Word Knowledge in a Theory of Reading Comprehension

eTale 2022

This study reintroduces a wide-angled view of reading comprehension and the Reading Systems Framework, which places word knowledge in the centre of the picture. Within this framework, word-to-text integration processes can serve as a model for the study of local comprehension processes. Studies of these processes allows the influence of one sentence on the reading of a single word in a second sentence to be examined, which enables the integration of the word meaning into the reader's mental model of the text.

Authors: Charles Perfetti & Joseph Stafura

Source: Perfetti, C. & Stafura, J. (2014). Word knowledge in a theory of reading comprehension. *Scientific Studies of Reading, 18*(1), 22-37, DOI: 10.1080/10888438.2013.827687

This study reintroduces a wide-angle view of reading comprehension and the Reading Systems Framework, which places word knowledge in the centre of the picture. Within this framework, word-to-text integration processes can serve as a model for the study of local comprehension processes. These processes require a linkage between the word identification system and the comprehension system, with lexicon performing the linking role. Studies of these processes allows examining the influence of one sentence on the reading of a single word in a second sentence, which enables the integration of the

word meaning into the reader's mental model of the text. Skilled comprehenders show immediate use of word meanings in the integration process.

- This modern study of reading comprehension was propelled by two complementary ideas: an enriched level of comprehension beyond the literal meaning of a text (the reader's situation model) and the cognitive dynamics of text comprehension (the construction-integration (C-I) model).
- An important benefit of the C-I model was demonstrating that text comprehension could be explained by an interactive combination of top-down (knowledge-driven) and bottom-up (word-based) processes.

The Reading Systems Framework: Claims about reading:

- Three classes of knowledge sources are used in reading: linguistic, orthographic, and general.
- The processes of reading—decoding, word identification, meaning retrieval, constituent building, inferencing, and comprehension monitoring use the three knowledge sources in both constrained and interactive ways.
- These processes take place within a cognitive system that has pathways between perceptual and long-term memory systems and limited processing resources.

A neurobiological model of language processing

- Hagoort (2005) asserted that memory, unification, and control operations are the functional core of a processing system that emerges from a distributed network of subsystems.
- When a reader encounters a word, input from the visual orthographic system drives operations in the temporal lobes to retrieve associated linguistic and general knowledge from long-term memory.
- Unification computation in the left inferior frontal

gyrus integrates the word-level syntactic and semantic knowledge into the ongoing context.
- Limitations in cognitive resources are managed through the application of control operations in the dorsolateral prefrontal cortex and anterior cingulate.

Comprehension skill within the lexical system of the Reading Systems Framework

Two complementary hypotheses:

- Text comprehension depends on understanding words and integrating their meaning into a mental model of the text.
- Learning words depends on acquiring information about both word forms and meanings from word-learning events.

Comprehending texts includes comprehending words

- A key set of processes links lexical outcomes with comprehension (selection of meaning and grammatical form).
- Early sentence comprehension processes that build sentence constituents and propositions make use of this link.
- There are three important methods for obtaining online measures of these links: word-by-word reading controlled by reader, eye-tracking, and event-related potentials (ERPs) during text reading.

Word-to-text integration

- For a motivated reader, it is assumed that understanding entails a mental representation of the situation described by a text.
- Identifying the structure and situational dimensions of representations and how they interact as the reader builds an understanding of the text are important topics of comprehension research.

- It is assumed that an unfolding narrative text asserts situations and events and that the reader builds and updates a situation model accordingly.
- A key additional assumption is that comprehension proceeds along multiple input units.

The paraphrase effect and comprehension skill

- The paraphrase is an implicit co-referential relation between a word or phrase in one sentence and a word or phrase in a following sentence.
- The co-referential relation is defined by the contents of the mental representation of the enriched semantic content of the text—the situation model.
- The paraphrase can update the situation model modestly while maintaining coherence.
- The paraphrase effect reflects online comprehension—an updating of the situation model that integrates a word with a text representation.
- Skilled comprehenders use the paraphrase effect more robustly than less skilled comprehenders, who are described as exhibiting sluggish word-to-text integration.
- Word-to-text integration can involve inferences and it can be argued that the paraphrase effect is a type of bridging inference.

Knowledge of word meanings is instrumental in reading comprehension

- The Lexical Quality Hypothesis assumes that word knowledge (both form and meaning) is central to reading skill.
- High-quality form knowledge includes phonological specificity and orthographic precision.
- The semantic constituent of lexical quality is closely connected to comprehension, as established by

correlations between vocabulary and reading comprehension.

- Accounting for word meaning knowledge as part of reading challenges the assumption that decoding a word unlocks all the knowledge associated with the spoken word.
- The Simple View of Reading would need to accommodate the direct effects of vocabulary on reading comprehension by allowing vocabulary knowledge to influence decoding.
- Word meaning would contribute to reading as a component of language comprehension and through word reading.
- A second aspect of the word knowledge-comprehension connection concerns learning new words.
- During reading, readers implicitly infer meanings from imperfectly understood text, allowing the establishment of a new (or refinement of an existing) lexical entry.

Word comprehension within the reading systems framework

- Word comprehension is the output of the word identification system and the input to the comprehension systems (sentence, text, and situation).
- The word comprehension model corresponds approximately to the construction and integration phases of the C-I model.
- The integration phase is partly a memory-driven process, in which words from recently-read text and the proposition they encode (the text model) are highly accessible in memory.
- The memory-driven process is adaptive for comprehension insofar as what is activated in memory is relevant and consistent with the current state of the situation model.
- Active construction can become necessary when coherence breaks down and requires new structures to be built.
- The minimum set of overlapping processers required for fluent word-to-text integration are as follows:
    - Rapid, automatic lexical access based on word

form;

- Rapid, automatic activation of associated knowledge from memory;
- Access to memory for recently read text at the level of text model, situation model, or both;
- Knowledge of context-relevant meaning associated with the lexical entry and its rapid retrieval; and
- Word-to-text integration resulting from these overlapping processes.

Activation of Background Knowledge for Inference Making: Effects on Reading Comprehension

eTale 2022

In this experimental study, 16 sixth-grade classes (N = 236) were randomly assigned to either experimental or control conditions. In the experimental condition, student contributions to ‘gap-filling’ inferences with expository texts were made explicit by means of graphic models and

inference-demanding questions. After 8 sessions of 30 min each, a large training effect was found on student inference-making skills with a substantial and sustained transfer effect to a standard measure of reading comprehension.

Authors: Carsten Elbro & Ida Buch-Iversen

Source: Elbro, C. & Buch-Iversen, I. (2013). Activation of background knowledge for inference making: Effects on reading comprehension. *Scientific Studies of Reading*, 17(6), 435-452. DOI: 10.1080/10888438.2013.774005

Failure to activate relevant, existing, background knowledge may be a cause of poor reading comprehension. This failure can result in particular problems with inferences that depend heavily on prior knowledge. In this experimental study, 16 sixth-grade classes (N = 236) were randomly assigned to either experimental or control conditions. In the experimental condition, student contributions to ‘gap-filling’ inferences with expository texts were made explicit through graphic models and inference-demanding questions. After 8 sessions of 30 min each, a large training effect was found on student inference-making skills with a substantial and sustained transfer effect to a standard measure of reading comprehension.

- Texts cannot be understood without contributions from readers.
- Texts provide instructions to readers about how to use relevant knowledge and experience to build an understanding of the text.
- Building an understanding depends heavily on the reader’s ability to draw inferences.
- In some cases, the reader does not have the knowledge necessary to form the inferences required to comprehend a text.
- Ability to make inferences can contribute to reading comprehension, even when other abilities and knowledge

are controlled (such as decoding, vocabulary, awareness of text structure, comprehension monitoring, and verbal IQ).

- Most experimental studies have aimed broadly to encourage students to reflect about texts. Further, inference making has not been taught or studied exclusively, but only as a part of a broader training programme.
- The present study focused exclusively on inferences during reading that require integration of background knowledge with information from the text to form a coherent representation of the meaning.
- The current study focused specifically on inferences that are both dependent on prior knowledge and crucial for maintaining global coherence in text comprehension.
- Identified inferences are termed 'gap-filling' inferences.
- To elucidate the contributions from reader knowledge, graphic models were employed in a questioning format.

The present study

In the present study, Grade 6 students (aged 11 years) were selected because they face an increasing number of expository texts from which they are expected to acquire new knowledge. The study focused exclusively on knowledge-demanding and gap-filling inferences for two reasons: they are necessary for building a coherent representation of texts and they may work as an ideal showcase for the use of background knowledge.

Research questions:

1. *Does such focused training generalise across texts to*

similar inferences in untrained texts with no prompts to activate background knowledge?

2. *Do primary training effects generalise to reading comprehension more broadly when measured with a standard test of reading comprehension and is the effect sustained?*
3. *Can the possible effects be mediated by student abilities prior to training?*

The present data

In this study, 16 sixth-grade classes were randomly assigned to either an experimental or a control condition. The class teachers provided voluntary participation. The experimental condition consisted of 10 classes, while the control condition comprised 6 classes (from 2 schools). In the experimental condition, eight lessons in knowledge-based inference making replaced a similar amount of teaching of mother-tongue language and literature, whereas the control group received ordinary teaching.

The inference-training programme

- The materials for the eight training sessions consisted of short expository texts and questions that required students to make gap-filling inferences.
- In the first session, students were introduced to the programme using a mix of short narrative and expository passages (typically 2–4 sentences). After each passage, a comprehension question was asked that required students to supply background knowledge to draw simple inferences.
- In each of the subsequent 7 sessions, students read 2 or 3 short texts of 100–200 words and answered relevant inference-demanding questions.
- The training programme comprised 15 texts of expository prose written for the programme.
- Text topics were selected from biology, geography,

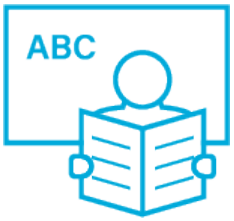
technology, sociology, and history.

- In Sessions 2–6, all texts were supported by graphic organisers.
- The organisers had empty boxes into which the students were asked to place relevant pieces of information stated in the text or supplied from their background knowledge.
- In the final 2 sessions, students read the same kind of texts and answered knowledge-demanding inference questions about them but without the support of graphic organisers.
- All teaching in the experimental programme was provided by the ordinary class teachers during 8 sessions of approximately 30 min each.
- At the beginning of each session, teachers presented the students with an overview of the session and explained any difficult words in the texts.
- The control group did not see any of the experimental materials and were taught ordinary mother language lessons according to national guidelines.
- All participating teachers were given a brief introduction to the aims and plan of the study.
- After teachers and classes had been randomly assigned to the experimental or the control condition, teachers in the experimental condition received a 1 hr introduction to the experimental programme.
- During the introduction, teachers were provided with all the teaching materials. This included all the student worksheets and a written step-by-step teaching manual that explained the goals and procedures of each training session.

Findings

- There were no group differences at pre-test except for a significant difference in word decoding in favour of the experimental group.
- No significant effects were found on either mathematics abilities or motivation; thus, the general expectancy effect was not supported.
- A large interaction effect (d = 0.92) was found between time and condition on inference making.
- A medium to large interaction effect (d = 0.69) was found between time and condition on reading comprehension.
- The effects for fiction and nonfiction texts were medium (d = 0.46 and 0.57, respectively).
- With regard to question types, the effect on literal question was medium (d = 0.45) whereas the effect on interpretation questions was medium to large (d = 0.73).
- With respect to improvements in inference making, results indicated that the training effect occurred during the training period and was sustained after completion of the training.
- Analogous analyses for reading comprehension provided a similar picture, though with smaller effects. The training effect occurred during the training and was sustained at follow-up.
- The results suggest that the effects of the training programme were not selectively mediated by gender, word decoding, vocabulary, nonverbal IQ, or motivation.
- The number of students per class correlated negatively with improvements in reading comprehension, indicating that smaller classes were associated with larger improvements.
- Average time per session spent on the experimental programme correlated positively with average class improvements in reading comprehension.
- However, these correlations were not backed up by

similar, significant correlations with inference making.



Summary

- It was possible to help 11-year-old students to improve their ability to make gap-filling inferences in a short programme of eight lessons that focused on the contribution of readers' background knowledge to text comprehension. The training effect remained large when initial abilities in word decoding, receptive vocabulary, and verbal IQ were controlled.
- Training was also associated with a significant advance in general reading comprehension (fiction and nonfiction) and for both literal and nonliteral questions. The effect was sustained for five weeks after termination of the experimental teaching.
- The effects of the experimental training were found to be robust and independent of student characteristics and abilities assessed prior to participation in the experimental programme (gender, vocabulary, decoding fluency, and nonverbal IQ).

Why Are Home Literacy

Environment and Children's Reading Skills Associated? What Parental Skills Reveal

eTale 2022

Data from 101 mother/father/child triads were used to consider the extent to which associations between home literacy and children's reading fluency could be accounted for by parental reading fluency. Although home literacy correlated significantly with children's reading, no variable predicted significant variance after allowing for parental reading, except the number of books in the home.

Authors: Elsje van Bergen, Titia van Zuijen, Dorothy Bishop & Peter F. de Jong

Source: Van Bergen, E., van Zuijen, T., Bishop, D. & de Jong, P.F. (2016). Why are home literacy environment and children's reading skills associated? What parental skills reveal. *Reading Research Quarterly, 52*(2), 147–160, DOI: 10.1002/rrq.160

Associations between the home literacy environment and children's reading ability are often assumed to reflect a direct influence. However, heritability could account for the association between parent and child literacy-related measures. Data from 101 mother/father/child triads were used to consider the extent to which associations between home literacy and children's reading fluency could be accounted for

by parental reading fluency. Although home literacy correlated significantly with children's reading, no variable predicted significant variance after allowing for parental reading, except the number of books in the home.

- Children's word-reading accuracy and fluency (i.e. decoding) is linked to aspects of the family environment that children grow up in, including parents' educational attainment, how often parents read themselves and to their children and the availability of reading material.
- Individual differences in reading are due to both environmental and genetic influences, with a substantial heritability of about 70%.
- Therefore, the association between home literacy and children's reading ability may well be explained (at least partly) by a third variable: genes shared by parents and offspring.
- The relationship between home literacy and child outcome might reflect a passive gene-environment correlation.
- According to the intergenerational multiple deficit model, the reading skills of the parents can be treated as an indicator of familial effect, which is a combination of the genetic and environmental influences transmitted from parent to child.
- It is reasoned that if an environmental measure is still significantly associated with children's reading after controlling for parental reading, the environmental measure exerts an effect on children's reading that is partly independent of the familial effect.
- Thus, an environmental measure exerts a true environmental effect (i.e. cultural transmission), rather than just a masked genetic effect (i.e. gene-environment correlation).
- It is important to identify variables that represent a true environmental effect as those are the variables that we can potentially manipulate to improve children's achievement.

The study

The present study examines reading fluency in a sample of children and their parents. The focus was on decoding skills because they form the basis for reading comprehension skills, and a decoding deficit is the primary criterion for dyslexia. As measures of the family environment, parental education and home literacy were studied. As indicators of home literacy, parents' print exposure and the availability of magazines, newspapers and books in the home were used.

Research question

1. Does the family environment predict children's reading fluency after controlling for the reading fluency of both parents?

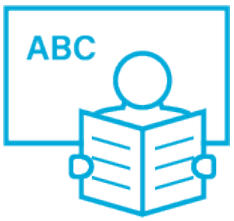
The data consisted of 101 Dutch mother/father/child families of which both (biological) parents and at least one child took part. The mean age of the children was 10.92 years old.

Findings

- Children's reading fluency correlated with parental reading fluency, parental educational level, fathers' reading frequency and the number of books at home.
- Parental education explained 7% of the variance in child reading but not over and above parental reading.
- Parental reading fluency explained 17% of the variance

in child reading.

- Fathers' reading frequency was a significant correlate of children's reading but, together with mothers' reading frequency, did not account for a significant amount of variance in children's reading or beyond parental reading fluency.
- The number of books at home predicted children's reading fluency, and this effect remained significant after controlling for parental reading fluency, accounting for an additional 5% of the variance.



Implications

- Parental education and parental reading frequency did not predict children's reading fluency over and above parental reading fluency. That is, the reason why these aspects of the home environment were connected with children's reading seemed to be because parents with good reading skills tend to have children with good reading abilities, as well as high educational attainment and highly literate homes.
- The strongest correlate of child reading appeared to be the number of books in the home, which predicted child reading over and above parental reading fluency.
- Two qualifications should be noticed when considering the conclusion that parent-offspring resemblance only seems to reflect genetic transmission. First, this does not imply that parental behaviour makes no difference; it would only mean that growing up with caretakers of a certain reading level is not a risk or protective

factor. Second, this conclusion pertains to parent-offspring resemblance, whether that is due to genetic or environmental transmission.

- It is possible that those with a family risk may benefit from a qualitatively different approach to reading instruction, rather than just increased quantity. For instance, it may be beneficial to control the timing of instruction and support to ensure that the child has underlying phonological skills firmly in place before introducing written language.
- The number of books in the home seems to have a genuine environmental effect.
- The key question here would be whether merely providing families with more books would enhance children's reading. From an educational viewpoint, it makes more sense to try to boost reading by providing books and encouraging families to engage in family literacy practices, such as shared reading and/or the direct tutoring of decoding.
- Correlations between children's reading fluency and other measures of home literacy could all be accounted for in terms of passive gene-environment correlations.
- It is possible that causal environmental effects might be observed with a larger sample and/or different methods.

Home Literacy Environments and Foundational Literacy

Skills for Struggling and Nonstruggling Readers in Rural Early Elementary Schools

eTale 2022

This study examined how home literacy environments might relate to rural kindergarten and first grade students' reading performance. Home literacy activities and access to literacy materials were positively related to basic word reading skills, passage comprehension and spelling.

Authors: Ariel Tichnor-Wagner, Justin D. Garwood, Mary Bratsch-Hines & Lynne Vernon-Feagans

Source: Tichnor-Wagner, A., Garwood, J.D., Bratsch-Hines, M. & Vernon-Feagans, L. (2015). Home literacy environments and foundational literacy skills for struggling and nonstruggling readers in rural early elementary schools. *Learning Disabilities Research & Practice, 31*(1), 6–21, DOI: 10.1111/ldrp.12090

Factors such as weak early literacy skills and living in poverty may put young students at risk of reading disabilities. This study examined how home literacy environments might relate to rural kindergarten and first grade students' reading performance. Parents of 1,108 kindergarten and first grade students in the rural Southeast

United States completed questionnaires on the frequency of home literacy activities and access to literacy materials. Home literacy activities and access to literacy materials were positively related to basic word reading skills, passage comprehension and spelling.

- Research has found that factors such as weak early literacy skills and living in poverty may put young students at risk of reading disabilities.
- Good early reading instruction by classroom teachers in early elementary schools can be critical to helping many children learn how to read.
- Whitehurst and Lonigan (1998) conceptualised foundational reading skills that affect children's later reading development in terms of two domains: 1) outside-in skills associated with reading comprehension, such as language, vocabulary, content and narrative understanding; and 2) inside-out skills focused on symbol/sound correspondences within words, such as word decoding, the alphabetic principle and phonemic awareness.
- Children's home literacy environments have been found to influence both outside-in and inside-out language and literacy skills associated with later reading success.
- Poverty is the best predictor of children's academic performance in school, including literacy development, and has been associated with weaker reading readiness in kindergarten and first grade.
- Rural children are exposed to many reading risk factors associated with geographic isolation, including limited access to libraries and other educational resources, the lower availability of high-quality preschool education and teachers who have fewer professional development opportunities, including less access to advanced degrees.

Literacy activities and materials in the home

- Frequency of reading to the child
- Teaching of letters
- Shared trips to the library
- Number of books in the home
- Helping the child with homework
- Listening to the child read

The study

In the current study, the types and frequency of literacy-related activities in the homes of rural kindergarten and first grade students were investigated, as well as the extent to which home literacy activities and access to literacy materials contributed to children's outside-in and inside-out literacy skills.

Research questions

1. *To what extent do rural families with children in kindergarten and first grade engage in literacy activities in their homes? Do differences exist between children who were identified as struggling and nonstruggling readers?*
2. *How do home literacy activities and access to literacy materials uniquely contribute to the basic word reading, reading comprehension and spelling scores of all students at the beginning of kindergarten or first grade, after controlling for demographic characteristics?*

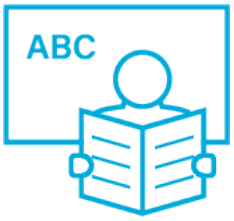
The data used in this study were drawn from a randomized controlled trial (RCT) prior to intervention implementation.

The targeted reading intervention (TRI) was developed to help kindergarten and first grade struggling readers and their teachers in rural low-wealth schools by providing teachers with a weekly literacy coach, who used webcam technology to watch the teachers work with struggling readers and to give them real time feedback. Reading achievement data were available for 1,108 students (556 were struggling readers and 552 were nonstruggling readers).

Findings

- Struggling readers were more likely to be boys and Hispanic, come from homes with a lower family income and have mothers with fewer years of education than nonstruggling readers.
- Struggling readers had lower scores on letter-word identification (LW), word attack (WA) reading aloud, passage comprehension (PC) and spelling of sounds (SS) tests.
- Of the parents, 74.19% reported helping with homework between 5 and 7 days per week and 92.86% at least twice per week.
- Moreover, 42.98% of the parents reported supporting their children in learning to read between 5 and 7 days per week and 80.04% at least twice per week.
- In addition, 32.80% of parents reported reading to their children between 5 and 7 days per week and 74.04% at least twice per week.
- Nonstruggling readers were more likely to come from homes where someone read to them between five and seven days per week.

- Of the children, 68% lived in homes that had a computer, and 31% of parents reported having more than 50 books in their homes.
- Nonstruggling readers had more books in their homes and were more likely to have a computer in their homes.
- Of the families, 70% checked out books from the library for their children at least once a month.
- Grade, gender, maternal education and income, as well as access to literacy materials and home literacy activities, were significantly associated with students' basic reading (LW and WA) scores.
- Grade, gender and income, as well as access to literacy materials and home literacy activities, were significantly related to students' reading comprehension (PC) scores.
- Grade, gender and maternal education, as well as access to literacy materials and home literacy activities, were significantly related to students' spelling performance (SS) scores.



Implications

- The results from the current study showed that rural families participated in a variety of literacy activities with their kindergarten and first grade children, and this was positively associated with outside-in (i.e. passage comprehension) and inside-out (i.e. letter identification, phonetic spelling) skills.
- Home literacy activities frequently took place in this sample of rural families.

- Considering that over half of the sample came from families with an annual income of less than $20,000, these findings combat negative stereotypes that cast low-income parents as being uninvolved with helping their children succeed in school.
- Rural kindergarten and first grade students had less access to print or digital reading materials when compared to national samples.
- Educators can provide parents with information to help children develop early literacy skills, including tips for how to help children with homework and engage their children in supplemental literacy activities.
- Teachers, for example, can provide details for parents on how to conduct storybook reading in ways that are aligned with school practices and that help build important early literacy skills (e.g. questions to ask to build comprehension, ways of pointing out aspects of the text to build print awareness, modelling fluency).
- Schools can ensure that they provide literacy resources to families with limited access; schools are an important avenue for providing access to computers and books.

Dyslexia – Early Identification and Prevention: Highlights from

the Jyväskylä Longitudinal Study of Dyslexia

eTale 2022

Over two decades of Finnish research, children born with a risk of dyslexia were monitored in the Jyväskylä Longitudinal Study of Dyslexia (JLD). In total, 200 children, half of whom were considered to be at risk, were assessed from birth to puberty using hundreds of measures. The aims were to identify measures for predicting later reading difficulty and to instigate appropriate and early diagnosis and intervention.

Authors: Heikki Lyytinen, Jane Erskine, Jarmo Hämäläinen, Minna Torppa & Miia Ronimus

Source: Lyytinen, H., Erskine, J., Hämäläinen, J., Torppa, M. & Ronimus, M. (2015). Dyslexia – Early identification and prevention: Highlights from the Jyväskylä Longitudinal Study of Dyslexia. *Curr Dev Disord Rep, 2*, 330–338, DOI: 10.1007/s40474-015-0067-1

Over two decades of Finnish research, children born with a risk of dyslexia were monitored in the Jyväskylä Longitudinal Study of Dyslexia (JLD). In total, 200 children, half of whom were considered to be at risk, were assessed from birth to puberty using hundreds of measures. The aims were to identify measures for predicting later reading difficulty and to instigate appropriate and early diagnosis and intervention. At-risk children can be identified from newborn electroencephalographic brain recordings. The earliest easy-

to-use predictive measure to identify children who need help in learning to read is letter knowledge. In response, a purpose-engineered computer game, GraphoGame (GG), provides an effective intervention tool. In doubling as a research instrument, GG provides bespoke intervention/reading instruction for typically/atypically developing children. GG is now crossing the developed and developing world to assist children, irrespective of the cause of their failing to learn to read.

- Since 1993, the JLD has followed, longitudinally from birth, a cohort of 200 Finnish children, half of whom are at familial risk of dyslexia.
- From the antenatal clinic to their upper school years, the JLD children have been assessed on a plethora of neuropsychological, neurophysiological, cognitive, behavioural and observational indices.
- By comparing the JLD children's early developmental measures with their current developmental statuses, it is now possible to demonstrate those indices that are the most salient predictors of later difficulty in reading skills.
- This also allows a programme of intervention to target these salient areas of difficulty at the earliest possible time, using a remediation-based technology, GraphoGame (GG), which has been developed alongside the JLD study.

The aetiology of dyslexia

- Many children are denied the opportunity to become competent readers for a number of reasons.
- These reasons may be environmental, such as a lack of teachers/teaching facilities.
- For others, a biological basis (e.g. dyslexia) may be the underlying cause of a severe bottleneck with regard to competence in literacy.
- Prevalence rates vary according to diagnostic criteria,

although a generally accepted figure is less than 10%.
- Etiologically, dyslexia is considered to have a genetic basis, probably due to the interaction of several different genes.
- The first candidate gene was identified on the basis of the JLD data.
- In family risk studies, the risk of dyslexia has been reported to range from fourfold to tenfold for children born with a family risk, depending on the applied criteria.

The impact of orthographic transparency

- Among alphabetic orthographies, Finnish is one of the most transparent.
- The transparency of a writing system refers to the consistency of links between sounds or phonemes in speech and the graphemes (letters, letter clusters) that represent them in text.
- Finnish children start school in August of the year that they turn seven years old.
- By this time, 45% can read, and the majority are at least familiar with most letter names.
- After a few months in school, most children can decode words and also pseudowords, because letter-by-letter decoding is not affected by the meaning of the word and differs from how decoding works, for example, in English.
- The disparity in the learning burden as a function of the transparency of the language is marked.
- Finnish children must learn to master the sounds of fewer than 30 letters/graphemes, and these can be relied upon to be perfectly consistent in their sound/written representation.
- In contrast, the much heavier burden of English, with its many-on-one permutations in the journey from sound to speech and back to sound, means that a child must

master numerous context-dependent permutations from the outset.

- Due to the lighter burden of learning to decode accurately, dyslexia in transparent orthographies is typically characterised by difficulties with the fluency of decoding, rather than with simple accuracy.
- One of the few complexities of Finnish is that an audible increase in the duration of the phoneme in the pronunciation is marked by repeated or double letters – in short, the manipulation of phonemic length or quantity.
- This feature has been recognised as one key area of difficulty for the Finnish dyslexic, particularly in terms of spelling.

The Jyväskylä Longitudinal Study of Dyslexia

- The JLD is a longitudinal study of 100 children at risk of developmental dyslexia and 100 age-matched peers with no known familial history of reading difficulties.
- Within days of these children's births, brain event-related potentials (ERPs) in response to changes in vowel duration within consonant-vowel syllable sounds (such as /ka:/ vs /ka/) were measured.
- Group differences emerged in terms of hemispheric preference for right hemisphere processing in the risk group vs left hemispheric preference in the non-risk group.
- Furthermore, more pronounced right hemisphere processing of consonant-vowel speech sounds (e.g. /ba/, /da/, /ga/) was also apparent in the risk children compared to in the control children.
- The brain ERPs measured at between three and five days old demonstrated a significant predictive correlation with reading skills in the second grade.
- By six months old, toddlers in the risk group demonstrated difficulty with the discrimination of

phonemic length at the behavioural level. The risk children required a longer pause to discriminate the difference between two pseudowords with short (/ata/) vs long (/atta/) phonemic quantity.

- These measures also predict letter knowledge and reading fluency.
- Problems with phonemic length discrimination seem to be persistent and still observable within the first three grades in school.
- By the time that speech emerges, the differential development of spoken language skills is the earliest behaviourally observable indication that has predictive relations to the acquisition of written language skills.
- A small (~15%) portion of children start speaking later than expected.
- This late-talking phenomenon can have three forms: delayed receptive language (comprehension of spoken language), delayed expressive language (articulated language) or a delay in both receptive and expressive language.
- Finnish letter names are nearly synonymous with letter sounds, and an awareness of Finnish phonology is considered to be nearly synonymous with an awareness of letter sounds.
- The best early predictors of dyslexia, in addition to a familial incidence of dyslexia, are a child’s phonological awareness, letter knowledge and rapid naming.
- Even though it is possible to demonstrate valid predictions of later reading difficulties from 3.5 years of age based on measures of rapid automatised naming (RAN) and phonological awareness, probably the most parent friendly way to identify children who are in need of help is the follow-up of their readiness to store letter sounds.
- In transparent orthographies, the impact of letter name learning, which directly supports the development of

phonemic processing, is particularly easy to understand, as the initial focus of learning to read is on building connections between the sounds of single phonemes and their representative letters/graphemes.

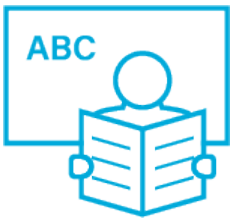
- Therefore, any difficulty with the differentiation of the small speech units (phonemes) or letters may manifest itself as a substantial bottleneck.
- The prediction of fluency development has been demonstrated in various orthographies through RAN.
- The impact of phonological awareness is limited to the early phases of reading acquisition, while the impact of rapid naming is higher when fluency is increasingly the skill in focus.
- Although the strongest predictors of reading development are phonological awareness, letter knowledge and RAN, the children with dyslexia in grade 2 also had lower early performance in vocabulary, verbal short-term memory and morphological skills from age 2 onward.

GraphoGame

- GraphoGame (GG) is a digital learning environment that has been developed to support at-risk children’s reading acquisition.
- The learning game, also comprising the training of basic mathematics skills, is used in schools and homes across Finland on a daily basis by thousands of children.
- Besides being an educational tool, GG is also a research instrument as it saves player logs, which can be used to analyse the learning processes of the players.
- In the game, the player hears a sound and matches it with the appropriate letter.
- The unique adaptive nature of the software ensures that the content of each trial is determined by the player’s performance in the previous trials, providing an optimal

challenge level for each individual player.

- After the basic decoding skill is achieved, the training can continue with the fluency version of GG, which focuses on improving children's reading speed by providing training in syllable recognition and the reading of sentences and longer texts.
- It is recommended that children who are at risk of reading difficulty and who will ultimately require more practice than their peers start to train with GG just before the beginning of formal schooling.



Conclusions

- The typical reader of transparent writing is able to quickly grasp the simple relationship between letters and sounds and assemble and manipulate these to form the words of the language and progress, with prolific reading and literacy experience, toward fluent reading with comprehension.
- Difficulty with the discrimination of complexity, such as phonemic length in Finnish, may hinder competence in letter-sound acquisition.
- Reading that lacks fluency is disrupted in nature and can never therefore become fully automatic.
- Unless automaticity is achieved, comprehension can never be fully achieved due to working memory limitations.
- It is therefore important for interventions to interrupt this potential impasse by quickly shifting the learner's attention away from letter-sound drilling toward larger units.
- It should be acknowledged that there are a plethora of

speech and language measures (e.g. phonological awareness (PA), rapid naming, the family literacy environment) that exert an influence on a child's later difficulties.

- However, what is suggested is that close attention should be paid to those children who display delayed language and/or who may not be grasping the letters of the alphabet in line with expected developmental milestones.
- In the earlier years, the content of interventions could involve introductions to more meaningful larger units in whole word form. This would help stimulate an awareness of orthography and the accumulation of vocabulary.
- Once sufficient cognitive maturity is reached at school entry, learners may progress to the manipulation of the smaller most consistent units that are dependent on orthography in order to foster the precursors of reading acquisition.

Helping Children with Reading Difficulties: Some Things We Have Learned So Far

eTale 2022

A substantial proportion of children struggle to learn to read. This not only impairs their academic achievement but also increases their risk of social, emotional and mental health problems. The aim of this study is to outline some of the things that we have learned so far and to provide a framework for considering the causes of reading difficulties and the most effective ways to treat them.

Authors: Genevieve McArthur & Anne Castles

Source: McArthur, G. & Castles, A. (2017). Helping children with reading difficulties: Some things we have learned so far. *NPJ Science of Learning, 2*(7), DOI: 10.1038/s41539-017-0008-3

A substantial proportion of children struggle to learn to read. This not only impairs their academic achievement but also increases their risk of social, emotional and mental health problems. The aim of this study is to outline some of the things that we have learned so far and to provide a framework for considering the causes of reading difficulties and the most effective ways to treat them.

- Sixteen per cent of children struggle to learn to read to some extent, and five per cent of children have significant, severe and persistent problems.
- Poor reading is associated with an increased risk of school dropout, attempted suicide, incarceration, anxiety, depression and low self-concept.

Poor readers display different reading behaviours

- Poor readers are highly heterogeneous; that is, they do not all display the same type of reading impairment.
- Some poor readers have a specific problem with learning to read new words accurately by applying the regular mappings between letters and sounds, that is, poor phonological recoding or decoding.
- Other poor readers have a particular difficulty with learning to read new words accurately that do not follow

the regular mappings between letters and sounds, that is, poor sight word reading or poor visual word recognition.
- Some poor readers have accurate phonological recoding and visual word recognition but struggle to read words fluently.
- Some poor readers have intact phonological recoding and visual word recognition and reading fluency, but struggle to understand the meaning of what they read.
- Most poor readers have various combinations of these problems.

Reading behaviours have different 'proximal' causes

- A proximal cause of a reading behaviour can be defined as a component of the cognitive system that directly and immediately produces that reading behaviour.
- Most reading behaviours will have more than one proximal cause.
- There are several theoretical and computational models of reading, which vary in some respects, but all include cognitive components that represent

1. the ability to recognise letters, letter clusters and written words;
2. the ability to recognise and produce speech sounds and spoken words;
3. the ability to access stored knowledge about the meanings of words and
4. links between these various components.

Reading behaviours have different 'distal' causes

- A distal cause has a distant, that is, an indirect or delayed, impact on a reading behaviour.
- Distal causes reflect the fact that reading is a taught skill that unfolds over time and through development.

- It depends upon a range of more cognitive abilities, such as memory, attention and language skills.
- Thus, there can be different causal pathways to the same impairment of the reading system.

Poor readers have concurrent problems with their cognition and emotional health

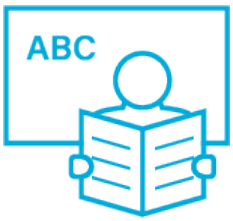
- Many poor readers (but not all) have comorbidities in terms of other aspects of their cognition and emotional health.
- A significant proportion of poor readers have impairments in their spoken language.
- Poor readers also have atypically high rates of attention deficit disorder.
- Poor readers, as a group, have higher levels of anxiety and lower self-concepts than typical readers.
- Comorbidities of poor reading might be categorised according to whether they represent the potential proximal or distal impairment of poor reading – or possibly both.
- The proximal and distal schema can prove useful in clarifying the causal chain of events linking a reading behaviour to a potential cause.
- The proximal and distal schema can also be useful in clarifying reciprocal or circular relationships between comorbidities of poor reading and reading behaviours.

Proximal intervention is more effective than distal intervention

- Randomised controlled trials (RCTs) are the gold standard method for assessing a treatment of any kind. Unfortunately, few interventions for reading difficulties have been tested with an RCT.
- Intervention can be divided into 'proximal

interventions', which focus training on the proximal causes of a reading behaviour that are proposed to be part of the cognitive system for reading, and 'distal interventions', which focus on the distal causes of a reading behaviour.

- Only phonics training, which focuses on improving a proximal cause of poor reading (i.e. letter-sound mappings), has been shown to produce a statistically reliable effect.
- The 'closer' the intervention is to an impaired reading behaviour, the more likely it is to be effective.



Translating what we know (thus far) into evidence-based practice

- First, the fact that poor readers vary in the nature of their reading behaviours suggests that the first step in identifying an effective intervention for a poor reader is to assess different aspects of reading.
- Second, the fact that poor readers' reading behaviours can have different proximal causes suggests that the next step is to test them for the potential proximal causes of their poor reading behaviours.
- Third, the fact that poor readers vary in the degree to which they experience comorbid cognitive and emotional impairments suggests that it would be useful to assess poor readers for their spoken language abilities, attention, anxiety, depression and self-concept, at the very least.
- Once a poor reader's reading behaviours, proximal impairments and comorbid cognitive and emotional health

problems have been identified, it should be possible to design an intervention that is a good match to their needs.

Sight Word and Phonics Training in Children with Dyslexia

eTale 2022

Sight word training led to significant gains in sight word reading measures, which were larger than gains made from phonics training; phonics training led to statistically significant gains in phonics reading measures, which were larger than gains made from sight word training; and both types of training led to significant gains in general reading that were similar in size. Training phonics before sight words had a slight advantage over the reverse order.

Authors: Genevieve McArthur, Anne Castles, Saskia Kohnen, Linda Larsen, Kristy Jones, Thushara Anandakumar & Erin Banales

Source: McArthur, G., Castles, A., Kohnen, S., Larsen, L., Jones, K., Anandakumar, T. & Banales, E. (2015). Sight word

and phonics training in children with dyslexia. *Journal of Learning Disabilities, 48*(4), 391–407, DOI: 10.1177/0022219413504996

The aims of this study were to a) compare sight word training and phonics training in children with dyslexia and b) determine if different orders of sight word and phonics training have different effects on the reading skills of children with dyslexia. One group of children (n = 36) participated in 8 weeks of phonics training and then 8 weeks of sight word training, one group experienced the reverse (n = 36) and one group took part in phonics and sight word training simultaneously for two 8-week periods (n = 32). Sight word training led to significant gains in sight word reading measures, which were larger than gains made from phonics training; phonics training led to statistically significant gains in phonics reading measures, which were larger than gains made from sight word training; and both types of training led to significant gains in general reading that were similar in size. Training phonics before sight words had a slight advantage over the reverse order.

- Around 5% of children find it unusually difficult to learn to read even though they have had normal reading instruction, they have normal intelligence and they have no known neurological or psychological problems.
- To date, most treatment trials performed with children with dyslexia have looked at the effects of ‘phonics’ reading programmes.
- These programmes teach children to learn to read using the grapheme-phoneme correspondence (GPC) rules (i.e. ‘letter-sound rules’).
- In children with poor reading, phonics training had a moderate and significant effect on reading accuracy for ‘nonwords’ and ‘regular words’, and a small but significant effect on reading mixed words.
- When children first see the word CAT, they have to a)

identify the letters, b) translate each grapheme into a speech sound and c) blend these phonemes together into a word that is spoken aloud.

- Once a word has been read a number of times via the phonics route, a memory is formed of the whole word.
- This memory activates the meaning of that word, the spoken representation of that word and the spoken output of that word.
- Together, these components form the 'sight word' or 'lexical' reading route of the dual route model of reading.
- Phonics reading plays an important role in the development of sight word reading.

The present study

This study had two aims: a) to compare sight word training and phonics training in children with dyslexia and b) to determine if different orders of sight word training and phonics training have different effects on the reading skills of children with dyslexia.

The hypotheses

1. *Sight word training will lead to statistically significant gains in sight word reading measures, which will be larger than gains made from phonics training.*
2. *Phonics training will lead to statistically significant gains in phonics reading measures, which will be larger than gains made from sight word training.*
3. *Phonics training and sight word training will have similar-sized significant effects on measures of reading that will affect both phonics and sight word reading.*

Study design

In Test 1, children aged between 7 and 12 years old completed the screening and outcome measures. After 8 weeks of no training, they returned to perform the outcome measures. The phonics + sight word group (n=36) then did 8 weeks of phonics training (and then Test 3) followed by 8 weeks of sight word training (and then Test 4). The sight word + phonics group (n=36) experienced the same except the order of training was reversed. The mixed + mixed group (n=32) participated in phonics and sight word training on alternate days for 8 weeks (and then Test 3) and then the same again for another 8 weeks (and then Test 4).

Interventions

Sight word training

- Children were asked to take part in five sight word training sessions per week for eight weeks.
- Each training session, which was designed to take 30 min, used one of 30 lists of 24 irregular words that increased in difficulty both between and within lists.
- The sight word training focused on reading accuracy rather than fluency.
- The training was done at home with the support of both a parent and a computer.

Phonics training

- Children and parents were instructed to perform the phonics training at home for 30 min per day, 5 days per week, for 8 weeks.
- All training was done on a computer.
- Training focused on accuracy rather than fluency.

Mixed training

- The mixed training was the same as the phonics and sight

word training except that each type of training was performed on alternate days.

Findings

Trained irregular word accuracy

- Eight weeks of phonics, sight word and mixed training had very large and significant training effects on trained irregular word accuracy.
- The two groups that participated in sight word training saw larger gains than the group that did phonics training.
- Sixteen weeks of phonics and sight word training had a very large and significant training effect on trained irregular word accuracy.
- The phonics + sight word group made smaller gains in their first eight weeks of training than the two groups that did sight word training but then made much larger gains than these groups when they did sight word training in the last eight weeks.

Untrained irregular word accuracy

- Eight weeks of phonics, sight word training and mixed training had very large and significant training effects on untrained irregular word reading accuracy.
- Sixteen weeks of phonics, sight word and mixed training had significant and very large training effects on untrained irregular word accuracy.
- The group that performed sight word training before phonics training made smaller gains than the phonics + sight word group and mixed + mixed group.

- Untrained irregular words respond similarly to eight weeks of phonics and sight word training, but benefit more when phonics precedes sight words than vice versa.

Nonword reading accuracy

- Eight weeks of phonics, sight word and mixed training had moderate to large training effects on nonword reading accuracy.
- Sixteen weeks of phonics and sight word training had a significant and moderate to large training effect in each training group.

Nonword reading fluency

- Eight weeks of phonics, sight word and mixed training had moderate to large training effects on nonword reading fluency in the phonics + sight word group and mixed + mixed group.
- Despite the absence of a true treatment effect in the sight word + phonics group, there were no significant differences between the gains made by the children who did phonics training, sight word training or mixed training.
- Sixteen weeks of phonics and sight word training had a significant and moderate to large training effect on nonword reading fluency in the phonics + sight word group and mixed + mixed group but not in the sight word + phonics group.
- However, the between group's ANCOVA revealed no difference between the groups after 16 weeks of training, suggesting that nonword reading fluency responds similarly to phonics training, sight word training and mixed training regardless of the order of the training.

Word reading fluency

- Eight weeks of phonics, sight word and mixed training

had a large and significant training effect on word reading fluency.
- Sixteen weeks of phonics and sight word training had a large and significant training effect on word reading fluency.
- Word reading fluency may respond slightly more to phonics training than sight word training.

Reading comprehension

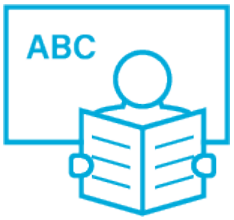
- Eight weeks of phonics, sight word and mixed training had large and significant effects on reading comprehension.
- Sixteen weeks of phonics and sight word training had a large and significant training effect on reading comprehension.
- Reading comprehension responds similarly to phonics training, sight word training and mixed training regardless of the order of the training.

Summary

- Sight word training had a significant effect on trained and untrained irregular word reading, and in the case of trained irregular words, this effect was larger than the effect of phonics training.
- Phonics training had a significant effect on nonword reading accuracy and nonword reading fluency.
- These results suggest that it is important to explicitly teach phonics to children with dyslexia because these children appear to learn GPC rules more readily from phonics training than from exposure to sight words.
- Both sight word training and phonics training had significant effects on word reading fluency and reading comprehension.
- An unpredicted finding of this study was that sight word training, even when restricted to irregular words, can

produce some benefits to reading via the phonics reading route, suggesting that phonics rules can be deduced implicitly from exposure to sight words to some extent.

- Training order had a significant effect on the untrained irregular word accuracy test.
- The group that experienced phonics training before sight word training saw significantly greater gains than the group who did sight word training and then phonics training.
- The superior effect of training phonics then sight words on untrained irregular words provides some support for the idea that phonics skills help children read unfamiliar words, even when those words are irregular.
- However, there appears to be no general disadvantage (or advantage) for training phonics and sight word reading simultaneously in children with dyslexia.



Implications

- These results, together with previous studies, suggest that relatively pure phonics training delivered via computers for up to 2 hr per week for less than 3 months has moderate to large effects on various reading skills, which reflect small yet reliable gains in children with dyslexia.
- The outcomes of this study support the idea that many children with dyslexia need more than just phonics training.
- Sight word training is particularly important for irregular words.
- Training children to read irregular words will not

impair their ability to read via the letter-sound rules.

The Home Literacy Environment Is a Correlate, but Perhaps Not a Cause, of Variations in Children's Language and Literacy Development

eTale 2022

Maternal language was a significant predictor of storybook exposure but not of direct literacy instruction. Maternal language and phonological skills predicted children's language and reading/spelling skills, respectively. Direct literacy instruction remained a predictor of children's reading/spelling skills.

Authors: Marina L. Puglisi, Charles Hulme, Lorna G. Hamilton & Margaret J. Snowling

Source: Puglisi, M.L., Hulme, C., Hamilton, L.G. & Snowling, M.J. (2017). The home literacy environment is a correlate, but perhaps not a cause, of variations in children's language and

literacy development. *Scientific Studies of Reading, 21*(6), 498–514, DOI: 10.1080/10888438.2017.1346660

The present study investigated whether the home literacy environment predicts children's reading and language skills once maternal language abilities are taken into account. Longitudinal data were collected during the preschool years for 251 children at high risk of dyslexia. Maternal language was a significant predictor of storybook exposure but not of direct literacy instruction. Maternal language and phonological skills predicted children's language and reading/spelling skills, respectively. After accounting for variations in maternal language, storybook exposure was not a significant predictor of children's outcomes. Direct literacy instruction remained a predictor of children's reading/spelling skills.

- It is well established that the home literacy environment is an important predictor of children's language and literacy development.
- The home literacy environment usually refers to activities undertaken by family members at home that relate to literacy learning as well as the literacy resources in the home and parental attitudes toward literacy.
- Home literacy environment activities may be formal or informal and active or passive.
- Genetic factors also have an important influence on literacy development.
- The heritability of reading and spelling is estimated to be .73 and .64, respectively, whereas shared environmental influences accounted for only 10% of the variance in reading.
- The correlation between the home literacy environment and children's literacy skills may be genetically mediated.

What is gene-environment (ge) correlation?

- Ge correlation refers to the influence of parental genes working via the environment.
- A passive ge correlation is observed when there is a correlation between the parents' genotype and both the child's genotype and their environment.
- An evocative ge correlation refers to the association between an individual's genetically influenced behaviour and others' reactions to that behaviour.
- An active ge correlation is observed when there is an association between a given genetic endowment and the environmental niches that individual selects.

The study

Hypotheses

- *Measures of maternal language skills will predict the home literacy environment.*
- *Measures of the home literacy environment will predict children's language and reading/spelling skills.*
- *Which measures of the home literacy environment will predict children's outcomes after controlling for variations in mothers' language and phonological skills?*

The participants were 251 children from the Wellcome Project, and children who were at cognitive risk of developing reading problems later on were overrepresented.

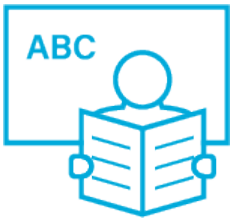
Findings

- Direct literacy instruction predicted child reading/spelling skills.
- Storybook exposure (i.e. the number of children's books, shared reading, parental familiarity with children's books and parental literacy instruction) predicted both children's language and reading/spelling skills.
- When maternal language and phonological skills were controlled in the model, neither of the paths from storybook exposure to child skills were significant.
- The path from direct literacy instruction to child reading/spelling skills remained significant after accounting for the effects of maternal phonological skills.

Summary

- Maternal language skills were a significant predictor of storybook exposure but not direct literacy instruction.
- Storybook exposure predicted children's general language and reading/spelling skills, whereas direct literacy instruction only predicted children's reading/spelling skills.
- Once mothers' language and phonological skills were taken into account, storybook exposure was no longer a predictor of children's language or reading/spelling skills.
- Direct literacy instruction remained a predictor of children's reading/spelling skills after accounting for variations in maternal language and phonological

abilities.



Implications

- The findings suggest that the informal home literacy environment does not directly influence children’s language and reading development.
- The effects of the informal home literacy environment may rather reflect genetic influences; that is, mothers with good language skills pass on genes that confer good language skills. Storybook exposure correlated highly with both maternal language and SES, suggesting that maternal education, rather than maternal genes, is also a plausible driver of the effects.
- The effects of direct literacy instruction in the home on children’s early mastery of the mechanics of reading and spelling do appear to reflect environmental influences, although the influence is weak.
- The findings thus suggest that it is not solely the amount of literacy activity a child is exposed to that determines his or her early language and literacy development; it is also the linguistic ability of the parent who is providing the literacy environment at home.
- If the relationship between the informal home literacy environment and child language and reading/spelling outcomes reflects the effects of ge correlations, this does not mean that interventions to improve or enrich the home literacy environment will not be effective in promoting children’s language and reading development.

Evolving Concepts of Dyslexia and Their Implications for Research and Remediation

eTale 2022

A crucial development is evident in understanding dyslexia, moving from its conceptualisation as a discrete identifiable condition toward the realisation of continuity with the general population with no clear boundaries and no qualitative differences. This conceptual evolution amounts to a transition from considering dyslexia to be some entity that causes poor reading toward considering the term dyslexia as simply labelling poor reading performance. This renders obsolete any searches for abnormalities and directs efforts toward understanding reading skill as a multifaceted domain following a complex multifactorial developmental course.

Author: Athanassions Protopapas

Source: Protopapas, A. (2019). Evolving concepts of dyslexia and their implications for research and remediation. *Frontiers in Psychology, 10*(2873), 1–10, DOI: 10.3389/fpsyg.2019.02873

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general population with no clear boundaries and no qualitative differences. This conceptual evolution amounts to a transition from considering dyslexia to be some entity that causes poor reading toward considering the term dyslexia as simply labelling poor reading performance. This renders obsolete any searches for abnormalities and directs efforts toward understanding reading skill as a multifaceted domain following a complex multifactorial developmental course.

Why define dyslexia?

- Once we know exactly what something is and is not, we can construct a definition that distils our understanding into a clear, concise statement of who belongs to the category and who does not.
- With regard to research, we need to know how to form our research groups.
- A definition also dictates what we should measure to document group inclusion and to examine the features of the classification.
- In education, we need to know which children are selected for remedial services, a decision of the utmost importance given that poor literacy is associated with poor academic, social, behavioural, emotional, professional, financial and health outcomes.
- The definition also directs our assessment and educational programmes, by highlighting what needs to be assessed to justify the selection, to document the relevant educational needs and also to guide the setting of specific objectives to be achieved by remedial education.

Elements of dyslexia definitions

- Dyslexia is seen as a difficulty or inability regarding learning to read in a situation where success was expected.
- The first element contributing to expectation is age and

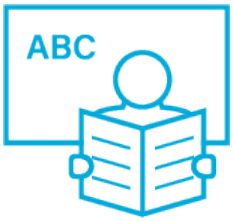
experience.

- A second element concerns limitations arising from sensory perception.
- A third element concerns educational opportunity.
- Finally, general cognitive ability is an element commonly seen as related to expectations in terms of reading competence.

Progress in understanding dyslexia

- The present approach means that the concept of dyslexia is not defined against an IQ reference, and instead, it is applied across ability ranges.
- The only skills that are relevant to the concept – and therefore the definition – of dyslexia are reading skills, at the word level.
- Word-level skills are not exhausted with accurate single-word decoding but also encompass reading fluency, which refers to the speed, or efficiency, of processing and, crucially, involves word sequences rather than isolated words.
- It seems to be increasingly accepted that there is no distinct group and that dyslexia concerns the low end of the distribution of reading skill.
- The roots of dyslexia are traced to many interacting factors at different levels of description and the idea that different routes can lead to similar outcomes so that even a common difficulty is not necessarily attributable to a common history.
- There is a strong genetic component in the propensity to acquire reading skills and in family risk with regard to reading difficulties, but this should not be interpreted as implying that one is doomed by their genes.
- Estimates of the heritability of reading in less homogeneously supportive environments are lower.
- It is increasingly understood that the final behavioural outcomes depend on a multitude of interacting factors,

only some of which concern genetics.



Implications

- Research should stop trying to answer the question ‘what causes dyslexia?’ and instead put more effort into understanding the observed range of reading development trajectories and the extent to which different factors affect learning to read at different ages and in distinct genetic and environmental contexts and instructional situations.
- A wider cognitive and learning profile may be necessary for the special educator or educational psychologist to identify the weak and strong areas for any given child, because the individualised educational plan will have to be based on strengths and build on these to address weaknesses.
- So, the specialist will consider and may have to support the development of phonological processing, phonological memory, phonological awareness, a knowledge of the alphabet and conventions of print, before reading itself can be addressed.

The Relationship Between Parental Literacy Involvement, Socio-Economic Status and Reading Literacy

eTale 2022

Multilevel analyses of a survey of 43,870 pupils (with an average age of 10) in Western European regions reveal a positive relation between early parental involvement in literacy activities and an increasing level of reading literacy and parental education. Students with a lower socioeconomic status (SES) also have lower reading literacy and reading attitudes than students with a higher SES. Children with a lower SES experience later parental involvement in literacy activities than children with a higher SES.

Authors: Kenneth Hemmerechts, Orhan Arigdag & Dimokritos Kavadias

Source: Hemmerechts, K.; Agirdag, O. & Kavadias, D. (2017) The relationship between parental literacy involvement, socio-economic status and reading literacy. *Educational Review, 69*(1), 85–101, DOI: 10.1080/00131911.2016.1164667

This study explored the relationship between parental literacy activities with the child, SES and reading literacy. Multilevel analyses of a survey of 43,870 pupils (with an

average age of 10) in Western European regions reveal a positive relation between early parental involvement in literacy activities and an increasing level of reading literacy and parental education. Students with a lower SES also have lower reading literacy and reading attitudes than students with a higher SES. Children with a lower SES experience later parental involvement in literacy activities than children with a higher SES.

- The socialisation process through which children begin to learn different ideas and skills and develop an identity is important.
- The socialisation process is initiated during early childhood in the family environment and continues into the school environment.
- Literacy activity is a specific from of this socialisation relevant to children's academic development.
- We expect that parents with a higher SES tend to spend more time instilling skills and attitudes before primary school begins, which then helps children to be more successful in school later on.
- We expect that early parental literacy involvement is related to pupils' reading literacy skills and attitudes toward reading.
- The primary habitus of children with a higher SES might be better suited to the primary school environment, and thus their parents have to interfere less in reading literacy during primary school.

The Bourdieusian theory of habitus development

Children enter the school environment after they have already experienced a specific family upbringing conditioned by the family's SES. This upbringing entails the development of deeply ingrained skills and attitudes. In school, children are taught specific skills and attitudes, but this socialisation depends on the primary habitus that the child learned at home.

The study

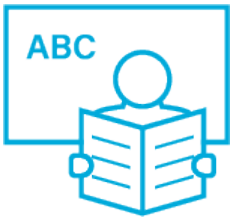
Hypotheses

- *Early parental literacy involvement at home (before primary school) is positively related to SES.*
- *Attitudes toward reading (in primary school) are positively related to SES and early literacy involvement.*
- *Early parental literacy involvement is positively related to reading literacy.*
- *Late parental literacy involvement at home (in primary school) is negatively related to SES.*
- *Late parental literacy involvement is related to the reading literacy of children: it is more likely when children have poor reading literacy and less likely when children have good reading literacy.*
- *The transition of a low early parental literacy involvement to a high late parental involvement is more likely for children with a lower SES.*

Participants were 43,870 pupils from Western European countries with an average age of 10.3 years old. The early literacy activities that the parents were asked about included reading books, telling stories and singing songs. Late parental literacy involvement included helping the child with reading for school. Children also did a reading literacy test, and their attitudes toward reading were measured.

Findings

- Parental education is significantly related to early parental involvement; when the level of the education of parents increases, the level of early parental involvement also increases.
- The relative probability of having high rather than low reading attitudes is 37% higher with an increase of one standard deviation of the early literacy variable.
- The relative probability that a child with parents who finished post-secondary, university or higher education has high reading attitudes over low reading attitudes is 136%.
- The effect of parental education on the later form of involvement is significant, but negative, meaning that it is more likely that children with a low-educated parental background experience high levels of late involvement in literacy activities.
- Early parental involvement in literacy activities is positively related to reading literacy.
- Children with parents with a high SES have higher reading literacy.



Summary

- There was a positive relation between early involvement in literacy activities (before primary school) and reading literacy at the age of 10 years old and parental education.
- Children from a family with a low SES experience the late type of involvement in literacy activities more

than children with a high SES.

- Positive attitudes toward reading are more likely for children in families with a higher SES and who experience a high level of early literacy involvement.
- Late parental literacy involvement is more likely when children have poor reading literacy.
- Those children who experience more late than early involvement have lower reading literacy.