.[81] Learning poverty is defined as being unable to read and understand a simple text by age 10. Although they say that all foundational skills are important, include reading, numeracy, basic reasoning ability, socio-emotional skills, and others – they focus specifically on reading. Their reasoning is that reading proficiency is an easily understood metric of learning, reading is a student's gateway to learning in every other area, and reading proficiency can serve as a proxy for foundational learning in other subjects. They suggest five pillars to reduce learning poverty: Learners are prepared and motivated to learn Teachers at all levels are effective and valued Classrooms are equipped for learning Schools are safe and inclusive spaces, and Education systems are well-managed. Researchers have concluded that approximately 95% of students can be taught to read by the end of the first or second year of school, yet in many countries 20% or more do not meet that expectation.[50][51]Learning to read or reading skills acquisition is the acquisition and practice of the skills necessary to understand the meaning behind printed words. For a skilled reader, the act of reading feels simple, effortless, and automatic.[82] However, the process of learning to read is complex and builds on cognitive, linguistic, and social skills developed from a very early age. As one of the four core language skills (listening, speaking, reading and writing),[83][84] reading is vital to gaining a command of written language. In the United States and elsewhere, it is widely believed that students who lack proficiency in reading by the end of grade three may face obstacles for the rest of their academic career.[85][86][87] For example, it is estimated that they would not be able to read half of the material they will encounter in grade four.[88] In 2019, among American fourth-graders in public schools, only 58% of Asian, 45% of Caucasian, 23% of Hispanic, and 18% of Black students performed at or above the proficient level of the Nation's Report Card.[89] Also, in 2012, in the United Kingdom it has been reported that 15-year-old students are reading at the level expected of 12-year-old students.[90] As a result, many governments put practices in place to ensure that students are reading at grade level by the end of grade three. An example of this is the Third Grade Reading Guarantee created by the State of Ohio in 2017. This is a program to identify students from kindergarten through grade three that are behind in reading, and provide support to make sure they are on track for reading success by the end of grade three.[91][92] This is also known as remedial education. Another example is the policy in England whereby any pupil who is struggling to decode words properly by year three must "urgently" receive help through a "rigorous and systematic phonics programme".[93] In 2016, out of 50 countries, the United States achieved the 15th highest score in grade-four reading ability.[94] The ten countries with the highest overall reading average are the Russian Federation, Singapore, Hong Kong SAR, Ireland, Finland, Poland, Northern Ireland, Norway, Chinese Taipei and England (UK). Some others are: Australia (21st), Canada (23rd), New Zealand (33rd), France (34th), Saudi Arabia (44th), and South Africa (50th). Spoken language is the foundation of learning to read (long before children see any letters) and children's knowledge of the phonological structure of language is a good predictor of early reading ability. Spoken language is dominant for most of childhood; however, reading ultimately catches up and surpasses speech.[95][96][97][98] By their first birthday most children have learned all the sounds in their spoken language. However, it takes longer for them to learn the phonological form of words and to begin developing a spoken vocabulary.[12] Children acquire a spoken language in a few years. Five-to-six-year-old English learners have vocabularies of 2,500 to 5,000 words, and add 5,000 words per year for the first several years of schooling. This rapid learning rate cannot be accounted for by the instruction they receive. Instead, children learn that the meaning of a new word can be inferred because it occurs in the same context as familiar words (e.g., lion is often seen with cowardly and king).[99] As British linguist John Rupert Firth says, "You shall know a word by the company it keeps". The environment in which children live may also impact their ability to acquire reading skills. Children who are regularly exposed to chronic environmental noise pollution, such as highway traffic noise, have been known to show decreased ability to discriminate between phonemes (oral language sounds) as well as lower reading scores on standardized tests.[100] Reading to children is not the same as teaching children to read; however, it does help if the children's attention is directed to the words on the page as they are being read to.[101][102] Children learn to speak naturally – by listening to other people speak. However, reading is not a natural process, and many children need to learn to read through a process that involves "systematic guidance and feedback".[103][104][105][106] So, "reading to children is not the same as teaching children to read".[107] Studies with primary age children indicate that having a child read rather than being read to is the better way to improve reading achievement.[108] However, there is some evidence that "shared reading" with children does help to improve reading if the children's attention is directed to the words on the page as they are being read to.[101][102] Nonetheless, reading to children is important because it socializes them to the activity of reading; it engages them; it expands their knowledge of spoken language; and it enriches their linguistic ability by hearing new and novel words and grammatical structures.[41] There is some debate as to the optimum age to teach children to read. The Common Core State Standards Initiative (CCSS) in the United States has standards for foundational reading skills in kindergarten and grade one that include instruction in print concepts, phonological awareness, phonics, word recognition, and fluency.[109] However, some critics of CCSS say that "To achieve reading standards usually calls for long hours of drill and worksheets – and reduces other vital areas of learning such as math, science, social studies, art, music and creative play".[110] The PISA 2007 OECD data from 54 countries demonstrates "no association between school entry age ... and reading achievement at age 15".[111] Also, a German study of 50 kindergartens compared children who, at age 5, had spent a year either "academically focused", or "play-arts focused" and found that in time the two groups became inseparable in reading skill.[112] The authors conclude that the effects of early reading are like "watering a garden before a rainstorm; the earlier watering is rendered undetectable by the rainstorm, the watering wastes precious water, and the watering detracts the gardener from other important preparatory groundwork".[111] Some scholars favor a developmentally appropriate practice (DAP) in which formal instruction on reading begins when children are about six or seven years old. And to support that theory some point out that children in Finland start school at age seven (Finland ranked 5th in the 2016 PIRLS international grade four reading achievement.)[113] In a discussion on academic kindergartens, professor of child development David Elkind has argued that, since "there is no solid research demonstrating that early academic training is superior to (or worse than) the more traditional, hands-on model of early education", educators should defer to developmental approaches that provide young children with ample time and opportunity to explore the natural world on their own terms.[114] Elkind emphasized the principle that "early education must start with the child, not with the subject matter to be taught".[114] In response, Grover J. Whitehurst, Director, Brown Center on Education Policy, (part of Brookings Institution)[115] said David Elkind is relying too much on philosophies of education rather than science and research. He continues to say education practices are "doomed to cycles of fad and fancy" until they become more based on evidence-based practice.[116] On the subject of Finland's academic results, as some researchers point out, prior to starting school Finnish children must participate in one year of compulsory free pre-primary education and most are reading before they start school.[117][118] And, with respect to developmentally appropriate practice (DPA), in 2019 the National Association for the Education of Young Children, Washington, D.C., released a draft position paper on DPA saying "The notion that young children are not ready for academic subject matter is a misunderstanding of developmentally appropriate practice; particularly in grades 1 through 3, almost all subject matter can be taught in ways that are meaningful and engaging for each child".[119] And, researchers at The Institutes for the Achievement of Human Potential say it is a myth that early readers are bored or become trouble makers in school.[120] Other researchers and educators favor limited amounts of literacy instruction at the age of four and five, in addition to non-academic, intellectually stimulating activities.[121] Reviews of the academic literature by the Education Endowment Foundation in the UK have found that starting literacy teaching in preschool has "been consistently found to have a positive effect on early learning outcomes"[122] and that "beginning early years education at a younger age appears to have a high positive impact on learning outcomes".[123] This supports current standard practice in the UK which includes developing children's phonemic awareness in preschool and teaching reading from age four. A study in Chicago reports that an early education program for children from low-income families is estimated to generate $4 to $11 of economic benefits over a child's lifetime for every dollar spent initially on the program, according to a cost-benefit analysis funded by the National Institutes of Health. The program is staffed by certified teachers and offers "instruction in reading and math, group activities and educational field trips for children ages 3 through 9".[124][125] There does not appear to be any definitive research about the "magic window" to begin reading instruction.[118] However, there is also no definitive research to suggest that starting early causes any harm. Researcher and educator Timothy Shanahan, suggests, "Start teaching reading from the time you have kids available to teach, and pay attention to how they respond to this instruction – both in terms of how well they are learning what you are teaching, and how happy and invested they seem to be. If you haven't started yet, don't feel guilty, just get going".[118] Some education researchers suggest the teaching of the various reading components by specific grade levels.[126] The following is one example from Carol Tolman, Ed.D. and Louisa Moats, Ed.D. that corresponds in many respects with the United States Common Core State Standards Initiative:[109] Reading instruction component Tolman & Moats US Common Core Phonological awareness K–1 K–1 Basic phonics K–1 K–1 Vocabulary K–6+ K–6+ Comprehension K–6+ K–6+ Written expression 1–6+ K–6+ Fluency 1–3 1–5 Advanced phonics/decoding 2–6+ 2–5 The percentage of US students who failed to perform at or above the Nations Report Card basic reading level were grade 4 (37% in 2022), grade 8 (30% in 2022), and grade 12 (30% in 2019).[127] As a result many secondary school teachers devote some class time to activities related to foundational reading skills.[128] The following chart shows the percentage of K-12 English Language Arts teachers that engaged in foundational reading activities with students (i.e., engaging every student in a class in activities related to the foundational reading skills for more than a few minutes within the past five class lessons).[129] Activities / Grades K-1 2-5 6-8 9-12 Print concepts 73% 56% 35% 40% Phonological awareness 85% 59% 29% 22% Phonics 92% 61% 25% 22% Fluency 80% 65% 36% 36% Secondary ELA teachers in states with reading legislation were significantly more likely to report frequently engaging their students in these activities than secondary ELA teachers in states without such legislation, even though only one-quarter of states with these laws include requirements around secondary ELA instruction.[130] See also: Reading § Teaching reading The path to skilled reading involves learning the alphabetic principle, phonemic awareness, phonics, fluency, vocabulary and comprehension.[131] British psychologist Uta Frith introduced a three-stage model to acquire skilled reading. Stage one is the logographic or pictorial stage where students attempt to grasp words as objects, an artificial form of reading. Stage two is the phonological stage where students learn the relationship between the graphemes (letters) and the phonemes (sounds). Stage three is the orthographic stage where students read familiar words more quickly than unfamiliar words, and word length gradually ceases to play a role.[132][133] Another recognized expert in this area is Harvard professor Jeanne Sternlicht Chall. In 1983 she published a book entitled Stages of Reading Development that proposed six stages.[134][135] Subsequently, in 2008 Maryanne Wolf, UCLA Graduate School of Education and Information Studies, published a book entitled Proust and the Squid in which she describes her view of the following five stages of reading development.[136][137] Normally, children will move through these stages at different rates; however, typical ages for children in the United States are shown below. Reading time at a primary school in rural Lao PDR, Southeast Asia. In 2017, approximately 70% of five-year-old children were not enrolled in Early Childhood Education programs, with those in hard-to-reach areas and from poor families being the most excluded.[138] The daily reading period shown here uses books provided by Big Brother Mouse, a not-for-profit that promotes reading in Lao schools and villages.[139] The emerging pre-reader stage, also known as reading readiness, usually lasts for the first five years of a child's life.[140] Children typically speak their first few words before their first birthday.[141] Educators and parents help learners to develop their skills in listening, speaking, reading and writing.[142] Reading to children helps them to develop their vocabulary, a love of reading, and phonemic awareness, i.e. the ability to hear and manipulate the individual sounds (phonemes) of oral language. Children will often "read" stories they have memorized. However, in the late 1990s, United States' researchers found that the traditional way of reading to children made little difference in their later ability to read because children spend relatively little time actually looking at the text. Yet, in a shared reading program with four-year-old children, teachers found that directing children's attention to the letters and words (e.g. verbally or pointing to the words) made a significant difference in early reading, spelling and comprehension.[143][102][144][145] Novice readers continue to develop their phonemic awareness, and come to realize that the letters (graphemes) connect to the sounds (phonemes) of the language; known as decoding, phonics, and the alphabetic principle.[146] They may also memorize the most common letter patterns and some of the high-frequency words that do not necessarily follow basic phonological rules (e.g. have and who). However, it is a mistake to assume a reader understands the meaning of a text merely because they can decode it. Vocabulary and oral language comprehension are also important parts of text comprehension as described in the Simple view of reading, Scarborough's reading rope, and The active view of reading model. Reading and speech are codependent: reading promotes vocabulary development and a richer vocabulary facilitates skilled reading.[147] The transition from the novice reader stage to the decoding stage is marked by a reduction of painful pronunciations and in its place the sounds of a smoother, more confident reader.[148] In this phase the reader adds at least 3,000 words to what they can decode. For example, in the English language, readers now learn the variations of the vowel-based rimes (e.g. sat, mat, cat)[149] and vowel pairs (also digraph) (e.g. rain, play, boat)[150] As readers move forward, they learn the makeup of morphemes (i.e. stems, roots, prefixes and suffixes). They learn the common morphemes such as "s" and "ed" and see them as "sight chunks". "The faster a child can see that beheaded is be + head + ed", the faster they will become a more fluent reader. At the beginning of this stage, a child will often be devoting so much mental capacity to the process of decoding that they will have no understanding of the words being read. It is nevertheless an important stage, allowing the child to achieve their ultimate goal of becoming fluent and automatic. It is in the decoding phase that the child will get to what the story is really about, and learn to re-read a passage when necessary to truly understand it. The goal of this stage is to "go below the surface of the text", and in the process the reader will build their knowledge of spelling substantially.[151] Teachers and parents may be tricked by fluent-sounding reading into thinking that a child understands everything that they are reading. As the content of what they can read becomes more demanding, good readers will develop knowledge of figurative language and irony which helps them to discover new meanings in the text. Children improve their comprehension when they use a variety of tools such as connecting prior knowledge, predicting outcomes, drawing inferences, and monitoring gaps in their understanding. One of the most powerful moments is when fluent comprehending readers learn to enter into the lives of imagined heroes and heroines. When teaching comprehension, the educational psychologist, G. Michael Pressley, says a strong case can be made for instruction in decoding, vocabulary, word knowledge, active comprehension strategies, and self-monitoring.[152] At the end of this stage, many processes are starting to become automatic, allowing the reader to focus on meaning. With the decoding process almost automatic by this point, the brain learns to integrate more metaphorical, inferential, analogical, background, and experiential knowledge. This stage in learning to read will often last until early adulthood.[153] At the expert stage, it will usually only take a reader one-half second to read almost any word.[154] The degree to which expert reading will change throughout an adult's life depends on what they read and how much they read. Main article: Science of reading Writing is only about 5,500 years old, unlike human speech which is thought to be from 50,000 years to 2 million years old.[155] So, unlike speech, the brain did not evolve to read naturally. As a result, the brain adapts to the challenge of reading. The process of reading involves most of the brain, particularly an interconnection between visual areas and language areas, as well as neural systems related to action, emotion, decision-making, and memory.[156][157] Science of Reading (SOR) is an interdisciplinary body of scientifically based research about reading. It draws on many fields, including cognitive science, developmental psychology, education, educational psychology, special education, and more.[158][159][160] Foundational skills such as phonics, decoding, and phonemic awareness are considered to be important parts of the science of reading, but they are not the only ingredients. SOR includes any research and evidence about how humans learn to read, and how reading should be taught. This includes areas such as oral reading fluency, vocabulary, morphology, reading comprehension, text, spelling and pronunciation, thinking strategies, oral language proficiency, working memory training, and written language performance (e.g., cohesion, sentence combining/reducing).[161][162] In cognitive science, there is likely no area that has been more successful than the study of reading. Yet, in many countries reading levels are considered low. In the United States, the 2019 Nation's Report Card reported that 34% of grade-four public school students performed at or above the NAEP proficient level (solid academic performance) and 65% performed at or above the basic level (partial mastery of the proficient level skills).[163] As reported in the PIRLS study, the United States ranked 15th out of 50 countries, for reading comprehension levels of fourth-graders.[70][71] In addition, according to the 2011–2018 PIAAC study, out of 39 countries the United States ranked 19th for literacy levels of adults 16 to 65; and 16.9% of adults in the United States read at or below level one (out of five levels).[164][80] Many researchers are concerned that low reading levels are due to how reading is taught. They point to three areas: Contemporary reading science has had very little impact on educational practice—mainly because of a "two-cultures problem separating science and education". Current teaching practice rests on outdated assumptions that make learning to read harder than it needs to be. Connecting evidence-based practice to educational practice would be beneficial , but is extremely difficult to achieve due to a lack of adequate training in the science of reading among many teachers.[165][166][167][51] Main article: Simple view of reading The Simple View of Reading proposes four broad categories of developing readers: typical readers; poor readers; dyslexics; and hyperlexics. The simple view of reading is a scientific theory about reading comprehension.[168] According to the theory, to comprehend what they are reading students need both decoding skills and oral language (listening) comprehension ability. Neither is enough on their own.[169][170][171] It is expressed in this equation: Decoding × Oral Language Comprehension = Reading Comprehension.[172] Hollis Scarborough published the Reading Rope infographics in 2001 using strands of rope to illustrate the many ingredients involved in becoming a skilled reader. The upper strands represent language comprehension and reinforce one another. The lower strands represent word recognition and work together as the reader becomes accurate, fluent, and automatic through practice. The upper and lower strands all weave together to produce a skilled reader.[173] Language-comprehension (Upper strands) Background knowledge (facts, concepts, etc.) Vocabulary (breadth, precision, links, etc.) Language structures (syntax, semantics, etc.) Verbal reasoning (inference, metaphor, etc.) Literacy knowledge (print concepts, genres, etc.) Word-recognition (Lower strands) Phonological awareness (syllables, phonemes, etc.) Decoding (alphabetic principle, spelling-sound correspondence) Sight recognition (of familiar words) More recent research by Laurie E. Cutting and Hollis S. Scarborough has highlighted the importance of executive function processes (e.g. working memory, planning, organization, self-monitoring, and similar abilities) to reading comprehension.[174][175] The active view of reading (AVR) model (May 7, 2021), Nell K. Duke and Kelly B. Cartwright,[176] offers an alternative to the simple view of reading (SVR), and a proposed update to Scarborough's reading rope (SRR). This model is more complete than the simple view of reading and does a better job of accommodating some of the knowledge about reading developed over the past several decades. The following chart shows the ingredients in the authors' infographic. In addition, the authors point out that reading is also impacted by text, task, and sociocultural context. Active Self Regulation Motivation and engagement Executive function skills Strategy use (related to word recognition, comprehension, vocabulary, etc.) Word recognition (WR) Phonological awareness (syllables, phonemes, etc.) Alphabetic principle Phonics knowledge Decoding skills Recognition of words at sight Bridging processes (the overlapping of WR and LC) Print concepts Reading fluency Vocabulary knowledge Morphological awareness (the structure of words and parts of words such as stems, root words, prefixes, and suffixes) Graphophonological-semantic cognitive flexibility (letter-sound-meaning flexibility) Language comprehension (LC) Cultural and other content knowledge Reading-specific background knowledge (genre, text, etc.) Verbal reasoning (inference, metaphor, etc.) Language structure (syntax, semantics, etc.) Theory of mind (the ability to attribute mental states to ourselves and others)[177] Main article: Automaticity In the field of psychology, automaticity is the ability to do things without occupying the mind with the low-level details required, allowing it to become an automatic response pattern or a habit. When reading is automatic, precious working memory resources can be devoted to considering the meaning of a text, etc. The unexpected finding from cognitive science is that practice does not make perfect. For a new skill to become automatic, sustained practice beyond the point of mastery is necessary.[178][179] Several researchers and neuroscientists have attempted to explain how the brain reads. They have written articles and books, and created websites and YouTube videos to help the average consumer.[180][181][182][183] A study conducted at the Medical University of South Carolina (MUSC) in 2022 indicates that "greater left-brain asymmetry can predict both better and average performance on a foundational level of reading ability, depending on whether the analysis is conducted over the whole brain or in specific regions".[184][185] Although it is not included in most meta-analytical studies, the sensorimotor cortex of the brain is the most active region of the brain during reading.[186] The occipital and parietal lobes, or more specifically fusiform gyrus, include the brain's visual word form area (VWFA).[187] The two major regions of the brain associated with phonological skills are the temporal-parietal region and the Perisylvian Region.[188] The Perisylvian Region, which is the portion of the brain believed to connect Broca's and Wernicke's area,[189] is another region that is highly active during phonological activities where participants are asked to verbalize known and unknown words.[190] The inferior frontal region is a much more complex region of the brain, and its association with reading is not necessarily linear, for it is active in several reading-related activities.[191] The cerebellum, which is not a part of the cerebral cortex, is also believed to play an important role in reading.[192] Main article: Eye movement in reading Reading is an intensive process in which the eye quickly moves to assimilate the text – seeing just accurately enough to interpret groups of symbols.[193] It is necessary to understand visual perception and eye movement in reading to understand the reading process. When reading, the eye moves continuously along a line of text but makes short rapid movements (saccades) intermingled with short stops (fixations). There is considerable variability in fixations (the point at which a saccade jumps to) and saccades between readers, and even for the same person reading a single passage of text. When reading, the eye has a perceptual span of about 20 slots. In the best-case scenario and reading English, when the eye is fixated on a letter, four to five letters to the right and three to four letters to the left can be clearly identified. Beyond that, only the general shape of some letters can be identified.[194] Research published in 2019 concluded that the silent reading rate of adults in English for non-fiction is in the range of 175 to 300 words per minute (wpm), and for fiction

children prior to grade one. It covers the areas of letter names and letter-sound correspondence (phonics), as well as conversation, play-based learning, print, phonological awareness, shared reading, and vocabulary.[248] Some researchers report that teaching reading without teaching phonics is harmful to large numbers of students, yet not all phonics teaching programs produce effective results. The reason is that the effectiveness of a program depends on using the right curriculum together with the appropriate approach to instruction techniques, classroom management, grouping, and other factors.[249] Louisa Moats, a teacher, psychologist and researcher, has long advocated for reading instruction that is direct, explicit and systematic, covering phoneme awareness, decoding, comprehension, literature appreciation, and daily exposure to a variety of texts.[250] She maintains that "reading failure can be prevented in all but a small percentage of children with serious learning disorders. It is possible to teach most students how to read if we start early and follow the significant body of research showing which practices are most effective".[251] Interest in evidence-based education appears to be growing.[252] In 2021, Best evidence encyclopedia (BEE) released a review of research on 51 different programs for struggling readers in elementary schools.[253] Many of the programs used phonics-based teaching and/or one or more of the following: cooperative learning, technology-supported adaptive instruction (see Educational technology), metacognitive skills, phonemic awareness, word reading, fluency, vocabulary, multisensory learning, spelling, guided reading, reading comprehension, word analysis, structured curriculum, and balanced literacy (non-phonetic approach). The BEE review concludes that a) outcomes were positive for one-to-one tutoring, b) outcomes were positive, but not as large, for one-to-small group tutoring, c) there were no differences in outcomes between teachers and teaching assistants as tutors, d) technology-supported adaptive instruction did not have positive outcomes, e) whole-class approaches (mostly cooperative learning) and whole-school approaches incorporating tutoring obtained outcomes for struggling readers as large as those found for one-to-one tutoring, and benefitted many more students, and f) approaches mixing classroom and school improvements, with tutoring for the most at-risk students, have the greatest potential for the largest numbers of struggling readers.[253] Robert Slavin, of BEE, goes so far as to suggest that states should "hire thousands of tutors" to support students scoring far below grade level – particularly in elementary school reading. Research, he says, shows "only tutoring, both one-to-one and one-to-small group, in reading and mathematics, had an effect size larger than +0.10 ... averages are around +0.30", and "well-trained teaching assistants using structured tutoring materials or software can obtain outcomes as good as those obtained by certified teachers as tutors".[254][255] What works clearinghouse allows you to see the effectiveness of specific programs. For example, as of 2020 they have data on 231 literacy programs. If you filter them by grade 1 only, all class types, all school types, all delivery methods, all program types, and all outcomes you receive 22 programs. You can then view the program details and, if you wish, compare one with another.[256] Evidence for ESSA[257] (Center for Research and Reform in Education)[258] offers free up-to-date information on current PK–12 programs in reading, writing, math, science, and others that meet the standards of the Every Student Succeeds Act (U.S.).[259] ProvenTutoring.org[260] a non-profit organization, is a resource for educators interested in research-proven tutoring programs. The programs it lists are proven effective in rigorous research as defined in the 2015 Every Student Succeeds Act. The Center for Research and Reform in Education at Johns Hopkins University provides the technical support to inform program selection.[258] The National Reading Panel concluded that systematic phonics instruction is more effective than unsystematic phonics or non-phonics instruction.[261] Systematic phonics is not one specific method of teaching phonics; it is a term used to describe phonics approaches that are taught explicitly and in a structured, systematic manner. They are systematic because the letters and the sounds they relate to are taught in a specific sequence, as opposed to incidentally or on a "when needed" basis.[262] The National Reading Panel (NRP) in the U.S. concluded that systematic phonics instruction is more effective than unsystematic phonics or non-phonics instruction. The NRP also found that systematic phonics instruction is effective (with varying degrees) when delivered through one-to-one tutoring, small groups, and teaching classes of students; and is effective from kindergarten onward, the earlier the better. It helps significantly with word-reading skills and reading comprehension for kindergartners and 1st graders as well as for older struggling readers and reading-disabled students. Benefits to spelling were positive for kindergartners and 1st graders but not for older students.[263] Systematic phonics is sometimes mischaracterised as "skill and drill" with little attention to meaning. However, researchers point out that this impression is false. Teachers can use engaging games or materials to teach letter-sound connections, and it can also be incorporated with the reading of meaningful text.[264] Phonics can be taught systematically in a variety of ways, such as analogy phonics, analytic phonics, phonics through spelling, and synthetic phonics. However, their effectiveness varies considerably because the methods differ in such areas as the range of letter-sound coverage, the structure of the lesson plans, and the time devoted to specific instructions.[265] Systematic phonics has gained increased acceptance in different parts of the world since the completion of three major studies into teaching reading; one in the US in 2000,[266][267] another in Australia in 2005,[268] and the other in the UK in 2006.[269] In 2009, the Department for Education in the UK published a curriculum review for England that added support for systematic phonics.[270] In fact, systematic phonics in the UK is known as synthetic phonics.[271] Beginning as early as 2014, several states in the United States have changed their curriculum to include systematic phonics instruction in elementary school.[272][273][274][275] In 2018, the State Government of Victoria, Australia, published a website containing a comprehensive Literacy Teaching Toolkit including Effective Reading Instruction, Phonics, and Sample Phonics Lessons.[276] Main article: Analytic phonics Analytic phonics does not involve pronouncing individual sounds (phonemes) in isolation and blending the sounds, as is done in synthetic phonics. Rather, it is taught at the word level and students learn to analyze letter-sound relationships once the word is identified. For example, students analyze letter-sound correspondences such as the ou spelling of /aʊ/ in shrouds. Also, students might be asked to practice saying words with similar sounds such as ball, bat and bite. Furthermore, students are taught consonant blends (separate, adjacent consonants) as units, such as break or shrouds.[277][278] Analogy phonics is a particular type of analytic phonics in which the teacher has students analyze phonic elements according to the speech sounds (phonograms) in the word. For example, a type of phonogram (known in linguistics as a rime) is composed of the vowel and the consonant sounds that follow it (e.g. in the words cat, mat and sat, the rime is "at".) Teachers using the analogy method may have students memorize a bank of phonograms, such as -at or -am, or use word families (e.g. can, ran, man, or may, play, say).[279][277] There have been studies on the effectiveness of instruction using analytic phonics vs. synthetic phonics. Johnston et al. (2012) conducted experimental research studies that tested the effectiveness of phonics learning instruction among 10-year-old boys and girls.[280] They used comparative data from the Clackmannanshire Report and chose 393 participants to compare synthetic phonics instruction and analytic phonics instruction.[281][280] The boys taught by the synthetic phonics method had better word reading than the girls in their classes, and their spelling and reading comprehension was as good. On the other hand, with analytic phonics teaching, although the boys performed as well as the girls in word reading, they had inferior spelling and reading comprehension. Overall, the group taught by synthetic phonics had better word reading, spelling, and reading comprehension. And, synthetic phonics did not lead to any impairment in the reading of irregular words.[280] Embedded phonics, also known as incidental phonics, is the type of phonics instruction used in whole language programs. It is not systematic phonics.[282] Although phonics skills are de-emphasised in whole language programs, some teachers include phonics "mini-lessons" when students struggle with words while reading from a book. Short lessons are included based on phonics elements the students are having trouble with, or on a new or difficult phonics pattern that appears in a class reading assignment. The focus on meaning is generally maintained, but the mini-lesson provides some time for focus on individual sounds and the letters that represent them. Embedded phonics is different from other methods because instruction is always in the context of literature rather than in separate lessons about distinct sounds and letters; and skills are taught when an opportunity arises, not systematically.[283][284] For some teachers, this is a method of teaching spelling by using the sounds (phonemes).[285] However, it can also be a method of teaching reading by focusing on the sounds and their spelling (i.e. phonemes and syllables). It is taught systematically with guided lessons conducted in a direct and explicit manner including appropriate feedback. Sometimes mnemonic cards containing individual sounds are used to allow the student to practice saying the sounds that are related to a letter or letters (e.g. a, e, i, o, u). Accuracy comes first, followed by speed. The sounds may be grouped by categories such as vowels that sound short (e.g. c-a-t and s-i-t). When the student is comfortable recognizing and saying the sounds, the following steps might be followed: a) the tutor says a target word and the student repeats it out loud, b) the student writes down each individual sound (letter) until the word is completely spelled, saying each sound as it is written, and c) the student says the entire word out loud. An alternate method would be to have the student use mnemonic cards to sound-out (spell) the target word. Typically, the instruction starts with sounds that have only one letter and simple CVC words such as sat and pin. Then it progresses to longer words, and sounds with more than one letter (e.g. hear and day), and perhaps even syllables (e.g. wa-ter). Sometimes the student practices by saying (or sounding-out) cards that contain entire words.[286] Main article: Synthetic phonics Synthetic phonics, also known as blended phonics, is a systematic phonics method employed to teach students to read by sounding out the letters and then blend the sounds to form the word. This method involves learning how letters or letter groups represent individual sounds, and that those sounds are blended to form a word. For example, shrouds would be read by pronouncing the sounds for each spelling, sh, r, ou, d, s (IPA /ʃ, r, aʊ, d, z/), then blending those sounds orally to produce a spoken word, sh – r – ou – d – s = shrouds (IPA /ʃraʊdz/). The goal of a synthetic phonics instructional program is that students identify the sound-symbol correspondences and blend their phonemes automatically. Since 2005, synthetic phonics has become the accepted method of teaching reading (by phonics instruction) in England, Scotland and Australia.[287][288][289][290] The 2005 Rose Report from the UK concluded that systematic synthetic phonics was the most effective method for teaching reading. It also suggests the "best teaching" includes a brisk pace, engaging children's interest with multi-sensory activities and stimulating resources, praise for effort and achievement; and above all, the full backing of the headteacher.[291] It also has considerable support in some States in the U.S.[267] and some support from expert panels in Canada.[292] In the US, a pilot program using the Core Knowledge Early Literacy program that used this type of phonics approach showed significantly higher results in K–3 reading compared with comparison schools.[293] In addition, several States such as California, Ohio, New York and Arkansas, are promoting the principles of synthetic phonics (see synthetic phonics in the United States). Resources for teaching phonics are available here. Laotian girls sit outside their school, reading books they received at a rural school book party. Main article: Phonemic awareness Phonemic awareness is the process by which the phonemes (sounds of oral language) are heard, interpreted, understood and manipulated – unrelated to their grapheme (written language). It is a sub-set of Phonological awareness that includes the manipulation of rhymes, syllables, and onsets and rimes, and is most prevalent in alphabetic systems.[294] The specific part of speech depends on the writing system employed. The National Reading Panel (NPR) concluded that phonemic awareness improves a learner's ability to learn to read. When teaching phonemic awareness, the NRP found that better results were obtained with focused and explicit instruction of one or two elements, over five or more hours, in small groups, and using the corresponding graphemes (letters).[295] See also Speech perception. As mentioned earlier, some researchers feel that the most effective way of teaching phonemic awareness is through segmenting and blending, a key part of synthetic phonics.[247] A critical aspect of reading comprehension is vocabulary development.[296] When a reader encounters an unfamiliar word in print and decodes it to derive its spoken pronunciation, the reader understands the word if it is in the reader's spoken vocabulary. Otherwise, the reader must derive the meaning of the word using another strategy, such as context. If the development of the child's vocabulary is impeded by things such as ear infections that inhibit the child from hearing new words consistently then the development of reading will also be impaired.[297] Sight words (i.e. high-frequency words), sometimes called the look-say or whole-word method, are not a part of the phonics method.[298] They are usually associated with whole language and balanced literacy where students are expected to memorize high-frequency words such as those on the Dolch word list and the Fry word list (e.g. a, be, call, do, eat, fall, gave, etc.).[299][300] The supposition (in whole language and balanced literacy) is that students will learn to read more easily if they memorize the most common words they will encounter, especially words that are not easily decoded (i.e. exceptions). On the other hand, using sight words as a method of teaching reading in English is seen as being at odds with the alphabetic principle and treating English as though it was a logographic language (e.g. Chinese or Japanese).[301] In addition, according to research, whole-word memorization is "labor-intensive", requiring on average about 35 trials per word.[302] Also, phonics advocates say that most words are decodable, so comparatively few words have to be memorized. And because a child will over time encounter many low-frequency words, "the phonological recoding mechanism is a very powerful, indeed essential, mechanism throughout reading development".[82] Furthermore, researchers suggest that teachers who withhold phonics instruction to make it easier on children "are having the opposite effect" by making it harder for children to gain basic word-recognition skills. They suggest that learners should focus on understanding the principles of phonics so they can recognize the phonemic overlaps among words (e.g. have, had, has, having, haven't, etc.), making it easier to decode them all.[303][304][305] Sight vocabulary is a part of the phonics method. It describes words that are stored in long-term memory and read automatically. Skilled fully-alphabetic readers learn to store words in long-term memory without memorization (i.e. a mental dictionary), making reading and comprehension easier. "Once you know the sound-based way to decode, your mind learns what words look like, even if you're not especially trying to do so".[306] The process, called orthographic mapping, involves decoding, crosschecking, mental marking and rereading. It takes significantly less time than memorization. This process works for fully-alphabetic readers when reading simple decodable words from left to right through the word. Irregular words pose more of a challenge, yet research in 2018 concluded that "fully-alphabetic students" learn irregular words more easily when they use a process called hierarchical decoding. In this process, students, rather than decode from left to right, are taught to focus attention on the irregular elements such as a vowel-digraph and a silent-e; for example, break (b – r – ea – k), height (h – eigh – t), touch (t – ou – ch), and make (m – a – ke). Consequentially, they suggest that teachers and tutors should focus on "teaching decoding with more advanced vowel patterns before expecting young readers to tackle irregular words". Others recommend including high-frequency words (i.e. Fry word list) while teaching the "sound-symbol relations" (i.e. phonics).[302][307][308][309] Main article: Fluency Fluency is the ability to read orally with speed, accuracy, and vocal expression. The ability to read fluently is one of several critical factors necessary for reading comprehension. If a reader is not fluent, it may be difficult to remember what has been read and to relate the ideas expressed in the text to their background knowledge. This accuracy and automaticity of reading serves as a bridge between decoding and comprehension.[310] One way to improve fluency is rereading (the student rereads a passage aloud several times with vocal expression). Another is assisted reading (the student visually reads a text while simultaneously hearing someone else fluently read the same text).[311] Main article: Reading comprehension The NRP describes reading comprehension as a complex cognitive process in which a reader intentionally and interactively engages with the text. The science of reading says that reading comprehension is heavily dependent on word recognition (i.e., phonological awareness, decoding, etc.) and oral language comprehension (i.e., background knowledge, vocabulary, etc.).[312] Phonological awareness and rapid naming predict reading comprehension in second grade but oral language skills account for an additional 13.8% of the variance.[313] It has also been found that sustained content literacy intervention instruction that gradually builds thematic connections may help young children transfer their knowledge to related topics, leading to improved comprehension.[314] The American educator, Eric "E. D." Donald Hirsch Jr., suggests that students need to learn about something in order to read well.[315] However, some researchers say reading comprehension instruction has become "content agnostic", focused on skill practice (such as "finding the main idea"), to the detriment of learning about science, history, and other disciplines. Instead, they say teachers should find ways to integrate content knowledge with reading and writing instruction. One approach is to merge the two – to embed literacy instruction into social studies and science. Another approach is to build content knowledge into reading classes, often called "high-quality or "content-rich" curricula.[316][317] However, according to Natalie Wexler, in her book The Knowledge Gap, "making the shift to knowledge is as much about changing teachers' beliefs and daily practice as about changing the materials they're supposed to use".[318] Researcher and educator Timothy Shanahan believes the most effective way to improve reading comprehension skills is to teach students to summarize, develop an understanding of text structure, and paraphrase.[319] Evidence supports the strong synergy between reading (decoding) and spelling (encoding), especially for children in kindergarten or grade one and elementary school students at risk for literacy difficulties. Students receiving encoding instruction and guided practice that included using (a) manipulatives such as letter tiles to learn phoneme-grapheme relationships and words and (b) writing phoneme-grapheme relationships and words made from these correspondences significantly outperformed contrast groups not receiving encoding instruction.[320][321] Research supports the use of embedded, picture mnemonic (memory support) alphabet cards when teaching letters and sounds, but not words.[322][323][324] Main article: Whole language Although widely used, whole-word methods are not supported by science.[325][82] Whole language has the reputation of being a meaning-based method of teaching reading that emphasizes literature and text comprehension. It discourages any significant use of phonics, if at all.[326] Instead, it trains students to focus on words, sentences and paragraphs as a whole rather than letters and sounds. Students are taught to use context and pictures to "guess" words they do not recognize, or even just skip them and read on. It aims to make reading fun, yet many students struggle to figure out the specific rules of the language on their own, which causes the student's decoding and spelling to suffer. The following are some features of the whole language philosophy: Children are expected to learn to read and write as they learned to talk, that is gradually, without a great deal of direct instruction. (However, researchers and neuroscientists say that learning to read, unlike learning to talk, is not a natural process and many learners require explicit instruction. They point out that millions of adults can speak their language just fine, yet they cannot read their language.)[327][328][82] Learning is emphasized more than teaching. It is assumed that the students will learn to read and write, and the teacher facilitates that growth. Students read and write every day in a variety of situations. Reading, writing, and spoken language are not considered separate components of the curriculum or merely ends in themselves; rather they permeate everything the students are doing. There is no division between first learning to read and later reading to learn.[329][330] As of 2020, whole language is widely used in the US and Canada (often as balanced literacy); however, in some US States and many other countries, such as Australia and the United Kingdom, it has lost favor or been abandoned because it is not supported by evidence.[331][332][333] Some notable researchers have clearly stated their disapproval of whole language and whole-word teaching. In his 2009 book, Reading in the brain, cognitive neuroscientist, Stanislas Dehaene, said "cognitive psychology directly refutes any notion of teaching via a 'global' or 'whole language' method". He goes on to talk about "the myth of whole-word reading", saying it has been refuted by recent experiments. "We do not recognize a printed word through a holistic grasping of its contours, because our brain breaks it down into letters and graphemes".[325] In addition, cognitive neuroscientist Mark Seidenberg, in his 2017 book Language at the speed of light, refers to whole language as a "theoretical zombie" because it persists despite a lack of supporting evidence.[334][335][331] Main article: Balanced literacy Balanced literacy is not well defined; however, it is intended as a method that combines elements of both phonics and whole language.[336] According to a survey in 2010, 68% of elementary school teachers in the United States profess to use balanced literacy.[337] However, only 52% of teachers in the United States include phonics in their definition of balanced literacy. The National Reading Panel concluded that phonics must be integrated with instruction in phonemic awareness, vocabulary, fluency, and comprehension. And, some studies indicate that "the addition of language activities and tutoring to phonics produced larger effects than any of these components in isolation". They suggest that this may be a constructive way to view balanced reading instruction.[338] However, balanced literacy has received criticism from researchers and others suggesting that, in many instances, it is merely whole language by another name.[339][340][341][342][343] According to phonics advocate and cognitive neuroscientist Mark Seidenberg, balanced literacy allows educators to defuse the reading wars while not making specific recommendations for change.[234] He goes on to say that, in his opinion, the high number of struggling readers in the United States is the result of how teachers are taught to teach reading.[344][113][345][346] He also says that struggling readers should not be encouraged to skip a challenging word, nor rely on pictures or semantic and syntactic cues to "guess at" a challenging word. Instead, they should use evidence-based decoding methods such as systematic phonics.[347][348][349] Structured literacy has many of the elements of systematic phonics and few of the elements of balanced literacy.[350] It is defined as explicit, systematic teaching that focuses on phonological awareness, word recognition, phonics and decoding, spelling, and syntax at the sentence and paragraph levels. It is considered to be beneficial for all early literacy learners, especially those with dyslexia.[351][352][353] According to the International Dyslexia Association, structured literacy contains the elements of phonology and phonemic awareness, sound-symbol association (the alphabetic principle and phonics), syllables, morphology, syntax, and semantics. The elements are taught using methods that are systematic, cumulative, explicit, multisensory, and use diagnostic assessment.[354] The three-cueing system (the searchlights model in England) is a theory that has been circulating since the 1980s, yet it is not supported by research.[355] Its roots are in the theories proposed in the 1960s by Ken Goodman and Marie Clay that eventually became whole language, reading recovery and guided reading (e.g., Fountas and Pinnell early reading programs).[356] As of 2010, 75% of teachers in the United States teach the three-cueing system.[337] It proposes that children who are stuck on a word should use various "cues" to figure it out and determine (guess) its meaning. The "meaning cues" are semantic ("does it make sense in the context?"), syntactic (is it a noun, verb, etc.?) and graphophonic (what are the letter-sound relationships?). It is also known as MSV (Meaning, Sentence structure/syntax and Visual information such as the letters in the words). According to some, three-cueing is not the most effective way for beginning readers to learn how to decode printed text.[357] While a cueing system does help students to "make better guesses", it does not help when the words become more sophisticated; and it reduces the amount of practice time available to learn essential decoding skills. They also say that students should first decode the word, "then they can use context to figure out the meaning of any word they don't understand". Consequently, researchers such as cognitive neuroscientists Mark Seidenberg and Timothy Shanahan do not support the theory. They say the three-cueing system's value in reading instruction "is a magnificent work of the imagination", and it developed not because teachers lack integrity, commitment, motivation, sincerity, or intelligence, but because they "were poorly trained and advised" about the science of reading.[358][359] In England, the simple view of reading and synthetic phonics are intended to replace "the searchlights multi-cueing model".[360][361] On the other hand, some researchers suggest that "context" can be useful, not to guess a word, but to confirm a word after it has been phonetically decoded.[362] The three Ps approach is used by teachers, tutors, and parents to guide oral reading practice with a struggling reader.[363] For some, it is merely a variation of the above-mentioned three-cueing system. However, for others it is very different.[364] For example: when a student encounters a word they do not know or get it wrong, the three steps are: 1) pause to see if they can fix it themselves, even letting them read on a little, 2) prompt them with strategies to find the correct pronunciation, and 3) praise them directly and genuinely. In the prompt step, the tutor does not suggest the student skip the word or guess the word based on the pictures or the first sound. Instead, they encourage students to use their decoding training to sound out the word and use the context (meaning) to confirm they have found the correct word. Guided reading is small group reading instruction that is intended to allow for the differences in students' reading abilities.[365] While they are reading, students are encouraged to use strategies from the three-cueing system, the searchlights model, or MSV. It is no longer supported by the Primary National Strategy in England as synthetic phonics is the officially recognized method for teaching reading.[366][367] In the United States, guided reading is part of the Reading Workshop model of reading instruction.[368] The reading workshop model provides students with a collection of books, allows them the choice of what to read, limits students' reading to texts that can be easily read by them, provides teaching through mini-lessons, and monitors and supports reading comprehension development through one-on-one teacher-student conferences. Some reports state that it is 'unlikely to lead to literacy success' for all students, particularly those lacking foundational skills.[369][370] Shared (oral) reading is an activity whereby the teacher and students read from a shared text that is determined to be at the students' reading level. Leveled reading involves students reading from "leveled books" at an appropriate reading level. A student who struggles with a word is encouraged to use a cueing system (e.g. three-cueing, searchlights model or MSV) to guess its meaning. Many systems purport to gauge the students' reading levels using scales incorporating numbers, letters, colors, and lexile readability scores.[371] Silent reading (and self-teaching) is a common practice in elementary schools. A 2007 study in the United States found that, on average only 37% of class time was spent on active reading instruction or practice, and the most frequent activity was students reading silently. Based on the limited available studies on silent reading, the NRP concluded that independent silent reading did not prove an effective practice when used as the only type of reading instruction to develop fluency and other reading skills – particularly with students who have not yet developed critical alphabetic and word reading skills.[372] Other studies indicate that, unlike silent reading, "oral reading increases phonological effects". According to some, the classroom method called DEAR (Drop everything and read) is not the best use of classroom time for students who are not yet fluent.[373] However, according to the self-teaching hypothesis, when fluent readers practice decoding words while reading silently, they learn what whole words look like (spelling), leading to improved fluency and comprehension.[374][375] The suggestion is: "if some students are fluent readers, they could read silently while the teacher works with the struggling readers". See also: Reading § History of learning to read For decades, the merits of phonics vs. whole language have been debated. It is sometimes referred to as the reading wars.[376][377] Phonics was a popular way to learn reading in the 19th century. William Holmes McGuffey (1800–1873), an American educator, author, and Presbyterian minister who had a lifelong interest in teaching children, compiled the first four of the McGuffey Readers in 1836.[378] McGuffey's Primer 1836 In 1841 Horace Mann, the Secretary of the Massachusetts Board of Education, advocated for a whole-word method of teaching reading to replace phonics. Others advocated for a return to phonics, such as Rudolf Flesch in his book Why Johnny Can't Read (1955). The whole-word method received support from Kenneth J. Goodman who wrote an article in 1967 entitled Reading: A psycholinguistic guessing game. In it, he says efficient reading is the result of the "skill in selecting the fewest, most productive cues necessary to produce guesses which are right the first time".[379] Although not supported by scientific studies, the theory became very influential as the whole language method.[380][335] At the same time, Marie Clay, the creator of the often criticized Reading recovery program suggested that young readers use "multiple clues from the text" as well as content to read.[381] [382] [383] Since the 1970s some whole language supporters such as Frank Smith, are unyielding in arguing that phonics should be taught little, if at all.[384] Yet, other researchers say instruction in phonics and phonemic awareness are "critically important" and "essential" to developing early reading skills.[347][385][82] In 2000, the National Reading Panel (U.S.) identified five ingredients of effective reading instruction, of which phonics is one; the other four are phonemic awareness, fluency, vocabulary and comprehension.[131] Reports from other countries, such as the Australian report on Teaching reading (2005)[268] and the U.K. Independent review of the teaching of early reading (Rose Report 2006) have also supported the use of phonics. Some notable researchers such as Stanislas Dehaene and Mark Seidenberg have clearly stated their disapproval of whole language.[386][387] Furthermore, a 2017 study in the UK that compared teaching with phonics vs. teaching whole written words concluded that phonics is more effective, saying "our findings suggest that interventions aiming to improve the accuracy of reading aloud and/or comprehension in the early stages of learning should focus on the systematicity present in print-to-sound relationships, rather than attempting to teach direct access to the meanings of whole written words".[388] More recently, some educators have advocated for the theory of balanced literacy purported to combine phonics and whole language yet not necessarily consistently or systematically. It may include elements such as word study and phonics mini-lessons, differentiated learning, cueing, leveled reading, shared reading, guided reading, independent reading, and sight words.[389][390][391][392] According to a survey in 2010, 68% of K–2 teachers in the United States practice balanced literacy; however, only 52% of teachers included phonics in their definition of balanced literacy. In addition, 75% of teachers teach the three-cueing system (i.e., meaning/structure/visual or semantic/syntactic/graphophonic) that has its roots in whole language.[337][393] In addition, some phonics supporters assert that balanced literacy is merely whole language by another name.[394] And critics of whole language and sceptics of balanced literacy, such as neuroscientist Mark Seidenberg, state that struggling readers should not be encouraged to skip words they find puzzling or rely on semantic and syntactic cues to guess words.[347][341][395] Over time a growing number of countries and states have put greater emphasis on phonics and other evidence-based practices (see Phonics practices by country or region). Hieroglyph, one of the earliest forms of writing Languages such as Chinese and Japanese are normally written (fully or partly) in logograms (hanzi and kanji, respectively), which represent a whole word or morpheme with a single character. There are a large number of characters, and the sound that each makes must be learned directly or from other characters that contain "hints" in them. For example, in Japanese, the On-reading of the kanji 民 is min and the related kanji 眠 shares the same On-reading, min: the right-hand part shows the character's pronunciation. However, this is not true for all characters. Kun readings, on the other hand, have to be learned and memorized as there is no way to tell from each character. Ruby characters are used in textbooks to help children learn the sounds that each logogram makes. These are written in a smaller size, using an alphabetic or syllabic script. For example, hiragana is typically used in Japanese, and the pinyin romanization into Latin alphabet characters is used in Chinese. 漢 かん 字 じ or かん じ 漢 字 The examples above each spell the word kanji, which is made up of two kanji characters: 漢 (kan, written in hiragana as かん), and 字 (ji, written in hiragana as じ). Textbooks are sometimes edited as a cohesive set across grades so that children will not encounter characters they are not yet expected to have learned. A person reading a book, in a second-hand store. According to the report by the US National Reading Panel (NRP) in 2000,[131][396] the elements required for proficient reading of alphabetic languages are phonemic awareness, phonics, fluency,[310] vocabulary,[296] and text comprehension. In non-Latin languages, proficient reading does not necessarily require phonemic awareness, but rather an awareness of the individual parts of speech, which may also include the whole word (as in Chinese characters) or syllables (as in Japanese) as well as others depending on the writing system being employed. The Rose Report, from the Department for Education in England makes it clear that, in their view, systematic phonics, specifically synthetic phonics, is the best way to ensure that children learn to read; such that it is now the law.[269][397][398][399] In 2005 the government of Australia published a report stating "The evidence is clear ... that direct systematic instruction in phonics during the early years of schooling is an essential foundation for teaching children to read".[400] Phonics has been gaining acceptance in many other countries as can be seen from this page Practices by country or region. Other important elements are: rapid automatized naming (RAN),[401][402] a general understanding of the orthography of the language, and practice. Rapid automatized naming, the ability to say quickly the names of letters, objects and colors, predicts an individual's ability to read. This might be linked to the importance of quick retrieval of phonological representations from long-term memory in reading and the importance of object-naming circuits in the left cerebral hemisphere that are recruited to underpin a learner's word-recognition abilities.[401][402] Orthography describes or defines the set of symbols used in a language, and the rules about how to write these symbols (i.e., the conventional spelling system of a language). Orthographic Development proceeds in increasing complexity as a person learns to read. Some of the first things to be learnt are the orthographic conventions such as the direction of reading and that there are differing typefaces and capitalization for each symbol. In general, this means that to read proficiently, the reader has to understand the elements of a written language. In the United States, a limited amount of spelling is taught up to grade four, and beyond that "we gain orthographic expertise by reading"; so the amount and variety of texts that children read is important.[403] Practice: Repeated exposure to print improves many aspects of learning to read and most importantly the knowledge of individual words. It increases the speed at which high-frequency words are recognized which allows for increased fluency in reading. It also supports orthographic development, reading comprehension and vocabulary development. Research suggests there is value in reading words both in isolation and in context. Reading words in isolation promotes faster reading times and better memory for spellings; whereas, reading words in context improves semantic knowledge and comprehension.[404] Difficulties in reading typically involve difficulty with one or more of the following: decoding, reading rate, reading fluency, or reading comprehension. Main article: Dyslexia Brain activity in young and older children can be used to predict future reading skills. Cross-model mapping between the orthographic and phonologic areas in the brain is critical in reading. Thus, the amount of activation in the left dorsal inferior frontal gyrus while performing reading tasks can be used to predict later reading ability and advancement. Young children with higher phonological word characteristic processing have significantly better reading skills later on than older children who focus on whole-word orthographic representation.[405] Difficulty with decoding is marked by having not acquired the phoneme-grapheme mapping concept. One specific disability characterized by poor decoding is dyslexia, a brain-based learning disability that specifically impairs a person's ability to read.[406] These individuals typically read at levels significantly lower than expected despite having normal intelligence. It can also be inherited in some families, and recent studies have identified a number of genes that may predispose an individual to developing dyslexia. Although the symptoms vary from person to person, common characteristics among people with dyslexia are difficulty with spelling, phonological processing (the manipulation of sounds), and/or rapid visual-verbal responding.[406] Adults can have either developmental dyslexia[407][408][409][410] or acquired dyslexia which occurs after a brain injury, stroke[411][412] or dementia.[413][414][408][409][411][412] Average reading rate in words per minute (wpm) depending on age and measured with different tests in English, French and German Individuals with reading rate difficulties tend to have accurate word recognition and normal comprehension abilities, but their reading speed is below grade level.[415] Strategies such as guided reading (guided, repeated oral-reading instruction), may help improve a reader's reading rate.[416] Many studies show that increasing reading speed improves comprehension.[417] Reading speed requires a long time to reach adult levels. According to Carver (1990), children's reading speed increases throughout the school years. On average, from grade 2 to college, the reading rate increases 14 standard-length words per minute each year (where one standard-length word is defined as six characters in text, including punctuation and spaces).[418] Scientific studies have demonstrated that speed reading – defined here as capturing and decoding words faster than 900 wpm – is not feasible given the limits set by the anatomy of the eye.[419] Individuals with reading fluency difficulties fail to maintain a fluid, smooth pace when reading. Strategies used for overcoming reading rate difficulties are also useful in addressing reading fluency issues.[396] Main article: Reading comprehension Individuals with reading comprehension difficulties are commonly described as poor comprehenders.[420] They have normal decoding skills as well as a fluid rate of reading, but have difficulty comprehending text when reading. The simple view of reading holds that reading comprehension requires both decoding skills and oral language comprehension ability.[421] Increasing vocabulary knowledge, listening skills, and teaching basic comprehension techniques may help facilitate better reading comprehension. It is suggested that students receive brief, explicit instruction in reading comprehension strategies in the areas of vocabulary, noticing understanding, and connecting ideas.[422] Scarborough's Reading Rope and The active view of reading model also outline some of the essential ingredients of reading comprehension. In some countries, a radio reading service provides a service for blind people and others who choose to hear newspapers, books, and other printed material read aloud, typically by volunteers. An example is Australia's Radio Print Handicapped Network with stations in capital cities and some other areas. The following organizations measure and report on reading achievement in the United States and internationally: Main article: NAEP In the United States, the National Assessment of Educational Progress or NAEP ("The Nation's Report Card") is the national assessment of what students know and can do in various subjects. Four of these subjects – reading, writing, mathematics, and science – are assessed most frequently and reported at the state and district level, usually for grades 4 and 8.[423] In 2024, concerning the reading skills of the nation's grade-four public school students, 31% performed at or above the NAEP Proficient level (solid academic performance), and 60% performed at or above the NAEP Basic level (partial mastery of the proficient level skills). In both instances, this represents a 2% decrease from 2022.[424] In 2013, 32% of grade-four students were reading below the basic level, whereas by 2024 this had increased to 40%. It is believed that students who read below the basic level do not have sufficient support to complete their schoolwork.[425] The only state that made statistically significant progress in grade-four reading since 2019 was Louisiana. This was attributed to the State having curriculum reviews since 2015, providing incentives for districts to use material that is evidence-based, together with professional training for teachers.[426] Reading scores for the individual States and Districts are available on the NAEP site. Between 2017 and 2019, Mississippi was the only State that had a grade-four reading score increase, and 17 States had a score decrease.[427] The COVID-19 pandemic had a significant impact on reading results in the United States. In 2022 the average basic-level reading score among elementary school children was 3 points lower compared to 2019 (the previous assessment year) and roughly equivalent to the first reading assessment in 1992. Students of all ethnic groups other than Asians saw their scores decline. However, "black, Hispanic, and American Indian/Alaska Native (AIAN) students and students in high-poverty schools were disproportionately impacted". (Other sources substantiated this).[428] In 2022, no states had a reading score increase, and 30 states had a score decrease.[429] The results by race or ethnicity were as follows:[89] Race / Ethnicity 2019 – Proficient level 2022 – Proficient level 2019 – Basic level 2022 – Basic level Asian 57% 58% 82% 83% Asian/Pacific Islander 55% 56% 81% 81% White 45% 42% 77% 73% Two or more races 40% 38% 72% 68% National Average 35% 33% 65% 63% Native Hawaiian/Other Pacific Islander 25% 23% 58% 50% Hispanic 23% 21% 55% 50% American Indian/Alaska Native 19% 18% 50% 43% Black 18% 17% 48% 44% NAEP reading assessment results are reported as average scores on a 0–500 scale.[430] The Basic Level is 208 and the Proficient Level is 238.[431] The average reading score for grade-four public school students was 219.[432] Female students had an average score that was 7 points higher than male students. Students who were eligible for the National School Lunch Program (NSLP) had an average score that was 28 points lower than that for students who were not eligible. Main article: PIAAC The Programme for the International Assessment of Adult Competencies (PIAAC) is an international study by the Organisation for Economic Co-operation and Development (OECD) of cognitive and workplace skills in 39 countries between 2011 and 2023.[433] The Survey measures adults' proficiency in key information-processing skills – literacy, numeracy, and problem-solving. The focus is on the working-age population between the ages of 16 and 65. For example, the study shows the ranking of 38 countries as to the literacy proficiency among adults. According to the 2019 OECD report, the five countries with the highest ranking are Japan, Finland, the Netherlands, Sweden, and Australia; whereas Canada is 12th, England (UK) is 16th, and the United States is 19th.[164] It is also worth noting that the PIAAC table A2.1 (2013) shows the percentage of adults reading at-or-below level one (out of five levels). Some examples are Japan 4.9%, Finland 10.6%, Netherlands 11.7%, Australia 12.6%, Sweden 13.3%, Canada 16.4%, England 16.4%, and the United States 16.9%.[80] Main article: PIRLS The Progress in International Reading Literacy Study (PIRLS) is an international study of reading (comprehension) achievement in fourth graders.[434] It is designed to measure children's reading literacy achievement, to provide a baseline for future studies of trends in achievement, and to gather information about children's home and school experiences in learning to read. The 2021 PIRLS report shows the 4th-grade reading achievement by country in two categories (literary and informational). The ten countries with the highest overall reading average (with scores) are Singapore (587), Ireland (577), Hong Kong SAR (573), Russian Federation (567), Northern Ireland (566), England (UK) (558), Croatia (557), Lithuania (552), Finland (549), and Poland (549). Some others are the United States (548) 11th and Australia (548) 13th. Among the benchmarking participants are the four Canadian provinces of Alberta (539), British Columbia (535), Newfoundland and Labrador (523), and Quebec (551).[435] Main article: PISA The Programme for International Student Assessment (PISA) measures 15-year-old school pupils scholastic performance on mathematics, science, and reading.[73] In 2018, of the 79 participating countries/economies, on average, students in Beijing, Shanghai, Jiangsu and Zhejiang (China), and Singapore outperformed students from all other countries in reading, mathematics, and science. 21 countries have reading scores above the OECD average scores and many of the scores are not statistically different.[436][437] Critics, however, say PISA is fundamentally flawed in its underlying view of education, its implementation, and its interpretation and impact on education globally.[74] In 2014, more than 100 academics from around the world called for a moratorium on PISA.[75][76] According to a 2023 book, PISA is failing in its mission. It suggests that flatlined student outcomes and policy shortcomings have much to do with PISA's implicit ideological biases, structural impediments such as union advocacy, and conflicts of interest.[438] The Education Quality and Accountability Office, EQAO

Rocket Science, American Federation of Teachers, Washington, DC, USA, 2020" (PDF). p. 5. ^ "How Third-Grade Reading Skills and Poverty Influence High School Graduation, figures 2, 4 and 6, The Annie E. Casey Foundation" (PDF). 2012. ^ "Nation's Report Card, reading scores, grade 4". 2022. This article incorporates text from this source, which is in the public domain. ^ Sarah Schwartz (January 29, 2025). "Reading Scores Fall to New Low on NAEP, Fueled by Declines for Struggling Students, edweek.org". ^ "Nations report card, reading". 2024. ^ "Test Results for California's Assessments website". 2023. ^ Benjamin W. Cottingham, Heather J. Hough, Jeannie Myung (December 2023). "What Does it take to accelerate the learning of every child, Policy Analysis for California Education" (PDF). ^ Betty Marquez Rosales, Daniel J. Willis (2023-06-06). "In California's youth justice system, many high schoolers graduate with grade-school reading skills, Edsource". ^ a b Sarah Schwartz (July 20, 2022). "Which States Have Passed 'Science of Reading' Laws? What's in Them? Education Week". ^ Cayla Bamberger (2023-05-09). "NYC to mandate citywide reading approach in bid to lift lagging literacy rates, New York Daily News". New York Daily News. ^ Bastian A. Betthäuser, Anders M. Bach-Mortensen, Per Engzell (January 30, 2023). A systematic review and meta-analysis of the evidence on learning during the COVID-19 pandemic, Nature Human Behaviour (Report). doi:10.1038/s41562-022-01506-4. ^ "COVID-19 means more students not learning to read, Amplify" (PDF). February 2021. ^ American Federation of Teachers, Reading rockets (2004). "Waiting Rarely Works: Late Bloomers Usually Just Wilt". ^ "EQAO's 2022–2023 assessment of reading, writing and mathematics, grade three" (PDF). 2023. ^ "Executive summary, Right to Read inquiry report, OHRC". January 27, 2022. ^ "Highlights of provincial results" (PDF). 2024. ^ "2021–2022 Nova Scotia Assessment, Literacy and Mathematics/Mathématiques in Grade 3" (PDF). 2022. ^ "New Brunswick Provincial Assessment Results 2022–2023, Grades 4 & 6 English Reading Proficiency" (PDF). 2023. ^ "Progress in International Reading Literacy Study (PIRLS) – Index". nces.ed.gov. ^ a b "PIRLS 2016 Exhibit 3.1: Achievement in Reading Purposes" (PDF). ^ a b "Where the world's fourth-graders read at the most advanced level, Barclays, 2017-12-05". 5 December 2017. ^ "Progress in International Reading Literacy Study (PIRLS): National Report for England, 2017-12-12" (PDF). ^ a b "About PISA". OECD PISA. Retrieved 8 February 2018. ^ a b Zhao, Y. (January 22, 2020). "Two decades of havoc: A synthesis of criticism against PISA". J Educ Change. 21 (2): 245–266. doi:10.1007/s10833-019-09367-x. S2CID 213889847. ^ a b "Expert: How PISA created an illusion of education quality and marketed it to the world, The Washington Post". The Washington Post. December 3, 2019. ^ a b "OECD and Pisa tests are damaging education worldwide – academics, The Guardian". TheGuardian.com. May 6, 2014. ^ Sarah Schwartz (August 29, 2024). "Teachers Say Older Kids Need Help With Basic Reading Skills, Too, edweek.org". ^ Elizabeth Heubeck (May 16, 2024). "Older Students Who Struggle to Read Hide in Plain Sight. What Teachers Can Do, edweek.org". ^ "PIAAC-OECD". ^ a b c "OECD Skills Outlook 2013, p. 257" (PDF). ^ World Bank (2019). Ending Learning Poverty: What will it take, World Bank (Report). pp. 1–34. hdl:10986/32553. ^ a b c d e f g h Rayner K, Barbara Foorman, Charles A. Perfetti, David Pesetsky, Mark S. Seidenberg (2001). "How psychological science informs the teaching of reading" (PDF). Psychological Science in the Public Interest. 2. 2 (2): 31–74. CiteSeerX 10.1.1.14.4083. doi:10.1111/1529-1006.00004. PMID 26151366. S2CID 134422. Archived from the original (PDF) on 2017-08-12. Retrieved 2021-01-15. ^ "The Four Basic Language Skills | Gorge Literacy | Columbia Gorge Community College". www.cgcc.edu. Archived from the original on 2020-10-31. Retrieved 2021-01-15. ^ "Skills". LearnEnglish. ^ "Center for public education, March 2015, NSBA.org" (PDF). ^ "Put Reading First, The National Institute for Literacy" (PDF). ^ "Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade, The Institute of Education Sciences" (PDF). ^ "Why Reading by the End of Third Grade Matters, p. 9, the Annie E. Casey Foundation, 2010" (PDF). ^ a b "NAEP Reading: National Achievement-Level Results". Nation's Report Card. Retrieved February 1, 2023. ^ "Many teenagers can't read GCSE exam papers, BBC News". BBC News. 2012-11-16. ^ "Third Grade Reading Guarantee | Ohio Department of Education". ^ "Reading Standards for Foundational Skills K–12, OHIO Department of Education, 2017". ^ "National curriculum in England: primary curriculum". GOV.UK. 6 May 2015. ^ "PIRLS reading results by country, NCES, 2016". ^ Mark Seidenberg (2017). Language at the speed of light. Basic Books. pp. 101–121. ISBN 978-0-465-08065-6. ^ Kamil, Michael L., Pearson, P. David, Moje, Elizabeth Birr, Afflerbach, Peter (2011). Handbook of Reading Research, Volume IV. Routledge. pp. 142–143. ISBN 978-0-8058-5342-1. ^ Harm, M. W., Seidenberg, M. S. (August 2000). "Phonology, Reading Acquisition, and Dyslexia: Insights from Connectionist Models". Psychological Review. 106 (3): 491–528. doi:10.1037/0033-295X.106.3.491. PMID 10467896. ^ "Common Core States Standard Initiative, USA, English language arts". p. Appendix A-26. Archived from the original on 2021-01-21. Retrieved 2021-01-15. ^ "Inference, says Clare Sealy, isn't a skill that can be taught. But it can be improved – through knowledge., ResearchED". 24 June 2019. ^ Cohen S, Glass DC, Singer JE (1973). "Apartment noise, auditory discrimination, and reading ability in children". Journal of Experimental Social Psychology. 9 (5): 407–422. doi:10.1016/S0022-1031(73)80005-8. ISSN 0022-1031. ^ a b Myers L, Botting N (2008). "Literacy in the mainstream inner-city school: Its relationship to spoken language" (PDF). Child Language Teaching and Therapy. 24 (1): 95–114. doi:10.1177/0265659007084570. ISSN 0265-6590. S2CID 145153275. ^ a b c Piasta SB, Justice LM, McGinty AS, Kaderavek JN (2012). "Increasing Young Children's Contact With Print During Shared Reading: Longitudinal Effects on Literacy Achievement, 2012-04-17". Child Development. 83 (3): 810–820. doi:10.1111/j.1467-8624.2012.01754.x. PMID 22506889. ^ Hempenstall K. "Whole Language! What was that all about?". National Institute for Direct Instruction. Retrieved 29 January 2019. ^ Gough P, Hillinger M (1980). "Learning to read: An unnatural act". Bulletin of the Orton Society. 30: 179–196. doi:10.1007/BF02653717. S2CID 143275563. ^ "Why Reading Is Not a Natural Process, volume 55, number 6, ASCD, Alexandria, VA". 1998. Archived from the original on 2021-01-16. Retrieved 2021-01-15. ^ Lyon GR (1998). "Why Reading Is Not a Natural Process". Educational Leadership. ISSN 0013-1784. ^ Seidenberg, Mark (2017). Language at the speed of sight. New York: Basic Books. pp. 114–117. ISBN 978-1-5416-1715-5. ^ "Reading Aloud to Kids and Why Lessons Need Purposes, Timothy Shanahan (educator)". June 11, 2017. ^ a b "English Language Arts Standards » Reading: Foundational Skills » Kindergarten | Common Core State Standards Initiative". www.corestandards.org. Archived from the original on 2021-01-21. Retrieved 2021-01-15. ^ Strauss V (13 January 2015). "Report: Requiring kindergartners to read – as Common Core does – may harm some". The Washington Post. ^ a b Sebastian Suggate, "Watering the garden before a rainstorm: the case of early reading instruction" in Contemporary Debates in Childhood Education and Development, ed. Sebastian Suggate, Elaine Reese. pp. 181–190. ^ Suggate SP, Schaughency EA, Reese E (2013). "Children learning to read later catch up to children reading earlier". Early Childhood Research Quarterly. 28: 33–48. doi:10.1016/j.ecresq.2012.04.004. ^ a b "PIRLS Achievement Results – PIRLS 2016". ^ a b Elkind D (2001). "Much Too Early". Education Next. ^ "Brown centre on education policy". 9 July 2020. ^ "Transitional Kindergarten: A Boondoggle by any other name, Brown Center on Education Policy, 2014-01-14". Archived from the original on 2021-01-21. Retrieved 2021-01-15. ^ "Overview of the Education System – PIRLS 2016 Encyclopedia". ^ a b c Refsnes H. "When should reading instruction begin? | Shanahan on Literacy". www.shanahanonliteracy.com. ^ "NAEYC Position Statement on Developmentally Appropriate Practice: 2020, Proposed Final Draft – Not For Citation" (PDF). ^ "Myths about reading". 20 July 2017. ^ Van Kleeck A, Schuele CM (2010). "Historical Perspectives on Literacy in Early Childhood". American Journal of Speech-Language Pathology. 19 (4): 341–355. doi:10.1044/1058-0360(2010/09-0038). PMID 20581109. ^ Education Endowment Foundation. "Early Literacy Approaches". Early Years Toolkit. Archived from the original on 3 April 2021. Retrieved 2021-04-03. ^ Education Endowment Foundation. "Earlier Starting Age". Early Years Toolkit. Archived from the original on 3 April 2021. Retrieved 2021-04-03. ^ NIH (2011-02-04). "High-quality Preschool Program Produces Long-term Economic Payoff". ^ NIH (2015-03-11). "Small investment in children's education yields big results". ^ "What Should Be Emphasized at Each Stage of Reading Development, Louisa Moats, Carol Tolman, Reading Rockets". 24 April 2013. ^ "National Achievement-Level Results". 2022. ^ Elizabeth Heubeck (May 16, 2024). "Older Students Who Struggle to Read Hide in Plain Sight. What Teachers Can Do, edweek.org". Education Week. ^ Elizabeth Heubeck (May 1, 2024). "Teachers Are Still Teaching Older Students Basic Reading Skills, Survey Finds, edweek.org". Education Week. ^ Shapiro A, Lee S, Woo A (April 30, 2024). "Exploring Foundational Reading Skill Instruction in K–12 Schools, Rand Corporation". ^ a b c d "National Reading Panel (NRP) – Summary Report (2000)" (PDF). ^ Stanislas Dehaene (2010). Reading in the brain. Penguin Books. pp. 199–204. ISBN 978-0-14-311805-3. ^ Ratz C, Lenhard W (2013-05-01). "Reading skills among students with intellectual disabilities". Research in Developmental Disabilities. 34 (5): 1740–1748. doi:10.1016/j.ridd.2013.01.021. ISSN 0891-4222. ^ Chall JS (1983). Stages of Reading Development. McGraw-Hill. ISBN 978-0-07-010380-1. ^ Chall, Jeanne (1983). Chall on Stages of Reading Development. New York: McGraw Hill. pp. 10–24. ^ Maryanne Wolf (2008). Proust and the Squid. Harper Perennial. ISBN 978-0-06-093384-5. ^ "Five Stages of Reading Development". The Literacy Bug. ^ "Education". www.unicef.org. ^ "Big Brother Mouse – Books in Laos". www.bigbrothermouse.com. ^ Wolf, Maryanne, Stoodley, Catherine J. (2007). Proust and the squid: the story and science of the reading brain. New York: Harper. pp. 115–139. ISBN 978-0-06-018639-5. OCLC 471015779. ^ "Handbook of Language and Literacy Development – A Roadmap from 0 to 60 Months – Vocalizing – Parent/Caregiver". theroadmap.ualberta.ca. Archived from the original on 2021-04-22. Retrieved 2021-01-15. ^ "Ohio's Early Learning & Development Standards: Birth to Kindergarten Entry". 2021. ^ Alix Spegel (2012-05-29). "Small Change In Reading To Preschoolers Can Help Disadvantaged Kids Catch Up". NPR. Retrieved 2012-07-17. ^ "Simple Yet Powerful Things to Do While Reading Aloud, Reading Rockets". 19 June 2016. ^ "Handbook of Language and Literacy Development – A Roadmap from 0 to 60 Months – Reading – Parent/Caregiver". theroadmap.ualberta.ca. Archived from the original on 2021-08-02. Retrieved 2021-01-15. ^ Maryanne Wolf (2008). Proust and the Squid. Harper Perennial. pp. 115–126. ISBN 978-0-06-093384-5. ^ Mark Seidenberg (2017). Language at the speed of light. Basic Books. pp. 113–117. ISBN 978-0-465-08065-6. ^ Maryanne Wolf (2008). Proust and the Squid. Harper Perennial. pp. 126–133. ISBN 978-0-06-093384-5. ^ "Rimes, Reading Rockets". 19 March 2013. ^ "Phonics, Reading Rockets". 25 April 2014. Archived from the original on 15 January 2021. Retrieved 15 January 2021. ^ Maryanne Wolf (2008). Proust and the Squid. Harper Perennial. pp. 136–143. ISBN 978-0-06-093384-5. ^ "Comprehension Instruction: What Works, LD Online". 2005. ^ Wolf, Maryanne, Stoodley, Catherine J. (2007). Proust and the squid: the story and science of the reading brain. New York: Harper. pp. 139–143. ISBN 978-0-06-018639-5. OCLC 471015779. ^ Maryanne Wolf (2008). Proust and the Squid. Harper Perennial. pp. 143–162. ISBN 978-0-06-093384-5. ^ "Human language may have evolved to help our ancestors make tools, Science Magazine". January 13, 2015. ^ Stanislas Dehaene (2009). Reading in the brain. Penguin books. p. 63. ISBN 978-0-670-02110-9. ^ Mark Seidenberg (2017). Language at the speed of light. Basic Books. p. 4. ISBN 978-0-465-08065-6. ^ "What is the science of reading". ^ "Making Sense of the Science of Reading". literacyworldwide.org. ^ "Executive summary, Right to Read inquiry report, OHRC". January 27, 2022. ^ "What Is the Science of Reading, Timothy Shanahan, Reading Rockets". 2019-05-29. ^ "Science of Reading Advocates Underscore: It's Not Just About Phonics, Sarah Schwartz, edweek.org". 2025-04-24. ^ "NAEP 2019 grade 4 reading report" (PDF). ^ a b Skills Matter: Additional Results from the Survey of Adult Skills (PDF). OECD Skills Studies. OECD Skills Studies. 2019. p. 44. doi:10.1787/1f029d8f-en. ISBN 978-92-64-60466-7. S2CID 243226424. ^ Seidenberg MS (2013-08-26). "The Science of Reading and Its Educational Implications". Language Learning and Development. 9 (4): 331–360. doi:10.1080/15475441.2013.812017. PMC 4020782. PMID 24839408. ^ Stanislas Dehaene (2010). Reading in the brain. Penguin Books. pp. 218–234. ISBN 978-0-14-311805-3. ^ Kamil, Michael L., Pearson, P. David, Moje, Elizabeth Birr, Afflerbach, Peter (2011). Handbook of Reading Research, Volume IV. Routledge. p. 630. ISBN 978-0-8058-5342-1. ^ Hoover, Wesley A., Gough, Philip B. "Overview – The Cognitive Foundations of Learning to Read: A Framework". The Cognitive Foundations of Learning to Read: A Framework. ^ Castles A, Rastle K, Nation K (11 June 2018). "Ending the Reading Wars: Reading Acquisition From Novice to Expert". Psychological Science in the Public Interest. 19 (1): 27. doi:10.1177/1529100618772271. PMID 29890888. ^ Refsnes H. "Early Reading Intervention | Shanahan on Literacy". www.shanahanonliteracy.com. ^ Catts HW, Hogan TP, Fey ME (18 August 2016). "Subgrouping Poor Readers on the Basis of Individual Differences in Reading-Related Abilities". Journal of Learning Disabilities. 36 (2): 151–164. doi:10.1177/002221940303600208. PMC 2848965. PMID 15493430. ^ Kendeou P, Savage R, Broek P (June 2009). "Revisiting the simple view of reading". British Journal of Educational Psychology. 79 (2): 353–370. doi:10.1348/978185408X369020. PMID 19091164. ^ "Scarborough's Reading Rope: A Groundbreaking Infographic". The Examiner. 7 (2). April 2018. ^ Timothy Shanahan (2021-03-06). "Why Your Students May Not Be Learning to Comprehend". ^ Cutting, Laurie, Scarborough, Hollis (2012). "Multiple bases for comprehension difficulties: the potential of cognitive and neurobiological profiling for validation of subtypes and development of assessments, Reaching an understanding: Innovations in how we view reading assessment". pp. 101–116. ^ "Kelly B. Cartwright". ^ "Theory of mind, Ruhl, C., Simply Psychology". 2020-08-07. ^ Samuels SJ, Flor RF (1997). "The importance of automaticity for developing expertise in reading". Reading & Writing Quarterly, 13(2), 107–121. 13 (2): 107–121. doi:10.1080/1057356970130202. ^ Daniel T. Willingham (2004). "Ask the Cognitive Scientist: Practice Makes Perfect—But Only If You Practice Beyond the Point of Perfection". ^ "Youtube, How the Brain Learns to Read – Prof. Stanislas Dehaene, October 25, 2013". YouTube. 25 October 2013. Archived from the original on 2021-10-30. ^ Seidenberg, Mark (2017). Language at the speed of light. Basic Books. ISBN 978-0-465-08065-6. ^ Dehaene, Stanislas (2010). Reading in the brain. Penguin Books. ISBN 978-0-14-311805-3. ^ Willingham, Daniel T. (2017). The reading mind. Jossey-Bass. ISBN 978-1-119-30137-0. ^ "How Left Brain Asymmetry Is Related to Reading Ability". Neuroscience News. Dyslexia Data Consortium. 5 April 2022. Retrieved 24 July 2022. ^ Mark A. Eckert, Kenneth I. Vaden Jr., Federico Iuricich (5 April 2022). "Cortical asymmetries at different spatial hierarchies relate to phonological processing ability". PLOS Biology. 20 (4): e3001591. doi:10.1371/journal.pbio.3001591. PMC 8982829. PMID 35381012. ^ Turkeltaub PE, Eden GF, Jones KM, Zeffiro TA (July 2002). "Meta-Analysis of the Functional Neuroanatomy of Single-Word Reading: Method and Validation". NeuroImage. 16 (3): 765–780. doi:10.1006/nimg.2002.1131. PMID 12169260. S2CID 8122844. ^ McCandliss BD, Cohen L, Dehaene S (July 2003). "The visual word form area: expertise for reading in the fusiform gyrus". Trends in Cognitive Sciences. 7 (7): 293–299. doi:10.1016/S1364-6613(03)00134-7. PMID 12860187. S2CID 8534353. ^ Turkeltaub PE, Gareau L, Flowers DL, Zeffiro TA, Eden GF (July 2003). "Development of neural mechanisms for reading". Nature Neuroscience. 6 (7): 767–773. doi:10.1038/nn1065. ISSN 1097-6256. PMID 12754516. S2CID 1256871. ^ Catani M, Jones DK, ffytche DH (January 2005). "Perisylvian language networks of the human brain". Annals of Neurology. 57 (1): 8–16. doi:10.1002/ana.20319. ISSN 0364-5134. PMID 15597383. S2CID 17743067. ^ Rutten GJ (2017). The Broca-Wernicke Doctrine. Cham: Springer International Publishing. doi:10.1007/978-3-319-54633-9. ISBN 978-3-319-54632-2. S2CID 12820073. ^ Aparicio M, Gounot D, Demont E, Metz-Lutz MN (April 2007). "Phonological processing in relation to reading: An fMRI study in deaf readers". NeuroImage. 35 (3): 1303–1316. doi:10.1016/j.neuroimage.2006.12.046. PMID 17329129. S2CID 20053235. ^ Li H, Yuan Q, Luo YJ, Tao W (June 2022). "A new perspective for understanding the contributions of the cerebellum to reading: The cerebro-cerebellar mapping hypothesis". Neuropsychologia. 170: 108231. doi:10.1016/j.neuropsychologia.2022.108231. PMID 35378104. S2CID 247859931. ^ "Eye Movements and Reading, Louisa Moats, Carol Tolman, Reading rockets". 2009. ^ Mark Seidenberg (2017). Language at the speed of light. Basic Books. pp. 61–66. ISBN 978-0-465-08065-6. ^ a b "Average reading speed, Research Digest, The British Psychological Society". 13 June 2019. Archived from the original on 5 February 2021. Retrieved 20 January 2021. ^ Brysbaert M (December 2019). "How many words do we read per minute? A review and meta-analysis of reading rate". Journal of Memory and Language. 109: 104047. doi:10.1016/j.jml.2019.104047. S2CID 202267075. ^ Coltheart M, Curtis, Brent, Atkins, Paul, Haller, Micheal (1 January 1993). "Models of reading aloud: Dual-route and parallel-distributed-processing approaches". Psychological Review. 100 (4): 589–608. doi:10.1037/0033-295X.100.4.589. ^ Yamada J, Imai H, Ikebe Y (July 1990). "The use of the orthographic lexicon in reading kana words". The Journal of General Psychology. 117 (3): 311–323. PMID 2213002. ^ a b Pritchard SC, Coltheart M, Palethorpe S, Castles A (October 2012). "Nonword reading: comparing dual-route cascaded and connectionist dual-process models with human data". J Exp Psychol Hum Percept Perform. 38 (5): 1268–1288. doi:10.1037/a0026703. PMID 22309087. ^ Zorzi M, Houghton G, Butterworth B (1998). "Two routes or one in reading aloud? A connectionist dual-process model". Journal of Experimental Psychology: Human Perception and Performance. 24 (4): 1131–1161. doi:10.1037/0096-1523.24.4.1131. ISSN 1939-1277. ^ Colin M MacLeod (December 18, 2011). "I said, you said: the production effect gets personal". Psychonomic Bulletin & Review. 18 (6): 1197–1202. doi:10.3758/s13423-011-0168-8. PMID 21938642. S2CID 11679593. ^ "What Is Evidence-Based Reading Instruction and How Do You Know It When You See It?, U.S. Department of Education, March 2012" (PDF). ^ "Reading and the Brain, LD at school, Canada". 15 May 2015. ^ Suárez N, Sánchez CR, Jiménez JE, Anguera MT (2018). "Is Reading Instruction Evidence-Based?, Frontiers in psychology, 2018-02-01". Frontiers in Psychology. 9: 7. doi:10.3389/fpsyg.2018.00007. PMC 5800299. PMID 29449818. ^ "Evidence based practices in schools, Reading Rockets". 12 January 2013. ^ Schwartz S (4 December 2019). "The Most Popular Reading Programs Aren't Backed by Science, EdWeek". Education Week. ^ Lane H, Contesse V, Gage N, Burns M (January 2025). "Effect of an Instructional Program in Foundational Reading Skills on Early Literacy Development of Students in Kindergarten and First Grade, Reading Research Quarterly". doi:10.1002/rrq.607. ^ Sarah Schwartz (January 17, 2025). "Researchers Created a Phonics Program With 'Dramatic' Results. How It Works". ^ Clinton V (2019-01-13). "Reading from paper compared to screens: A systematic review and meta-analysis". Journal of Research in Reading. 42 (2): 288–325. doi:10.1111/1467-9817.12269. S2CID 149835771. ^ Ibaibarriaga G, Acha J, Perea M (May 2025). "The impact of handwriting and typing practice in children's letter and word learning: Implications for literacy development". Journal of Experimental Child Psychology. 253. doi:10.1016/j.jecp.2025.106195. ^ Susan B. Porter, Timothy N. Odegard, Emily A. Farris, Eric L. Oslund (2023-06-09). "Effects of teacher knowledge of early reading on students' gains in reading foundational skills and comprehension". Reading and Writing. 37 (8): 2007–2023. doi:10.1007/s11145-023-10448-w. S2CID 259619958. ^ a b c "Will the Science of Reading Catch On in Teacher Prep?" (PDF). spotlight. Education week. 2020-03-12. pp. 12–15. ^ Sarah Schwartz (March 23, 2021). "Most States Fail to Measure Teachers' Knowledge of the 'Science of Reading,' Report Says, Education Week". Education Week. ^ Elizabeth Heubeck (September 15, 2023). "I Literally Cried: Teachers Describe Their Transition to Science-Based Reading Instruction". Education Week. ^ "NAEP Reading: State Average Scores". www.nationsreportcard.gov. ^ School changes reading program after realizing students 'weren't actually learning to read', CNN national correspondent Athena Jones. 2023-04-24. ^ Sarah Schwartz, Madeline Will (2023-03-28). "Why Some Teachers' Unions Oppose 'Science of Reading' Legislation". Education Week. ^ "No compromise on literacy bill as hearing deadline looms, edsource.org". April 16, 2025. ^ Diana Lambert (June 14, 2025). "California retires RICA; new teacher test to focus on phonics, edsource.org". ^ "English viewing and reading, k-2, EECD, NB" (PDF). ^ Government of New Brunswick C (October 30, 2014). "Curriculum Development (Anglophone Sector)". www2.gnb.ca. ^ "The Center for Literacy and Learning | Literacy & Education Professional Development". The Center for Literacy & Learning. ^ "The Science of Reading". The Reading League. ^ "Science of reading eBook, The reading league" (PDF). ^ "Science for Early Literacy Learning Really Matters, Psychology Today". July 16, 2020. ^ Stanislas Dehaene (2010). Reading in the brain. Penguin Books. p. 228. ISBN 978-0-14-311805-3. ^ Johnstone, Corinne H, Burk, Frederic Lister (1912). A Course of Study in Phonics. Sacramento, F.W. Richardson, Superintendent of State printing. OCLC 1042899593. ^ "National reading panel, p. 2-89, nichd.nih.gov (USA)" (PDF). ^ Borowsky R, Esopenko C, Cummine J, Sarty GE (2007). "Neural representations of visual words and objects: a functional MRI study on the modularity of reading and object processing". Brain Topogr. 20 (2): 89–96. doi:10.1007/s10548-007-0034-1. PMID 17929158. S2CID 1640138. ^ Borowsky R, Cummine J, Owen WJ, Friesen CK, Shih F, Sarty GE (2006). "FMRI of ventral and dorsal processing streams in basic reading processes: insular sensitivity to phonology". Brain Topogr. 18 (4): 233–239. doi:10.1007/s10548-006-0001-2. PMID 16845597. S2CID 10815942. ^ Chan ST, Tang SW, Tang KW, Lee WK, Lo SS, Kwong KK (November 2009). "Hierarchical coding of characters in the ventral and dorsal visual streams of Chinese language processing". NeuroImage. 48 (2): 423–435. doi:10.1016/j.neuroimage.2009.06.078. hdl:10397/24142. PMID 19591947. S2CID 23720865. ^ Sanabria Díaz G, Torres Mdel R, Iglesias J, et al. (November 2009). "Changes in reading strategies in school-age children". Span J Psychol. 12 (2): 441–453. doi:10.1017/S1138741600001827. PMID 19899646. S2CID 13821050. ^ McArthur G, Sheehan Y, Badcock NA, Francis DA, Wang HC, Kohnen S, Banales E, Anandakumar T, Marinus E, Castles A (14 November 2018). "Phonics training for English-speaking poor readers". The Cochrane Database of Systematic Reviews. 2018 (11): CD009115. doi:10.1002/14651858.CD009115.pub3. ISSN 1469-493X. PMC 6517252. PMID 30480759. ^ a b Seidenberg, Mark (2017). Language at the speed of sight. New York: Basic Books. ISBN 978-1-5416-1715-5. ^ Rayner K, Barbara Foorman, Charles Perfetti, David Pesetsky, Mark Seidenberg (March 2002). "How Should Reading be Taught?" (PDF). Scientific American. 286 (3): 84–91. Bibcode:2002SciAm.286c..84R. doi:10.1038/scientificamerican0302-84. PMID 11857904. S2CID 32588383. Archived from the original (PDF) on 2017-04-20. ^ "NY English Language Arts Learning Standards, p. 22, 2017" (PDF). ^ "Oral language interventions". EEF. ^ "Exploring interventions for children and young people with speech, language and communication needs: A study of practice, UK Government" (PDF). ^ "Concepts of print". www.education.vic.gov.au. ^ "Word Study Instruction: Enhancing Reading Comprehension" (PDF). www.edu.gov.on.ca. WHAT WORKS? Research into Practice. September 2010. Archived from the original (PDF) on 2020-10-16. Retrieved 2021-01-15. ^ "Word Study Instruction in the K–2 Classroom, Reading Rockets". 5 January 2011. ^ "Morphology Works" (PDF). www.edu.gov.on.ca. WHAT WORKS? Research into Practice. June 2012. Archived from the original (PDF) on 2020-12-17. Retrieved 2021-01-15. ^ "Exploding some of the myths about learning to read, NSW Teachers Federation, AU". Archived from the original on 2020-06-25. Retrieved 2021-01-15. ^ "What Is the Science of Reading? Timothy Shanahan, Reading Rockets 2019-05-29". 29 May 2019. ^ "National Reading Panel, NICHD, p. 2–97 and 2–1 – 4–1" (PDF). ^ "Why An Overemphasis on Foundational Reading Skills Makes Kids Sick | Shanahan on Literacy". www.shanahanonliteracy.com. ^ a b Timothy Shanahan (2005). "The National Reading Panel Report: Practical Advice for Teachers" (PDF). University of Illinois at Chicago, Learning Point Associates. p. 9. ^ "Supporting early language and literacy" (PDF). www.edu.gov.on.ca. WHAT WORKS? Research into Practice. October 2011. Archived from the original (PDF) on 2021-02-07. Retrieved 2021-01-15. ^ "Science of reading, Robert Slavin's blog". 26 March 2020. ^ Moats, Louisa (2000). Speech to print: language essentials for teachers. Baltimore, MD: Paul H. Brookes Pub. ISBN 978-1-55766-387-0. ^ Louisa C. Moats. "Teaching Reading Is Rocket Science, American Federation of Teachers, Washington, DC, USA, 2020" (PDF). p. 4. ^ "researchED Events for Researchers, Teachers & Policy Makers". ResearchED. ^ a b "A Quantitative Synthesis of Research on Programs for Struggling Readers in Elementary Schools, Best Evidence Encyclopedia" (PDF). Reading Research Quarterly. 2021-03-21. doi:10.1002/rrq.379. S2CID 233850664. ^ "How Much Have Students Lost in The COVID-19 Shutdowns?, Robert Slavin, 2020-10-01". October 2020. ^ "ProvenTutoring.org: Getting Proven Tutoring Programs Into Widespread Practice, Robert Slavin". 2021-03-21. ^ "Results: Literacy". ies.ed.gov. ^ "Home – Evidence for ESSA". Evidence for ESSA – Find Evidence-Based PK-12 Programs. ^ a b "Center for Research and Reform in Education". 13 September 2023. ^ "Every Student Succeeds Act (ESSA) | U.S. Department of Education". www.ed.gov. ^ "Home". ProvenTutoring.Org. ^ "National Reading Panel, NICHD, p. 2-92" (PDF). ^ "Explaining Phonics Instruction, An Educator's Guide, International Literacy Association, p.1, 2018" (PDF). ^ "National Reading Panel, NICHD, p. 2-92 ... 2–96" (PDF). ^ Ehri LC (2020). "The science of learning to read words: A case for systematic phonics instruction". Reading Research Quarterly. 55S1 (334): S57. doi:10.1037/0022-0663.83.4.451. ^ "Independent review of the teaching of early reading, Rose report, 2006, UK, p. 2–89" (PDF). Archived from the original (PDF) on 2010-05-12. Retrieved 2021-01-15. ^ "Complete report – National Reading Panel" (PDF). ^ a b "Findings and Determinations of the National Reading Panel by Topic Areas". NICHD Publications and Materials. Archived from the original on 2008-07-05. ^ a b c "Teaching Reading" (PDF). Australian Government Department of Education, Science and Training. ^ a b "Independent review of the teaching of early reading, 2006" (PDF). Archived from the original (PDF) on 2010-05-12. Retrieved 2021-01-15. ^ "Independent Review of the Primary Curriculum" (PDF). Archived from the original (PDF) on 2010-02-05. Retrieved 2021-01-15. ^ "Independent review of the teaching of early reading" (PDF). 2006. Archived from the original (PDF) on 2013-04-01. Retrieved 2014-06-16. ^ "English Language Development Framework for California Public Schools K–12" (PDF). July 9, 2014. Archived from the original (PDF) on October 9, 2022. Retrieved January 15, 2021. ^ "ELA Standards". New York State Education Department. ^ "Rules for Phonics, Ohio, 2015". ^ "Reading Initiative for Student Excellence, arkansased.gov/divisions/learning-services, 2018". Archived from the original on 2019-07-30. Retrieved 2021-01-15. ^ "Effective reading instruction". www.education.vic.gov.au. ^ a b "National Reading Panel" (PDF). pp. 2–89. ^ "Understanding Terminology of Grammar and Phonics". Archived from the original on 2020-06-05. Retrieved 2021-01-15. ^ "Analogy based phonics, LD Online". Archived from the original on 2021-04-17. Retrieved 2021-01-15. ^ a b c Johnston RS, McGeown S, Watson JE (2012). "Long-term effects of synthetic versus analytic phonics teaching on the reading and spelling ability of 10-year-old boys and girls" (PDF). Reading and Writing. v25 n6 (6): 1365–1384. doi:10.1007/s11145-011-9323-x. S2CID 55324494. ^ "Clackmannanshire Report, a seven-year study that was published in 2005, webarchive.org.uk". Archived from the original on 2015-02-22. ^ "Put reading first booklet, Partnership for reading, National institute for literacy, 3rd ed" (PDF). p. 12. ^ "What is phonics?". National Literacy Trust. ^ "Understanding Terminology of Grammar and Phonics, Learning difficulties, Australia". Archived from the original on 2020-06-05. Retrieved 2021-01-15. ^ "Phonics instruction, Reading Rockets". 24 April 2013. ^ Van Rijthoven R, Kleemans T, Segers E, Verhoeven L (2020-01-13). "Response to Phonics Through Spelling Intervention in Children With Dyslexia". Reading & Writing Quarterly. 37: 17–31. doi:10.1080/10573569.2019.1707732. hdl:2066/219397. ISSN 1057-3569. S2CID 212828096. ^ "Independent Review of the Primary Curriculum: Final Report" (PDF). DCSF Publications. Retrieved 14 November 2011. ^ "Teaching Reading: Report and Recommendations" (PDF). Commonwealth Copyright. Archived from the original (PDF) on 12 August 2011. Retrieved 14 November 2011. ^ Johnston R, Joyce E Watson (11 February 2005). "A Seven Year Study of the Effects of Synthetic Phonics Teaching on Reading and Spelling Attainment". Retrieved 14 November 2011. ^ "Why a Structured Phonics Program is Effective, Standards Institutes" (PDF). Archived from the original (PDF) on 2021-01-15. Retrieved 2021-03-17. ^ "Independent Review of the Primary Curriculum: Final Report, pp. 16, 49" (PDF). DCSF Publications. Retrieved 14 November 2011. ^ "Early Reading Strategy: The Report of the Expert Panel on Early Reading in Ontario" (PDF). Ministry of Education. 2003. Retrieved 14 November 2011. ^ "Core Knowledge Early Literacy Pilot in NYC" (PDF). Archived from the original (PDF) on 2016-05-15. Retrieved 2021-01-15. ^ Ehri L, Simone Nunes, Dale Willows, Barbara Valeska Schuster, Zohreh Yaghoub-Zadeh, Timothy Shanahan (educator (July–September 2001). "Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis". Reading Research Quarterly. 36 (3): 250–287. doi:10.1598/RRQ.36.3.2. JSTOR 748111. ^ "National Reading Panel, 2000, NICHD" (PDF). pp. 2–4. ^ a b Justice LM (2002). "Word Exposure Conditions and Preschoolers' Novel Word Learning During Shared Storybook Reading". Reading Psychology. 23 (2): 87–106. doi:10.1080/027027102760351016. ISSN 0270-2711. S2CID 144874700. ^ Wolf, Maryanne, Stoodley, Catherine J. (2007). Proust and the squid: the story and science of the reading brain. New York: Harper. pp. 104–105. ISBN 978-0-06-018639-5. OCLC 471015779. ^ "What Are Sight Words?". www.understood.org. 30 August 2019. ^ "High Frequency Words – UEN". www.uen.org. ^ Education MH. "McGraw-Hill Education Acknowledges Enduring Contributions of Reading and Language Arts Scholar, Author and Innovator Ed Fry". www.prnewswire.com (Press release). ^ Gatto JT (2006). "Eyless in Gaza". The Underground History of American Education. Oxford, NY: The Oxford Village Press. pp. 70–72. ISBN 0-945700-04-0. ^ a b Murray B, McIlwain J (2019). "How do beginners learn to read irregular words as sight words". Journal of Research in Reading. 42 (1): 123–136. doi:10.1111/1467-9817.12250. ISSN 0141-0423. S2CID 150055551. ^ Seidenberg, Mark (2017). Language at the speed of sight. New York: Basic Books. p. 147. ISBN 978-1-5416-1715-5. ^ "A New Model for Teaching High-Frequency Words, Reading Rockets". 2019. ^ "Teaching Sight Words According to Science, OHIO Department of Education". 2019. ^ Willingham, Daniel T. (2017). The reading mind. Jossey-Mind. p. 68. ISBN 978-1-119-30137-0. ^ "Orthographic mapping, Reading rockets". 19 September 2019. ^ Timothy Shanahan (educator) (2023-11-11). "Should We Still Teach Sight Vocabulary". ^ Sarah Schwartz (January 10, 2025). "Does Teaching 'Sight Words' Contradict the Science of Reading, edweek.org". ^ a b Rasinski, T. "Assessing Reading Fluency". Pacific Resources for Education and Learning. Archived from the original on 2005-01-23. Retrieved 2007-10-21. ^ Timothy Rasinski (April 24, 2024). "Reading Fluency: The Neglected Key to