Read About It: Scientific Evidence for Effective Teaching of Reading

Kerry Hempenstall

Edited by Jennifer Buckingham

Research Report | March 2016

National Library of Australia Cataloguing-in-Publication Data:

Creator: Hempenstall, Kerry, author.

Title: Read about it : scientific evidence for effective teaching
of reading / Kerry Hempenstall ; edited by Jennifer Buckingham.

ISBN: 9781922184610? (paperback)

Subjects: Effective teaching.
Early childhood education--Research--Australia.
Literacy--Research--Australia.
Teacher effectiveness.

Other Creators/Contributors:
Buckingham, Jennifer, editor.
Originally published by The Centre for Independent Studies Limited.
FIVE from FIVE is now owned by MultiLit Pty Ltd.

Dewey Number: 371.10994

Read About It:
Scientific Evidence for Effective Teaching of Reading

Kerry Hempenstall

Edited by
Jennifer Buckingham

MultiLit five from five

Research Report | March 2016

Related CIS publications

Research Report

RR9 Jennifer Buckingham and Trisha Jha, *One School Does Not Fit All* (2016)

Policy Magazine

Spring Issue Jennifer Buckingham, Kevin Wheldall and Robyn Beaman-Wheldall, *'Why Jaydon can't read: The triumph of ideology over evidence in teaching reading'* (2013)

Contents

Executive Summary

One million Australian children are at risk of reading failure, with serious negative consequences for their quality of life and for Australian society. This figure — based on the results of national and international literacy tests — is five times higher than the number of children reading scientists estimate to have serious learning difficulties.

Children from disadvantaged backgrounds are five times more likely to have low literacy at school, perpetuating a cycle of low educational attainment and poverty. One in three disadvantaged children arrive at school with very poor language skills, and the gap between the language-rich and the language-poor grows over time.

Despite there being various causes of disadvantage, there is only one domain in which an education system can have a significant and sustained impact — by harnessing the power of improved instruction, especially in literacy in the early years of school.

Major reviews of research on reading not only agree on the key components of reading programs but also the most effective way of teaching them.

There are five essential and interdependent components of effective, evidence-based reading instruction — the five 'keys' to reading:

- Phonemic awareness: Knowledge of, and capacity to manipulate, the smallest distinct sounds (phonemes) in spoken words.
- Phonics: Learning and using the relationships between sounds and letter-symbols to sound out (decode) written words.
- Fluency: The ability to read accurately, quickly and expressively. Fluent readers are able to focus on reading for meaning.
- Vocabulary: The words children need to know in order to comprehend and communicate. Oral vocabulary is the words children recognise or use in listening and speaking. Reading vocabulary is the words children recognise or use in reading and writing.
- Comprehension: Extracting and constructing meaning from written text using knowledge of words, concepts, facts, and ideas.

There is also mounting evidence that explicit or direct instruction is the most effective teaching method, especially for the fundamental code-based components — phonemic awareness and phonics — and especially for children at-risk of reading failure. In recent years, research has continued to demonstrate that explicit teaching of the five keys to reading benefits all children and can significantly reduce literacy gaps.

The impact of reducing the number of struggling students through more effective initial class teaching should not be underestimated. School resources and teacher time can be deployed more effectively, learning support can be targeted to children with serious learning problems, and benefits for students extend from improved educational achievement through to a lower likelihood of the mental health and behavioural problems that frequently arise following reading difficulties.

Progress in knowledge of teaching and reading is dependent on evidence from studies that conform to the rigors of research in other disciplines where the human and economic costs of failure are high.

There is an extensive and rigorous body of evidence about how children learn to read and the most effective ways to teach them. While this research is slowly beginning to be acknowledged in government policy, unfortunately it is not always reflected in teacher education or classroom practice.

This decade could be the beginning of one of the most exciting periods in education history, as the sleeping giant of educational knowledge — ignored for so long — begins to influence education systems around the world. If the evidence on teaching reading is adopted and implemented, there should be no more casualties in the 'reading wars'.

Introduction

National and international assessments indicate that about one quarter of Australian students achieve literacy results at or below the minimum standards. There is also concern about a seemingly intractable gulf between the educational outcomes of students in high and low socio-economic groups.

> " …some Australian students are not being equipped with the literacy skills they will need to participate fully in life beyond school. Australia faces the urgent challenge of closing the achievement gaps that exist between students from metropolitan and rural Australia, between Indigenous and non-Indigenous students, between students from higher and lower socioeconomic backgrounds and, in some cases, between boys and girls".[1]

This gulf becomes very large as students approach the middle stages of secondary school. For example, from 2012 PISA results:

> "In reading literacy, students in the highest socioeconomic quartile achieved a mean score of 557 points, compared to a mean score of 471 points for students in the lowest quartile. The mean score difference of 86 points on average equates to about two-and-a-half years of schooling".[2]

So we have a significant problem in ensuring our most vulnerable students have the opportunity to develop literacy skills at least sufficient to enable them to participate in our society. How big is the problem in real terms? There are nearly four million students in Australian schools, and taking a conservative percentage of 25% whose literacy progress threatens their future wellbeing, we have a million students at serious risk.

Attaining broad scale literacy has been a long-term challenge, but today low levels of literacy are more limiting for those affected than in the past. The demands on literacy today are greater than they were when many jobs were available to those with minimal literacy skills. Not so today, as unskilled jobs are becoming rare.

Increased education spending has had little effect on literacy and numeracy levels in the student population.[3]

Andrew Leigh and Chris Ryan conclude in their analysis of school productivity that "resources alone are not the answer to improving school performance. Instead, education policy makers should rigorously evaluate the impact of new reforms and focus on raising the quality of education expenditure". Education economist Kevin Gould notes that "School funding has risen by at least 14% over the past ten years. But in that time our international performance has declined. One-third of 15-year olds aren't meeting national literacy standards and in less than a decade, Australian school students' performance in maths has declined by the equivalent of half a year of schooling."[4]

A further reason why greatly increased funding hasn't made a difference: a necessary step in ascertaining whether a program is effective, and therefore whether it should be continued, is to evaluate it. Evaluation of programs and policies has been either weak or non-existent.[5]

> 232. A key problem in assessing the impact of targeted programs for disadvantaged groups is the absence of any formal evaluation for many of these programs. This weakness is present across all school sectors and systems, and all states and territories. … over 40 per cent of programs did not record any evaluation having been undertaken.
>
> 254. Re students from disadvantaged groups, learning disabilities, indigenous, ESL, low SES, remote areas. Weak monitoring and reporting inhibits the capacity of school systems to build sector knowledge of the relevance and context of improvement strategies that have demonstrated effectiveness. This means there is a lack of evidence-based links for programs and their effects on learning.

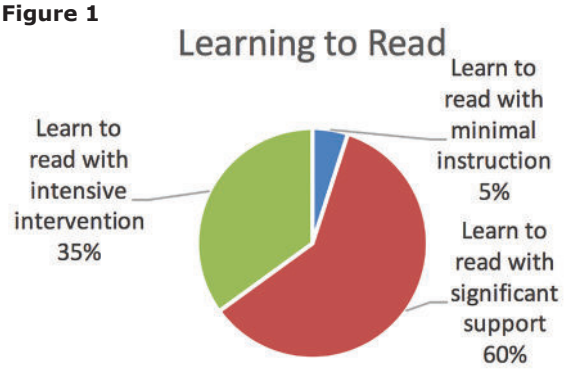
The power of improved instruction

Despite there being various causes of educational disadvantage, there is only one domain in which an education system can have a significant impact — by harnessing the potential power of improved instruction.

Reid Lyon reported research findings that about 40% of children learn to read readily with only minimal instruction; another 30-40% will require significant support to make progress in reading; and for 20-30% reading is a seriously difficult task requiring exemplary instruction, probably both intensive and over a longer period.[6] Other estimates, such as by Tyce Palmaffy, vary only slightly from those figures.[7] The National Reading Panel reported that about 5% of children find learning to read to be a readily achieved process. About 60% find early reading difficult, and a third to a half of that number have great difficulty[8] (National Reading Panel, 2000).

The Organisation for Economic Co-operation and Development (2005) reported: "Research shows that the quality of the teacher is the single greatest in-school influence on student achievement". There have been numerous studies with similar findings.[9] Leigh found that "In terms of literacy and numeracy test scores, a 75th percentile teacher can achieve in three-quarters of a year what a 25th percentile teacher can achieve in a full year; while a 90th percentile teacher can achieve in half a year what a 10th percentile teacher can achieve in a full year".[10] Auguste, Kihn, and Miller reported that students at the 50th percentile would differ by more than 50 percentile points after three years, depending on the quality of their teachers (teachers among the top 20% vs those among the bottom 20%).[11]

Figure 1



Source: National Reading Panel (2000)

If evidence-based programs were to be employed wide scale, far fewer students would be left in the parlous state in which they currently find themselves. When more students make good progress consequent upon their participation in these programs, there remains a smaller more manageable number of students left requiring small group or individual instruction. A number of studies have estimated that the residual proportion of students with serious literacy problems following early evidence-based reading instruction may be around 5%.[12]

Effective, evidence-based reading instruction: The five 'keys' to reading

What is the evidence base for optimal instruction in reading? Academic journals contain thousands of studies on reading instruction. Reading this research would require a huge amount of time. For most people, a viable alternative approach is to examine systematic reviews and meta-analyses that enable the trends across many studies to be teased out. Even more efficient is the study of large scale reports completed by expert panels (often government sponsored) who sift through mountains of research using tight acceptability criteria to ensure that only studies of high quality are included. If such panels produce similar findings across different countries and educational settings, then one can feel some sense that this consensus may represent a trusted source of information to guide practice. This is the case with research on reading instruction, and the identification of the five 'keys' or 'big ideas'.

In 2000, in the largest, most comprehensive evidenced-based review ever conducted of research on how children learn to read, the USA National Reading Panel (NRP) presented its findings.[13] For its review, the NRP selected methodologically sound research from the approximately 100,000 reading studies that had been published since 1966, and from another 15,000 earlier studies.

The specific areas the NRP noted as crucial for reading instruction were phonemic awareness, phonics, fluency, vocabulary, and comprehension. The recommendations were that students be explicitly and systematically taught:

1. Phonemic awareness: The ability to hear and identify individual sounds in spoken words.

2. Phonics: The relationship between the letters of written language and the sounds of spoken language.
3. Fluency: The capacity to read text accurately and quickly.
4. Vocabulary: All the words students must know to communicate effectively.
5. Comprehension: The ability to understand what has been read.

The Panel's emphasis on the five critical elements is also consonant with the findings of other several major international reports, such as those of the US National Research Council (1998), the US National Institute for Child Health and Human Development (1997), the UK Rose Report (2006) and the UK Primary National Strategy (2006).[14]

In the UK in 2006, the Primary Framework for Literacy and Mathematics was released, updating its 1998 predecessor, and mandating practice even more firmly onto an evidence base.[15] In particular, it withdrew its imprimatur from the 3-cueing system, and embraced the Simple View of Reading: that reading is the combination of decoding and comprehension.[16]

The Simple View has had increasing empirical support over the last 25 years, and highlights the importance of decoding as the pre-eminent strategy for saying what's on the page, and language comprehension for understanding that which has been decoded. In contrast, under the 3-cueing system popularised in the Whole Language approach to reading, making meaning by any method (for example, guessing from pictures, syntactic, and semantic cues) was considered optimal, and, for many protagonists, took precedence over decoding as the prime strategy.[17]

Explicit instruction

The major reviews of reading not only agreed on the key components of reading programs but also the most effective way of teaching them. They found that explicit or direct instruction was the most effective teaching method, especially for the fundamental code-based components—phonemic awareness and phonics.

The NRP recommended that conjoint phonemic awareness and phonics emphases should be taught directly, rather than incidentally, as effective instruction in both skills leads to strong early progress in reading and spelling. The emphasis on direct, explicit, and systematic instruction in these domains was because expecting students to induce these skills with only minimal guidance leads to an unnecessarily wide range of learning outcomes.[18]

A review of research on explicit instruction by Marchand-Martella, Martella, Modderman, Petersen, & Pan in 2013 found that "Research almost universally supports explicit instructional practices…Explicit instructional approaches are considered more effective and efficient as compared to discovery-based approaches…particularly when students are naïve or struggling learners".[19]

The 2006 UK Primary National Strategy mandated a specific form of explicit instruction — a *synthetic phonics* approach, in which letter-sound correspondences are taught in a clearly defined sequence, and the skills of blending and segmenting phonemes are assigned high priority. This approach contrasts with the less effective *analytic phonics*, in which the phonemes associated with particular graphemes are not pronounced in isolation (i.e., outside of whole words). In the analytic phonics approach, students are asked to analyse the common phoneme in a set of words in which each word contains the phoneme being introduced.[20] The lesser overall effectiveness of analytic phonics instruction may be due to a lack of sufficient systematic practice and feedback usually required by the less able reading student.[21]

In Australia, the 2005 National Inquiry into the Teaching of Literacy produced similar recommendations, exhorting the education field to turn towards science for its inspiration.[22] The committee argued strongly for empirical evidence to be used to improve the manner in which reading is taught in Australia.

> "In sum, the incontrovertible finding from the extensive body of local and international evidence-based literacy research is that for children during the early years of schooling (and subsequently if needed), to be able to link their knowledge of spoken language to their knowledge of written language, they must first master the alphabetic code – the system of grapheme-phoneme correspondences that link written words to their pronunciations. Because these are both foundational and essential skills for the development of competence in reading, writing and spelling, they must be taught explicitly, systematically, early and well." (p.37)

Clear evidence exists to enable schools to improve their performance in supporting students, particularly those whose progress is dangerously slow.

The impact of reducing the number of struggling students through more effective initial class teaching should not be underestimated. School resources and teacher time can be deployed more effectively, and benefits for students extend from improved educational achievement through to a lower likelihood of the mental health and behavioural difficulties that frequently arise following serious reading difficulties.[23]

This paper will outline the research evidence underpinning each of the 'Big Five' elements of effective reading approaches as well as the importance of explicit instruction pedagogies. It is not intended to be an exhaustive reference; it is rather a concise but comprehensive guide to major studies and research published since the review reports described above.

Phonemic Awareness

What is phonemic awareness and why is it important?

> Phonemic awareness concerns the structure of spoken words rather than their meaning or their representation in print. Phonemes are the smallest discernible unit of sound in speech and phonemic awareness is knowledge of, and capacity to manipulate, individual phonemes in spoken words.[24]

Phonemic awareness facilitates learning to read because beginning readers must first have, or develop, some understanding that spoken words are composed of individual and distinguishable sounds, rather than perceiving each word as a single indivisible sound stream.

Phonemic awareness appears to be part of a sequence of development ranging from simple to complex. Phonemic awareness is a complex sensitivity to individual sounds while its close relative, phonological awareness, is a more global term that includes the earlier developing, simpler aspects of speech sound recognition, such as rhyme, initial sound, and syllable awareness.[25]

The phonemic awareness concept has had a significant influence on our understanding of reading and its acquisition.[26] Good phonemic awareness makes it easier for beginning readers to understand that written words are composed of graphemes (printed letters and letter combinations) that correspond to phonemes, a concept called the 'alphabetic principle'. Students with good phonemic awareness tend to become better readers than those without.[27]

Development of phonemic awareness

There may be a typical developmental sequence of phonological awareness. It begins with awareness of words as a unit of analysis; then proceeds to the awareness that words can share certain ending properties that we call rhyme, to an awareness that words can be decomposed into syllables, then (possibly though not definitely) more finely into sub-syllabic units called onsets and rimes, to beginning, final, and medial properties, and then (and most importantly for reading) into awareness of individual phonemes, the smallest unit of sound analysis.[28]

However, the apparent developmental sequence of phonemic awareness should not be viewed as fixed

> "… because this type of generalisation obscures important variation that occurs in response to the demands of the assessment task, the type of instruction taking place in the classroom and the nature of the spoken and written languages under investigation."[29]

Synthesis (also known as blending) and analysis (also known as segmentation) are the most important elements of phonemic awareness, with synthesis usually preceding segmentation. These two components are the most directly salient to reading. Students need to be able to combine the individual phonemes to construct a spoken word, and also when given a spoken word, be able to break down the word into its constituent phonemes.[30]

Phonemic awareness doesn't always occur naturally in the same manner as speech and oral language and often needs to be taught. Research shows 30% of first-graders don't appreciate the phonemic structure of words, and the proportion is even higher in disadvantaged children.[31]

Phonemic awareness predicts later reading progress

The discovery that phonemic awareness is a powerful predictor of subsequent reading progress led to an interest in teaching it prior to reading instruction, thereby priming the student for a higher likelihood of success when reading instruction is introduced.

Phonological awareness and knowledge of letters have been shown in numerous studies to be the two best predictors of initial reading progress.[32] Students who start with low phonological awareness develop reading ability at much slower rates.[33] In one study, students who were assessed as low progress readers in Year 5 were those whose pre-school progress in developing phonemic awareness was slower than most, even if some of them eventually reached an acceptable level of phonemic awareness.[34]

With respect to phonemic awareness development at the beginning of school, there are likely to be three groups of students:

- The first group is those already well into the developmental sequence, probably because of home-based activities such as singing nursery rhymes and language games like Spoonerisms and tongue twisters. These students are primed to appreciate school-based phonological and phonics instruction.
- The second group have had few such early experiences, but when presented with an appropriate phonologically-based curriculum, display increasing sensitivity to phonology relatively quickly and make strong progress in tying their new-found phonological knowledge to the task of reading.
- The third group don't seem to 'get it' so easily. They make slow progress, even with a structured systematic approach with appropriate monitoring and intensity.[35] This group may have a resistance to instruction that is at least partly genetically-based.[36] Hence this group, in particular, require intensive interventions.[37]

Screening of phonemic awareness

Given the role of phonemic awareness in early reading acquisition, screening phonemic awareness early in children's school careers may help prevent the long term reading failure cycle for students whose difficulties are unidentified until late in their primary years. The probability that a child who was initially a poor reader in first grade would be classified as a poor reader in the fourth grade has been found to be a depressingly high +0.88.[38]

The cost of slow initial progress is high, both for the low progress student and for the system that will need to devote much greater resources to redressing such a situation than in preventing it. Identification is a necessary step towards intervention. Simple, brief phonemic awareness assessment tools are readily available, which have been shown to predict later reading difficulties with a high degree of accuracy.

Some examples:

- Catts et al. (2015) screened 366 children with a battery of tests at the beginning of school and assessed progress over the school year. The tests were of letter naming fluency, phonological awareness, rapid naming, and non-word repetition. They achieved accuracy levels of around 90% in predicting end of year reading levels. They also provided an intervention program to those deemed at-risk in the screening measure. Regular monitoring of progress in literacy skills over the year predicted reading outcomes over and above that of the screening battery.[39]
- Hurford et al (1994) assessed 170 school beginners using phoneme deletion, phonological discrimination, IQ, pseudo-words. They accurately predicted all students diagnosed with reading disability two years later.[40]
- Badian (1994) assessed 118 pre-schoolers mid-year and successfully predicted 91% would be good or poor readers two years later. The study used phonological awareness, naming speed, and an orthographic matching task.[41]
- Maisterek & Ellenwood (1995) used two measures of phonemic awareness (sound blending and rhyme detection) and found they were significantly related to word reading accuracy three years later, that is, at the end of Year 2.[42]
- Stuart (1995) found that sound to letter matching at the start of school predicted 93% of reading progress at the end of Year One, and seven months later.[43]

The impact of phonological awareness instruction on reading

Over the past four decades, but particularly in the last 30 years, there has been an increasing acceptance that phonemic awareness plays an important role in beginning reading success, and also in specific reading disability or dyslexia.[44]

As in most human skill areas, there are genetic influences involved in reading acquisition. This is obviously important when considering the potential influence of teaching. For the early stages of reading, print awareness, phonological awareness, and decoding have been found to be influenced by both genetic and environmental

factors.[45] The degree found in different studies varies, but estimates for heritability of phonological awareness were quite high, explaining 50%–65% of the variance. Adding complexity is that gene expression is influenced by environmental experience.[46] Nonetheless, there remains a role for education; genetic vulnerability to phonemic deficits require effective instruction and intervention.[47]

Bradley and Bryant's seminal paper published in 1983 described a longitudinal study that appeared to convincingly argue for a causal role of phonemic awareness in reading acquisition.[48] They were able to demonstrate high correlations between initial phonemic sensitivity scores and students' reading and spelling more than three years later. Selecting 65 of the students with low phonemic awareness scores, Bradley and Bryant randomly assigned them to either a training group, or a non-training group. The first group was taught (in 40 sessions over two years) to attend to the sound structure of words, while the second was taught to categorise words in terms of their meaning. The children received normal reading instruction in school, and at the end of the project were re-assessed. The training group had made significantly more progress in reading. In 1990, Bradley retested the original experimental and control groups 5 years after the training was completed, and the differences were still present in all four reading and spelling tests.[49] Subsequent intervention studies obtained similar results, and those that employed follow-up assessments have noted the endurance of the effects.[50]

There have also been other meta-analyses since that of the National Reading Panel, including those by Ehri and colleagues in 2001 that examined 52 training studies measuring the results of phonemic awareness instruction on reading outcomes.[51] They reported large effects on subsequent phonemic awareness assessment, and moderate effects on reading (d = 0.86) and spelling (d = 0.59).

In 2009 the US National Early Literacy Panel reviewed 300 studies that examined the relevant instructional emphases that led to subsequent progress in reading and spelling.[52] Their results were consistent with those of the reports described above. Most relevant were knowledge of letter names and sounds, phonological awareness (particularly blending and segmenting), being able to write (at least one's name), oral language, and knowing how books work. Strongest results derived from approaches that were adult directed, and which focused upon the structure of spoken and written words. So, it is singularly beneficial, at home and in preschool settings, to teach children about the alphabet (e.g., letter names/sounds) and simple phonics tasks (e.g., blending letter sounds to make words). Other emphases of worth are reading to children, and aiding their oral language development through conversation.

Several studies have not found strong effects of purely phonemic awareness training. Galuschka, Ise, Krick, and Schulte-Körn conducted a meta-analysis of 22 randomised controlled trials from a total of 305 studies involving school aged children and adolescents with reading difficulties.[53] Their analysis indicated that phonemic awareness interventions *alone* did not produce significant effects on reading or spelling. When combined into a phonics intervention the effects were significant, though small. Additionally, increasing duration and intensity of interventions was associated with stronger effects. The small effects may be due to the interventions being provided to older students rather than to beginners, and to the preponderance of struggling readers in these studies, rather than including the full range of reading attainment.[54]

Duff et al reported that in a range of studies "interventions for children at family risk of dyslexia that are delivered *before* the onset of formal reading instruction tend to show short-term effects on phoneme awareness and letter knowledge. Though there are exceptions, these initial benefits seem not to transfer to higher level literacy skills".[55] This is not surprising, as the function of phonemic awareness program is only to sensitise students to the alphabetic principle. That is, it is intended to aid them in decoding print. Successful decoding is a necessary but insufficient step towards skilled reading. A successful reading program will also include other components: phonics, fluency, vocabulary, and comprehension.

The issue of the relationship of phonemic awareness to subsequent reading development is still debated. As Castles and Coltheart explain, it is difficult to disentangle the causal variables involved.[56] However, there is an increasing trend towards the acceptance of a reciprocal relationship — a basic sensitivity to phonology aids the understanding of the alphabetic principle, and this results in the acquisition of spelling and reading skills that then further enhance phoneme awareness.[57]

At what age is phonemic awareness training most effective?

Some level of simple phonological awareness, such as rhyming and alliteration, may develop around the ages of two to four years, though there will be individual variation depending on a child's capacity, experience, and interest.[58] Some suggest that initial experiences of phonemic awareness activities should be in the home or in child care, others in pre-school, while it is often seen as best corresponding to the time of initial reading instruction. A report from the National Association for the Education of Young Children argues that there is ample time in the preschool day for phonemic awareness activities within a play-based program.[59] For children at risk, in particular, early intervention has been shown to be of critical importance.[60]

The US National Reading Panel found that children as young as four years of age benefited from instruction in phonemic awareness and the alphabetic principle when the instruction was presented in an interesting and entertaining, albeit systematic manner.[61] Children who attended more academically-oriented preschool programs had significantly higher scores in reading, math, and general knowledge when tested in the fall of their kindergarten year than children attending less

academically-oriented preschools. Reid Lyon suggested in 2001 that the 20 million children suffering from reading failure in the US at the time could be reduced by approximately two-thirds through effective phonemic awareness training.[62]

What should be the focus of phonemic awareness instruction?

There is the possibility that students exposed to a purely oral phonemic awareness program long before reading instruction commences will fail to appreciate the salience to reading skill development of this new found phonological sensitivity. One role for a beginning reading teacher is to make salient to the reading task those phoneme awareness skills previously developed. If the teacher's initial instruction is meaning-dominated or has an initial whole word emphasis, then students are unlikely to notice that phonological skills can be helpful.

Research shows that phonemic awareness training has a stronger association with reading development when letter knowledge is taught simultaneously with, and incorporated into, the phonemic awareness activities so as to highlight their mutual benefits to reading.[63] According to Castles and colleagues, "Overall, the data suggest that there is little value in training pre-schoolers in either letter forms or sounds in isolation in advance of providing instruction on the links between the two."[64]

When phonemic awareness is combined with letter knowledge training, one might argue that this constitutes phonics instruction. New phonics programs may incorporate both but earlier traditional phonics programs were less alert to the need for beginning readers to have or develop phonological sensitivity in order to obtain maximum benefit from phonics teaching. In a report for the US National Research Council, Snow, Burns, and Griffin commented, "In conventional phonics programs… such [phonemic] awareness was generally taken for granted, and therein lies the force of the research on phonemic awareness."[65]

Do teachers know how to teach phonemic awareness?

A classroom emphasis on phonological processes assumes that teachers have the necessary deep understanding of phonemic awareness required to teach it effectively. This assumption may not be warranted, as research has indicated that some teachers do not themselves have a solid foundation in their own phonemic awareness, and few have received the level of training that produces the supra-skill level important in awakening children's fine-grained sensitivity to the sound structure of words. For example, in one study only 2% of teachers-in-training and 19% of working teachers knew that the word *box* is constructed from four speech sounds.[66] In a recent Australian study, findings indicated a mismatch between what teachers believed they knew about phonological processes and what they did know.[67] The teachers generally had positive perceptions about the value of such teaching, but had not themselves been taught how to do so. Teachers tend to erroneously believe that their implicit knowledge about reading is sufficient for them to instruct others explicitly.

Studies in the USA have found that 50% of teachers are young, inexperienced, and with little knowledge concerning phonics teaching and word study.[68] A 2012 study by Binks-Cantrell, Washburn, Joshi, & Hougen noted that there were similar issues among teachers in both Australia and Great Britain.[69] Numerous Australian studies published over the last decade confirm the overseas findings.[70] Additionally, teacher educators themselves have often lacked a good understanding of basic language constructs, perpetuating what the authors described as the 'Peter Effect' — one cannot teach what one does not know.

In many teacher-training facilities, pre-service instruction in these areas is not among the priorities in presenting a teacher education curriculum on literacy.[71] Hence, many teachers are likely to need retraining if the results of phonological process research into beginning reading are to be put into practice successfully.

Is phonemic awareness still important later?

Recognising that phonemic awareness has a role to play in beginning reading, and becomes less of a primary driver as reading progresses into the independent phase, might it continue to have even a diminished role?

A study by Ziegler, Bertrand, Lété, & Grainger in 2014 indicated that phonemic awareness continues to influence reading across development.[72] An earlier study by Shankweiler, Lundquist, Dreyer, and Dickinson also noted a phonological role that was associated with differences in reading comprehension.[73] A 2008 meta-analysis indicated a strong association of phonological awareness and reading comprehension using cross-sectional and longitudinal design.[74] Given that the majority of struggling readers are those who do not develop efficient word reading/decoding strategies, it would not be surprising that the underlying problem might be phonemic in nature.[75]

Phonics

What is phonics?

The English written language is an alphabetic code in which spoken language is codified by symbols (letters). Phonics has several related meanings:

1) the relationship between speech sounds and their symbols;
2) the methods employed to teach that relationship;
3) the phonological process of using the relationship to sound out (decode) a new word.[76]

Teaching phonics

All approaches to teaching phonics are not equal. It is possible to teach phonics carefully, and with parsimony; it is possible to do so ineffectively and excessively; and it is possible to do it in name only.

There are essentially two broad approaches to teaching phonics: synthetic and analytic phonics instruction. It is important to understand the difference between these two approaches, as their effectiveness differs markedly.

In *synthetic phonics*, teachers build up phonic skills from their smallest unit (graphemes). In a synthetic program, the processes of blending ("What word do these sounds make when we put them together mmm-aaa-nnn?"), and segmenting ("Sound out this word for me") are also taught. It is of little value knowing the building blocks of our language's structure if one does not know how to put those blocks together appropriately to allow written communication, or to separate them to enable decoding of a letter grouping.

After letter-sound correspondence has been taught, phonograms (such as: er, ir, ur, wor, ear, sh, ee, th) are introduced, and more complex words can be introduced into reading activities. In conjunction with this approach 'controlled vocabulary' stories may be used — books using only words decodable using the students' current knowledge base.[77] This is intended to reduce the memory load on beginning readers that follows from having too large a range of words at a time when the aim is for students to induce the alphabetic principle.[78]

Analytic phonics involves the analysis (breaking down) of the whole word to its parts (an analysis only necessary when a child cannot read it as a whole word). In analytic phonics, students are expected to absorb or induce the required information from the word's

structure, merely from presentation of similar sounding words. For example, "The sound you want occurs in these words: mad, maple, moon." The words may be pointed to or spoken by the teacher, but the sounds in isolation from words are not presented to children. A major problem with analytic phonics methods is the erroneous assumption that all students will already have the fairly sophisticated phonemic awareness skills needed to enable the comparison of sounds within the various words.

In analytic phonics, children learn words by sight at first, and their attention is drawn only to initial letter sounds. Segmenting and blending are introduced later after all the letter sounds have been introduced. By contrast, synthetic phonics teaches children to sound and blend from the beginning of reading instruction, after a few letter sounds have been taught.

There is also an approach known as *analogy-based phonics* in which students are taught to use known words to decode unknown words.[79] More recently, this has been found to be more beneficial as an adjunct to a synthetic phonics program rather than as a stand-alone approach because students first need to build a substantial store of comparison words for it to be helpful.[80]

When synthetic phonics is taught explicitly, students will learn the associations between the letters and their sounds in a direct and usually *systematic* way, separately from text reading. This may comprise showing students the graphemes (letters or letter combinations) and teaching them the sounds that correspond to them, as in "this letter makes the sound sssss." Alternatively, some teachers prefer teaching students single sounds (phonemes) orally at first, and then later introducing the visual cue (the grapheme) for the sound, as in "You know the mmmm sound we've been practising, well here's the letter used in writing that tells us to make that sound."

Systematic implies that there is attention paid to the detail of the teaching process. Instruction will usually be teacher-directed, based on a logical analysis of the skills required and their optimal sequence. At its most systematic, it will probably involve massed and spaced practice of those skills (sometimes in isolation and in text), corrective feedback of errors, and continuous evaluation of progress.

In contrast, *incidental* instruction shifts the responsibility for making use of phonic cues from the teacher to the student. It assumes that students will develop a self-sustaining, natural, unique reading style that integrates the use of contextual and graphophonic cues without any preordained teaching sequence, but dependent upon opportunity arising from the passages being read.

Within phonics teaching there are several other models, again with varying levels of efficacy. They differ in their curriculum construction and in the degree of their explicitness. Examples are Phonics through spelling, Embedded phonics, and Onset-rime phonics instruction. At present the model known as explicit synthetic phonics has the strongest research support. However, just because a phonics program is described or marketed as systematic, synthetic or explicit does not guarantee its effectiveness. Experimental evaluation is still important.

The aim of phonics teaching in a code-emphasis program is to make explicit to students the alphabetic principle. When teachers simply point out word parts to students in the context of authentic literature as the situation arises, the limitations of such incidental analytic phonics are most apparent for at-risk students. This is the group on whom the failure of incidental analytic phonics to be sufficiently explicit and unambiguous impacts most heavily.[81]

> "Children who need to gain insight into a systematic system are probably best served when the instruction they receive is also systematic. More specifically, the fact that the phoneme /s/ is (almost) always represented by the letter "s" irrespective of its position in a word can be taught by systematically confronting children with (regular) words with the phoneme /s/ in different positions. Children who are confronted with too many words at a time that consist of many different letters will have more difficulties gaining insight in the alphabetic principle."[82]

Evidence for systematic synthetic phonics instruction

Scientific research has demonstrated that initial synthetic phonics instruction is the single most effective decoding approach for students. Obviously, many students can learn to read without such instruction;[83] however, it is not only the seriously at-risk students who achieve greater success under such a phonics regime — so do those in the average range, and also do those in below-average reading groups, that is, those who are making progress, but slowly.[84]

The National Reading Panel's review of the research on phonics instruction came to the following conclusions:

- Systematic phonics instruction makes a bigger contribution to children's growth in reading than alternative programs providing unsystematic or no phonics instruction (2.84)
- Various types of systematic phonics approaches are significantly more effective than non-phonics approaches in promoting substantial growth in reading (2.85)
- Phonics instruction taught early proved much more effective than phonics instruction introduced after first grade (2.85)
- Systematic phonics instruction is significantly more effective than non-phonics instruction in helping to prevent reading difficulties among at risk students and in helping to remediate reading difficulties in disabled readers (2.86)

There was some criticism of the NRP report initially; however, since then there have been numerous studies

and reports supportive of the findings of the National Reading Panel meta-analysis.[85]

The National Inquiry into Teaching Literacy in Australia in 2005:

> 2. The Committee recommends that teachers provide systematic, direct and explicit phonics instruction so that children master the essential alphabetic code-breaking skills required for foundational reading proficiency.[86]

The 'Rose' review in England in 2006:

> 4.16 "The evidence is clear that the teaching of systematic synthetic phonics is the most effective way of teaching young children to read, particularly for those at risk of having problems with reading."[87]
>
> 51. "The case for systematic phonic work is overwhelming and much strengthened by a synthetic approach, the key features of which are to teach beginner readers:
>
> - grapheme/phoneme (letter/sound) correspondences (the alphabetic principle) in a clearly defined, incremental sequence
> - to apply the highly important skill of blending (synthesising) phonemes in order, all through a word to read it
> - to apply the skills of segmenting words into their constituent phonemes to spell
> - that blending and segmenting are reversible processes.[88]

Individual studies have come to similar conclusions. A large scale study by Barbara Foorman and colleagues from the University of Houston found that synthetic, systematic phonics was by far the most effective approach.[89] It was also more effective in reducing the occurrence of reading problems than any of the one-on-one tutorial programs that were evaluated, including Reading Recovery. Her findings are consistent both with currently accepted theories of reading development and instruction, and with other empirical research emphasising student outcome measures.

An Australian study by Christensen and Bowey found clear advantages for systematic synthetic phonics over analytic phonics in reading and spelling for the full range of students in their second year of school.[90] They also noted that those in the analytic phonics group tended to focus only upon the initial letter of words in their attempts to decode, rather than a complete decoding of all the letters in the word as the synthetic group had been taught to do. It has been suggested that because analytic approaches include a strong sight word element in initial teaching, student confusion between whether to employ whole word or initial letter strategies may lead to guessing or only partial decoding attempts.[91]

An analysis by McArthur et al. focused on studies of phonics training for children, adolescents, and adults classes as 'low-progress' readers. Their tight criteria for acceptable research designs led to only 11 studies in the analysis. They found that phonics instruction had "statistically significant effects for non-word reading accuracy (large effect), word reading accuracy (moderate effect), and letter-sound knowledge (small-to-moderate effect). For several other outcomes, there were small or moderate effect sizes that did not reach statistical significance but may be meaningful: word reading fluency, spelling, phonological output, and reading comprehension."[92]

The synthetic approach has been exciting much interest due to some very powerful and long-lasting effects reported from Clackmannanshire in Scotland.[93] In Scotland, 300 school beginners were taught by either synthetic or analytic phonics programs for 20 minutes per day over an intensive 16-week period from school commencement. All students completed the programs by the end of their first year. They were then re-assessed annually.

> "In our version of synthetic phonics children use magnetic letters to build up words and to help them understand how letter sounds can be blended together to pronounce the words. In order to read a word, the appropriate magnetic letters are set out; the children then blend the letter sounds together, smoothly co-articulating them, while pushing the letters together. The approach is also used for learning to spell (and to reinforce blending for reading). The children listen to a spoken word, select the letters for the sounds, and then push the letters together, sounding and blending them to pronounce the word. Consonant blends are not explicitly taught at all as they can be read by blending, although digraphs (i.e. a phoneme represented by two letters, such as 'sh', 'th', 'ai', 'oa') are taught."[94]

At the end of the first year, those who were taught by the synthetic phonics method were seven months above their chronological age and similarly advanced beyond their analytically taught peers. In the 2003 follow-up, the synthetic group's word-reading ability was three-and-a-half years ahead of the analytic group, and almost two years ahead in spelling. Disadvantaged children achieved a similar rate of progress. Unaccountably, the progress of boys exceeded that of girls (by 11 months), and only 5.6% of the students taught synthetic phonics were behind in word reading at the five-year follow-up. In a longer term follow-up, students taught by the two methods were re-assessed at age 10.

> "Overall, the group taught by synthetic phonics had better word reading, spelling, and reading comprehension. ... It was found in Study 1 that, after 6 years at school,

> children taught by the synthetic phonics approach read words, spelt words and had reading comprehension skills significantly in advance of those taught by the analytic phonics method. This shows that despite English being an opaque orthography, children are not impaired when taught by an approach to reading that is common in transparent orthographies. ... Maintaining the gain in word reading for age would have been noteworthy, but in fact it increased over time, leading to a high level of attainment at the age of 10."[95]

Phonics should be taught early

By the second year of schooling there are already differences in the amount of reading in which students engage. The fast starters read more, thereby enhancing both their ease and enjoyment of reading. Further, they increase their associated skills in spelling, vocabulary, world knowledge, and comprehension.[96] In contrast, those whose initial progress lags are more likely to repeat grades, be referred for special education intervention, become disheartened, and disengaged from reading with its subsequent academic consequences. This decline towards the achievement gulf known as the Matthew Effect (rich get richer, poor get poorer) commences early.[97] Hence, the advice *phonics first and fast*.[98]

> "... earlier intervention led to significantly better outcomes than the same interventions begun later in kindergarten. … First, students with poorly developed English language, whether the deficit is related to experience and exposure, to cognitive development, or to learning English as a second language, responded well to instruction very similar to what the field considers best practice in kindergarten literacy instruction. Specifically, intervention that focuses on letter knowledge, phonemic awareness, the alphabetic principle, and oral language appears to be successful for the majority of students with limited vocabulary in English."[99]

Phonics and at-risk children

Many students have great difficulty in appreciating individual sound-spelling relationships if their only opportunities to master them occur at variable intervals, and solely within a story context. In a story, the primary focus is quite properly on story comprehension not word structure, so restricting the opportunity to focus on word parts to such activities is both distracting and ineffective. The de Graaf et al. study found that with the same curriculum their systematic-phonics group progressed significantly more than did the unsystematic training group on follow-up of the students' phonemic awareness, spelling, and reading skills.[100]

At-risk students require careful systematic instruction in individual letter-sound correspondences, and developing them requires teachers to explicitly isolate the phoneme from the word (This "mmm" sound matches this letter: *m*). At-risk students also need ample practice of these sounds in isolation from stories if they are to build a memory of each sound-symbol relationship.

It is necessary to teach at least 40-50 such associations, and to provide stories in which these associations are beneficial. The restriction of teaching to *authentic* texts precludes the use of controlled vocabulary stories — the very ones that will build students' confidence in the decoding strategies which they have been taught. Cheatham and Allor analysed seven studies of controlled vocabulary:

> "... decodability is a critical characteristic of early reading text as it increases the likelihood that students will use a decoding strategy and results in immediate benefits, particularly in regard to accuracy. ... Theoretical research and empirical evidence support the need for students to apply phonics skills in connected text. The evidence is very clear that decodable text positively impacts early reading progress."[101]

Flooding children with an uncontrolled array of words in text reading does no favours for struggling students; it forces them to guess from context (a strategy still promoted in some education systems). Even good readers find that contextual guessing is accurate on only one occasion for every four or five times it is attempted.[102] Guessing is a hallmark of poor readers — good readers abandon it as moribund.[103] The end result is that struggling students are burdened with a limp strategy—one that fails them regularly when they most need it.

The 'phonics in context' model implies that it is valuable to mix sound-spelling instruction with comprehension activities. In the early years of schooling, students are vastly superior in oral comprehension compared to written comprehension. Children enter school knowing thousands of words, but it is some years before their written vocabulary matches their oral lexicon. Both written and oral language development are appropriate emphases for instruction, but given the wide initial disparity, it is more effective to address them separately. Thus, the use of teacher-read stories is an appropriate vehicle for oral comprehension, and allows for a level of language complexity which students could not attain if the stories were presented in written form.

The relatively undeveloped decoding skill requires simpler text to allow the development of the competence and confidence needed for the ultimate objective — equivalent oral/written comprehension proficiency. Those arguing that the two are inextricable have confused process with objective, and compromise the development of both oral and written language.

Phonics and struggling readers

Older students do not find it easy to alter the inefficient strategies they've entrenched over time. Even at risk students in Year 1 may require extensive support. Abbott et al. estimated that about 2.5 hours per day for two years is the level of intensity needed for some of these students. This intervention includes whole class and small group programs.[104]

In later primary and into the secondary years, the decoding problem has commonly broadened as predicted by the Matthew Effects mentioned earlier. Their needs now encompass all the components identified by the National Reading Panel, along with additional motivational issues. In their analyses of interventions with this cohort, Vaughn et al.[105] and Scammacca et al. found that only those multifocal,[106] intensive interventions had any significant impact. The need for systematic synthetic phonics should be included as part of the multiple reading component approach as word level problems remain unresolved.

It is now accepted that for struggling readers, the intensity of instruction is very important.

> "Students who are behind do not learn more in the same amount of time as students who are ahead. Catch-up growth is driven by proportional increases in direct instructional time. Catch-up growth is so difficult to achieve that it can be the product only of quality instruction in great quantity."[107]

Phonics is essential for struggling readers, as well as students with learning disabilities including dyslexia, [108] students with intellectual disabilities,[109] and students for whom English is not their first language.[110]

Fluency

What is reading fluency?

> Reading fluency is the ability to read accurately, quickly and expressively.[111]

Why is reading fluency named as important by the National Reading Panel?[112] Surely the purpose of reading is to comprehend the meaning of the written word. Why is speed so important?

Fluency in any activity is achieved largely through practice. Listening to fluent readers reading aloud a passage for the first time, one first notices an easy speech rhythm, with few errors or regressions to prior words to assist self-correction. One can detect changes in their volume and pitch, and be aware of inserted grammatically appropriate pauses and emphases that help to guide both reader and listener towards the author's intended meaning. Because there is evident attention to the passage's grammatical structure, it is clear that to be able to achieve this print to speech conversion the reader must be comprehending the author's meaning on-the-fly. One has to know the meaning and the syntax in order to insert the pauses and emphases appropriately.

The complexity involved is described by reading researchers Fuchs, Fuchs, Hosp, and Jenkins:

> "Oral reading fluency represents a complicated, multifaceted performance that entails, for example, a reader's perceptual skill at automatically translating letters into coherent sound representations, unitizing those sound components into recognizable wholes, and automatically accessing lexical representations, processing meaningful connections within and between sentences, relating text meaning to prior information, and making inferences to supply missing information."[113]

Despite the complex coordination of processes required, the conversion of print to elegant speech appears effortless. It is breathtaking when you stop to think about it, yet it is largely taken for granted. By contrast, to listen to a low progress reader struggle with text demonstrates what happens when the coordinated processes don't occur. The reading is slow, halting, error-prone and it is obvious that the reader is unlikely to understand what has been read.

Oral reading fluency refers to reading text passages aloud. When students first begin to read, their efforts at decoding consume most of their attentional resources, and their reading will be tentative rather than smooth. As their familiarity with written words increases, their reading rate increases. When students reach about 80 words correct per minute (wcpm) on age-appropriate text, they are considered to have achieved 'automaticity' and be classed as independent readers.[114] By about Year Three, an average reader's fluency will approach the average speech rate of 120-150 words per minute.[115]

For fluency, as with development of most skills, practice is the key. As they progress with their understanding of the function of the alphabet, students begin to appreciate

that each time they decode an unfamiliar word its recognition subsequently becomes easier and faster. [116] Practising decoding enables them to become adept at storing letter-patterns — orthographic information that can dramatically hasten word recognition of these and new words.[117] These are not simply visual images, as are pictographs, but are alphabetic sequences.

It is in reaching the stage of automaticity that the apparent magic of skilled reading becomes evident – whole words are recognised as quickly as are individual letters. The actual process of reading, of transforming squiggles into language, appears transparent — that is, the words seem to leap off the page and into consciousness without any noticeable effort or strategy.[118] According to Begeny et al. this level of development should be evident during Year 2 for average readers.[119] The apparent effortlessness of fluent reading belies the complex synchronisation of a variety of cognitive and textual processes.[120] These include the orthographic, phonological, and semantic processes necessary for identifying words, and the grammatical, syntactic, and semantic linguistic processes necessary for making sense of connected text.[121]

How automaticity aids comprehension

Reading demands that numerous cognitive processes are simultaneously managed by the reader. Prior to automatization, this produces a heavy load on working memory — to both hold information and deal with it. Working memory is a limited resource, and too much complexity can be overwhelming. When cognitive processes become automatic through practice, there is a reduced load on a reader's working memory. This is because the assets required now reside in long term memory and are instantly accessible with minimal effort. The explanation is known as Cognitive Load Theory.[122] For beginners and struggling readers, the heavy cognitive load leaves few resources available for comprehension; however, upon achieving sufficient fluency the reader is free to concentrate on the extraction of meaning.

The issue of variation in the effort required to make sense of print has been addressed by employing neuro-imaging techniques when both capable and struggling students are engaged in reading. Richards et al. noted that the low progress readers used four to five times as much physical energy (oxygen, glucose) as the capable readers do in order to complete the same phonologically-based reading tasks.[123] This difference was not observed when non-language tasks were presented. It is unsurprising that struggling students claim that reading is too hard, and reduced motivation to read becomes a serious secondary obstacle for dysfluent readers.

Oral reading fluency is related to reading comprehension

Oral reading fluency has been found to be strongly related to reading comprehension.[124] Shinn, Good, Knutson, Tilly, and Collins found oral reading fluency in the early grades was as valid a measure of reading comprehension as of decoding ability.[125] Others have reported correlations as high as .91 for older students.[126] Oral reading fluency measures correlate better with reading comprehension tests than those same tests correlate with each other.[127]

Oral reading fluency acts as the link or bridge between word reading and reading comprehension,[128] and reading fluency difficulties have been shown to be the single biggest concern for more than 90% of children with under-developed reading comprehension.[129] These findings suggest, but don't demonstrate, a causal connection; however, recent studies have confirmed the strong impact of this automaticity of processes on reading comprehension.[130] An additional boost to comprehension arising from fluency is that fluent readers gain access to more vocabulary than do less fluent readers, by virtue of their greater volume of reading. So, fluency also indirectly influences comprehension via increased vocabulary growth.[131]

The relationship of fluency to reading comprehension is exemplified in the graph below. Researchers compared third grade readers' performance on the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) measure of Oral Reading Fluency to their scores on state assessments of reading comprehension. [132] They found high correlations, as did other similar analyses with the North Carolina end-of-grade assessment and in Michigan.[133]

The FCAT passmark is a score of 280. For students whose fluency is below 80 wcpm, the vast majority fall below the passmark (see in the lower left segment). For students reading between 80 and 110 wcpm (see the centre column) about half fall above and below the passmark. For students above 110 wcpm, the vast majority passed the FCAT comprehension test. For those students whose fluency was at or above 110 wcpm, only 9% of these students were reading below grade level on the state reading comprehension test (FCAT). By contrast, 81% of those students who scored below 80 wcpm failed the comprehension test.

Figure 2: The relationship between oral reading fluency and reading comprehension.

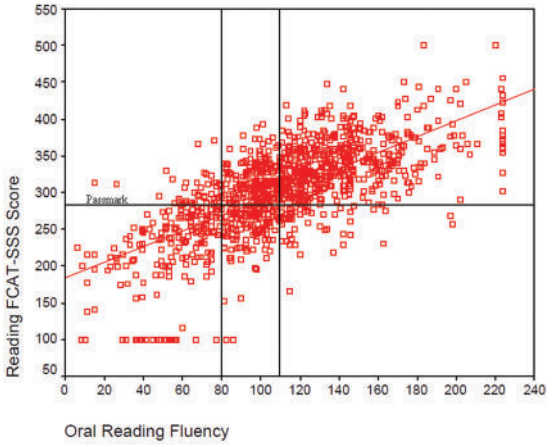


Figure 1: The relationship between ORF and reading FCAT-SSS scores using the ORF benchmarks described by Good, Simmons, Kame'enui, Kaminski, & Wallin (2002).

Source: Barger (2003)

Effective fluency teaching

Effective teachers model the fluency strategies, teach explicitly, maximise student time on task, and provide small group individualised instruction as required.[134] The Begeny et al. analysis of effective programs added these components: cueing students to read with expression and comprehension, providing systematic error-correction, using fluency criteria to determine how many passage repetitions are required beyond the standard three times, having clear written protocols that determine which activities are provided and when, graphing the students' progress, and supporting student effort via praise and structured reinforcement schedules.[135] These findings are consonant with those of the National Reading Panel:

> "The demonstrated effectiveness of guided oral reading compared to the lack of demonstrated effectiveness of strategies encouraging independent silent reading suggests the importance of explicit compared to more implicit instructional approaches for improving reading fluency."[136]

Evidence-based teaching approaches that include a fluency component, such as MULTILIT[137] and the Corrective Reading program, have demonstrated their effectiveness in this domain but have not yet achieved the mainstream recognition they deserve.[138] There is much to gain for our education system in addressing the reading fluency component of the five keys to reading.

The general intention of fluency programs is to assist students to appreciate the value of more fluent reading, and to provide regular opportunities for them to test and chart their developing rate and accuracy. Various methods have been employed to assist fluency, including repeated reading, speed drills, computer-guided practice, and rapid word recognition charts.[139]

Because reading fluency requires well established letter, word part, and whole word recognition, activities have included flash cards that are either presented for brief durations, or incorporate a timing system to chart how long it takes to complete a card. The aim is both to evaluate and promote speed of recognition of these letter fluency, word parts, and whole words.[140] At the passage level, choral reading of short texts in which the whole class reads a short passage in unison with the teacher is another common approach. Partner reading pairs students to take turns reading aloud to each other. Usually, a more fluent reader is paired with a less fluent reader.

Repeated reading vs silent reading

Repeated reading of texts remains the most frequently employed strategy. This involves multiple readings of the same text with feedback, increasing in speed until a criterion is reached, for example, a 20% improvement. When using passages, the texts should be brief — around 100-200 words — and at a difficulty level that allows about 95% correct reading. Texts can vary, from narrative, expository, poetry, song lyrics, jokes, and so on. Teachers should both model and expect expression in reading these passages.[141]

Repeated reading can be individualised through the use of parents, para-professionals, and computers to monitor the multiple repetitions of words or passages. The use of computers is attractive, cost beneficial, and can be more motivating for students than are teacher-presented programs.[142]

The National Reading Panel reported on the effectiveness of repeated oral reading:

> "...repeated reading and other procedures that have students reading passages orally multiple times while receiving guidance or feedback from peers, parents, or teachers are effective in improving a variety of reading skills...These procedures help improve students' reading ability, at least through grade 5, and they help improve the reading of students with learning problems much later than this. ... (And they) tended to improve word recognition, fluency (speed and accuracy of oral reading), and comprehension with most groups."[143]

Since the NRP there have been six major reviews of the repeated oral reading intervention literature, with five reviews offering support to the method and one review unsupportive.[144]

Silent reading has been a popular literacy activity in Australian schools for decades, under several names such as uninterrupted sustained silent reading (USSR) and Drop Everything and Read (DEAR). The activity sounds intuitively attractive, particularly as a means of encouraging wider and more frequent recreational reading — a worthwhile objective. A concern has always been, for struggling readers in particular, that they may simply entrench their uncorrected errors; and that there is no obvious way to detect whether they are, in fact, reading during this period.

Regarding fluency and silent reading programs, the NRP was guarded due to the lack of well-designed studies available for their analysis.

> "With regard to the efficacy of having students engage in independent silent reading with minimal guidance or feedback, the Panel was unable to find a positive relationship between programs and instruction that encourage large amounts of independent reading and improvements in reading achievement, including fluency."[145]

For struggling readers, every instructional minute is precious; and in an evidence-based perspective, time is better spent on activities with known associations with fluency progress. A crucial component in this perspective is that these students are engaged in structured, monitored activities if they are to develop the fluency skills required for comprehension.[146] Future research may identify the circumstances under which

silent reading may be a beneficial use of time. However, it appears thus far that silent reading is best reserved for average and above average readers.

Early assessment for effective intervention

Fluency is among the most difficult components to rectify among older struggling students.[147] As with the other components identified by the National Reading Panel, intervening early when a student displays slow progress in oral reading fluency is more efficient and effective than are later attempts.[148]

It is generally accepted that fluency with grade level text should occur between the first and third years.[149] Thus, screening and regular monitoring are critical prerequisites for ensuring the development of fluency over this period.[150].

Both standardised and informal assessments of oral reading accuracy and rate are recommended in the National Reading Panel Report[151] and in Australian National Inquiry into the Teaching of Literacy.[152] The report also recommends guided oral reading as a valuable fluency enhancing activity, yet acknowledges that both fluency assessment and instruction are notably absent from the reading curricula of many schools, and the panel recommended that the topic should be included in teacher education curricula.

It has been noted that such students who struggle with fluency display problems with phonemic awareness in preschool, and subsequently with decoding of pseudowords (i.e. phonics skill).[153] Another finding is that letter-naming and letter-sound fluency in preschool predicted subsequent oral reading fluency.[154] If these skills are assessed upon school entry or during the first year of schooling, a plan can be established for careful fluency monitoring of the at-risk cohort.

Effective intervention

The deficits that underlie the mechanisms of fluency have been less studied than other aspects of reading until recently.[155] This suggests that there are likely to be more effective strategies developed as research progresses. At present, improving fluency — while possible and worthwhile — has been a stumbling block for many students whose accuracy can been fairly readily increased by effective evidence-based interventions.[156]

Improved accuracy is a necessary precondition for fluency gains, and certainly contributes to such gains. However, providing solely a decoding focus seems insufficient for some students unless adding a fluency component also forms part of the multi-component intervention for those whose reading progress is compromised. Allowing that strong fluency gains are difficult to obtain without intense longer-term programs, particularly among older struggling students, even relatively small increases are valuable because they add to reading comprehension and also to motivation toward reading, a quality known to increase time spent in reading.[157]

For some students, fluency may develop simply from practice at reading, but can be enhanced when students' attention is drawn to the goal of increasing their reading speed. The greater the volume of appropriately constructed text read at a student's independent reading level (95% accuracy), the more rapidly fluency is likely to develop.[158] Students whose fluency does not develop normally may require significant additional support, a circumstance easily overlooked unless regular fluency checks are an element in the reading program.

Intervention has not been as effective with older students.[159] It requires far more intensity and duration than that for younger students.[160] Nevertheless, progress is achievable for older students when systematic research-validated approaches are well implemented over an extended period.[161] In the Rasinski, Homan, and Biggs analysis, best results for struggling students arose from direct instruction in all of the skills underlying fluency.[162] The Galuschka, Ise, Krick, and Schulte-Korne meta-analysis of randomised controlled trials of approaches for children and adolescents with reading disabilities found that to be effective, treatment should not focus solely on fluency activities.[163] However, when fluency and systematic phonics are combined the effects can be very helpful to these students.

Of course, older students may also require attention to vocabulary enhancement, metacognitive strategies, and, possibly, motivational supports — the Matthew effects having added to the student's burden. For example, it can be difficult persuading students to discard their existing focus on context-and-initial-letters in favour of careful attention to all the letters and their positions in words as it usually involves a temporary slowing of the students' reading rate.[164] However, the intensive daily practice over a period of a year or more is eventually considered worthwhile by the students when they begin to appreciate that reading actually can be enjoyable and meaningful.[165]

Vocabulary

What is vocabulary?

> Vocabulary refers to the words children need to know to comprehend and communicate. Oral vocabulary is the words children recognise or use in listening and speaking. Reading vocabulary is the words children recognise or use in reading and writing.[166]

The National Reading Panel included vocabulary as an essential component of a comprehensive reading program.[167] Vocabulary has significant corpus of research. Hairrell, Rupley, and Simmons documented six reviews and two meta-analyses published between 1998 and 2009.[168] The findings across age groups from preschool through to Year 12 highlighted how important was early vocabulary knowledge and hence instruction to academic success. The US National Assessment of Educational Practice reports also reiterate the significance of vocabulary in reading attainment.[169]

The importance of vocabulary development for reading has been well described by Sinatra, Zygouris-Coe, and Dasinger.

> "The process of acquiring and using words in oral and written contexts is a life-long learning process that begins quite critically during the early years. Knowledge of vocabulary meanings affects children's abilities to understand and use words appropriately during the language acts of listening, speaking, reading, and writing. Such knowledge influences the complexities and nuances of children's thinking, how they communicate in the oral and written languages, and how well they will understand printed texts. … Unless children develop strong vocabularies early in life and continue to deepen and broaden their vocabulary knowledge throughout the schooling years, they will predictably face difficulty in understanding what they read, will not use advanced and mature words in their writing, will have problems with academic subjects, will perform poorly on national achievement tests, and will fall steadily behind their more vocabulary-proficient peers."[170]

What does it mean to *know a word*? Developing a vocabulary is an incremental process in which there are degrees of knowing. Students initially hear a word as foreign to them. They may hear the word again somewhere, but still have no idea what it means. They may make some strategic guesses and derive an inkling of the meaning based upon the differing contexts in which they've heard it. Through being told, or by checking a definition, they arrive at a meaning

for the word and its appropriate contexts. Finally, they are able to employ the word appropriately in speech and writing.[171] Students gradually learn that many words have the quality of more than one meaning (polysemy). They learn that some words are common, some rare, some words frequently go along with others, some words share similarity of construction and have related meaning.

Vocabulary is wide, complex, and deep. There is a whole network underlying the words we use, not simply a huge list of unrelated words.

Vocabulary predicts later reading development

The most obvious application of vocabulary in reading is to enable reading comprehension. It is clear that knowledge of word meanings is essential if a reader is to comprehend what has been decoded in a text. This knowledge extends beyond simple definition of words to it acting as a cue to information about the word, and to make sense of any communication in which the word is immersed. It is likely that vocabulary exerts a direct effect on reading because early vocabulary level is a better predictor of later reading comprehension than is early listening comprehension level.[172] In fact, it is the most powerful pre-school predictor of early reading comprehension.[173] Beyond its significance for reading comprehension, word knowledge has an impact on thinking, speaking, and writing throughout life,[174] and perhaps, even on cognitive development.[175]

Early vocabulary acquisition, prior to preschool, has been demonstrated to be particularly important because of its relationship to subsequent reading progress throughout the school years.[176] Additionally, it appears to play a role in the development of phonemic awareness, a quality associated with decoding development. The mechanism seems to relate to the manner in which children begin to gradually appreciate the sound structure of words when their attention is directed to sound rather than to meaning. The more words they know that have similar sounds, such as *sleep* and *sleet,* the more they attend to the slight differences in sound between such words, and they continue to build more accurate phonological representations. Their sensitivity to the sounds in speech grows, and ultimately they achieve phonemic awareness, in part due to having access to a wide range of words in their vocabulary.[177] Early vocabulary gaps tend to not only persist over time, but also evoke further disparities in students' subsequent educational careers.[178]

Vocabulary development in the years prior to school

The 2009 Australian Early Development Index (AEDI) showed that 23% of children were vulnerable in language skills and that 25% were vulnerable in communication skills.[179] The Oral Language Supporting Early Literacy report indicated that on school entry approximately 20% of Australian students are deficient in the vocabulary domain, and in disadvantaged areas this percentage rises to near 30%.[180]

While recognising that genetic influences play a part in determining who will thrive and who will struggle, in the years prior to early primary school, the environmental influences on vocabulary development far exceed those due to genetics.[181] Research over the past 20 years has shown the role of parental interactions with children to be even more significant than originally thought. Hart and Risley showed, through their observation studies, vast differences between parents in the level of language interaction with their children in the first three years. Some of these differences were associated with SES.[182] Children from families whose parents worked in a profession heard 30 million more words by age three, and developed a spoken vocabulary more than twice as large as their less advantaged peers.[183] The average growth of vocabulary is spectacular — from around 200 words at age two up to 20,000 words by age eight.[184] This avalanche is dependent upon stimulation to commence, and important catalysts for this growth are parent-child conversations and language interactions, including story reading.

Adding detail to the conversations research, Weisleder and Fernald noted that it was speech directed to a child that was significant in vocabulary growth rather than simply *overheard speech*, presumably because of the attention-drawing salience to the child of speech directly spoken to the child.[185] Fernald, Marchman, and Weisleder reported that, over the period from age 18 months to three years, children from wealthier homes learned 30% more words than did the children from homes in low SES areas.[186] Hoff added that language minority children face similar risk to their low SES peers.[187] As early as 18 months of age, vocabulary deficits can be detected. By age two, some students are already six months delayed, and by the time they reach school, they may be as far as two years behind their peers on standardised language tests.[188]

Given the recognised extent to which parental language interaction promotes child language development, it is apparent that many children raised in impoverished circumstances may also be at risk of long term inhibited language development that leads to school failure.[189]

Shared reading at home

Even when students do begin attending school, they spend five times as long at home and in the community as they do in class.[190] Home-based language intervention has enormous potential, but has yet to have a major national impact. The Reach Out and Read shared book program has been in operation in the US since 1989.[191] It encourages the nurturing of infants' language from birth through talking, singing, and playing, and it also offers guidance and books to parents encouraging reading aloud to infants and toddlers. It has numerous research studies on its efficacy.[192] A What Works Clearinghouse review of shared book programs covered eight studies that met their criteria, and reported the studies produced mixed effects on language, some worthwhile others not. There were only small effects on other literacy components, such as alphabetics, reading comprehension, and phonemic awareness.[193]

Recent research on reading to young children emphasises the need to include the child in the reading activity, rather than solely reading books aloud. Hence the expression shared reading. Just as phonemic awareness activities are enhanced by addressing the alphabetic nature of our written language, so too is reading aloud to children. Reading aloud may be enjoyable and an excellent family activity, but of itself it appears not to benefit the literacy development of all children. However, if children are able to see the print, and have the function of letters, words, and sounds made explicit to them then the positive impact is enhanced.[194] Other beneficial aspects include exposure to more complex or rare words in books than are found in general conversation, and the opportunity for discussion about the text meaning, promoting further subsequent beneficial parent-child communication.[195] In a study by Treiman et al. children of parents who included in their shared reading conversations the initial letter of their child's first name tended to be superior readers in their first year of school.[196] So the emphasis for parents is on natural conversations with children, asking questions about the story while reading books, and helping children identify letters and words during reading time.

Early education at preschools and childcare

Dickinson, McCabe, Anastasopoulos, Feinberg, and Poe examined the relationship between phonology and vocabulary in early literacy, and noted the strong correlation between early vocabulary and later reading comprehension.[197] They made the point that while preschool programs are beginning to pay attention to code-based literacy instruction, they should not neglect the important role that vocabulary plays in early literacy progress. So, vocabulary belongs along with code-based instruction in an effective preschool program. The results of a recent preschool intervention study by Fricke, Bowyer-Crane, Haley, Hulme, and Snowling demonstrated just how successful such an early focus can be.[198]

Abrya, Latham, Bassok, and LoCasale-Crouch in their study of 2650 preschool students found their teachers, when asked to rate the importance of various skills, placed academic skills last in the three categories of academic, or self-regulatory competencies.[199] They also found the children's subsequent performance in their first year of school was affected when there was a misalignment between the preschool teachers' attitudes and the teachers in their new school. This deleterious effect was most dramatic for economically disadvantaged children.

Reports and studies emphasise this time period as potentially highly beneficial. In Australia, the Benevolent Society in their analysis of research into early childhood education called for a strong commitment to effective preschool programs to help redress the disadvantage experienced by so many children.[200]

Melhuish asserted that "the benefit deriving from 18 months of pre-school is similar to that gained from 6 years of primary school."[201] The Organisation for Economic Co-operation and Development, (OECD) reported research indicating that, by age 15, children who had attended pre-school were a year ahead in academic achievement of those children who had not experienced pre-school.[202]

Two qualities that have been shown to be important in preschool programs are: longer programs of a year's duration are needed to have a significant impact, and those programs need to be delivered by well qualified personnel.[203] Such requirements are not easily met, but short term programs provided by unskilled staff are unlikely to have the desired effect.[204]

Greenwood et al. noted several issues to be addressed in preschool vocabulary education.[205] Despite an increased focus on academics, research studies (including a number of randomised controlled trials) have not found significant improvement in language as a consequence of most of the more popular programs, though teacher development programs focused on alphabetics have experienced success in that domain. The results for disadvantaged children's vocabulary have been less impressive, and the authors attribute this to a lack of differentiated treatment for this cohort.

Redressing slow early language development requires much more than is currently provided in a whole group vocabulary curriculum. They argue for explicit instruction provided at a greater intensity and duration. They consider the lack of structure in implicit approaches leaves this group to flounder. To improve vocabulary instruction with these students, a Response to Intervention model would be the best option both to ensure progress is monitored and to offer the high level of differentiated instruction required. The structure should involve repeated readings (rather than a single exposure to each text) over multiple days, with many planned opportunities for student responses.

Early intervention at school — the earlier the better

While recognising the important role of early vocabulary growth in subsequent literacy development, there will always be students entering school without a sufficient vocabulary store to make the most of the phonologically based instruction that forms the foundation of initial reading instruction.

The average school-age child learns about 3,000 new words per year.[206] Unfortunately, many children with delayed vocabulary are either not detected, or are not provided with adequate assistance. This may be because of a teacher belief in a natural developmental trajectory, in which later maturation will cause a catch-up. This is not a helpful concept as the gap does not typically reduce. Vocabulary for this cohort will increase over the school years, but it is largely limited to gains deriving from conversation—they do not catch up without intensive, extended levels of intervention.

> "Students with low levels of initial vocabulary knowledge likely require supplemental intervention in addition to classroom-based vocabulary instruction in order to make gains

> similar to those of students with higher levels of initial vocabulary knowledge."[207]

Students with vocabulary deficits can be readily detected as part of an initial screening process, and intervention in vocabulary development included as part of their initial instruction. In a study by O'Connor, Bocian, Beebe-Frankenberger, and Linklater, intervention at the beginning of school produced far better outcomes than did intervening later in that first year.[208] In fact, twice as many needy students whose support commenced at the beginning were within the average range by year's end as those whose support was delayed. This intervention embedded vocabulary enrichment within the program of letter knowledge, phonemic awareness, and the alphabetic principle and was equally effective regardless of whether the students' limited vocabulary in English was due to a lack of language experience and exposure, or to lower cognitive development, or to learning English as a second language.

Hirsch also pointed to evidence that improving vocabulary before age 6 was very highly associated with literacy success (particularly reading comprehension) in late primary school and even into mid secondary school.[209] Farkas and Beron found that, for those disadvantaged students whose language development was delayed by a low level of stimulation in their early years, intensive assistance in letters, sounds, language, and word recognition was capable of at least reducing the projected language and literacy gap they were likely to experience.[210]

Effective vocabulary instruction

Research findings have emphasised a multiple strategy approach is necessary for vocabulary building. The features highlighted are direct instruction/explicit teaching, guided instruction, multiple encounters of the same words in varying contexts, working with a partner or small group, story retelling, use of props or concrete objects, comprehension and vocabulary discussion, and ensuring vocabulary instruction is embedded in all curriculum areas.[211]

The most successful methods typically involve direct teaching of vocabulary. In a randomised controlled trial, Clarke, Snowling, Truelove, and Hulme, reported that enhancing children's vocabulary development was more effective at improving reading comprehension than was teaching the students comprehension strategies.[212] It is rare for students to struggle with reading comprehension if their decoding and vocabulary are well developed.[213]

Both explicit and implicit methods have their place but less advanced students appear to derive more benefit from the more explicit approach. In this approach, children are taught word meanings directly, using everyday language rather than dictionary definitions. It is important for retention of word meanings into the long term store that students engage with the same words frequently and in varying contexts.[214] The use of syntactical knowledge and morphology (root words, prefixes, and suffixes) to help with meaning making may be included.

To help develop a model of instruction for teaching words to at-risk beginning students, Lenfest and Reed designed research-based 15-minute/day supplementary vocabulary program for whole class or small group instruction.[215] They selected 66 highly functional words, teaching 12 words per week over 4 sessions per week. They used reinforcement techniques to aid the students' on-task behaviour. Words were reviewed in several read-alouds of the same stories. The program also incorporated home-based frequent review of words, and weekly monitoring of student word knowledge. The program was effective, and its structure is similar to a Tier 2 Response to Intervention approach in which all students receive the basal program, and the low progress students receive additional small group instruction.

The implicit approach relies largely on students' own preparedness and capacity to interrogate the text to derive meanings of new words. The idea is to find clues in the context that help with the unknown word's meaning. This latter approach has been less successful for struggling students.[216] Additionally, word meanings can be gleaned from listening, discussing, and writing. However, Nicholson and Whyte warned that expecting incidental learning of words through reading stories to them was only effective with above average readers.[217] Ford-Connors and Paratore refer to several survey research studies noting that many teachers spent too little time engaging in vocabulary discussion, instead merely suggesting synonyms, and providing lists of words for dictionary investigation.[218] The authors describe how reliance on these strategies has been shown to be unproductive, and the dictionary approach may actually lead to imprecise and misleading understanding of word meanings.

The question for direct teaching is which words to teach, and how many? There are differences in the way researchers have addressed this issue. Beck and McKeown[219] argue for selecting and teaching intensively those words that have both immediate utility in age-appropriate text, but also are likely to be helpful in various other contexts, while, Biemiller argues for volume over immediate significance.[220] Thus, he supports introducing a much larger corpus of new words as a means of kick starting subsequent growth. Pressley, Mohan, Raphael, and Fingeret take a broader view that word introduction needs to be incorporated within a multi-strategy approach.[221]

There is research focusing upon just which words are most useful at the different stages of reading maturity. By determining what corpus of words is needed to read a particular literacy text, and then determining what 'precursor readings' would enhance the vocabulary needed for that particular text, a better understanding of which words to teach becomes possible.[222]

Morphology

Teaching about morphology can enable students to comprehend the meanings of new words based upon their structural similarity to known words. For example, if a student knows the meaning of the word *view*,

and the notion of prefixes, such as *pre*, then the new word *preview* can be understood without being directly taught. Students can become word detectives. When words share such a similarity they are known as word families, and when students are sensitised to seeking out similarities between a target word and a similar word that they know from the same family, they are more likely to derive the correct meaning.[223]

This is an area that only recently has become a focus for enhancing vocabulary. It is also important in reading and spelling, but has had little emphasis until the late primary grades, if at all.[224] Recent meta-analyses, such as by Goodwin and Ahn[225] and Bowers, Kirby, and Deacon,[226] have demonstrated its value in improving literacy from the early stages, in particular for the less able students who are unlikely to note these morphemic similarities without being taught how to do so. Morphological instruction has been to improve the performance of students in several literacy domains, and recently this has begun to include vocabulary.[227] One program that teaches these relationships is called Spelling through Morphographs.[228]

There are large differences by Grade 2 in the number of base words known by students.[229] Those who are alert to this morphological aspect of language have a distinct advantage subsequently in literacy, including in vocabulary. Nagy and Anderson estimated that when a child learns a word, there are up to three related words in English that children will be able to understand if they can make use of morphology to induce meanings.[230]

Strategic classroom discussion

Strategic classroom discussion can provide "a language-rich context in which to explore words' meanings and uses and to tie important vocabulary to texts and content."[231] The quality of these discussions is the major variable, but few teachers have been offered the training needed to make optimal use of these procedures. It is another potentially important addition to the range of vocabulary enhancement components of a comprehensive vocabulary program.

According to Ford-Connors and Paratore,

> "… greater student outcomes are associated with teachers who emphasise rich language, critical thinking, and conceptual understanding; connect content to students' backgrounds and experience; develop students' content *and* strategic knowledge; and emphasise instructional coherence through the links they created among instructional activities and within and across lessons and subject areas."[232]

The role of reading practice in extending vocabulary development

Even with the most efficient instruction, there is no possibility of directly teaching students all the words they need to know. The average number of new words taught in school in a year is about 300-500, yet students on average increase their vocabulary by 3000–4000 words a year.[233] By Year 12, students need to know over 100,000 words to comprehend the information in their texts.[234] Somehow, vocabulary needs to grow far faster than schools can teach it.

Large differences in reading practice occur, often consequent upon early reading difficulties, leading to diminished exposure to words, and lowered vocabulary development. How large might be these differences in reading practice?

In a study of Year One students, Allington noted that the number of words read per week ranged from 16 in the less skilled group to nearly 2000 in the upper group.[235] Nagy and Anderson estimated that struggling mid-primary readers may read around 100,000 words per year in school;[236] whereas, for keen students the figure is closer to 10,000,000, that is, a 100 fold difference. For out-of-school reading, Fielding, Wilson and Anderson (1986) suggested a similar ratio, noting that children at the 10th percentile of reading ability in their Year Five sample read about 50,000 words per year out of school, while those at the 90th percentile read about 4,500,000 words per year.[237] So, successful readers read more from the early stages, develop the habit of reading, and there is a mutually supportive relationship between their reading fluency, their vocabulary, and their reading comprehension.[238]

So, while good readers are continuously increasing their vocabulary and understanding of the world through their reading,[239] the struggling students compromise not only their vocabulary development but also their reading comprehension.[240] Continued vocabulary development is vitally dependent on the volume of reading, as other potential sources, such as conversation and television have much less impact on vocabulary growth than does reading.[241] Written language is not simply speech written down. It employs more complex structures and also includes far more rare words than does speech. Even magazines and children's books have more rare words than do adult conversation and television, and provide three times as many opportunities for the learning of new words.[242] Of course, reading volume is a crude variable. What is most helpful to vocabulary growth is reading frequency and quantity, reading widely, and of texts with age-appropriate complexity. Pfost, Dörfler, and Artelt found that the most powerful association with vocabulary was from choosing narrative (fiction) books. [243]

The process in which children who struggle to read initially then read less than those who are adept has been described as a 'vicious circle'.[244] The adept group, however, is in a 'virtuous circle', and its vocabulary knowledge accelerates, while the 'vicious circle' group languishes, and may even fall further behind over time as the gap between their volume of reading and that of their peers continues to grow. Such students are greatly and increasingly hampered throughout their education as vocabulary assumes even greater importance for reading comprehension over time.[245] Stanovich described this rich-get-richer-poor-get-poorer phenomenon as the Matthew Effect.[246]

Vocabulary and older students

Secondary school is characterised by an array of increasingly sophisticated concepts across all curriculum areas. Additionally, the complexity of language increases, representing a challenge to students. For older students who struggle to read, reading volume is low, the increasing educational demands threaten their progress, and quality vocabulary instruction remains a crucial contributor to their future.

Given what is known about the Matthew Effect, it is unsurprising that there is a direct relationship between the age of intervention and the increasing difficulty and cost of providing effective intervention.[247] Though some moderate success has been documented with systematic, explicit multi-focus interventions,[248] an additional focus on motivation is often required, as disillusionment can arise and act as a further obstacle to progress.[249] Due to the vocabulary chasm that usually becomes increasingly deep in the middle primary and through the secondary grades, the level of intensity of vocabulary instruction required by students follows a similarly steep gradient.[250]

The fate of such older students is clear and unpromising, and the message for the education system is early intervention saves time, money, and heartache. Later intervention, however difficult, is a matter of necessity.

So, to summarise, vocabulary should be paid a greater amount of attention because of its strong and enduring impact on overall reading progress. Early development rests initially with parents, and there are educational resources to both raise awareness and provide suitable activities. Preschools can play a role, and research is increasingly demonstrating its potential impact when evidence-based programs are instituted. While vocabulary development in the very early years is beyond schools to significantly control, the attention from children's school entry point can be very beneficial. Again research has shown that there are approaches that are more efficient and successful than others. Research has also shown the continued significance of vocabulary growth for academic success right through to the senior years.

Comprehension

What is reading comprehension?

> Reading comprehension is extracting and constructing meaning from written text using knowledge of words, concepts, and ideas.

We have already seen how important vocabulary is to reading comprehension, and that phonological processes are also significant. Important, too, are phonics and reading fluency. In fact, each of the five components highlighted in this series is related to the other components in some way.

Reading is not a natural process as are speech and language, with their specific brain areas dedicated to speech and language development, so we must recruit other brain areas and processes and have them function harmoniously if comprehension is to occur.[251] We must be able to say what is on the page using accurate and fluent word-level processing (decoding). We must be able to assign meaning to each word (vocabulary). We need to assemble these words into sentences, attending also to syntax and morphology to enable sentence comprehension. We need to retain this information while attending to subsequent sentences, continuously updating our understanding of the text. We must also make use of our knowledge of the world to supply further context.

Poor reading comprehension has multiple possible causes

The Simple View of Reading predicts that if decoding is compromised, so will be reading comprehension.[252] For beginners, the most common stumbling blocks for reading comprehension are inadequate decoding first, followed by vocabulary.[253] In a large study of over 400,000 students from Year One to Three, it was revealed that among students whose decoding and vocabulary were developing normally, less than 1% displayed reading comprehension problems.[254]

However, numerous potential disruptors to skilful comprehension have been identified: decoding; vocabulary; syntax; working memory; making inferences; monitoring of comprehension; domain knowledge; and text structure.[255] Ability to sustain attention, called 'attention-allocation', is also a factor in reading comprehension.

Often, comprehension difficulties observed by either formal testing or from teacher observation are addressed by teaching reading comprehension strategies. However, it should not be assumed the problem is at the reading comprehension strategy level until domains such as fluent decoding and vocabulary have been ruled out. If there are problems at these levels, then intervening solely at the level of reading comprehension strategies will not have the desired effect.[256] Unless one has the resources to tackle each domain intensively at the

same time, attention should be directed first to those compromised lower order processes.[257] In most cases, the reading comprehension issue will recede as the other processes advance. If not, then reading comprehension becomes a subsequent focus.

Accurate and fluent decoding

The importance of *accurate* decoding is clear: misreading words alters the meaning of the text, making comprehension less likely. One can sometimes garner the identity of troublesome words from the context; however, context clues are notoriously unreliable sources of word identity.[258] Error-prone reading is a very attention demanding process. Poor readers use four to five times as much physical energy in the left anterior lobe of the brain as do capable readers in completing the same phonological tasks.[259]

Fluent decoding is also important. All readers have a limited amount of attentional capacity to devote to the reading task. If the basic process of extracting the words from the page is laboured (slow and usually error-prone), readers will lose track of that which already has been read and be unable to follow the text's sequence of ideas.[260] Beginners and low progress students are also relatively slow at reading passages, leading to the additional obstacle to comprehension: a high demand on working memory that leads to an inability to remember what was in preceding sentences.[261] So, it is unsurprising that growth rate in oral reading fluency in Year 1 is the largest single predictor of reading comprehension in Year 3, with vocabulary being the next most influential.[262]

Attention-allocation may be a general problem for those students with attention deficits. However, other students may have low working-memory capacity which compromises their capacity to maintain information as they read.[263] For this latter group, improving decoding fluency can enhance comprehension. More attentional and memory capacity can be released when fewer precious cognitive resources are needed to decode what is on the page. Additionally for this group, the use of non-written media can be employed to teach comprehension processes and strategies as some comprehension strategies are also involved in listening comprehension. So, both listening to a text, or presenting a visual presentation of a narrative text, can be of value in teaching reading comprehension.

Prosody

Pressley asserts that beginning readers literally or figuratively listen to themselves reading in order to comprehend the written sentence as though it were spoken.[264] They are then able to employ their listening comprehension skills which are far better developed at this stage than is their reading comprehension capacity. So, they read in a way that is similar to speech. Arcand et al. found that reading with expression — that is, with appropriate changes in intonation and with attention to syntax and punctuation — enhances reading comprehension. [265] Perhaps, more directly relevant for those struggling with comprehension is the insertion of inappropriate pauses in a sentence that may occur due to decoding errors — necessitating re-reading and thus a failure of real-time comprehension processing. When words are read with pauses unrelated to the natural flow of speech, comprehension is seriously compromised. For older readers, this technique loses its value, as written sentences develop a style of their own that is not the same as speech.

Vocabulary

Once decoding ability is established, deficits in knowledge of words and language become more salient in comprehension.[266] Over time, the relative influence of reading fluency and listening comprehension (including vocabulary) on reading comprehension reverses. The correlation between fluency and reading comprehension falls from 0.9 to 0.77 over the Years 1 to 4, while the correlation between listening comprehension and reading comprehension rises from 0.70 to 0.90 over the same period.[267]

Wagner and Meros found that nine out of 10 Year 2 students whose decoding was fluent, but whose reading comprehension was inadequate, had a low vocabulary level. [268]

Initially, the number of words children understand in speech exceeds the number of written words they recognise, and hence vocabulary-related comprehension issues may be present but do not become evident until the middle primary years. A classic study on the 'fourth grade reading slump' noted that students with under-developed vocabulary in Year Three had reading comprehension problems evident by Years 4 and 5.[269] Effective early intervention can change the trajectory.[270] Fricke, Bowyer-Crane, Haley, Hulme, and Snowling completed a late-preschool year study with at risk pre-schoolers in which language intervention enabled reading comprehension problems to be avoided or ameliorated in the school years.[271]

Domain knowledge

A wide array of knowledge is not easily or quickly achieved, yet it is crucial to reading comprehension. Willingham considers that a wide vocabulary and a high level of background knowledge add more to reading comprehension over time than do comprehension strategies.[272] Compton, Miller, Elleman, and Steacy also highlighted domain knowledge as a necessary precondition for the outcomes of strategy instruction to be optimised.[273] Hirsch too argued in favour of domain knowledge over reading comprehension strategies as the major focus for instruction: [274]

> "Cognitive psychologists have determined that when a text is being understood, the reader (or listener) is filling in a lot of the unstated connections between the words to create an imagined situation model based on domain-specific knowledge...To understand language, whether written or spoken, we need to construct a situation model

> consisting of meanings construed from the explicit words of the text as well as meanings inferred or constructed from relevant background knowledge. The spoken and the unspoken taken together constitute the meaning. Without this relevant, unspoken background knowledge, we can't understand the text."[275]

Domain knowledge confers other advantages, too. Memory is easier to build when we start from a broad base of knowledge about a given topic. If you have no rich set of associations between aspects of a domain, then adding new knowledge is more difficult. The more you know, the less hard your brain has to work to incorporate what are simply additions to you but entirely novel to someone lacking such knowledge.

Effective teaching of reading comprehension skills and strategies

Fluent decoding and vocabulary are necessary skills for successful comprehension, but alone may be insufficient for the level of reading comprehension required in later primary and secondary schooling. For many students, directly teaching reading comprehension skills is necessary, and for students older than about ten years, reading comprehension becomes the most concerning focus.[276] Willingham argues that this is the optimal time to introduce comprehension strategies.[277]

The National Reading Panel commented about reading comprehension:

> "Teaching a variety of reading comprehension strategies leads to increased learning of the strategies, to specific transfer of learning, to increased memory and understanding of new passages, and, in some cases, to general improvements in comprehension."[278]

One way of determining what strategies might best be included is to consider how sophisticated readers approach text:

> "Good readers are extremely active as they read, as is apparent whenever excellent adult readers are asked to think aloud as they go through text. Good readers are aware of why they are reading a text, gain an overview of the text before reading, make predictions about the upcoming text, read selectively based on their overview, associate ideas in text to what they already know, note whether their predictions and expectations about text content are being met, revise their prior knowledge when compelling new ideas conflicting with prior knowledge are encountered, figure out the meanings of unfamiliar vocabulary based on context clues, underline and reread and make notes and paraphrase to remember important points, interpret the text, evaluate its quality, review important points as they conclude reading, and think about how ideas encountered in the text might be used in the future. Young and less skilled readers, in contrast, exhibit a lack of such activity (e.g., Cordón & Day, 1996)."[279]

Most reasonably frequent readers will acquire at least some strategies for comprehension informally. They will realise it requires an active process of bringing what you know to make sense of what you read. However, as text complexity increases these simple strategies may be insufficient for full comprehension. Strategies are procedures students can use to guide them in unravelling a text's true meaning. At their simplest, they may be of the *who, what, where, why* question type. They are sometimes called meta-cognitive strategies because they ask us to think about our thinking in order to aid our understanding. *Meta* means above, so we are monitoring our own thoughts using even higher cognitive processes.

Some of the common strategies are described by Cooper, McWilliams, Boschken, and Pistochini.[280]

Reciprocal teaching: Teacher and students take turns acting as teacher, modelling the strategies after reading a portion of a text. It has often been said that an excellent way to learn a skill is to attempt to teach it to others. A caveat to this approach is offered by Mason who noted that there can be error problems transmitted from student to student unless careful oversight is taken by teachers, especially with low-progress students.[281]

Summarising: A task once common in schools was instruction in how to produce a précis – a written summary of a passage that has just been read, that is brief, but contains the main thrust of the passage. Directly teaching the strategies involved in précis production, along with the active processing of information required by the task, have also been shown to improve comprehension. Thus, learning how to summarise helps students identify and integrate the most important information in the text.

Sentence combination: As with summarisation, having students practise combining two or more sentences has been shown to enhance comprehension.[282] Both strategies direct closer attention to the substance of a text, and it may be this feature that has the impact on comprehension.

Questioning: This involves students in formulating their own question about the text that can be answered from within it. Initially, questions are directed at specific text information. Subsequently, this approach progresses to using the text plus one's own domain knowledge to produce inferential and evaluative questions. Again, the strategy scaffolds increasingly deep analysis of what one is reading. Comprehension improves when analysis is deeper rather than shallow. At the extreme, skim reading would normally produce a shallow analysis.

Clarifying: Students learn to monitor their comprehension, and rescue the meaning that eludes them, by recourse to domain knowledge, syntax, word meanings, or word pronunciations. Even encouraging students to pause when they recognise a failure

of comprehension is an important step in reading comprehension improvement. Some students disregard a non-comprehended sentence, hoping it will all turn out okay in the end.

Predicting: By asking *What do I think will occur in this passage?* students are orienting themselves to the task, and can then draw on relevant background knowledge of the topic. There is also a motivational benefit, as students having posed the question are more likely to read on to solve the puzzle.

Mapping: Another common strategy involves visualisation and graphic organisers to aid the comprehension and recall of text meaning. Story maps and concept maps provide a concrete format to assist the visualisation. The intent is to support students to seek main ideas and their supporting details, so as to understand the relationships between them.

Inference making: There is increasing focus on the importance of inference-making; that is, how to use background knowledge to enable inferences to improve reading comprehension.[283] All text contains a writer's assumptions about what the reader will already know. These holes in the meaning must be filled by the background knowledge of the reader or comprehension will not eventuate. The more relevant knowledge a reader has, the easier is the reading and the comprehension. So, inferences must be made. Teaching how to do this will lead to a reduction in fluency because the process is initially slow. However, with practice the process becomes automatic, occurring quickly and without conscious attention.

How much time should be spent on teaching reading comprehension strategies?

The proportion of time spent on comprehension should be student-dependent, that is, based on need. As the texts become more complex, requiring more advanced comprehension skills, so too students will differ in the degree to which they require assistance.

As described above, there are many interacting skills involved in reading comprehension, but how much time is needed just for the comprehension strategies described earlier, such as main idea strategy instruction, mapping, summarisation, and questioning? Willingham sees the knowledge of comprehension strategies as a one-time boost to reading (requiring only five to ten 20-30 minute sessions) rather than being a long-term curriculum topic, apart from the occasional review. He argues that once a student has learned a range of comprehension strategies, there is little value in continuing with further such teaching, particularly after about Year 7.[284]

Mason also noted that the effects of their strategy intervention once developed, remained stable over time.[285] Yet, a self-developing system of new strategies did not eventuate. Further research is needed to consider whether there is a need for more complex strategies for the increasingly complex text students meet over time, or whether the learned strategies do not require additional emphasis beyond the initial instruction.

Effective interventions for struggling readers: explicit instruction in comprehension strategies

Swanson and Sachse-Lee reported a meta-analysis of 30 years of studies of reading comprehension interventions.[286] The strongest effects occurred in studies that incorporated explicit instruction as their curriculum delivery method. This entails small highly interactive groups employing a mode of instruction that emphasised an initial orientation to a task, followed by teacher modelling of steps when presenting new material that had also been optimally sequenced. Sufficient opportunities for student responses, corrective feedback, massed and then spaced practice, and ongoing monitoring were also elements of the effective systems. The ultimate objective of this demonstration-practice-review mode is the students' internalisation of the strategies, so that eventually they can summon up the relevant strategy as needed without further assistance.

Subsequently, and increasingly, research has supported the systematic and explicit model of instruction and there has been continued attention on what is the optimal mix of comprehension strategies to enhance the ability of all students to make sense of what they read.[287] Hairrell et al. noted also that when teachers were provided with professional development on comprehension programs student outcomes were optimal when they implemented the approaches with fidelity.[288]

More recent research has been generally supportive of the role of strategies, such as main idea strategy instruction, comprehension monitoring, mnemonics, mapping, summarisation, and questioning.[289] Multiple strategy instruction has had strong support.[290] The common finding across the Solis et al. cohort of studies with upper-primary school low-progress readers was the strong impact of the teaching method: explicit instruction that included modelling, feedback, and opportunities for practice.

Ciullo and Reutebuch provided a systematic review of the use of computer-based concept maps in classrooms for low-progress readers in Years 4 to 8.[291] Teachers were able to successfully make use of them, and the computer-based delivery was motivating to the students. Student comprehension was improved, but only when the teachers employed explicit instruction, guided practice, feedback to support learning, and taught students to use the software proficiently.

The Elbro and Buch-Iversen short, eight-lesson training study in inference-making produced a large effect on reading comprehension for the subjects.[292] It appears some students already have unused comprehension capacities, but need direction to incorporate them into their day-to-day efforts at understanding what they read. The results were impressive, even when other possibly confounding variables such as word decoding, receptive vocabulary, and verbal IQ were taken into account.

McMaster, Espin, & van den Broek had students think aloud when reading passages in order to access the strategies they were employing.[293] The students who

struggled with comprehension tended to restrict their strategy use to one of two kinds — frequent paraphrasing and text repetition, or making elaborative inferences, rather than choosing strategies most suitable for a given task. The authors believe these predilections are alterable, and suggest how teacher guidance may make them more flexible in their approach, given the task characteristics of the current passage under consideration — including directing students to attend to important, highly connected parts of the text they are reading, and providing explicit feedback that is responsive to individual students' ways of processing text.

There appears to be an underlying commonality in the various strategies — they involve the reader in actively interacting with or *interrogating* the text. It is also significant that no single strategy is universally effective. Compton et al. also consider that perhaps it is not the content of the actual strategies that are the causal factors.[294] Perhaps the process of employing strategies evokes "deeper engagement with the text and awareness of the need to monitor comprehension."[295]

Older students

There has been research focussing on older students. Generally speaking, the same issues arise as they do with younger students, and similar intervention approaches (with age-related adaptations where necessary) are effective with this cohort.[296] Scammaca et al. found that well-designed interventions focussing on both word level and text level issues could be equally effective with adolescents as with younger students.[297] Similarly, Vaughn et al. noted that effective programs for secondary school students offered targeted structured reading intervention addressing variously comprehension, multiple reading components, and word-recognition strategies.[298]

Reading comprehension is difficult to assess

Given the less well developed state of research into reading comprehension compared with the lower-order aspects of reading, it is unsurprising that current testing instruments also have their problems. Comprehension is difficult to observe and assess, as there are many processes at work simultaneously.[299]

Garcia and Cain in their meta-analysis of 110 studies and 42,000 readers noted differences in comprehension assessment results depending on the assessment tasks chosen and the activities students were required to complete.[300] Thus, the nature of the assessment can influence the obtained reading profile, a finding also emphasised by Keenan, Betjemann, and Olson.[301] Across tests, there may be differences in the format of the comprehension materials, the type of reading comprehension task, expository versus narrative passages, the information assessed (e.g., literal or inferential questions), whether re-reading is accepted, whether tests are time limited or not, and whether participants must read the test items themselves. Their recommendation is to be aware of this variation, and to combine different measures and materials and procedures to fully assess reading comprehension.

Much of the intervention research has involved experimenter-devised tests, and these have often produced larger effect sizes than have standardised tests when evaluating the same instructional method. Experimenter-devised tests may favour the intervention group over the control group if the test items are very closely aligned to the curriculum taught, but not to the control group. The control group may receive different content, or a briefer intervention.[302]

For the studies on *question generation*, the average effect size averaged about 0.90 for experimenter-written tests, which is a large effect; whereas, for standardised tests, the average effect size was small at 0.36. The pattern was similar for the multiple strategy instruction experiments in which for experimenter-written tests the average effect size was 0.88, and for standardised tests, only 0.32.[303] Clearly some consensus is needed about what forms of comprehension assessment are optimal for a specific given purpose.

Standardised comprehension tests are predicated on the assumption that there is a consensus on what are appropriate, progressively increasing grade levels of comprehension. However, there are many variables to cloud interpretation of results. Grade level materials can be analysed on the basis of their readability, usually utilising one or other algorithms based upon word length, word prevalence, and sentence length. However, difficulty levels of vocabulary and syntax can vary significantly across tests, and are not quantified by readability measures. Are the questions literal or inferential? Inferential questions are usually considered harder than literal questions, but both have difficulty levels along a continuum. A weakness, then, of comprehension measures is that the methods chosen are only indirect indicators of whether the reader has 'got it', and to what extent. And each of the numerous and varied methods tried has had its own set of weaknesses, whether issues of validity (particularly for individual scores), external accountability, reliability, or generalisability.[304] Perhaps, future brain imaging techniques will provide more insight into the process of comprehension, thereby leading to more precise assessment tools.

Miller et al. were interested in the interplay between text characteristics and reader characteristics in reading comprehension assessment.[305] They described text variations — whether a text was cohesive, that is, requiring little inference-making, how readily decodable it was, and the complexity of vocabulary and syntax. Student variations included their decoding fluency, morphological knowledge, vocabulary knowledge, the capacity to hold previous information and integrate subsequent ideas, and employ inference skills, and relevant background knowledge. The authors consider that for assessment to guide intervention it needs to account for these co-variations. They too found that task variation did indeed interact with student skills, such that some common assessment tests may produce markedly different outcomes for a given student than did tasks in a different assessment tool. As tools vary in passage length, genre, topic, and format this finding indicates

the need for the development of more sophisticated assessment devices.

As an example of improved assessments in the future, Sabatini, O'Reilly, Halderman, and Bruce recommended a more authentic scenario-based comprehension assessment approach in which students are asked to read a range of sources to complete a particular reading task.[306]

The authors describe the scenario-based comprehension assessment as:

> "Test takers are provided with a specific purpose for reading (e.g., studying for a test, preparing for a class presentation, etc.) and a set of materials (e.g., websites, blogs, newspaper articles, Op Ed pieces, authoritative texts, etc.). Test takers progress through the materials in a structured, scaffolded way that enables them to: demonstrate different dimensions of comprehension (e.g., conceptual and social); learn, remember, and organise what they read; manage their learning through strategy use; and apply, synthesise, and extrapolate what they have learned to satisfy their original purpose for reading. The benefits of properly designed and implemented innovative task designs such as those used in GISA include increased construct relevant sources of variance, decreased construct irrelevant variance, alignment to theories and effective instruction, and improved examinee motivation and engagement (Mislevy & Sabatini, 2012)."[307]

Clearly, this style of comprehension assessment is far more complex and time-consuming than the traditional read-a-passage-and-answer-some-questions style. Sabatini et al. also recognised that the major determining factor in comprehension success remained the students' basic reading skills. Thus, they developed a dual assessment that considered whether a problem was due to language-based analytic/evaluation skills or insufficiently developed component skills that are needed for success, such as fluent decoding skills. Hence, their battery includes word recognition and decoding, vocabulary, morphological awareness, sentence processing, efficiency of basic reading comprehension, and a traditional reading comprehension test — in order to ascertain the required intervention focus for students who are struggling with reading comprehension.

To conclude, the research on reading comprehension is less well advanced than is the research on lower-order processes. However, research is continuing apace, and there are some exciting and, one hopes, fruitful lines of enquiry such as those described in this paper.

Explicit instruction

What is explicit instruction?

The term explicit instruction involves the teacher directly instructing the students in the content or skill to be learned, employing clear and unambiguous language. Teacher modelling, teacher guidance, and then students producing the relevant outcomes/answers with specific and immediate feedback, is followed by scheduled opportunities for practice. Student/teacher interaction is high, and their responses are many. Students are made aware of the objectives, and what is required of them.[308]

Explicit instruction is also systematic: there is a carefully planned sequence for instruction, not simply a spur of the moment approach. The plan is constructed in a logical sequence that proceeds in a hierarchy from simple to complex objectives. There is a planned and observable outcome of the instructional sequence, and the sequence commences from the point at which the students are already competent. The sequence is usually dissected into manageable chunks that are presented without ambiguity.

Some teaching methods are more effective than others

Education has always been ready to adopt new ideas, but without large-scale evaluation and scientific data analysis it was not easy to detect whether any innovations enhanced or inhibited student progress. As recently as 2009, there have been criticisms that programs are not routinely evaluated by some education authorities.[309] Perhaps that failing represents a remnant of the belief that education is incapable of influencing a student's progress in school and beyond.[310]

The Coleman Report and other studies deflated many in the educational community when they reported that what occurred in schools had little impact on student achievement.[311] It was argued that the effects on educational outcomes of genetic inheritance, early childhood experiences, and subsequent family environment vastly outweigh school effects. That being the case, there would be little point in stressing a particular curriculum or teaching model over any other since the effects would be negligible compared to other variables outside a school's control. Fortunately, this perspective has been challenged[312] and it is now clear that teaching can be a powerful influence on student attainment, and further that there are attainment differences associated with different teaching approaches.

A brief history of the effective teaching research

Attempts to enhance student attainment through factors external to the classroom have not generally produced strong outcomes.[313] Through further research and powerful statistical methods, it has become apparent that system input into, for example, the financial aspects of teaching — salaries and higher degrees for teachers — have not been shown to strongly influence student achievement.[314] Similarly, huge expenditure on modest reductions in class size has not met with improvement in student outcomes in Australia and elsewhere.[315]

A major school influence on student achievement is now, clearly, classroom practice. According to Hattie, what students bring to their learning accounts for 50% of the variation of achievement; but even so, 30% of the variation is still attributed to teaching variables.[316] Wenglinsky reported a total standardised effect for teacher variables as 0.70, larger than the total standard effect of background measures such as socio-economic status (0.56).[317] Based upon his analysis of empirical findings available since the 1970s, Jencks altered his earlier view, and accepted the potential of education to significantly reduce inequality in student achievement.[318] Sanders and Rivers found that students who were in classes with very effective teachers (in the Rosenshine sense) for three years in a row achieved 50% more learning than those in classes with ineffective teachers over the same period.[319]

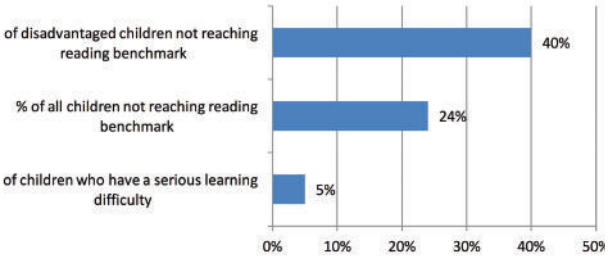
Hanushek found that effective teachers achieve for students a learning gain of 1.5 grade level equivalents;[320] whereas ineffective teachers may produce a gain of only 0.5 grade level equivalents. Thus, variation in the quality of teachers may produce a difference of up to a full year's learning growth. In Australia, Hill and Rowe observed that differences among classrooms within schools were greater than differences among schools.[321] They pointed out that these differences between classrooms are important foci in improving school performance. What individual teachers do in those classes is pivotal for student learning.[322]

Auguste, Kihn, and Miller reported that students at the 50th percentile (i.e., the average student) may differ by more than 50 percentile points after three years, depending on the quality of their teachers (teachers among the top 20% vs those among the bottom 20% for each of the three years).[323]

Project 'Follow Through'

Any discussion on the history of the development of explicit instruction should include a ground-breaking study known as Follow Through, a major study federally funded in the USA in the late 1960's, arising because of a concern about the poor educational outcomes for disadvantaged students.

Figure 3: Cumulative effect of teacher quality over three years



Source: Auguste, Kiln and Miller (2010)

Follow Through was aimed at the primary school stage, and was designed to determine which methods of teaching would be most effective for disadvantaged students throughout their primary school career.[324] It was a huge study — involving 75,000 children in 180 communities over the first three years of their school life. It has been the largest educational experiment ever undertaken, extending from 1967 to 1995, at a cost of almost a billion dollars. There were comparisons across 20 competing sponsors covering a broad range of educational philosophies. They included child-directed learning, individualised instruction, language experience, learning styles, self-esteem development, cognitive emphasis, parent-based teaching, Direct Instruction, and behavioural teaching. Each of the 20 sponsors had extensive requirements for program design, implementation and evaluation.[325]

The models can be reduced to three distinct themes — those emphasising basic academic outcomes, cognitive development, or affective development. The targeted basic skills included reading, language, spelling, writing, and maths. The models that emphasised the systematic teaching of basic skills (Direct Instruction, and Behaviour Analysis) performed by far the best across the skill areas; most of the other models failed to produce results better than those of the control groups, comprising students receiving usual classroom education.[326]

In reading, the Direct Instruction model, which also has a strong phonic emphasis, had the most impressive results in both academic and affective areas. Later follow up studies of the DI students showed "strong consistent

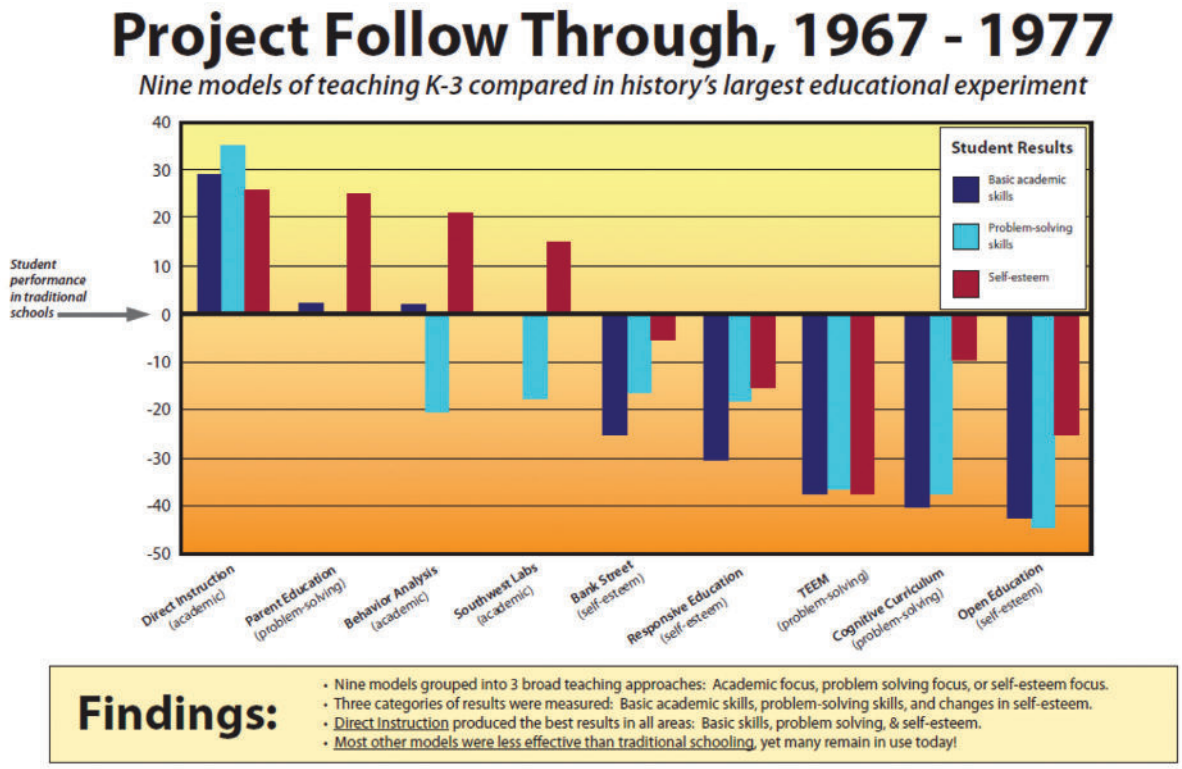


Image from Education Consumers.Org

long term benefits in reading" three, six, and nine years after the DI students completed Follow Through. The effects were evident in higher achievement, fewer grade retentions, and more university acceptances than in comparison groups that had traditional education in the same communities.[327]

In recent years, there have been attempts to isolate, quantify and rank the specific practices in schools and classrooms that have an impact on how much students learn. The intent of these exercises is to allow system authorities, principals and teachers to focus their efforts and resources on activities that are likely to yield the greatest outcomes.

John Hattie's research synthesis, *Visible Learning*, examined the research evidence for dozens of student- and school-related variables. Since most variables have been found to have a positive relationship with learning outcomes, the more pertinent question is which have the largest impacts. Hattie posited an effect size of 0.4 as a benchmark for variables that have a noticeable 'real world difference'.[328]

In addition to evaluating and rating the effectiveness of educational programs, What Works Clearinghouse indicates the strength of the evidence to support their findings, based on the number of studies and their methodological rigor. The Australian Teaching and Learning Toolkit, which is based on work done by the UK Education Endowment Foundation and Sutton Trust, was devised as a guide for educators and administrators.[329] It adds a further piece of information — the relative cost of implementation.

These are welcome developments in education research and analysis. They promote and give credence to high quality studies. These syntheses routinely find high impacts of explicit teaching methods, particularly for reading instruction. Hattie's meta-analysis found strong effects on student achievement for the key components of effective, evidence-based reading instruction (effect sizes greater than 0.4) and weak effects for discovery learning and whole language approaches (effect sizes less than 0.4).

Table 1: Effect sizes from Hattie's meta-analysis (2009) —Benchmark of 0.4 for 'real world' impact

Effective, evidence-based reading instruction	Constructivist/discovery approaches
Phonics 0.6	Whole language 0.06
Vocabulary programs 0.67	Exposure to reading 0.36
Comprehension programs 0.58	Student control over learning 0.04
Mastery learning 0.58	Mentoring 0.15
Worked examples 0.57	Inquiry-based teaching 0.31
Spaced practice 0.71	Problem-based learning 0.15
Feedback 0.73	
Questioning 0.46	
Direct instruction 0.59	

The Australian Teaching and Learning Toolkit lists phonics, reading comprehension, mastery learning and feedback among the teaching strategies with the highest impact, strongest evidence-base and lowest cost of implementation.

Explicit instruction v discovery learning

There are essentially two approaches to teaching. The first is 'explicit' or 'direct'—*I tell you*—and the second is 'discovery' or 'inquiry'—*You find out for yourself*. These approaches are rarely used in their extreme forms. In practice, the two approaches represent a continuum rather than a dichotomy. Thus, there are degrees of explicitness in instruction through to degrees of discovery learning.

There is a strong body of research supportive of a systematic, explicit approach generally, but particularly when it involves learning of new concepts and operations, and also for students who struggle with learning.[330] By contrast, approaches that are student-led, unsystematic, and rely largely on personal discovery have not been supported by evidence.

> "After half a century of advocacy associated with instruction using minimal guidance, it appears that there is no body of sound research that supports using the technique with anyone other than the most expert students. Evidence from controlled experimental (a.k.a. "gold standard") studies almost uniformly supports full and explicit instructional guidance rather than partial or minimal guidance for novice to intermediate learners. These findings and their associated theories suggest teachers should provide their students with clear, explicit instruction rather than merely assisting students in attempting to discover knowledge themselves."[331]

Explicit instruction

During the 1970's, studies of classroom instructional processes began in earnest. What was it that effective teachers did, that was missing from the repertoires of ineffective teachers? Attention was thus drawn to instruction rather than to learner deficits. Engelmann[332] and Skillman, Garcia, and Witcher argued that a student's failure to learn should be viewed as a consequence of a failure to teach effectively.[333] Rosenshine used the expression direct instruction to describe a set of instructional variables that tied teacher behaviour and classroom organization to higher levels of academic performance for primary school students.[334] High levels of achievement were related to a number of variables—among them being the amount of content covered and mastered, the amount of student academic engaged time, having an academic focus rather than an self-esteem emphasis, teacher-centred rather than student-centred classrooms, low cognitive level questions, a high success rate (above 80%), and immediate and academically oriented feedback to students. These were some of the features noted among teachers who achieved results above those of their peers.

Barak Rosenshine created 10 instructional principles to assist teachers in lesson structure plans (which form the core of recommended steps for direct or explicit instruction).[335]

1. Begin a lesson with a short review of previous learning.
2. Present new material in small steps with student practice after each step.
3. Ask a large number of questions and check the responses of all students.
4. Provide models.
5. Guide student practice.
6. Check for student understanding.
7. Obtain a high success rate.
8. Provide scaffolds for difficult tasks.
9. Require and monitor independent practice.
10. Engage students in weekly and monthly review.

In recent years, there have been many studies highlighting both the importance of this model of effective teaching, and its identifying qualities. For a detailed review of research in this area, see Archer and Hughes.[336] An example of such findings is below:

> "The results of this study suggest that effective teachers whose students score high on standardized tests in urban school settings actively engage their students in learning in a teacher-centered classroom. These teachers are consistent in following set rules and procedures resulting in instructional flow as students stay on task. The teachers have developed rapport with their students through good verbal and nonverbal communication skills. Their focus on instruction seems to be linked with seamless classroom management. These teachers are committed to helping students learn through the use of repetition as a means of ensuring student understanding of concepts and skills."[337]

A report on effective teaching strategies produced by the NSW Centre for Education Statistics and Evaluation (CESE) include explicit teaching among the seven approaches that have a high impact on student learning, and a rigorous evidence-base for their effectiveness. The report highlighted explicit phonics instruction as a particularly strong example.

> Explicit teaching was first evaluated during the 1960s in 'Project Follow Through', a ten-year study involving over 72,000

> students (including control groups)…This research demonstrates that 'when dealing with novel information, learners should be explicitly shown what to do and how to do it'. Subsequent studies have confirmed the original findings about the benefits of explicit teaching, which has been found to be particularly effective for disadvantaged children. One review of meta-analyses in this area concluded that 'citing an individual study to prove that direct instruction doesn't work is like citing a rainstorm in Tucson to prove that southern Arizona isn't a desert. The preponderance of evidence shows otherwise'. Another review of evidence found that the empirical research was overwhelming and unambiguous.[338]

An analysis of nine high-performing and high improvement schools in Western Australia in 2015 found that seven schools had adopted explicit instruction pedagogy across the curriculum, and all nine schools used explicit and systematic phonics instruction for teaching reading.[339]

Discovery learning

Some have argued that learning by discovery is a superior form of learning, and leads to learning being retained more strongly, through students subsequently embracing exploration as their approach, and through increased student motivation. Though there have been some problem solving domains in which this outcome may occur, there is scant evidence for it as a general finding, and in the literacy domain in particular.[340]

> "Like some zombie that keeps returning from its grave, pure discovery continues to have its advocates. However, anyone who takes an evidence-based approach to educational practice must ask the same question: Where is the evidence that it works? In spite of calls for free discovery in every decade, the supporting evidence is hard to find."[341]

From the constructivist perspective, as exemplified by the whole language philosophy, student reading progress is largely self-determined, and thus teachers should act not as instructors, but as facilitators.[342] This approach to reading assumes that children will discover the alphabetic principle through exposure to print and through their writing experiences. Within this whole language approach, teachers are expected to react appropriately to student-initiated direction, rather than expect students to respond to a curriculum presented in a preplanned, systematic manner. The level of student engagement determines how much learning occurs. Good relationships evoke student engagement, and thus the ability to establish relationships with students becomes the single most important quality for a teacher. Further, it is implied that teacher centred instruction is not compatible with good teacher/student relationships. An additional assumption of the whole language approach is that students should learn at their own pace, and in ways consistent with their learning style. If these constructivist principles are accepted, then student centred learning becomes the *a priori* preferable method of ensuring student success, and empirical data is unnecessary.[343]

Minimally guided instruction

The term 'minimally guided instruction' has been coined to cover those strategies that offer some guidance rather than constituting pure discovery. Is minimally guided instruction useful in any settings? There is some evidence that when students are of high aptitude and have already established understanding of a domain, then minimally guided instruction can be helpful. Thus, the level of instructional guidance should vary with student need, sometimes described as differentiated instruction. For initial instruction in a skills/knowledge area, however, systematic instruction is generally found to be superior. Additionally, when students are not when students are not self-starters, they are inclined, are inclined to struggle with new learning, then again systematic instruction is generally found to be superior.

One finding of interest has been that discovery approaches typically require substantially higher levels of practice in order to have a beneficial impact.[344] When considering the needs of low progress students there is a strong requirement for instructional efficiency, and student learning time should be carefully conserved. When students have fallen behind their rate of learning is below average. If they are to catch-up it can only be because they are now learning faster than average, because the other students continue to progress while an intervention is implemented with those who are behind. To achieve accelerated learning requires exemplary programs that teach more in less time. That is, they are efficient in design and implementation.[345]

One reason for the superiority of systematic instruction in most settings is offered by cognitive psychologist John Sweller, and is known as Cognitive Load Theory.[346] The demands on working memory are greater when a student is engaged in their own process of discovery than when they are being taught through explicit teaching. The act of construction is cognitively expensive. It involves processes of managing attention, analysis, sequencing and applying strategies, applying meta-knowledge and thinking processes, and holding components in memory. The additional cognitive load that is consequent upon the unstructured discovery approach makes the learning more difficult, and thereby less successful. In explicit instruction these processes have been at least partly completed for the student making the learning task less onerous.[347]

Table 2: Summary of explicit teaching v discovery learning

	Salient features	Learning objectives	Dominant approaches
Structured teaching approaches	✓ Basic principles: mastery learning; progression from simple to complex ✓ Directiveness ✓ Explicit teaching of contents ✓ Modelling ✓ Independent and guided practice	✓ Mastery of content ✓ Academic achievement ✓ Acquiring learning strategies	✓ Direct instruction ✓ Explicit teaching
Discovery-based teaching approcahes	✓ Basic principles: the child, focus of attention; progression from complex to simple ✓ High interactivity ✓ Building knowledge through investigation/discovery ✓ Inter-learning ✓ Situated cognition	✓ Conceptual understanding of contents ✓ Critical analysis ✓ Problem-solving skills	✓ Whole language ✓ Constructivism/discovery learning ✓ Cognitively oriented curriculum ✓ Developmentally Appropriate Practices

Source: Gauthier and Dembele (2004).[348]

The importance of systematic explicit instruction in literacy development

In reading, there has long been substantial agreement among researchers about how best to initiate reading instruction.

> "A number of major studies have demonstrated the importance of direct or explicit instruction to student learning. Explicit = direct instruction has been shown to be efficacious in learning and teaching the major components of the reading process — phonemic awareness, phonics, fluency, vocabulary, and comprehension (National Institute of Child Health and Human Development, 2000). Baumann and Duffy (1997) of the National Reading Research Center summarized the key ideas that are instrumental in fostering motivated, lifelong readers. Five years of research on fostering reading growth showed that reading skills and strategies can be taught effectively and efficiently in preschool and elementary school reading programs when instruction is systematic and explicit."[349]

The debate over effective teaching is not simply technical. Reading researchers over the years have argued that the notion of learning to read by discovery is cavalier and prejudicial to the progress of at-risk students — those least likely to induce the alphabetic principle, and who make up the majority of the children who do not learn to read adequately.[350] 'Discovering' how to read is time-wasting and fraught with risk. If it were true that everyone has a unique reading style it would be understandable, but neuroscience has shown how similar are the processes we employ in reading. Those who read well share a distinctive neural signature, and those who do not read well also share a different but distinctive neural signature.

> "It simply is not true that there are hundreds of ways to learn to read […] when it comes to reading we all have roughly the same brain that imposes the same constraints and the same learning sequence."[351]

An influential report by Snow, Burns, and Griffin under the auspices of the US National Research Council was published in 1998.[352] Without being overtly critical of discovery learning, the report made clear the significance of explicit and systematic teaching of the alphabetic principle, a point made even more strongly by the National Reading Panel in 2000.[353]

> "Beginning readers need explicit instruction and practice that lead to an appreciation that spoken words are made up of smaller units of sounds, familiarity with spelling-sound correspondences and common spelling conventions and their use in identifying printed words, "sight" recognition of frequent words, and independent reading, including reading aloud. Fluency should be promoted through practice with a wide variety of well-written and engaging texts at the child's own comfortable reading level."[354]

The tension between constructivist ideologies and direct teaching continues across the basic skills in education, not solely in reading development. However, the case for explicit instruction over minimally guided instruction is strong:

> "At the current state of knowledge, it is adequate to conclude that the systematic instruction of letter-sound correspondences and decoding strategies, and the application of these skills in reading and writing activities, is the most effective method for improving literacy skills of children and adolescents with reading disabilities.[355]

"We now know that the whole-language approach is inefficient; all children regardless of their socioeconomic backgrounds benefit from explicit and early teaching of the correspondences between letters and speech sounds. This is a well-established fact, corroborated by a great many classroom experiments. Furthermore, it is coherent with our present understanding of how the reader's brain works."[356]

Explicit instruction is especially important for children at risk of reading failure

It is important to note that explicit instruction in basic skills is beneficial to all students. Instructional time in class is fixed, so efficiency in teaching basic skills enables all students to learn more in less time. However, a major concern with educational attainment is the gap between the affluent and the middle class on one hand, compared with those from low-income and minority groups. Data from the National Assessment Program for Literacy and Numeracy (NAPLAN) show that students with parents from the lowest status education and occupation groups are six to seven times more likely to fail to reach minimum reading standards than students whose parents are in the highest status groups.[357] Similar literacy gaps are found in international assessments.[358]

Studies have persistently found a 'moderate' statistical relationship between socioeconomic background and literacy achievement, but there is evidence to suggest that rather than being a direct causal influence on literacy, socioeconomic status is a proxy for other mediating factors. In the early years, the language and literacy environment provided by parents is strongly implicated.[359] When children reach school age, the quality of instruction is highly salient.[360]

High-quality reading instruction can reduce literacy gaps.[361] In a longitudinal study of Canadian children from Kindergarten to Grade 5 in which children were provided with a 'rich' initial and on-going literacy program which included explicit instruction in phonemic awareness and phonics, initial literacy gaps associated with socioeconomic status decreased with each year of school and were no longer evident in Grade 3.[362] In the 'Clackmannshire study', no literacy gaps between socioeconomic groups remained among children who had been given synthetic phonics instruction as part of a balanced literacy program, up to Grade 5 for comprehension and Grade 7 for reading and spelling.[363]

If effective literacy methods are especially beneficial for struggling readers, particularly those from socioeconomically disadvantaged backgrounds, the corollary is that they are more adversely affected by the absence of high-quality literacy instruction.

Genes can influence the effects of life experiences, and those life experiences can influence the manner in which those genes are expressed. In disadvantaged families, 60% of the variance in IQ is accounted for by the environment, particularly the educational environment. This makes high quality teaching a much more important requirement for such low progress students. Teacher effectiveness varies considerably across education systems.

> " … high value added teachers have a different profile of instructional practices than do low value added teachers. Teachers in the top quartile as measured by value added scores score higher than second quartile teachers on all 16 elements of instruction that were measured. The differences are statistically significant for a subset of practices including explicit strategy instruction"[364]

Unfortunately, the disadvantaged group is less likely to receive high quality instruction than are their more advantaged peers. For example, advantaged students are more commonly situated among studious peers in orderly classes have the opportunity to learn more. Further, teachers are able to produce their best because they are less distracted and exhausted by classroom management concerns.[365]

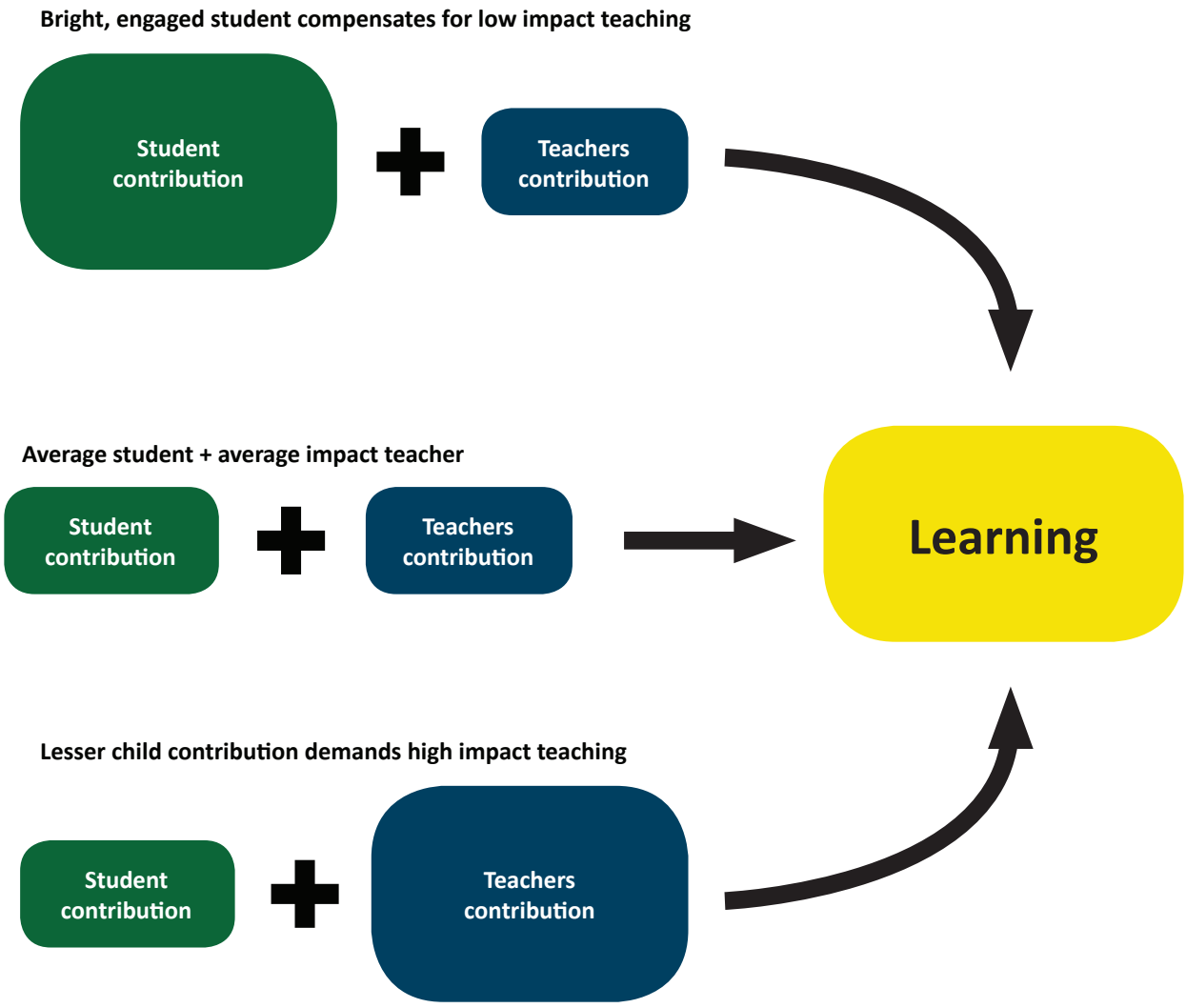
> "Clearly, there is a tremendous interaction effect between longitudinal exposure to ineffective teachers and effective teachers when crossed with prior student achievement level. A sequence of ineffective teachers with a student already low achieving is educationally deadly." [366]

One way to think about the particular need for high quality teaching for disadvantaged students is to consider the interaction between what the student brings to the learning task and what is contributed by the teacher and school.

Learning is likely to occur when there is sufficient *capital* in the learning setting, whether provided by the student or the system. The student brings (in no particular order) intelligence, attitude, motivation, resilience, attendance, prior learning, parent influence, and sibling and peer history.[367] The capital produced by the interaction of these student qualities may be strong, average, or weak.

The system brings curriculum, teacher quality, and infrastructure. Similarly, the system qualities may be strong, average, or weak. For students who can only contribute little, it is incumbent upon the system to provide more for that cohort than is necessary for other less needy students. Our education system struggles to meet this goal of providing quality education for all.

Figure 4: Why some students do well in the absence of effective instruction, while others struggle.



These boxes are not necessarily immutable. For at least some students the improvements in their attainment wrought by successful intervention will enable them to supply more capital to subsequent learning tasks, thereby requiring less from the education system to achieve success. The earlier these interventions are introduced, the more likely that the at-risk students are able to reduce their demand upon the system.

Conclusions

After thousands of hours of literacy teaching, around one in four Australian children is unable to read at a basic level.[368] Reading scientists estimate this is at least five times the number of children who will have significant difficulty learning to read if they are taught well.[369] As this report shows, there is an extensive and rigorous body of evidence about how children learn to read and the most effective ways to teach them. Unfortunately, this research is not always reflected in teacher education or classroom practice.[370]

There are reams of information about the results of high quality educational research. However, linking this research to the world of teachers has been problematic. Research journals are expensive, teachers have not typically been trained to seek out and interpret these resources, and there often remains the thorny issue of implementation of research into effective practice.

> "First, research reports are inaccessible to many practitioners. Second, there is a lack of professional norms for practitioners to engage with research. Third, very few practitioners and policy makers carry out research. Fourth, educational researchers, policy makers, and practitioners seldom work in collaborative forums. Finally, research findings are rarely used to formulate new policies; they are rather used to support political decisions already made. If this existing gap between research and practice continues to widen…students will perish while educational researchers publish their findings."[371]

The web has provided an access portal to vast quantities of information, but there is no guarantee of its quality. There are many sites that claim to make use of an evidence base, often to sell a product. Identifying worthwhile, trustworthy sites can be a fraught process. Teachers, principals and parents need to be critical and informed consumers of claims made about reading instruction. As cognitive scientist Daniel Willingham puts it, they need to know when to trust the experts.[372]

Of course this does not mean we now know everything there is to know. The processes by which the foundation lower-order skills required for accurate and fluent word decoding are well established. There is increasing recognition of the importance of early acquisition of vocabulary and oral language proficiency. It is clear that these skills and knowledge are powerful predictors and essential precursors of reading comprehension. Yet the complex interplay of cognitive operations required for skilled and sophisticated reading comprehension, and the most effective way to teach and assess it, need more and better research.

This decade could be the beginning of one of the most exciting periods in education history, as the sleeping giant of educational knowledge, ignored for so long, begins

to influence education systems around the world. These effects may become evident at both a macro/policy level and at a micro/classroom level—these two arenas have never been well attuned. There may develop increased funding and demand for higher quality research: more longitudinal studies; better designs; and evaluations of larger scale implementations.

In Australia, the budgets for the provision of health and education services are roughly similar; however, the funding provided for health research is about 16 times that for educational research.[373] This has made large scale exemplary studies necessarily rare in this country and hence much of what has been gleaned from literacy research has been from research from countries other than Australia. One hopes that a change in attitudes in education towards research will also lead to an increase in the volume and quality in Australia.

How might one begin to investigate further the skills and techniques that exemplify highly effective teaching? A review by a consortium of researchers in the UK rejected the idea that effectiveness is not measurable while acknowledging the complexities.[374]

> "How teaching leads to learning is undoubtedly very complex. It may be that teaching will always be more of an art than a science, and that attempts to reduce it to a set of component parts will always fail. If that is the case then it is simply a free-for-all: no advice about how to teach can claim a basis in evidence. However, the fact that there are some practices that have been found to be implementable in real classrooms, and that implementing them has led to improvements in learning, gives us something to work with."

They consider a variety of options, and conclude that multiple measures, including value-added assessments of student learning provide the strongest evidence.

Progress in knowledge of teaching and reading is dependent on evidence from studies that conform to the rigors of research in other disciplines where the human and economic costs of failure are high. According to Professor Keith Stanovich,

> "An adherence to a subjective, personalized view of knowledge is what continually leads to educational fads that could easily be avoided by grounding teachers and other practitioners in the importance of scientific thinking for solving educational problems.
>
> Nothing has retarded the cumulative growth of knowledge in the psychology of reading more than failure to deal with problems in a scientific manner."[375]

While more sound research can only be helpful, more than forty years of research has shown a clear path to improve literacy rates that can be taken immediately. If provided with explicit instruction in the five 'keys to literacy' from the first year of school when most children turn five — 'Five from Five' — with effective early intervention for children who struggle, most (if not all) children will learn to read. If the evidence on teaching reading is adopted and implemented, there should be no more casualties in the 'reading wars'.

Endnotes

1 Thomson, S 2011, Challenges for Australian education. Research developments, 25, Art. 2, 2-6, p.5. http://research.acer.edu.au/resdev/vol25/iss25/2

2 Thomson, S, De Bortoli, L, & Buckley, S 2013, Highlights from the full Australian report: PISA 2012: How Australia measures up. Camberwell: ACER, p.21. http://www.acer.edu.au/ozpisa/pisa-2012

3 Australian Government Productivity Commission 2012, Schools Workforce. http://www.pc.gov.au/inquiries/completed/education-workforce-schools/report; Leigh, A, & Ryan, C 2011, Long-run trends in school productivity: Evidence from Australia. Education Finance and Policy, 6(1), 105–135. www.andrewleigh.org/pdf/schoolproductivity.pdf

4 Gould, K 2013, Securing Australia's future: Education. The Conversation, 19 December 2013. http://theconversation.com/securing-australias-future-education-19606

5 Rorris, A, Weldon, P, Beavis, A, McKenzie, P, Bramich, M, & Deery, A 2011, Assessment of current process for targeting of schools funding to disadvantaged students. An Australian Council for Educational Research report prepared for The Review of Funding for Schooling Panel. http://research.acer.edu.au/policy_analysis_misc/10/

6 Lyon, GR 1998, Overview of NICHD reading and literacy initiatives, U.S. Senate Committee on Labor and Human Resources, United States Congress, Congressional Printing Office, Washington, D.C.

7 Palmaffy, T 1997, See Dick Flunk, Policy Review, 86, 32-40.

8 National Institute of Child Health and Human Development 2000, Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction (NIH Publication No. 00-4769), U.S. Government Printing Office, Washington, D.C. www.nichd.nih.gov/publications/pubs/nrp/documents/report.pdf

9 Goldhaber, D 2002, The mystery of good teaching: Surveying the evidence on student achievement and teachers' characteristics, Education Next, 2(1), 50–55; Leigh, A 2009, Estimating teacher effectiveness from two-year changes in students' test scores, Discussion Paper No. 619, Research School of Social Sciences, Australian National University. https://www.cbe.anu.edu.au/researchpapers/cepr/DP619.pdf; Raj Chetty, R, Friedman, JN, & Rockoff, JE 2011, The long-term impacts of teachers: Teacher value-added and student outcomes in adulthood, Executive Summary of National Bureau of Economic Research Working Paper No. 17699, December 2011. http://obs.rc.fas.harvard.edu/chetty/va_exec_summ.pdf; Sanders, W & Rivers, J 1996, Cumulative and residual effects of teachers on future student academic achievement, University of Tennessee Value-Added Research and Assessment Center, Knoxville, TN.

10 Leigh, A 2009, Estimating teacher effectiveness from two-year changes in students' test scores, Discussion Paper No. 619, Research School of Social Sciences, Australian National University. https://www.cbe.anu.edu.au/researchpapers/cepr/DP619.pdf

11 Auguste, B, Kihn, P, & Miller, M 2010, Closing the talent gap: Attracting and retaining the top-third graduates to careers in teaching, McKinsey & Co. http://mckinseyonsociety.com/closing-the-talent-gap/

12 Brown, IS & Felton, RH 1990, Effects of instruction on beginning reading skills in children at risk for reading disability, Reading & Writing: An Interdisciplinary Journal, 2, 223-241; Lyon, GR 2003, Why do some children have difficulty learning to read? What can be done about it? Perspectives, 29(2), The International Dyslexia Association. www.wrightslaw.com/info/read.disability.lyon.pdf; Felton, RH 1993, Effects of instruction on the decoding skills of children with phonological-processing problems, Journal of Learning Disabilities, 26, 583-589; Torgesen, JK, Wagner, R, Rashotte, C, Alexander, A, & Conway, T 1997, Preventative and remedial interventions for children with severe reading disabilities, Learning Disabilities: A Multidisciplinary Journal, 8, 51-61; Torgesen, JK, Alexander, AW, Wagner, RK, Rashotte, CA, Voeller, KKS, & Conway, T 2001, Intensive remedial instruction for children with severe reading disabilities, Journal of Learning Disabilities, 34, 33-58; Vellutino, FR, Scanlon, DM, Sipay, ER, Small, SG, Pratt, A, Chen, R, & Denckla, MB 1996, Cognitive profiles of difficult to remediate and readily remediated poor readers: Early intervention as a vehicle for distinguishing between cognitive and experiential deficits as basic causes of specific reading disability, Journal of Educational Psychology, 88, 601-638.

13 National Institute of Child Health and Human Development 2000, Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction (NIH Publication No. 00-4769), U.S. Government Printing Office, Washington, D.C. www.nichd.nih.gov/publications/pubs/nrp/documents/report.pdf

14 Snow, CE, Burns, S, & Griffin, P (Eds.) 1998. Preventing reading difficulties in young children. Report of the National Research Council. http://www.nap.edu/readingroom/books/reading/; Grossen, B 1997. A synthesis of research on reading from the National Institute of Child Health and Human Development. http://uncw.edu/wha/hillcrest/documents/ASynthesisofResearchonReadingbyBonitaGrossen.pdf; Rose, J 2006, Independent review of the teaching of early reading. Bristol: Department for Education and Skills. http://dera.ioe.

ac.uk/5551/2/report.pdf; Primary National Strategy 2006, Primary framework for literacy and mathematics, UK Department of Education and Skills. http://webarchive.nationalarchives.gov.uk/20100202100434/nationalstrategies.standards.dcsf.gov.uk/node/84445

15 Primary National Strategy 2006, Primary framework for literacy and mathematics, UK Department of Education and Skills. http://webarchive.nationalarchives.gov.uk/20100202100434/nationalstrategies.standards.dcsf.gov.uk/node/84445

16 Hempenstall, K 2003, The three-cueing system: Trojan horse? Australian Journal of Learning Disabilities, 8(3), 15-23. Hoover, WA & Gough, PB 1990, The simple view of reading, Reading and Writing: An interdisciplinary journal, 2, 127-160. http://www.homepage.psy.utexas.edu/HomePage/Class/Psy338K/Gough/Chapter7/simple_view.pdf

17 Weaver, C 1988, Reading process & practice: From socio-psycholinguistics to whole language, Heinemann, Portsmouth, NH.

18 Clark, RE, Kirschner, PA, & Sweller, J 2012, Putting students on the path to learning: The case for fully guided instruction, American Educator, March 23, 2012. http://www.aft.org/pdfs/americaneducator/spring2012/Clark.pdf

19 Marchand-Martella, N, Martella, RC, Modderman, SL, Petersen, HM, & Pan, S 2013, Key areas of effective adolescent literacy programs, Education & Treatment of Children, 36(1), 161-184.

20 Ehri, LC, Satlow, E, & Gaskins, I 2009, Grapho-phonemic enrichment strengthens keyword analogy instruction for struggling young readers, Reading & Writing Quarterly, 25(2), 162–191.

21 Adams, MJ 1990, Beginning to read: Thinking and learning about print, MIT Press, Cambridge, MA; 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, Reading and Writing: An Interdisciplinary Journal, 25(6), 1365-1384.

22 National Inquiry into the Teaching of Literacy 2005, Teaching reading - A review of the evidence-based research literature on approaches to the teaching of literacy, particularly those that are effective in assisting students with reading difficulties. Australian Government Department of Education, Science and Training. http://research.acer.edu.au/cgi/viewcontent.cgi?filename=2&article=1004&context=tll_misc&type=additional

23 Hempenstall, K 2012. Literacy and behaviour. National Institute for Direct Instruction. http://nifdi.org/news/hempenstall-blog/405-literacy-and-behaviour; Hempenstall, K 2012, Literacy and mental health, National Institute for Direct Instruction. http://nifdi.org/news/hempenstall-blog/404-literacy-and-mental-health

24 Ehri, LC, Nunes, SR, Willows, DM, Schuster, BV, Yaghoub-Zadeh, Z, Shanahan, T 2001, Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. Reading Research Quarterly, 36, 250-287

25 Ouellette, G & Haley, A 2013, One complicated extended family: The influence of alphabetic knowledge and vocabulary on phonemic awareness, Journal of Research in Reading, 36(1), 29-41.

26 Melby-Lervåg, M, Lyster, S.-AH, & Hulme, C 2012, Phonological skills and their role in learning to read: A meta-analytic review, Psychological Bulletin, 138(2), 322-352.

27 McNamara, JK, Scissons, M, & Gutknecth, N 2011. A longitudinal study of kindergarten children at risk for reading disabilities: The poor really are getting poorer, Journal of Learning Disabilities, 44(4), 21-430.

28 Ehri, LC. Nunes, SR, Willows, DM, Schuster, BV, Yaghoub-Zadeh, Z, Shanahan, T 2001, Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis, Reading Research Quarterly, 36, 250-287.

29 Duncan, LG, Castro, SL, Defior, S, Seymour, PHK, Baillie, S, Leybaert, J, Mousty, P, Genard, N, Sarris, M, Porpodas, CD, Lund, R, Sigurðsson, B, Þráinsdóttir, AS, Sucena, A, & Serrano, F 2013, Phonological development in relation to native language and literacy: Variations on a theme in six alphabetic orthographies, Cognition, 127(3), 398-419.

30 Ouellette, G & Haley, A 2013, One complicated extended family: The influence of alphabetic knowledge and vocabulary on phonemic awareness, Journal of Research in Reading, 36(1), 29-41; Smith, SB, Simmons, DC, & Kameenui, EJ 1995, Synthesis of research on phonological awareness: Principles and implications for reading acquisition. National Center To Improve the Tools of Educators, Eugene, OR. http://eric.ed.gov/?id=ED386868

31 Adams, MJ 1990, Beginning to read: Thinking and learning about print, MIT Press, Cambridge, MA; Raz, IS & Bryant, P 1990, Social background, phonological awareness and children's reading, British Journal of Developmental Psychology, 8(3), 209–225.

32 Adams, MJ 1990, Beginning to read: Thinking and learning about print, MIT Press, Cambridge, MA; Ball, EW & Blachman, BA 1991, Does phoneme awareness training in kindergarten make a difference in early word recognition and developmental spelling? Reading Research Quarterly, 25, 49-66; Bradley, L & Bryant, P 1983, Categorizing sounds and learning to read: A causal connection, Nature, 301, 419-421; Byrne, B & Fielding-Barnsley, R 1989, Phonemic awareness and letter knowledge in the child's acquisition of the alphabetic principle, Journal of Educational Psychology, 81, 313-321; Scarborough, HS 1998, Early identification of children at risk for reading disabilities: Phonological awareness and some other promising predictors. In BK Shaprio, PJ Accardo & AJ Capute (Eds.), Specific reading

disability: A view of the spectrum (pp. 75-119), York Press, Timonium, MD; Stuart, M, & Coltheart, M 1988, Does reading develop in a sequence of stages? Cognition, 30(2), 139-181.

33 Byrne, B, Fielding-Barnsley, R & Ashley, L 2000, Effects of preschool phoneme identity training after six years: Outcome level distinguished from rate of response, Journal of Educational Psychology, 92, 659-667; McNamara, JK, Scissons, M, & Gutknecth, N 2011, A longitudinal study of kindergarten children at risk for reading disabilities: The poor really are getting poorer, Journal of Learning Disabilities, 44(4), 21-430.

34 Byrne, B, Fielding-Barnsley, R & Ashley, L 2000, Effects of preschool phoneme identity training after six years: Outcome level distinguished from rate of response, Journal of Educational Psychology, 92, 659-667.

35 Catts, HW, Nielsen, DC, Bridges, MS, Liu, YS, & Bontempo, DE 2015, Early identification of reading disabilities within an RTI framework, Journal of Learning Disabilities, 48(3), 281-97.

36 Olson, RK, Keenan, JM, Byrne, B, & Samuelsson, S 2014, Why do children differ in their development of reading and related skills? Scientific Studies of Reading, 18(1), 38-54; Skeide, MA, Kirsten, H, Kraft, I, Schaadt, G, Müller, B, Neef, N, Brauer, J, Wilcke, A, Emmrich, F, Boltze, J, & Friederici, AD 2015, Genetic dyslexia risk variant is related to neural connectivity patterns underlying phonological awareness in children, NeuroImage, 118, 414-421.

37 Catts, HW, Nielsen, DC, Bridges, MS, Liu, YS, & Bontempo, DE 2015, Early identification of reading disabilities within an RTI framework, Journal of Learning Disabilities, 48(3), 281-97.

38 Juel, C 1988, Learning to read & write: A longitudinal study of 54 children from first through fourth grades, Journal of Educational Psychology, 80, 437-447.

39 Catts, HW, Nielsen, DC, Bridges, MS, Liu, YS, & Bontempo, DE 2015, Early identification of reading disabilities within an RTI framework, Journal of Learning Disabilities, 48(3), 281-97.

40 Hurford, DP, Schauf, JD, Bunce, L, Blaich, T, & Moore, K 1994, Early identification of children at risk for reading disabilities, Journal of Learning Disabilities, 27, 371-382.

41 Badian, NA 1994, Preschool prediction: Orthographic and phonological skills, and reading, Annals of Dyslexia, 44, 3-25.

42 Majsterek, DJ, & Ellenwood, AE 1995, Phonological awareness and beginning reading: Evaluation of a school-based screening procedure, Journal of Learning Disabilities, 28, 449-456.

43 Stuart, M 1995, Prediction and qualitative assessment of five and six-year-old children's reading: A longitudinal study, British Journal of Educational Psychology, 65, 287-296.

44 Hatcher, P, Hulme, C, & Ellis, A 1994, Ameliorating reading failure by integrating the teaching of reading and phonological skills: The phonological linkage hypothesis, Child Development, 65, 41-57; Melby-Lervåg, M, Lyster, S.-AH, & Hulme, C 2012, Phonological skills and their role in learning to read: A meta-analytic review, Psychological Bulletin, 138(2), 322-352; Nelson, JM, Lindstrom, JH, Lindstrom, W, & Denis, D 2012, The structure of phonological processing and its relationship to basic reading, Exceptionality: A Special Education Journal, 20(3), 179-196; Share, DL 1995, Phonological recoding and self-teaching: Sine qua non of reading acquisition, Cognition, 55, 151-218.

45 Soden-Hensler, B, Taylor, J, & Schatschneider, C 2012, Evidence for common etiological influences on early literacy skills in kindergarten, Scientific Studies of Reading, 16(5), 457-474; Christopher, ME, Hulslander, J, Byrne, B, Samuelsson, S, Keenan, JM, Pennington, B, DeFries, JC, Wadsworth, SJ, Willcutt, EG, & Olson, RK 2013, Modeling the etiology of individual differences in early reading development: Evidence for strong genetic influences, Scientific Studies of Reading, 17(5), 350-368; Skeide, MA, Kirsten, H, Kraft, I, Schaadt, G, Müller, B, Neef, N, Brauer, J, Wilcke, A, Emmrich, F, Boltze, J, & Friederici, AD 2015, Genetic dyslexia risk variant is related to neural connectivity patterns underlying phonological awareness in children, Neuroimage, 118, 414-421.

46 Hart, SA, Logan, JAR, Soden-Hensler, B, Kershaw, S, Taylor, J, & Schatschneider, C 2013, Exploring how nature and nurture affect the development of reading: An analysis of the Florida twin project on reading, Developmental Psychology, 49(10), 1971-1981.

47 Byrne, B, Coventry, WL, Olson, RK, Wadsworth, SJ, Samuelsson, S, Petrill, SA, Willcutt, EG, & Corley, R 2010, "Teacher effects" in early literacy development: Evidence from a study of twins, Journal of Educational Psychology, 102(1), 32–42.

48 Bradley, L & Bryant, P 1983, Categorizing sounds and learning to read - A causal connection, Nature, 301, 419-421.

49 Bradley, L 1990, Rhyming connections in learning to read and spell. In PD Pumphrey and CD Elliot (Eds.), Children's difficulties in reading, spelling and writing: Challenges and responses (pp. 83-100), The Falmer Press London.

50 Ball, EW & Blachman, BA 1988, Phoneme segmentation training: Effect on reading readiness, Annals of Dyslexia, 38, 208-225; Ball, EW & Blachman, BA 1991, Does phoneme awareness training in kindergarten make a difference in early word recognition and developmental spelling? Reading Research Quarterly, 25, 49-66; Byrne, B & Fielding-Barnsley, R 1989, Phonemic awareness and letter knowledge in the child's acquisition of the alphabetic principle, Journal of Educational Psychology, 81, 313-321; Byrne, B & Fielding-Barnsley, R 1990, Acquiring the alphabetic principle: A case for teaching recognition of phoneme identity, Journal of Educational Psychology, 82, 805-812; Byrne, B & Fielding-Barnsley, R 1991, Evaluation of a program to

teach phonemic awareness to young children, Journal of Educational Psychology, 83, 451-455; Byrne, B & Fielding-Barnsley, R 1993 Evaluation of a program to teach phonemic awareness to young children: A one-year follow-up, Journal of Educational Psychology, 85, 104-111; Byrne, B & Fielding-Barnsley, R 1995, Evaluation of a program to teach phonemic awareness to young children: A 2- and 3- year follow-up and a new preschool trial, Journal of Educational Psychology, 87, 488-503; Cunningham, A 1990, Explicit vs implicit instruction in phonemic awareness, Journal of Experimental Child Psychology, 50, 429-444; Hatcher, P, Hulme, C & Ellis, A 1994, Ameliorating reading failure by integrating the teaching of reading and phonological skills: The phonological linkage hypothesis, Child Development, 65, 41-57; Lundberg, I, Frost, J & Petersen, OP 1988, Effects of an extensive program for stimulating phonological awareness in preschool children, Reading Research Quarterly, 23, 263-284; Tangel, DM & Blackman, BA 1992, Effect of phoneme awareness instruction on kindergarten children's invented spelling, Journal of Reading Behaviour, 2, 233-261.

51 Ehri, LC, Nunes, SR, Willows, DM, Schuster, BV, Yaghoub-Zadeh, Z, Shanahan, T 2001, Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis, Reading Research Quarterly, 36, 250-287.

52 National Early Literacy Panel. (2009). Developing Early Literacy: Report of the National Early Literacy Panel, Executive Summary. Washington, DC: National Institute for Literacy. http://www.nifl.gov/nifl/publications/pdf/NELPReport09.pdf

53 Galuschka, K, Ise, E, Krick, K, & Schulte-Korne, G 2014. Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials. PLoS ONE 9(2), 1-12. e89900. doi:10.1371/journal.pone.0089900

54 Goodwin, AP & Ahn, S 2013, A meta-analysis of morphological interventions in English: Effects on literacy outcomes for school-age children, Scientific Studies of Reading, 179(4), 257-285.

55 Duff, FJ, Hulme, C, Grainger, K, Hardwick, SJ, Miles, J, & Snowling, MJ 2014, Reading and language intervention for children at risk of dyslexia: A randomised controlled trial, Journal of Child Psychology and Psychiatry, 55(11), 1234-43, p. 1235.

56 Castles, A & Coltheart, M 2004, Is there a causal link from phonological awareness to success in learning to read? Cognition, 91(1), 77-111.

57 Duncan, LG, Castro, SL, Defior, S, Seymour, PHK, Baillie, S, Leybaert, J, Mousty, P, Genard, N, Sarris, M, Porpodas, CD, Lund, R, Sigurðsson, B, Þráinsdóttir, AS, Sucena, A, & Serrano, F 2013, Phonological development in relation to native language and literacy: Variations on a theme in six alphabetic orthographies, Cognition, 127(3), 398-419; Magloughlin, L 2010, Learning to read and the development of phonological awareness: Altering our pedagogical approach. Working Papers of the Linguistics Circle of the University of Victoria, 20, 37–49; Nag, S, & Snowling, MJ 2012, Reading in an alphasyllabary: Implications for a language universal theory of learning to read, Scientific Studies of Reading, 16(5), 404-423.

58 Maclean, M, Bryant, P & Bradley, L 1987, Rhyme, nursery rhymes and reading in early childhood. Merrill-Palmer Quarterly, 33, 255-282; Moats, L, & Tolman, C 2009, Language essentials for teachers of reading and spelling (LETRS): The speech sounds of English: Phonetics, phonology, and phoneme awareness (Module 2). Sopris West, Boston; Nithart, C, Demont, E, Metz-Lutz, M, Majerus, S, Poncelet, M, & Leybaert, J 2011, Early contribution of phonological awareness and later influence of phonological memory throughout reading acquisition, Journal of Research in Reading, 34(3), 346-363.

59 Snow, K 2012, Research news you can use: Debunking the play vs. learning dichotomy, National Association for the Education of Young Children. http://www.naeyc.org/content/research-news-you-can-use-play-vs-learning

60 Cunningham, AE & Chen, Y 2014, Matthew Effects: the rich get richer in literacy, Encyclopedia of Language Development, SAGE Publications Inc, Thousand Oaks, CA; Griffiths, Y & Stuart, M 2013, Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties, Journal of Research in Reading, 36(1), 96-116.

61 National Reading Panel 2000, Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. U.S. Department of Health and Human Services, Washington, DC. http://www.nationalreadingpanel.org

62 Lyon, GR 2001, Measuring success: Using assessments and accountability to raise student achievement. Subcommittee on Education Reform Committee on Education and the Workforce, U.S. House of Representatives Washington, D.C. http://www.reidlyon.com/edpolicy/10-measuring-success-using-assessments-and-accountability-to-raise-student-achievement.pdf

63 Byrne, B & Fielding-Barnsley, R 1991, Evaluation of a program to teach phonemic awareness to young children, Journal of Educational Psychology, 83, 451-455; Ehri, LC, Nunes, SR, Willows, DM, Schuster, BV, Yaghoub-Zadeh, Z, Shanahan, T 2001, Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis, Reading Research Quarterly, 36, 250-287; Griffiths, Y & Stuart, M 2013, Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties, Journal of Research in Reading, 36(1), 96-116; Shankweiler, D, & Fowler, AE 2004, Questions people ask about the role of phonological processes in learning to read, Reading and Writing: An Interdisciplinary Journal, 17, 483-516.

64 Castles, A, Coltheart, M, Wilson, K, Valpied, J, & Wedgwood, J 2009, The genesis of reading

ability: What helps children learn letter-sound correspondences? Journal of Experimental Child Psychology, 104, 68-88.

65 Snow, CE, Burns, S & Griffin, P (Eds) 1998, Preventing reading difficulties in young children. Report of the National Research Council. pp 1-432, National Academy Press, Washington, D.C. http://www.nap.edu/catalog/6023/preventing-reading-difficulties-in-young-children

66 Mather, N, Bos, C, & Babur, N 2001, Perceptions and knowledge of preservice and in-service teachers about early literacy instruction, Journal of Learning Disabilities, 34, 472-482.

67 Hammond, L. 2015, Early childhood educators' perceived and actual metalinguistic knowledge, beliefs and enacted practice about teaching early reading, Australian Journal of Learning Difficulties, doi: 10.1080/19404158.2015.1023208

68 Clark, SK, Jones, CD, Reutzel, R, & Andreasen, L 2013, An examination of the influences of a teacher preparation program on beginning teachers' reading instruction, Literacy Research and Instruction, 52(2), 87-105.

69 Binks-Cantrell, E, Washburn, EK, Joshi, RM, & Hougen, M 2012, Peter Effect in the preparation of reading teachers, Scientific Studies of Reading, 16(6), 526-536.

70 Fielding-Barnsley, R 2010, Australian pre-service teachers' knowledge of phonemic awareness and phonics in the process of learning to read, Australian Journal of Learning Difficulties, 15(1), 99-110; Fielding-Barnsley, R & Purdie, N 2005, Teachers' attitude to and knowledge of meta-linguistics in the process of learning to read, Asia-Pacific Journal of Teacher Education, 33, 65–76; Hammond, L 2015, Early childhood educators' perceived and actual meta-linguistic knowledge, beliefs and enacted practice about teaching early reading, Australian Journal of Learning Difficulties, DOI: 10.1080/19404158.2015.1023208; Mahar, NE, & Richdale, AL 2008, Primary teachers' linguistic knowledge and perceptions of early literacy instruction, Australian Journal of Learning Difficulties, 13, 17–37; Rohl, M, & Greaves, D 2005, How are pre-service teachers in Australia being prepared for teaching literacy and numeracy to a diverse range of students? Australian Journal of Learning Disabilities, 10(1), 3-8; Tetleya, D, & Jones, C 2014, Pre-service teachers' knowledge of language concepts: Relationships to field experiences, Australian Journal of Learning Difficulties, 19(1), 17-32.

71 DEECD 2012, New directions for school leadership and the teaching profession: Discussion paper, June 2012. http://www.eduweb.vic.gov.au/edulibrary/public/commrel/about/teachingprofession.pdf; National Inquiry into the Teaching of Literacy 2005, Teaching reading - A review of the evidence-based research literature on approaches to the teaching of literacy, particularly those that are effective in assisting students with reading difficulties. Australian Government Department of Education, Science and Training; Roberts-Hull, K, Jensen, B & Cooper, S 2015. A new approach: Teacher education reform. Learning First, Melbourne, Australia. www.learningfirst.org.au/s/A-new-approach.pdf

72 Ziegler, JC, Bertrand, D, Lété, B & Grainger, J 2014, Orthographic and phonological contributions to reading development: Tracking developmental trajectories using masked priming, Developmental Psychology, 50(4), 1026-1036.

73 Shankweiler, D, Lundquist, E, Dreyer, LG, & Dickinson, CC 1996, Reading and spelling difficulties in high school students: Causes and consequences, Reading and Writing: An Interdisciplinary Journal, 8, 267-294.

74 ; Yaghoub Zadeh, Z, Farnia, F, Chan, E, Thompson, T, Cohen, N & Ungerleider, C 2008, A meta-analysis of phonological-based interventions on reading comprehension. Canadian Literacy and Research Network. http://www.ccl-cca.ca/pdfs/ResearchReports/CACAP_readingcomprehension.pdf.

75 Nelson, JM, Lindstrom, JH, Lindstrom, W & Denis, D 2012, The structure of phonological processing and its relationship to basic reading, Exceptionality: A Special Education Journal, 20(3), 179-196.

76 Adams, MJ 1990, Beginning to read: Thinking & learning about print, as above

77 Cheatham, JP & Allor, JH 2012, The influence of decodability in early reading text on reading achievement: A review of the evidence, Reading and Writing: An Interdisciplinary Journal, 25(9), pp.2223-2246

78 de Graaff, S, Bosman, AMT, Hasselman, F & Verhoeven, L 2009, Benefits of systematic phonics instruction, Scientific Studies of Reading, 13(4), pp. 318-333, http://fredhasselman.com/main/wp-content/papercite-data/pdf/degraaff2009.pdf

79 Gaskins, IW, Ehri, LC, Cress, C, O'Hara, C & Donnelly, K, 1996, Procedures for word learning: Making discoveries about words, The Reading Teacher, 50, pp. 312-327, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.120.2162&rep=rep1&type=pdf

80 Ehri, LC, Satlow, E & Gaskins, I 2009, Grapho-phonemic enrichment strengthens keyword analogy instruction for struggling young readers, Reading & Writing Quarterly, 25(2), pp. 162-191

81 Byrne, B 1996, The learnability of the alphabetic principle: Children's initial hypotheses about how print represents spoken speech, Applied Psycholinguistics, 17, pp. 401-426

Simner, ML 1995, Reply to the Ministries' reactions to the Canadian Psychological Association's position paper on beginning reading instruction, Canadian Psychology, 36, pp. 333-342

82 de Graaff, S, Bosman, AMT, Hasselman, F & Verhoeven, L 2009, Benefits of systematic phonics instruction, as above

83 Sonnenschein, S, Stapleton, LM & Benson, A 2010 The relation between the type and amount of instruction and growth in children's reading competencies, American Educational Research Journal, 47(2), pp. 358-389

84 National Reading Panel 2000, National Reading Panel: Teaching children to read, www.nichd.nih.gov/publications/pubs/nrp/documents/report.pdf

85 Stuebing, KK, Barth, AE, Cirino, PT, Francis, DJ & Fletcher, JM 2008, A response to recent reanalyses of the National Reading Panel report: Effects of systematic phonics instruction are practically significant, Journal of Educational Psychology, 100(1), pp.123-134; Galuschka, K, Ise, E, Krick, K & Schulte-Korne, G 2014, Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials, PLoS ONE 9(2), 1-12. e89900. doi:10.1371/journal.pone.0089900; Piasta, SB & Wagner, RK 2010, Developing early literacy skills: A meta-analysis of alphabet learning and instruction, Reading Research Quarterly, 45(1), pp.8-38; Piasta, SB & Wagner, RK 2010, Developing early literacy skills: A meta-analysis of alphabet learning and instruction, Reading Research Quarterly, 45(1), pp.8-38; Ziegler, JC, Bertrand D, Lété, B & Grainger, J 2014, Orthographic and phonological contributions to reading development: Tracking developmental trajectories using masked priming, Developmental Psychology, 50, pp. 1026-1036; de Graaff, S, Bosman, AMT, Hasselman, F & Verhoeven, L 2009, Benefits of systematic phonics instruction, Scientific Studies of Reading, 13(4), pp. 318-333, http://fredhasselman.com/main/wp-content/papercite-data/pdf/degraaff2009.pdf

86 Department of Education, Science and Training, 2005, National Inquiry into the Teaching of Literacy, Canberra, Commonwealth of Australia

87 Department for Education, 2010, Importance of Teaching: The Schools White Paper Executive Summary, TSO, London, England, http://www.official-documents.gov.uk/

88 Rose, J 2006, Independent review of the teaching of early reading, as above

89 Foorman, B, Francis, D, Beeler, T, Winikates, D & Fletcher, J 1997, Early interventions for children with reading problems: Study designs and preliminary findings, Learning Disabilities: A Multidisciplinary Journal, 8, pp. 63-71

90 Christensen, CA & Bowey JA 2005, The efficacy of orthographic rime, grapheme-phoneme correspondence, and implicit phonics approaches to teaching decoding skills, Scientific Studies of Reading, 9(4), pp. 327-349, http://coaches4.wikispaces.com/file/view/onset%2Brime%2Bdecoding%2Barticle.pdf

91 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, Reading & Writing, 25(6), pp. 1365-1384, http://www2.hull.ac.uk/science/pdf/johnston_etal.pdf

92 McArthur, G, Eve, PM, Jones, K, Banales, E, Kohnen, S, Anandakumar, T, Larsen, L, Marinus E, Wang, HC, & Castles, A. 2012. Phonics training for English-speaking poor readers (Review). Cochrane Database of Systematic Reviews, Issue 12, Art. No.: CD009115. http://dx.doi.org/10.1002/14651858.CD009115.pub2

93 Johnston, RS & Watson JE 2003, Accelerating reading and spelling with synthetic phonics: A five year follow up, Research, Economic and Corporate Strategy (RECS) Unit, Edinburgh, http://dera.ioe.ac.uk/4938/1/nls_phonics0303rjohnston.pdf

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, Reading & Writing, 25 (6), pp. 1365-1384, http://www2.hull.ac.uk/science/pdf/johnston_etal.pdf

Watson, JE & Johnston, RS 1998, Accelerating reading attainment: The Effectiveness of Synthetic Phonics, Interchange, Scottish Office Education and Industry Department (SOEID), Edinburgh

94 Johnston, RS & Watson JE 2003, Accelerating reading and spelling with synthetic phonics: A five year follow up, as above

95 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, as above

96 Reschly, AL 2010, Reading and school completion: Critical connections and Matthew Effects, Reading & Writing Quarterly: Overcoming Learning Difficulties, 26(1), 67-90;Sparks, RL, Patton J & Murdoch, A 2014, Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years later', Reading and Writing, 27(1), pp. 189-211.

97 McGuinness AL 2010, Reading and school completion: Critical connections and Matthew Effects, Reading & Writing Quarterly: Overcoming Learning Difficulties, 26(1), pp. 67-90

98 Education and Skills Committee 2005, Select Committee on Education and Skills Eighth Report, http://www.publications.parliament.uk/pa/cm200405/cmselect/cmeduski/121/12106.htm

99 O'Connor, RE, Bocian, K, Beebe-Frankenberger, M & Linklater, DL 2010, Responsiveness of students with language difficulties to early intervention in reading, The Journal of Special Education, 43(4), pp.220-235

100 de Graaff, S, Bosman AMT, Hasselman, F & Verhoeven, L 2009, Benefits of systematic phonics instruction. Scientific Studies of Reading, as above

101 Cheatham, JP & Allor, JH 2012, The influence of decodability in early reading text on reading achievement: A review of the evidence, p. 2241-2242

102 Stanovich, KE 1990, Concepts in developmental theories of reading skill: Cognitive resources, automaticity, and modularity, Developmental Review, 10, pp.72-100

103 Rose, J 2006, Independent review of the teaching of early reading, as above

104 Abbott, M, Wills, H, Greenwood, CR, Kamps, D, Heitzman-Powell, L & Selig, J 2010, The combined effects of grade retention and targeted small-group intervention on students' literacy outcomes, Reading & Writing Quarterly: Overcoming Learning Difficulties, 26(1), pp.4-25

105 Vaughn, S, Wexler, J, Roberts, G, Barth, AA, Cirino, PT, Romain, MA, Francis, D, Fletcher, J & Denton, CA 2011, Effects of individualized and standardized interventions on middle school students with reading disabilities, Exceptional Children, 77(4), pp.391-407

106 Scammacca, N, Roberts G, Vaughn, S, Edmonds, M, Wexler, J, Reutebuch, CK & Torgesen, JK 2007,

Interventions for adolescent struggling readers: A meta-analysis with implications for practice, RMC Research Corporation, Centre on Instruction, Portsmouth, NH, http://www.centeroninstruction.org/interventions-for-adolescent-struggling-readers-a-meta-analysis-with-implications-for-practice

107 Fielding, L, Kerr, N & Rosier, P 2007, Fielding, L., Kerr, N., Rosier, P. (2007). Annual growth for all students, Catch-up growth for those who are behind, The New Foundation Press Inc., Kennewick, WA

108 Denton, CA & Al Otaiba, S 2011, Teaching word identification to students with reading difficulties and disabilities, Focus on Exceptional Children, 43(7), pp. 1-16, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4299759/

House of Commons Science and Technology Committee 2009, Evidence Check 1: Early Literacy Interventions, http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/44/4402.htm

Sonnenschein, S, Stapleton, LM & Benson, A 2010, The relation between the type and amount of instruction and growth in children's reading competencies, American Educational Research Journal, 47(2), pp.358-389

109 Allor, JH, Mathes, PG, Roberts, JK, Cheatham, JP & Al Otaiba, S 2014, Is scientifically based reading instruction effective for students with below-average IQs? Exceptional Children, 80(3), pp. 287-306

Fredrick, LD, David, DH, Alberto, PA & Waugh, RE 2013, From initial phonics to functional phonics: Teaching word-analysis skills to students with moderate intellectual disability, Education and Training in Autism and Developmental Disabilities, 48(1), pp. 49-66

Lemons, CJ, Mrachko, AA, Kostewicz, DE & Paterra, MF 2012, Effectiveness of decoding and phonological awareness interventions for children with Down Syndrome, Exceptional Children, 79(1), pp. 67-90

110 Nishanimut, SP, Padakannaya, P, Johnston, RS, Joshi, RM & Thomas, PJ 2013, Effect of synthetic phonics instruction on literacy skills in an ESL setting, Learning and Individual Differences, 27, pp. 47-53, http://dx.doi.org/10.1016/j.lindif.2013.06.007

Vadasy, PF & Sanders, EA 2012, Two-year follow-up of a kindergarten phonics intervention for English learners and native English speakers: Contextualizing treatment impacts by classroom literacy instruction, Journal of Educational Psychology, 104(4), pp. 987-1005

111 Carnine, D, Silbert, J, Kame'enui, EJ, Tarver, SG, & Jungjohann, K. 2006. Teaching Reading to Struggling and At-Risk Readers, Pearson Prentice Hall, New Jersey.

112 National Reading Panel 2000, Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction, Department of Health and Human Services, Washington, DC, http://www.nationalreadingpanel.org

113 Fuchs, LS, Fuchs, D, Hosp, MD & Jenkins, J 2001, Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis, Scientific Studies of Reading, 5, pp. 239-240, http://www.specialistedpsy.com/fuchsetalreadfluency.pdf-link.pdf

114 Abbott, M, Wills, H, Greenwood, CR, Kamps, D, Heitzman-Powell, L & Selig, J 2010, The combined effects of grade retention and targeted small-group intervention on students' literacy outcomes, Reading & Writing Quarterly: Overcoming Learning Difficulties, 26(1), pp. 4-25

115 Shipley, KG & McAfee, JG 2015, Assessment in speech-language pathology: A resource manual, 5th ed., Cengage Learning, Boston, MA

116 Share, DL 1995, Phonological recoding and self-teaching: Sine qua non of reading acquisition, Cognition, 55, pp. 151-218

117 Torgesen, JK 1998, Catch them before they fall: Identification and assessment to prevent reading failure in young children, American Educator, http://www.ldonline.org/ld_indepth/reading/torgeson_catchthem.html

118 Laberge, D & Samuels, S 1974, Toward a theory of automatic information processing in reading, Cognitive Psychology, 6, pp. 293-323

119 Begeny, JC, Laugle, Km, Krouse, HE, Lynn, AE, Tayrose, MP & Stage, SA 2010, A control-group comparison of two reading fluency programs: The Helping Early Literacy With Practice Strategies (HELPS) Program and the Great Leaps K–2 Reading Program, School Psychology Review, 39(1), pp. 137–155

120 Langer, N, Benjamin, C, Minas, J & Gaab, N 2015, The neural correlates of reading fluency deficits in children, Cerebral Cortex, 25, pp. 1441–1453

121 O'Brien, BA, Wallot, S, Haussmann, A & Kloos, H 2014, Using complexity metrics to assess silent reading fluency: a cross-sectional study comparing oral and silent reading, Scientific Studies of Reading, 18(4), pp. 235-254

122 Paas, F, van Gog, T & Sweller, J 2010, Cognitive Load Theory: New conceptualizations, specifications, and integrated research perspectives, Educational Psychology Review, 22, pp.115–121, http://download.springer.com/static/pdf/195/art%253A10.1007%252Fs10648-010-9133-8.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs10648-010-9133-8&token2=exp=1448860352~acl=%2Fstatic%2Fpdf%2F195%2Fart%25253A10.1007%25252

Fs10648-010-9133-8.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252Fs10648-010-9133-8*~hmac=2cac7923c97a7ad849977ddc72f96edb351fb153604c96478590dbc3800791d7

Park, P, Chaparro, EA, Preciado, J & Cummings, KD 2015, Is earlier better? Mastery of reading fluency in early schooling, Early Education and Development, DOI: 10.1080/10409289.2015.1015855

Sweller, J 1988, Cognitive load during problem solving: Effects on learning, Cognitive Science, 12, pp. 257 285, http://onlinelibrary.wiley.com/doi/10.1207/s15516709cog1202_4/epdf

123 Richards, TL, Dager, SR, Corina, D, Serafini, S, Heide, AC, Steury, K, Strauss, W, Hayes, CE, Abbott, RD, Craft, S, Shaw, D, Posse, S & Berninger, VW 1999, Dyslexic children have abnormal brain lactate response to reading-related language tasks, American Journal of Neuroradiology, 20, pp. 1393-1398

Richards, TL, Corina, D, Serafini, S, Steury, K, Echelard, DR, Dager, SR, Marro, K, Abbott, RD, Maravilla, KR & Berninger, VW 2000, The effects of a phonologically-driven treatment for dyslexia on lactate levels as measured by Proton MRSI, American Journal of Neuroradiology, 21, pp. 916-922. http://faculty.washington.edu/toddr/dyslexic2.htm

124 Hiebart, EH, Samuels, SJ, Rasinski, T 2012, Comprehension-based silent reading rates: what do we know? What do we need to know?, Literacy Research and Instruction, 51(2), pp. 110-124; Wayman, MM, Wallace, T, Wiley, HI, Ticha, R & Espin, CA 2007, Literature synthesis on curriculum-based measurement in reading, The Journal of Special Education, 41(2), pp. 85-120

Miller, J & Schwanenflugel, PL 2006, Prosody of syntactically complex sentences in the oral reading of young children, Journal of Educational Psychology, 98(4), pp. 839-853

O'Connor, RE, Bell, KM, Harty, KR, Larkin, LK, Sackor, SM & Zigmond, N 2002, Teaching reading to poor readers in the intermediate grades: A comparison of text difficulty, Journal of Educational Psychology, 94, pp. 474-485

Roehrig, AD, Petscher, Y, Nettles, SM, Hudson, RF & Torgesen, JT 2008, Accuracy of the DIBELS Oral Reading Fluency measure for predicting third grade reading comprehension outcomes, Journal of School Psychology, 46(3), pp. 343–366

125 Shinn, MR, Good, RH, Knutson, N, Tilly, WD & Collins, V 1992, Curriculum-based measurement of oral reading fluency: A confirmatory analysis of its relation to reading, School Psychology Review, 21, pp. 459-479

126 Fuchs, LS, Fuchs, D, Hosp, MK Jenkins, JR 2001, Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis, Scientific Studies of Reading, 5, pp. 239-256

127 Fuchs, LS & Fuchs, D 1992, Identifying a measure for monitoring student reading progress, School Psychology Review, 21, pp. 45-58

128 Young-Suk, K, Chea, HP & Wagner, RK 2014, Is oral/text reading fluency a "bridge" to reading comprehension?, Reading and Writing, 27(1), pp.79-99, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4313766/pdf/nihms657868.pdf

129 Rasinski, T, Homan, S & Biggs, M 2009, Teaching reading fluency to struggling readers: Method, materials, and evidence, Reading & Writing Quarterly, 25(2), pp. 192-204, http://accelerating-literacy-learning.edu.au/files/52d258db98d66.pdf

130 Veenendaal, NJ, Groen, MA & Verhoeven, L 2015, What oral text reading fluency can reveal about reading comprehension, Journal of Research in Reading, 38(3), pp. 213–225

131 Park, P, Chaparro, EA, Preciado, J & Cummings, KD 2015, Is earlier better? Mastery of reading fluency in early schooling, Early Education and Development, DOI, 10.1080/10409289.2015.1015855

132 Barger, J 2003, Comparing the DIBELS Oral Reading Fluency indicator and the North Carolina end of grade reading assessment (Technical Report), North Carolina Teacher Academy, Asheville, NC, https://dibels.uoregon.edu/docs/techreports/NC_Tech_Report.pdf

133 Carlisle, JF, Schilling, SG, Scott, SE & Zeng, J 2004, Do fluency measures predict reading achievement? Results from the 2002-2003 school year in Michigan's Reading First Schools Technical Report #1, Evaluation of Reading First in Michigan, University of Michigan, Ann Arbor, http://www.mireadingfirst.org/resources/research/downloads/tr1.pdf

134 Al Otaiba, S, Connor, C, Lane, H, Kosanovich, ML, Schatschneider, C, Dyrlund, AK, Miller, MS & Wright, TL 2008, Reading First kindergarten classroom instruction and students' growth in phonological awareness and letter naming–decoding fluency, Journal of School Psychology, 46(3), pp. 281-314

135 Begeny, JC, Laugle, KM, Krouse, HE, Lynn, AE, Tayrose, MP & Stage, SA 2010, A control-group comparison of two reading fluency programs: The Helping Early Literacy With Practice Strategies (HELPS) Program and the Great Leaps K–2 Reading Program, as above

136 National Reading Panel 2000, Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction, Chapter 3-4

137 Wheldall, K & Beaman, R 2000, An evaluation of MULTILIT: 'Making Up Lost Time In Literacy, as above

138 Adams, G & Engelmann, S 1996, Research on Direct Instruction: 25 years beyond DISTAR, Educational Achievement System, Seattle, WA

Gunn, G, Biglan, A, Smolkowski, K & Ary, D 2000, The efficacy of supplemental instruction in decoding skills for Hispanic and non-Hispanic students in early elementary school, The Journal

of Special Education, 34, pp. 90-103

139 Marinus, E, de Jong, P & van der Leij, A 2012, Increasing word-reading speed in poor readers: No additional benefits of explicit letter-cluster training, Scientific Studies of Reading, 16(2), pp. 166-185

140 As above

141 Rasinski, T, Homan, S & Biggs, M 2009, Teaching reading fluency to struggling readers: Method, materials, and evidence, Reading & Writing Quarterly, 25(2),pp. 192 - 204

142 Rasinski, TV 2003, The fluent reader: Oral reading strategies for building word recognition, fluency, and comprehension, Scholastic, New York, NY; Homan, SP, Klesius, JP & Hite, C 1993, Effects of repeated readings and nonrepetitive strategies on students' fluency and comprehension, Journal of Educational Research, 87, pp. 94–99; Heikkilä, R, Aro, M, Närhi, V, Westerholm, J, & Ahonen, T 2013, Does training in syllable recognition improve reading speed? A computer-based trial with poor readers from second and third grade, as above

143 National Reading Panel 2000, Report of the National Reading Panel, Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups, pp. 3-20

144 O'Keeffe, BV, Slocum, TA, Burlingame, C, Snyder, K & Bundock, K 2012, Comparing results of systematic reviews: Parallel reviews of research on repeated reading, Education & Treatment of Children, 35(2), pp. 333 – 366

145 National Institute for Child Health and Human Development 2006, Report of the National Reading Panel: Teaching Children to Read, para. 39

146 Paige, DD 2011, Testing the acceleration hypothesis: Fluency outcomes utilizing still- versus accelerated-text in sixth-grade students with reading disabilities, Literacy Research and Instruction, 50(4), pp. 294-312

147 Langer, N, Benjamin, C, Minas, J & Gaab, N 2015, The neural correlates of reading fluency deficits in children, as above

Spencer, SA & Mains, FR 2010, The effects of a fluency intervention program on the fluency and comprehension outcomes of middle-school students with severe reading deficits, Learning Disabilities Research & Practice, 25(2), pp. 76–86

148 Griffiths, Y & Stuart, M 2013, Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties, Journal of Research in Reading, 36(1), pp. 96-116

149 Begeny, JC, Laugle, KM, Krouse, HE, Lynn, AE, Tayrose, MP & Stage, SA 2010, A control-group comparison of two reading fluency programs: The Helping Early Literacy With Practice Strategies (HELPS) Program and the Great Leaps K–2 Reading Program, School Psychology Review, 39(1), pp. 137–155

150 Snow, CE, Burns, S & Griffin, P (Eds.) 1998, Preventing reading difficulties in young children, Report of the National Research Council, National Academy Press, Washington, DC, http://www.nap.edu/readingroom/books/reading/ ; California Department of Education 2014, Reading/language arts framework for California public schools: Kindergarten through Grade Twelve, http://www.cde.ca.gov/ci/rl/cf/documents/elaeldfwchapter8.pdf; Dion, E, Brodeur, M, Gosselin, C, Campeasu, ME & Fuchs, D 2010, Implementing research-based instruction to prevent reading problems among low-income students: Is earlier better?, Learning Disabilities Research & Practice, 25, pp. 87–96

151 National Institute for Child Health and Human Development 2006, Report of the National Reading Panel: Teaching Children to Read, Findings and Determinations of the National Reading Panel by Topic Areas, https://www.nichd.nih.gov/publications/pubs/nrp/Pages/findings.aspx

152 National Inquiry into the Teaching of Literacy 2005, Teaching Reading: A review of the evidence-based research literature on approaches to the teaching of literacy, particularly those that are effective in assisting students with reading difficulties, Commonwealth of Australia

153 Savage, RS & Frederickson, N 2006, Beyond phonology: What else is needed to describe the problems of below-average readers and spellers?, Journal of Learning Disabilities, 39(5), pp. 399–413

154 Speeve, DL, Mills, C, Ritchey, KD & Hillman, E 2003, Initial evidence that letter fluency tasks are valid indicators of early reading skill, Journal of Special Education, 36, pp. 223-233

Stage, SA, Sheppard, J, Davidson, MM & Browning, MM 2001, Prediction of first-graders' growth in oral reading fluency using kindergarten letter fluency, Journal of School Psychology, 9(3), pp. 225-237

155 Langer, N, Benjamin, C, Minas, J & Gaab, N 2015, The neural correlates of reading fluency deficits in children, as above

156 Spencer, SA & Manis, FR 2010, The effects of a fluency intervention program on the fluency and comprehension outcomes of middle-school students with severe reading deficits, as above

157 Heikkilä, R, Aro, M, Närhi, V, Westerholm, J, & Ahonen, T 2013, Does training in syllable recognition improve reading speed? A computer-based trial with poor readers from second and third grade, Scientific Studies of Reading, 17(6), pp. 398-414

158 Lyon, GR 1998, Overview of reading and literacy initiatives, Statement to Committee on Labor and Human Resources, www.nrrf.org/learning/overview-of-nichd-reading-and-literacy-initiatives/

159 Griffiths, Y & Stuart, M 2013, Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties, Journal of Research in Reading, 36(1),pp. 96-116

160 Alexander, K, Entwisle, D & Olsen, CR 1997, Early schooling and inequality: Socioeconomic

disparities in children's learning, Falmer Press, London; Swanson, HL 2001, Research on interventions for adolescents with learning disabilities: A meta-analysis of outcomes related to higher-order processing, The Elementary School Journal, 101, pp. 331-348; Shaywitz, SE, Fletcher, JM, Holahan, JM, Schneider, AE, Marchioone, KE, Stuebing, KK, Francis, DJ, Pugh, KR & Shaywitz, BA 1999, Persistence of dyslexia: The Connecticut longitudinal study at adolescence, Pediatrics, 104, pp. 1336; Torgesen, JK, 1998, Catch them before they fall: Identification and assessment to prevent reading failure in young children, as above

161 Wheldall, K & Beaman, R 2000, An evaluation of MULTILIT: 'Making Up Lost Time In Literacy', Training and Youth Affairs, Department of Education, Canberra

162 Rasinski, T, Homan, S & Biggs, M 2009, Teaching reading fluency to struggling readers: Method, materials, and evidence, as above

163 Galuschka, K, Ise, E, Krick, K & Schulte-Korne, G 2014, Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials, PLoS ONE 9(2): e89900. doi:10.1371/journal.pone.0089900

164 Apel, K & Swank, LK 1999, Second chances: Improving decoding skills in the older student. Language, Speech & Hearing Services in Schools, 30, pp. 231-243

165 Swanson, HL 2001, Research on interventions for adolescents with learning disabilities: A meta-analysis of outcomes related to higher-order processing, as above

Wong, BYL 2001, Commentary: Pointers for literacy instruction from educational technology and research on writing instruction, The Elementary School Journal, 101, pp. 359-369

166 Carnine, D, Silbert, J, Kame'enui, EJ, Tarver, SG, & Jungjohann, K. 2006. Teaching Reading to Struggling and At-Risk Readers, Pearson Prentice Hall, New Jersey.

167 National Reading Panel 2000, Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction, Department of Health and Human Services, Jessup, MD, http://www.nationalreadingpanel.org

168 Hairrell, A, Rupley, W & Simmons, D 2011, The state of vocabulary research. Literacy Research and Instruction, 50(4), pp. 253-271

169 National Assessment of Educational Practice 2012, The nation's report card: Vocabulary results from the 2009 and 2011 NAEP Reading Assessments, Institute of Educational Sciences, Washington, DC, http://nces.edgov/nationsreportcard/pubs/main2011/2013452.asp

170 Sinatra, R, Zygouris-Coe, V & Dasinger, S 2011, Preventing a vocabulary lag: What lessons are learned from research, Reading & Writing Quarterly, 28(4), pp. 333-334

171 Ford-Connors, E & Paratore, JP 2015, Vocabulary instruction in fifth grade and beyond: Sources of word learning and productive contexts for development, Review of Educational Research, 85(1),pp. 50–91, http://www.bu.edu/sedreadingclinic/files/2015/09/Ford-ConnorsParatore_2015_RER.pdf

172 Perfetti, C & Strafura, J 2014, Word knowledge in a theory of reading comprehension, Scientific Studies of Reading, 18, pp. 22–37, http://www.tandfonline.com/doi/pdf/10.1080/10888438.2013.827687

173 Papademitriou, AM & Vlachos, FM 2014,Which specific skills developing during preschool years predict the reading performance in the first and second grade of primary school? Early Child Development and Care, 184(11), pp. 1706-1722

174 Verhoeven, L & van Leeuwe, J 2011, Vocabulary growth and reading development across the elementary school years, Scientific Studies of Reading, 15, pp. 8–25

175 Sparks, RL, Patton, J & Murdoch, A 2014, Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years later', Reading and Writing, 27(1), pp. 189-211

Stanovich, KE 1993, Does reading make you smarter? Literacy and the development of verbal intelligence. In Reese, H (Ed.), Advances in child development and behaviour, Vol. 24, Academic Press, San Diego, CA, pp. 133-180

176 Sinatra, R, Zygouris-Coe, V & Dasinger, S 2011, Preventing a vocabulary lag: What lessons are learned from research, pp. 333-357

177 Cunningham, AJ & Carroll, JM 2015, Early predictors of phonological and morphological awareness and the link with reading: Evidence from children with different patterns of early deficit, Applied Psycholinguistics, 36, pp. 509-531

178 Taylor, CL, Christensen, D, Lawrence, D, Mitrou, F & Zubrick, SR 2013, Risk factors for children's receptive vocabulary development from four to eight years in the longitudinal study of Australian children, PLoS ONE, 8(11), pp.1-20

179 Australian Early Development Index 2009, A snapshot of early childhood development in Australia, Australian Early Development Index (AEDI) National Report 2009, Centre for Community Child Health and the Telethon Institute for Child Health Research, http://www.rch.org.au/uploadedFiles/Main/Content/aedi/Report_NationalReport2011Reissue_1103.pdf

180 Hay, I & Fielding-Barnsley, R 2009, Competencies that underpin children's transition into early literacy, Australian Journal of Language and Literacy, 32(2), 148-162; Reilly, S, Wake, M, Ukoumunne, O, Bavin, E, Prior, M, Cini, E, Conway, L, Eadie, P, & Bretherton, L 2010, Predicting language outcomes at 4 years of age: findings from Early Language in Victoria study, Pediatrics, 126(6), 1530-1537, doi: DOI: 10.1542/peds.2010- 0254

181 Olson, RK, Keenan, JM, Byrnw, B, Samuelsson, S,

Conventry, WL, Corley, R, Wadsworth, SJ, Willcutt, SG, DeFries, JC, Pennington, BF & Hulslander, J 2007 Genetic and environmental influences on vocabulary and reading development. Scientific Studies of Reading : The Official Journal of the Society for the Scientific Study of Reading, 20(1-2), pp. 51–75, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3019615/

182 Hart, B & Risley, T 1995, Meaningful differences in the everyday experiences of young American children, Paul H. Brookes Publishing, Baltimore, in … to child in the preschool and school years. Presentation at the session on Consequences of Child Poverty and Deprivation, at the Annual Meetings of the Population Association of America, Washington, D.C., http://www.pop.psu.edu/general/pubs/working_papers/psu-pri/wp0105.pdf

183 Hart, B & Risley, TR 2003, The early catastrophe: The 30 million word gap, American Educator, pp. 4-9 https://www.aft.org/sites/default/files/periodicals/TheEarlyCatastrophe.pdf

184 Taylor, CL, Christensen, D, Lawrence, D, Mitrou, F & Zubrick, SR 2013, Risk factors for children's receptive vocabulary development from four to eight years in the longitudinal study of Australian children, as above

185 Weisleder, A & Fernald, A 2013, Talking to children matters: Early language experience strengthens processing and builds vocabulary, Psychological Science, 24(11), pp. 2143-2152

186 Fernald, A, Marchman, VA & Weisleder, A 2013, SES differences in language processing skill and vocabulary are evident at 18 months, Psychological Science, 16(2), pp. 234-238

187 Hoff, E 2013, Interpreting the early language trajectories of children from low-SES and language minority homes: Implications for closing achievement gaps, Developmental Psychology, 49(1), pp.4–14

188 Fernald, A, Marchman, VA & Weisleder, A 2013, SES differences in language processing skill and vocabulary are evident at 18 months , as above

189 Farkas, G & Beron, K 2001, Family linguistic culture and social reproduction: Verbal skill from parent to child in the preschool and school years, Prepared for presentation at the session on Consequences of Child Poverty and Deprivation, at the Annual Meetings of the Population Association of America, Washington, D.C

Hart, B & Risley, TR 2003, The early catastrophe: The 30 million word gap, as above

190 Berliner, CD 2006, Our impoverished view of educational reform, Teachers College Record, 108(6), pp. 949-995, http://epsl.asu.edu/epru/documents/EPSL-0508-116-EPRU.pdf

191 Reach Out & Read 2015, Reach Out & Read Program, Reach Out and Read National Center, http://www.reachoutandread.org/

192 What Works Clearinghouse 2015, Evidence for what works in education, Institute of Education Sciences, U.S. Department of Education, http://ies.ed.gov/ncee/wwc/

193 What Works Clearinghouse, 2015, Shared book reading, Institute of Education Sciences, U.S. Department of Education, http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=458

194 Levy, BA, Gong, Z, Hessels, S, Evans, MA & Jared, D 2006, Understanding print: Early reading development and the contributions of home literacy experiences, Journal of Experimental Child Psychology, 93(1), pp. 63-93

Robins, S, Treiman, R, Rosales, N & Otakes, S 2012, Parent–child conversations about letters and pictures, Reading and Writing: An Interdisciplinary Journal, 25, pp. 2039–2059

195 Duursma, E, Augustyn, M, Zuckerman, B 2008, Reading aloud to children: The evidence, Archives of Diseases in Children, 93(7), pp. 554-7, http://www.reachoutandread.org/FileRepository/ReadingAloudtoChildren_ADC_July2008.pdf

196 Treiman, R, Schmidt, J, Decker, K Robins, S, Levine, SC & Demir, ÖE, Parents' talk about letters with their young children, Child Development

197 Dickinson, DK, McCabe, A, Anastaspoulos, L, Feinberg, ES & Poe, MD 2003, The comprehensive language approach to early literacy: The interrelationships among vocabulary, phonological sensitivity, and print knowledge among preschool-aged children, Journal of Educational Psychology, 95(3), pp. 465-481

198 Fricke, S, Bowyer-Crane, C, Haley, AJ, Hulme, C & Snowling, MJ 2013, Efficacy of language intervention in the early years, Journal of Child Psychology and Psychiatry, 54(3), pp. 280–290

199 Abrya, T, Latham, S, Bassok, D & LoCasale-Crouch, J 2015, Preschool and kindergarten teachers' beliefs about early school competencies: Misalignment matters for kindergarten adjustment, Early Childhood Research Quarterly, 31, pp. 78–88

200 Moore, TG & McDonald, M 2013, Acting Early, Changing Lives: How prevention and early action saves money and improves wellbeing, Prepared for The Benevolent Society, Centre for Community Child Health at The Murdoch Childrens Research Institute & The Royal Children's Hospital, Parkville, Victoria, http://www.benevolent.org.au/~/media/Benevolent/Think/Actingearlychanginglives%20.pdf

201 Melluish, EC 2011, Preschool Matters, Science, 333, p. 300

202 OCD 2011, Pisa in focus 2011/1: Does participation in preprimary education translate into better learning outcomes at school?, Paris, http://www.pisa.oecd.org/dataoecd/37/0/47034256.pdf

203 Education Endowment Foundation 2015, Early years intervention, London, https://educationendowmentfoundation.org.uk/toolkit/toolkit-a-z/early-years-intervention/

204 Loftus, SM & Coyne, MD 2013, Vocabulary instruction within a multi-tier approach, Reading & Writing Quarterly, 29(1), pp. 4-19

205 Greenwood, CR, Carta, JJ, Goldstein, H, Kaminski, RA, McConnell, SR & Atwater, J 2015, The Center

on Response to Intervention in Early Childhood (CRTIEC): Developing evidence-based tools for a multi-tier approach to preschool language and early literacy instruction, Journal of Early Intervention, 36, pp. 246-262

206 Baumann, JF, Kame'enui, EJ & Ash, GE 2003, Research on vocabulary instruction: Voltaire redux. In J. Flood, J. Jensen, D. Lapp, & J. R. Squire (Eds.), Handbook of research on teaching the English language arts, Macmillan, New York, NY, pp. 752-785

207 Loftus, SM & Coyne, MD 2013, Vocabulary instruction within a multi-tier approach, Reading & Writing Quarterly: Overcoming Learning Difficulties, 29(1), p.8

208 O'Connor, RE, Bocian, K, Beebe-Frankenberger, M & Linklater, DL 2010, Responsiveness of students with language difficulties to early intervention in reading, The Journal of Special Education, 43(4), pp. 220-235

209 Hirsch, ED 2013, Primer on success: Character and knowledge make the difference, Education Next, 13(1), http://educationnext.org/primer-on-success/; Figurate, L 2010, Teaching vocabulary: Intentional, explicit instruction, US Department of Education, No Child Left Behind, http://esu4vocabularystrategies.wikispaces.com/Teaching+Strategies

210 Farkas, G & Beron, K 2001, Family linguistic culture and social reproduction: Verbal skill from parent to child in the preschool and school years, Prepared for presentation at the session on Consequences of Child Poverty and Deprivation, at the Annual Meetings of the Population Association of America, Washington, D.C

211 Sinatra, R, Zygouris-Coe, V & Dasinger, S 2011, Preventing a vocabulary lag: What lessons are learned from research, Reading & Writing Quarterly, 28(4), pp. 333-357; Lenfest, A & Reed, DK 2015, Enhancing basal vocabulary instruction in kindergarten, Learning Disabilities Research & Practice, 30(1), pp. 43–50

212 Clarke, P, Snowling, MJ, Truelove, E & Hulme, C 2010, Ameliorating children's reading comprehension difficulties: A randomised controlled trial, Psychological Science, 21, pp. 1106-1116

213 Spencer, M, Quinn, JM & Wagner, RK 2014, Specific reading comprehension disability: Major problem, myth, or misnomer?, Learning Disabilities Research & Practice, 29(1), pp. 3-8

214 Marzano, R 2004, Building background knowledge for academic achievement: Research on what works in schools, Association for Supervision and Curriculum Development, Alexandria, VA, http://www.ascd.org/ASCD/pdf/siteASCD/video/buildingacademic.pdf

Stahl, SA 1999, Vocabulary development, Brookline Books, Cambridge, MA,

215 Lenfest, A & Reed, DK 2015, Enhancing basal vocabulary instruction in kindergarten, Learning Disabilities Research & Practice, 30(1), pp. 43–50

216 Clarke, P, Snowling, MJ, Truelove, E & Hulme, C 2010, Ameliorating children's reading comprehension difficulties: A randomised controlled trial, Psychological Science, 21, pp.1106-1116

217 Nicholson, T & Whyte, B 1992, Matthew effect in learning new words while listening to stories. In Literacy research: Theory and practice: Views from many perspectives. In Charles K. Kinzer and Donald J. Leu (Eds.), National Reading Conference, Chicago

218 Ford-Connors, E & Paratore, JP 2015, Vocabulary instruction in fifth grade and beyond: Sources of word learning and productive contexts for development, Review of Educational Research, 85(1), pp. 50–91

219 Beck, LL & McKeown, MG 2007, Increasing young low-income children's oral vocabulary repertoires through rich and focused instruction, The Elementary School Journal, 107, pp. 251–271, https://chrisshively.wikispaces.com/file/view/Increasing+Young+Low%E2%80%90Income+Children%E2%80%99s+Oral+Vocabulary+Repertoires+through+Rich+and+Focused+Instruction.pdf

220 Biemiller, A 2010, Words worth teaching: Closing the vocabulary gap, McGraw-Hill, Columbus, OH

221 Pressley, M, Mohan, I, Raphael, LM & Fingeret, L 2007, How does Bennet Woods Elementary School produce such high reading and writing achievement? Journal of Educational Psychology, 99(2), pp. 221–240

222 Biemiller, A, Rosenstein, M, Spakrs, R, LAndauer, TK, Foltz, PW 2014, Models of vocabulary acquisition: Direct tests and text-derived simulations of vocabulary growth, Scientific Studies of Reading, 18(2), p. 146

223 Bowers, PN & Kirby, JR 2010, Effects of morphological instruction on vocabulary acquisition, Reading and Writing: An Interdisciplinary Journal, 23, pp. 515–537, http://wordworkskingston.com/WordWorks/Research_files/published%20vocab%20paper.pdf

224 Berninger, VW, Nielsen, KH, Abbott, RD, Wijsman, E & Raskind, W 2008, Writing problems in developmental dyslexia: Under-recognized and under-treated, Journal of School Psychology, 46, pp.1–21

Carlisle, JF 2010, Effects of instruction in morphological awareness on literacy achievement: An integrative review, Reading Research Quarterly, 45, pp. 464–487

225 Goodwin, AP & Ahn S 2013, A meta-analysis of morphological interventions in English: Effects on literacy outcomes for school-age children Scientific Studies of Reading, 179(4), pp. 257-285

226 Bowers, PN, Kirby, JR & Deacon, SH 2010, The effects of morphological instruction on literacy skills: A systematic review of the literature, Review of Educational Research, 80, pp. 144–179, http://wordworkskingston.com/WordWorks/Research_files/published%20Meta-Analysis.pdf

227 Bowers, PN & Kirby JR 2010, Effects of morphological instruction on vocabulary acquisition, as above

228 Dixon, R & Engelmann, S 2007, Spelling through morphographs, McGraw-Hill, SRA

229 Biemiller, A & Slonin, N 2001, Estimating root word vocabulary growth in normative and advantaged populations: Evidence for a common sequence of vocabulary acquisition, Journal of Educational Psychology, 93, pp. 498-520

230 Nagy, WE & Anderson RC 1984, How many words are there in printed English?, Reading Research Quarterly, 19, pp.304-330

231 Ford-Connors, E & Paratore, JP 2015, Vocabulary instruction in fifth grade and beyond: Sources of word learning and productive contexts for development, Review of Educational Research, 85(1),p.77

232 Ford-Connors, E & Paratore, JP 2015, Vocabulary instruction in fifth grade and beyond: Sources of word learning and productive contexts for development, Review of Educational Research, 85(1),p.80-81

233 Osborn, JH & Armbruster, BB 2001, Vocabulary acquisition: Direct teaching and indirect learning, Basic Education Online Edition, 46(3), pp. 11-16

Baumann, JF, Kame'enui, EJ & Ash, GE 2003, Research on vocabulary instruction: Voltaire redux. In J. Flood, J. Jensen, D. Lapp, & J. R. Squire (Eds.), Handbook of research on teaching the English language arts, Macmillan, New York, NY, pp. 752–785

234 Nagy, W 1998, Increasing students' reading vocabularies, Presentation at the Commissioner's Reading Day Conference, Austin, TX

235 Allington, RL 1984, Content coverage and contextual reading in reading groups, Journal of Reading Behaviour, 16, pp. 85-96, http://jlr.sagepub.com/content/16/2/85.full.pdf

236 Nagy, WE & Anderson, RC 1984, How many words are there in printed English?, Reading Research Quarterly, 19, pp.304-330

237 Fielding, L, Wilson, P & Anderson, R 1986, A new focus on free reading: The role of trade books in reading instruction. In R. Raphael and R. Reynolds (Eds.), Contexts in literacy, Longman, New York, NY

238 Sparks, Rl, Patton, J & Murdoch, A 2014, Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years later', Reading and Writing, 27(1), pp. 189-211

239 Nagy, WE & Anderson, RC 1984, How many words are there in printed English?, Reading Research Quarterly, 19, pp. 304-330

Osborn, JH & Armbruster, BB 2001, Vocabulary acquisition: Direct teaching and indirect learning, Basic Education Online Edition, 46(3), pp. 11-16

240 Lyon, GR 2001, Measuring success: Using assessments and accountability to raise student achievement, Subcommittee on Education Reform Committee on Education and the Workforce U.S. House of Representatives Washington, D.C, http://learninghelp.org.au/information-sheets-from-ses-with-permission/measuring-success-using-assessments-and-accountability-to-raise-student-achievement/

241 Cunningham, A & Stanovich, KE 1998, What reading does for the mind, American Educator, 22(1-2), pp. 8-15, http://www.aft.org/pdfs/americaneducator/springsummer1998/cunningham.pdf

242 Stanovich, KE 1993, Does reading make you smarter?, Literacy and the development of verbal intelligence, Advances in Child Development and Behaviour, 24, pp. 133-180

243 Pfost, M, Dörfler, T & Artelt, C, 2013, Students' extracurricular reading behavior and the development of vocabulary and reading comprehension, Learning and Individual Differences, 26, pp. 89-102, https://www.uni-bamberg.de/fileadmin/uni/fakultaeten/ppp_lehrstuehle/bildungsforschung/Publikationen/Artelt/Pfost_Doerfler_Artelt_Students_Extracurricular.pdf

244 Pulido, D & Hambrick, DZ 2008, The virtuous circle: Modeling individual differences in L2 reading and vocabulary development, Reading in a Foreign Language, 20, pp. 164-190, http://nflrc.hawaii.edu/rfl/October2008/pulido/pulido.pdf

245 Sparks, RL, Patton, J & Murdoch, A 2014, Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years later', Reading and Writing, 27(1), pp. 189-211

246 Stanovich, KE 1986, Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy, Reading Research Quarterly, 21, pp. 360-406

247 Moore, TG & McDonald, M 2013, Acting Early, Changing Lives: How prevention and early action saves money and improves wellbeing, as above

248 Scammacca, N, Roberts, G, Vaughn, S, Edmonds, M, Wexler, J, Reutebuch, CK & Torgesen, JK 2007, Interventions for adolescent struggling readers: A meta-analysis with implications for practice, Centre on Instructions RMC Research Corporation Portsmouth, NH, http://www.centeroninstruction.org/interventions-for-adolescent-struggling-readers-a-meta-analysis-with-implications-for-practice

Vaughn, S, Wexler, J, Roberts, G Barth, AA, Cirino, PT, Romain, MA, Francis, D, Fletcher, J & Denton, CA 2011, Effects of individualized and standardized interventions on middle school students with reading disabilities, Exceptional Children, 77(4), pp. 391-407

249 Griffiths, Y & Stuart, M 2013, Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties, Journal of Research in Reading, 36(1), pp. 96-116

Marchand-Martelle, NE, Martella, RC, Modderman, SL, Petersen, HM & Pan, S 2013, Key areas of effective adolescent literacy programs, Education

and Treatment of Children, 36(1), pp. 161-184

250 Denton, CA, Tolar, TD, Fletcher, JM, Barth, AE, Vaughn, S & Francis, DJ 2013, Effects of Tier 3 Intervention for students with persistent reading difficulties and characteristics of inadequate responders Journal of Educational Psychology, 105(1), pp. 1-16

251 Lyon, GR 2000, Why reading is not a natural process, LDA Newsbriefs, http://www.ldonline.org/article/6396; Landi, N, Frost, SJ, Menci, WE, Sandak, R & Pugh, KR 2013, Neurobiological bases of reading comprehension: Insights From neuroimaging studies of word-level and text-level processing in skilled and impaired readers, Reading & Writing Quarterly: Overcoming Learning Difficulties, 29(2), pp. 145-167

252 Gough, PB & Tunmer WE 1986, Decoding, reading, and reading disability, Remedial and Special Education, 7, pp. 6–10

253 Sabatini, JP, O'Reilly, T, Halderman, LK & Bruce, K 2014, Integrating scenario-based and component reading skill measures to understand the reading behavior of struggling readers, Learning Disabilities Research & Practice, 29(1), pp. 36–43

Spencer, M, Quinn, JM & Wagner, RK 2014, Specific reading comprehension disability: Major problem, myth, or misnomer?, as above

Wagner, RK & Meros, D 2010, Vocabulary and reading comprehension: Direct, indirect, and reciprocal influences, Focus on Exceptional Children, 43, pp. 1-12

254 Spencer, M, Quinn, JM & Wagner, RK 2014, Specific reading comprehension disability: Major problem, myth, or misnomer?, as above

255 Wagner, RK & Meros, D 2010, Vocabulary and reading comprehension: Direct, indirect, and reciprocal influences, as above

256 Garcia, JR & Cain, K 2014, Decoding and reading comprehension: A meta-analysis to identify which reader and assessment characteristics influence the strength of the relationship in English, Review of Educational Research, 84(1), pp. 74–111, http://rer.sagepub.com/content/84/1/74.full.pdf+html

257 Gentaz, E., Sprenger-Charolles, L., & Theurel, A. (2015). Differences in the predictors of reading comprehension in first graders from low socio-economic status families with either good or poor decoding skills. PLoS ONE 10(3). e0119581. doi:10.1371/journal.pone.0119581

Spencer, M, Quinn, JM & Wagner, RK 2014, Specific reading comprehension disability: Major problem, myth, or misnomer?, Learning Disabilities Research & Practice, 29(1), pp. 3-9, http://onlinelibrary.wiley.com/doi/10.1111/ldrp.12024/pdf

258 Nicholson, T 1993, The case against context, In G. B. Thompson, W. E. Tunmer, & T. Nicholson (Eds.), Reading acquisition processes, pp. 91-104, Multilingual, Clevedon, UK

Primary National Strategy 2006, Phonics and early reading: An overview for headteachers, literacy leaders and teachers in schools, and managers and practitioners in Early Years settings, Department of Education and Skills, UK,

http://www.frameworkplanning.co.uk/resources/docs/Phonics_and_early_reading.doc

Spear- Swerling, L 2006, The use of context cues in reading, LDOnline, http://www.ldonline.org/spearswerling/11773

259 Richards, TL Dager, SR Corina, D, Serfafini, S, Heide, AC, Steury, K, Strauss, W, Hayes, CE, Abbott, RD, Craft, S, Shaw, D, Posse, S & Berninger, VW 1999, Dyslexic children have abnormal brain lactate response to reading-related language tasks, American Journal of Neuroradiology, 20, pp. 1393-1398

260 Mastropieri, MA, Leinart, AW & Scruggs, TE 1999, Strategies to increase reading fluency, Intervention in School and Clinic, 34(5), pp. 278-292; Kamhi, AG & Catts, HW 1999, Reading development. In H. W. Catts & A. G. Kamhi (Eds.), Language and reading disabilities, Allyn & Bacon, Needham Heights, MA, pp. 25-50

261 Just, MA & Carpenter, PA 1992, A capacity theory of comprehension: Individual differences in working memory, Psychological Review, 99(1), pp. 122-149, http://repository.cmu.edu/cgi/viewcontent.cgi?article=1730&context=psychology

Kudo, M, Lussier, C & Swanson, HL 2015, Reading disabilities in children: A selective meta-analysis of the cognitive literature, Research in Developmental Disabilities, 40, pp. 51–62

262 Young-Suk, K, Petscher, Y, Schatschneider, C & Foorman, B 2010, Does growth rate in oral reading fluency matter in predicting reading comprehension achievement?, Journal of Educational Psychology, 102(3),pp.652–667

263 Kendeou, P, van de Broek, P, Helder, A & Karlsson, J 2014, A cognitive view of reading comprehension: Implications for reading difficulties, Learning Disabilities Research & Practice, 29(1), pp. 10–16

264 Pressley, M, Duke, NK, Gaskins, IW, Fingeret, L, Halliday, J, Hilden, K & Collins, S 2009, Working with the struggling readers: Why we must get beyond the simple view of reading and visions of how it might be done, as above

265 Arcand, M-S, Dion, E, Lemire-Théberge, E, Guay, M-H, Barrette, A, Gagnon, V, Caron, P-O & Fuchs, D 2014, Segmenting texts into meaningful word groups: Beginning readers' prosody and comprehension, Scientific Studies of Reading, 18(3), pp. 208-223

266 Chall, J & Jacobs, VA 2003, The classic study on poor children's fourth grade reading slump, American Educator, Spring. http://www.aft.org/periodical/american-educator/spring-2003/classic-study-poor-childrens-fourth-grade-slump

Garcia, JR & Cain, K 2014, Decoding and reading comprehension: A meta-analysis to identify which reader and assessment characteristics influence the strength of the relationship in English, Review of Educational Research, 84(1), pp. 74–111

267 Young-Sek, K, Chea, HP & Wagner, RK 2014, Is oral/text reading fluency a "bridge" to reading comprehension?, Reading and Writing, 27(1), pp.79-99

268 Wagner, RK & Meros, D 2010, Vocabulary and reading comprehension: Direct, indirect, and reciprocal influences, as above

269 Chall, J & Jacobs, VA 2003, The classic study on poor children's fourth grade reading slump, as above

270 Sinatra, R, Zygouris-Coe & Dasinger, S 2011, Preventing a vocabulary lag: What lessons are learned from research, Reading & Writing Quarterly, 28(4), pp. 333-357

271 Fricke, S, Bowyer-Crane, C, Haley, AJ, Hume, C & Snowling, MJ 2013,

Efficacy of language intervention in the early years, Journal of Child Psychology and Psychiatry, 54(3), pp. 280–290

272 Willingham, DT 2006, The usefulness of brief instruction in reading comprehension strategies. American Educator, pp. 39-50, http://www.aft.org/sites/default/files/periodicals/CogSci.pdf

273 Compton, DL, Miller AC, Elleman, AM & steacy, LM 2014, Have we forsaken reading theory in the name of "quick fix" interventions for children with reading disability?, as above

274 Hirsch, ED 2013, Primer on success: Character and knowledge make the difference, Education Next, 13(1), http://educationnext.org/primer-on-success/

275 Hirsch, ED 2006, The knowledge deficit, Mifflin, Houghton, New York, pp. 38

276 Garcia, JR & Cain, K 2014, Decoding and reading comprehension: A meta-analysis to identify which reader and assessment characteristics influence the strength of the relationship in English, as above

277 Willingham, DT 2006, The usefulness of brief instruction in reading comprehension strategies, American Educator, pp. 39-50, as above

278 National Reading Panel 2000, Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction, U.S. Department of Health and Human Services, Jessup, MD, pp. 4-51, http://www.nationalreadingpanel.org,

279 Pressley, M, Duke, NK, Gaskins, IW, Fingeret, L, Halliday, J, Hilden, K & Collins, S 2009, Working with the struggling readers: Why we must get beyond the simple view of reading and visions of how it might be done. In T. B. Gutkin & C. R. Reynolds (Eds.), Handbook of school psychology (4th ed.), pp. 522-546, Wiley, Hoboken, NJ, p. 548

280 Cooper, JD, McWilliams, J, Boschken, I & Pistochini, L 1997, Stopping reading failure: Reading intervention for intermediate-grade students, Miflin, Houghton, New York, http://www.eduplace.com/intervention/soar06/articles/cooper.html

281 Mason, LH 2013, Teaching students who struggle with learning to think before, while, and after reading: Effects of self-regulated strategy development instruction, Reading & Writing Quarterly: Overcoming Learning Difficulties, 29(2), pp. 124-144

282 Mason, LH 2013, Teaching students who struggle with learning to think before, while, and after reading: Effects of self-regulated strategy development instruction, Reading & Writing Quarterly: Overcoming Learning Difficulties, 29(2), pp. 124-144

283 Elbro, C & Buch-Iversen, I 2013, Activation of background knowledge for inference making: Effects on reading comprehension, Scientific Studies of Reading, 17(6), pp. 435-452

Landi, N, Frost, SJ, Menci, WE, Sandak, R & Pugh, KR 2013, Neurobiological bases of reading comprehension: Insights From neuroimaging studies of word-level and text-level processing in skilled and impaired readers, Reading & Writing Quarterly: Overcoming Learning Difficulties, 29(2), pp. 145-167

284 Willingham, DT 2006, The usefulness of brief instruction in reading comprehension strategies, as above

285 Mason, LH & Hagaman, JL 2012, Highlights in reading comprehension intervention research for students with learning disabilities, as above

286 Swanson, HL & Sachse-Lee, C 2000, A meta-analysis of single-subject-design intervention research for students with LD, Journal of Learning Disabilities, 33, pp. 114-136

287 Solis, M, Ciullo, S, Vaughn, S, Pyle, N, Hassaram, B & Leroux, A 2012, Reading comprehension interventions for middle school students with learning disabilities: A synthesis of 30 years of research, Journal of Learning Disabilities, 45, pp.327- 340

288 Hairrell, A, Rupley, WH, Edmonds, M, Larsen, R, Simmons, D, Willson, V, Byrns, G & Vaughn, S 2011, Examining the impact of teacher quality on fourth-grade students' comprehension and content-area achievement, Reading & Writing Quarterly: Overcoming Learning Difficulties, 27(3), pp. 239-260

289 Solis, M, Ciullo, S, Vaughn, S, Pyle, N, Hassaram, B & Leroux, A 2012, Reading comprehension interventions for middle school students with learning disabilities: A synthesis of 30 years of research, as above

290 Compton, Dl, Miller, AC, Elleman, AM & Steacy, LM 2014, Have we forsaken reading theory in the name of "quick fix" interventions for children with reading disability?, Scientific Studies of Reading, 18(1), pp. 55-73

291 Ciullo, S & Reutebuch 2013, Computer-based graphic organizers for students with LD: A systematic review of literature, Learning Disabilities Research & Practice, 28(4), pp. 196–210

292 Elbro, C & Buch-Iversen, I 2013, Activation of background knowledge for inference making: Effects on reading comprehension, as above

293 McMaster, KL, Espin, CA, van den Broek, P 2014, Making connections: Linking Cognitive Psychology and intervention research to improve comprehension of struggling readers, Learning Disabilities Research & Practice, 29(1), pp. 17–24

294 Compton, DL, Miller AC, Elleman, AM & Steacy, LM 2014, Have we forsaken reading theory in the name of "quick fix" interventions for children with reading disability?, as above

295 Compton, DL, Miller, AC, Elleman, AM & steacy, LM 2014, Have we forsaken reading theory in the name of "quick fix" interventions for children with reading disability?, pp. 64

296 Griffiths, Y & Stuart, M 2013, Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties, Journal of Research in Reading, 36(1), pp. 96-116

297 Scammacca, N, Roberts, G, Vaughn, S, Edmonds, M, Wexler, J, Reutebuch, CK & Torgesen, JK 2007, Interventions for adolescent struggling readers: A meta-analysis with implications for practice, RMC Research Corporation, Centre on Instructions, Portsmouth, NH, http://www.centeroninstruction.org/interventions-for-adolescent-struggling-readers-a-meta-analysis-with-implications-for-practice

298 Vaughn, S, Wexler, J, Roberts, G, Barth, AA, Cirino, PT, Romain, MA, Francis, D, Fletcher, J & Denton, CA 2011, Effects of individualized and standardized interventions on middle school students with reading disabilities, Exceptional Children, 77(4),pp.391-407

299 Kendeou, P, van den Broek, P, Helder, A & Karlsson, J 2014, A cognitive view of reading comprehension: Implications for reading difficulties, Learning Disabilities Research & Practice, 29(1), pp. 10–16

300 Garcia, JR & Cain, K 2014, Decoding and reading comprehension: A meta-analysis to identify which reader and assessment characteristics influence the strength of the relationship in English, Review of Educational Research, 84(1), pp. 74–111

301 Keenan, JM, Betjemann, RS & Olson, RK 2008, Reading comprehension tests vary in the skills they assess: Differential dependence on decoding and oral comprehension, Scientific Studies of Reading, 12, pp. 281–300

302 Slavin R, & Madden, NA 2011, Measures inherent to treatments in program effectiveness reviews, Journal of Research on Educational Effectiveness, 4, 370–380.

303 National Reading Panel 2000, Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction, as above

304 Pearson, PD & Hamm, DN 2005, The assessment of reading comprehension: A review of practices – past, present, and future, pp. 13-69, In S. G. Paris, & S. A. Stahl (Eds.), Children's reading comprehension and assessment, Lawrence Erlbaum Associates Publishers, Mahwah, NJ, pp. 131-160

305 Miller, AC, Davis, N, Gilbert, JK, Cho, S-J, Toste, JR, Street, J & Cutting, LE 2014, Novel approaches to examine passage, student, and question effects on reading comprehension, Learning Disabilities Research & Practice, 29(1), pp. 25–35

306 Sabatini, SP, O'Reilly, T, Halderman, LK & Bruce, K 2014, Integrating scenario-based and component reading skill measures to understand the reading behavior of struggling readers, Learning Disabilities Research & Practice, 29(1), pp. 36–43

307 Sabatini, JP, O'Reilly, T, Halderman, LK & Bruce, K 2014, Integrating scenario-based and component reading skill measures to understand the reading behavior of struggling readers, as above

308 Archer, AL & Hughes, CA 2011, Explicit instruction: Effective and efficient teaching, The Guilford Press, New York, NY

309 Victorian Auditor-General 2012, Programs for students with special learning needs: Audit summary, http://www.audit.vic.gov.au/publications/20120829-Special-Learning-Need/20120829-Special-Learning-Need.rtf

310 Jencks, CS, Smith, M, Acland, H, Bane, MJ, Cohen, D, Ginits, H, et al. 1972, Inequality: A reassessment of the effect of family and schooling in America, Basic Books, New York, NY

311 Coleman, J, Campbell, E, Hobson, C, McPartland, J, Mood, A, Weinfeld, FD, et al 1966, Equality of educational opportunity, Department of Health, Education & Welfare, Washington, DC, http://files.eric.ed.gov/fulltext/ED012275.pdf

312 Auguste, B, Kihn, P & Miller, M 2010, Closing the talent gap: Attracting and retaining the top-third graduates to careers in Teaching, McKinsey & Co., http://www.ptec.org/document/ServeFile.cfm?ID=10526&DocID=2026&Attachment=1

Hattie, J 2009, Visible Learning; a synthesis of over 800 meta-analyses relating to achievement, Routledge, London

313 Productivity Commission 2011, Issues paper - Education and Training Workforce: Schools Workforce Study, www.pc.gov.au/__data/assets/word.../schools-workforce-issues.doc

314 Wenglinsky, H 2000, How teaching matters, Milken Foundation & Educational Testing Service, Princeton, NJ, www.ets.org/research/pic/teamat.pdf

315 Leigh, A & Ryan, C 2008, How has school productivity changed in Australia?, The Australian National University, Canberra, http://econrsss.anu.edu.au/~aleigh/pdf/SchoolProductivity.pdf

316 Hattie, J 2009, Visible Learning; a synthesis of over 800 meta-analyses relating to achievement, Routledge, London

317 Wenglinsky, H 2003, Using large- scale research to gauge the impact of instructional practices on student reading comprehension: An exploratory study, Education Policy Analysis Archives, 11(19), http://epaa.asu.edu/epaa/v11n19/

318 Jencks, CS & Phillips, M 1998, America's next achievement test, The American Prospect, 9(40),

http://www.prospect.org/print/V9/40/jencks-c.html

319 Sanders, W & Rivers, J 1996, Cumulative and residual effects of teachers on future student academic achievement, University of Tennessee Value-Added Research and Assessment Center. Knoxville, http://www.cgp.upenn.edu/pdf/Sanders_Rivers-TVASS_teacher%20effects.pdf

320 Hanuschek, EA 1992, The trade-off between child quantity and quality, Journal of Political Economy, 100(1), pp. 84–117, http://hanushek.stanford.edu/sites/default/files/publications/Hanushek%201992%20JPE%20100(1).pdf

321 Hill, P & Rowe, KJ 1996, Multilevel modelling in school effectiveness research, School Effectiveness

322 Rupley, WH 2011, Research on teacher quality: Improving reading and writing instruction, Reading & Writing Quarterly: Overcoming Learning Difficulties, 27(3), pp. 179-182

323 Auguste, B, Kihn, P & Miller, M 2010, Closing the talent gap: Attracting and retaining the top-third graduates to careers in Teaching, McKinsey & Co., http://www.ptec.org/document/ServeFile.cfm?ID=10526&DocID=2026&Attachment=1

324 Engelmann, S, Becker, WC, Carnine, D, & Gersten, R 1988, The Direct Instruction Follow Through model: Design and outcomes. Education and Treatment of Children, 11, 303-317.

325 Watkins, CL 1997, Project Follow Through: A Case Study of Contingencies Influencing Instructional Practices of the Educational Establishment, Cambridge Center for Behavioural Studies, Cambridge, MA. www.behavior.org/resources/901.pdf

326 Education Consumers.Org 2015, Supplement: A summary of the results of Project Follow Through. Retrieved from http://education-consumers.org/pdf/PFT_page.pdf; Gersten, RM, Keating, T, & Becker, W 1988, The continued impact of the Direct Instruction Model: Longitudinal studies of Follow Through students, Education and Treatment of Children, 11(4), 318-327.

327 Gersten, RM, Keating, T, & Becker, W 1988, The continued impact of the Direct Instruction Model: Longitudinal studies of Follow Through students, Education and Treatment of Children, 11(4), 318-327.

328 Hattie, J 2009, Visible Learning; a synthesis of over 800 meta-analyses relating to achievement, Routledge, London.

329 http://australia.teachingandlearningtoolkit.net.au/

330 Clark, RE, Kirschner, PA & Sweller, J 2012, Putting students on the path to learning: The case for fully guided instruction, American Educator, http://www.aft.org/pdfs/americaneducator/spring2012/Clark.pdf

Kirschner, PA, Sweller, J & Clark, RE 2006, Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching, Educational Psychologist, 41(2), pp. 75–86, http://www.cogtech.usc.edu/publications/kirschner_Sweller_Clark.pdf

Klahr, D & Nigam, M 2004, The equivalence of learning paths in early science instruction: Effects of direct instruction and discovery learning, Psychological Science, 15, pp. 661–67,

Marchand-Martelle, NE, Martella, RC, Modderman, SL, Petersen, HM & Pan, S 2013, Key areas of effective adolescent literacy programs, Education and Treatment of Children, 36(1), pp. 161-184, https://www.mheonline.com/research/assets/products/3cec07e9ba5f5bb2/key_areas_effective_adolescent_literacy_programs.pdf

Sweller, J, Kirschner, PA & Clark, RE 2007, Why minimally guided teaching techniques do not work: A reply to commentaries, Educational Psychologist, 42(2), pp. 115–121, http://www.vincematsko.com/Talks/WorkedExamples/sweller_kirschner_clark_reply_ep07.pdf

331 Clark, RE, Kirschner, PA & Sweller, J 2012, Putting students on the path to learning: The case for fully guided instruction, American Educator, p. 11, http://www.aft.org/pdfs/americaneducator/spring2012/Clark.pdf

332 Engelmann, S 1980, Toward the design of faultless instruction: The theoretical basis of concept analysis, Educational Technology, 20(2), pp. 28–36

333 Skillman, L, Garcia, L & Witcher, C 1977, Direct Instruction model implementation manual II. Guidebook for supervisors, Eugene: Follow Through Project, Division of Teacher Education, University of Oregon

334 Rosenshine, BV 1979, Content, time, and direct instruction. In P. L. Peterson & H. J. Walbert (Eds.), Research on teaching: Concepts, findings, and implications, McCutchan, Berkeley, CA, pp. 28-56

Rosenshine, B & Stevens, R 1995, Functions for teaching well-structured tasks, Journal of Educational Research, 88, pp.262–268

335 Rosenshine, B 2010, Principles of Instruction. International Academy of Education, UNESCO. Geneva: International Bureau of Education. http://www.ibe.unesco.org/fileadmin/user_upload/Publications/Educational_Practices/EdPractices_21.pdf

Rosenshine, B 2012, Principles of Instruction: Research based principles that all teachers should know. American Educator, Spring 2012. http://www.aft.org/pdfs/americaneducator/spring2012/Rosenshine.pdf

336 Archer, AL & Hughes, CA 2011, Explicit instruction: Effective and efficient teaching, The Guilford Press, New York, NY

337 Thompson, S, Ransdell, MF & Rousseau, CK 2005, Effective teachers in urban school settings: Linking teacher disposition and student performance on standardized tests, Journal of Authentic Learning, 2(1) p. 22, http://dspace.sunyconnect.suny.edu/bitstream/handle/1951/6596/thompson.pdf?sequence=1

338 Centre for Education Statistics and Evaluation 2014, What works best: Evidence-based practices to help improve NSW student performance, NSW Department of Education and Communities, Sydney. http://www.cese.nsw.gov.au/images/stories/PDF/what_works_best.pdf

339 Louden, B. 2015, High performing primary schools: What do they have in common? Western Australian Department of Education. http://www.education.wa.edu.au/home/detcms/cms-service/download/asset/?asset_id=16987548

340 Sonnenschein, S, Stapleton, LM & Benson, A 2010, The relation between the type and amount of instruction and growth in children's reading competencies, American Educational Research Journal, 47(2), pp. 358-389

341 Mayer, RE 2004, Should there be a three-strikes rule against pure discovery learning? The case for guided methods of instruction, American Psychologist, 59, p. 17, http://projects.ict.usc.edu/itw/vtt/MayerThreeStrikesAP04.pdf

342 Schickendanz, JA 1986, More than the ABC's: The early stages of reading and writing, NAEYC, Washington, DC, https://www.naeyc.org/store/files/store/TOC/709%20So%20Much%20More%20than%20the%20ABCs.pdf

Smith, F 1973, Psychology and reading, Rinehart & Winston, Holt, New York

Weaver, C 1988, Reading process & practice: From socio-psycholinguistics to whole language, Heinemann, Portsmouth, NH

343 Smith, F 1992, Learning to read: The never-ending debate, Phi Delta Kappan, 74, 432-441, p. 440

344 Lee, HS & Anderson, JR 2013. Student learning: What has instruction got to do with it? Annual Review of Psychology, 64, 445-469.

345 Vaughn, S, Denton, CA & Fletcher, JM 2010, Why intensive interventions are necessary for students with severe reading difficulties, Psychology in the Schools, 47(5), pp. 432–444

346 Sweller, J 1988, Cognitive load during problem solving: Effects on learning, Cognitive Science, 12, pp.257–85, http://onlinelibrary.wiley.com/doi/10.1207/s15516709cog1202_4/pdf

347 Berninger, VW, Abbott, RD, Abbott, SP, Graham, S & Richards, T 2002, Writing and reading: Connections between language by hand and language by eye, Journal of Learning Disabilities, 35, pp. 39-56

348 Gauthier, C & Dembélé, M 2004, Quality of teaching and quality of education: A review of research findings, UNESCO Background paper prepared for the Education for All Global Monitoring Report 2005 The Quality Imperative, http://unesdoc.unesco.org/images/0014/001466/146641e.pdf

349 Rupley, WH, Blair, TR & Nichols, WD 2009, Effective reading instruction for struggling readers: The role of direct/explicit teaching, Reading & Writing Quarterly, 25(2), pp. 125-126. http://www.tandfonline.com/doi/pdf/10.1080/10573560802683523

350 Groff, P 1990, An analysis of the debate: Teaching reading without conveying phonics information, Interchange, 21(4), pp. 1-14; Stahl, SA & Miller, PD 1989, Whole language & language experience approaches for beginning reading: A quantitative research synthesis, Review of Educational Research, 59, pp. 87-116.

351 Dehaene, S 2009, Reading in the brain: The science and evolution of a human invention, Viking/Penguin, New York, p.218.

352 Snow, M, Burns, S 7 Griffin, P 1998, Preventing Reading Difficulties in Young Children - Executive Summary, Committee on the Prevention of Reading Difficulties in Young Children, National Research Council, p. 7, http://www.nap.edu/catalog/6023.html

353 National Reading Panel 2000, Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction, Department of Health and Human Services, Washington, D.C. https://www.nichd.nih.gov/publications/pubs/nrp/documents/report.pdf

354 Snow, M, Burns, S 7 Griffin, P 1998, Preventing Reading Difficulties in Young Children - Executive Summary, as above

355 Galuschka, K, Ise, E, Krick, K& Schulte- Körne, G 2014, Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials, PLoS ONE 9(2), p. 9.

356 Dehaene, S 2009, Reading in the brain: The science and evolution of a human invention, p. 326

357 Australian Curriculum, Assessment and Reporting Authority 2015, NAPLAN Achievement in Reading, Persuasive Writing, Language Conventions and Numeracy: National Report for 2015, ACARA, Sydney.

358 Organisation for Economic Cooperation and Development (OECD) 2013, PISA 2012 Results: What Students Know and Can Do – Student Performance in Mathematics, Reading and Science (Volume I), PISA, OECD Publishing. http://dx.doi.org/10.1787/9789264201118-en

359 Buckingham J, Beaman R & Wheldall K 2014, Why poor children are more likely to become poor readers: the early years, Educational Review, 66, 428-466, doi:10.1080/00131911.2013.795129

360 Buckingham J, Wheldall K, & Beaman-Wheldall, R 2013, Why poor children are more likely to become poor readers: The school years, Australian Journal of Education, 57, 190-213, DOI: 10.1177/0004944113495500

361 Chatterji M 2006, Reading achievement gaps, correlates, and moderators of early reading achievement: Evidence from the early childhood longitudinal study (ECLS) Kindergarten to first grade sample. Journal of Educational Psychology, 98, 489–507; Faust, M & Kandelshine-Waldman, O 2011, The effects of different approaches to reading instruction on letter detection tasks in

normally achieving and low achieving readers, Reading and Writing: An Interdisciplinary Journal, 24(5), pp. 545–566.

362 D'Angiulli A, Siegel LS, & Hertzman, C 2004, Schooling, socioeconomic context and literacy development. Educational Psychology, 24, 865–883; D'Angiulli A, Siegel LS, & Maggi S 2004, Literacy instruction, SES, and word-reading achievement in English-language learners and children with English as a first language: A longitudinal study, Learning Disabilities Research & Practice, 19, 202–213.

363 Johnston R, & Watson J E 2005, The effects of synthetic phonics teaching on reading and spelling attainment: A seven year longitudinal study. Edinburgh: Scottish Executive Education Department. Retrieved from www.scotland.gov.uk/Resource/Doc/36496/0023582.pdf

364 Grossman, PL, Loeb, S, Cohen, J, Hammerness, K, Wyckoff, JH, Boyd, DJ, & Lankford, H 2010, Measure for measure: The relationship between measures of instructional practice in middle school English language arts and teachers' value-added score, NBER Working Paper 16015, National Bureau for Economic Research. http://www.nber.org/papers/w16015

365 The Education Trust 2004, The real value of teachers: If good teachers matter, why don't we act like it? Thinking K-16. www.cgp.upenn.edu/pdf/Ed%20Trust.pdf; Turkheimer, E, Haley, A Waldron, M, D'Onofrio, B, Gottesman, II 2003, Socioeconomic status modifies heritability of IQ in young children. Psychological Science, 14, 623-628.

366 Babu, S., & Mendro, R. (2004). Teacher Accountability: HLM-based teacher effectiveness indices in the investigation of teacher effects on student achievement in a state assessment program, Dallas TX public schools, AERA. http://www.dallasisd.org/cms/lib/TX01001475/Centricity/Shared/evalacct/research/articles/Babu-Teacher-Accountability-HLM-Based-Teacher-Effectiveness-Indices-2003.pdf.

367 Hattie, J 2009, Visible Learning; a synthesis of over 800 meta-analyses relating to achievement, Routledge, London

368 Lamb, S, Jackson, J, Walstab, A & Huo, S 2015, Educational opportunity in Australia 2015: Who succeeds and who misses out, Centre for International Research on Education Systems, Victoria University, for the Mitchell Institute, Melbourne: Mitchell Institute.

369 Wheldall, K 2011, Ensuring that all children learn to read, LDA Bulletin, 43, July 2011, https://www.ldaustralia.org/client/migrated/bulletin_reprint_july2011.pdf

370 Buckingham, J, Ferrari, J and Alegounarias, T 2014, Why Jayden Can't Read: A Forum on Fixing Literacy, The Centre for Independent Studies, Sydney.

371 Anwaruddin, SM 2015, Teachers' engagement with educational research: Toward a conceptual framework for locally-based interpretive communities, Education Policy Analysis Archives, 23(40). http://dx.doi.org/10.14507/epaa.v23.1776

372 Willingham, D 2012. When can you trust the experts? How to tell good science from bad in education. Jossey-Bass, San Francisco, CA.

373 Australian Bureau of Statistics. (2010). ABS Research and Experimental Development, All Sector Summary, Australia, 2008-09. Retrieved from http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8112.02008-09?OpenDocument

374 Coe, R, Aloisi, C, Higgins, S, & Major, LE 2014, What makes great teaching? Review of the underpinning research, Durham University, Centre for Evaluation and Monitoring. Retrieved from http://www.suttontrust.com/wp-content/uploads/2014/10/What-Makes-Great-Teaching-REPORT.pdf

375 Stanovich, KE 2000, Progress in Understanding Reading: Scientific Foundations and New Frontiers. Guilford Press, New York.

About the Author

Kerry Hempenstall

Kerry Hempenstall is an educational psychologist, former lecturer at RMIT University and former secondary school teacher.

About the Editor

Jennifer Buckingham

Jennifer Buckingham is Director, Strategy & Senior Research Fellow, MultiLit Pty Ltd.

RESEARCH REPORT • ISSN: 2204-8979 (PRINTED) 2204-9215 (ONLINE) • ISBN: 978-1-922184-61-0

Originally published March 2016 by The Centre for Independent Studies Limited.
FIVE from FIVE is now owned by MultiLit Pty Ltd.

This publication is available from FIVE from FIVE. Visit www.fivefromfive.org.au.

11 Talavera Rd, Macquarie Park NSW 2113 • phone: +61 2 9888 3818 • fax: +61 2 9439 7310 • email: multilit@multilit.com