

Effective literacy teaching for dyslexic learners, particularly focusing on addressing the issues raised by research into neurological processes

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Despite decades of research, it still seems that the methodology used to teach early reading, particularly to dyslexics and others with learning differences, is poorly understood in some schools. We have the benefit of new technologies, such as fMRI, which give us fascinating insights into brain processes in reading and we have access to extensive research going back for several decades. However, the plethora of information seems to have created an explosion of new theories and new 'methods', some of which are contradictory and some simply confusing. This article will attempt to examine of the key issues involved, starting with looking at the stages of literacy and why some children fall through the cracks. To do this, it will look briefly at some key neurological research, how it fits in with developmental theories and how we can incorporate these principles into our teaching.

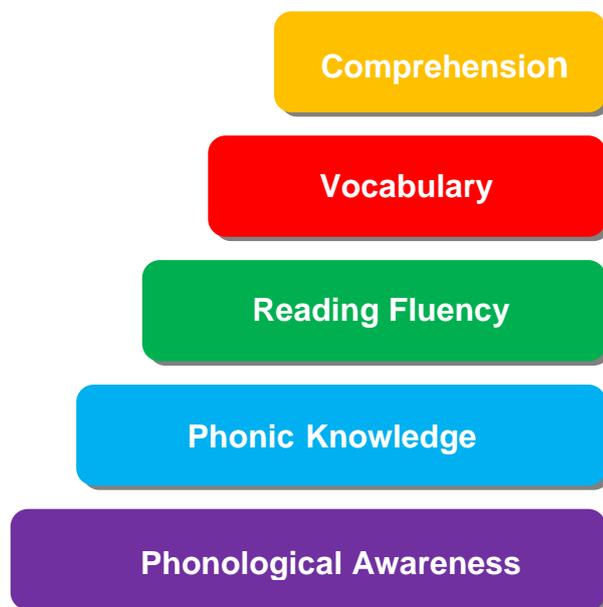
It is widely accepted that children differ greatly in the ease with which they acquire literacy skills. An estimate from the National Institute of Child Health and Human Development, (G.Reid Lyon, 1997) is that approximately 50% of children learn to read relatively easily, but some struggle and that for 20-30% of children, reading can prove to be one of the most difficult challenges in their lives. This raises two questions, of course. The first is 'why do some children struggle and not others'? But the second is just as important. What do we do about it?

One of the most useful models of literacy development comes from the American concept of the **Five Big Ideas in Beginning Reading**, (USA National Reading Panel, 2000).

This is a very clear and sequential description of the stages in literacy acquisition. It's also a great illustration of the differences between the 'top down' model of literacy and the 'bottom up' approach. The whole language approach (top down) emphasizes the importance of comprehension and meaning, arguing that the learner should be focusing on context and the meaning of text. In contrast, proponents of the traditional 'phonics' approach (bottom up) emphasize teaching phonic knowledge first, including the ability to decode and encode regular words.

Both camps criticize each other freely! The whole language brigade are usually horrified at children being given 'sterile, boring' phonic readers, while the phonics brigade are appalled at

The Five Big Ideas in Beginning Reading



USA National Reading Panel, 2000

children being presented with words they haven't yet got the skills or knowledge to work out for themselves and being asked to guess from the context or picture.

In reality, though, it shouldn't be an 'either/or' situation, if we understand how to incorporate both aspects at different stages. Of course comprehension and exposure to the richness and beauty of 'real language' are important. If we deny a child that, we run the risk of removing all of the joy of literacy and of books, not to mention damaging those vital comprehension and other language skills. However, those learners who need a more structured approach to literacy will fail with a pure 'whole-language' method. To explain why, let's work backwards and look at each stage of the 'Five Big Ideas' and how it 'rests' on the previous stage.

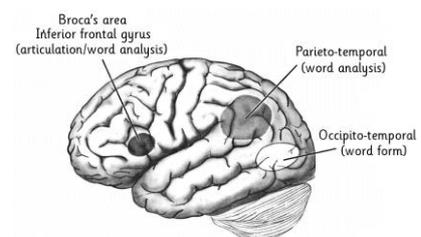
Few people would argue that comprehension is the ultimate goal of literacy. However, comprehension depends on having acquired an adequate vocabulary. Developing vocabulary effectively depends, in turn, on having access to varied texts of the right level (intellectual level, not reading level!). However, it also depends on the ability to read those texts reasonably fluently. We cannot adequately process and comprehend text if we are still reliant on a decoding strategy – some degree of rapid 'whole-word recognition' needs to have developed.

Reading fluency only develops when words have been sufficiently internalised for them to become sight vocabulary – in other words, they no longer need to be decoded, but can be recognised instantly. So, by definition, the stage before 'fluency' is 'phonic knowledge', but it's important to define exactly what we mean by that and to understand exactly what is involved. At its most basic, we're talking about the ability to understand and apply a code. The code consists of 26 letters and approximately 44 sounds (depending on regional accent). Sounds simple? Well, not exactly, as most English-speakers are well aware! However, put in its simplest form, the learner needs to learn which letters go with which sounds and then use that knowledge to decode (read) or to encode (spell).

This is, in fact, where some of the misapprehensions about early literacy occur. Many teachers misuse the term *phonological awareness* to describe the process above. However, phonological awareness is actually a distinct stage in its own right. To put it simply, phonological awareness is the awareness of individual sounds (phonemes) and sound patterns (rhyme & syllabification) and the ability to manipulate them. It's only when we start to relate this skill to letters and letter patterns that we can call it phonic knowledge. It's clear from this that there are two distinct stages here, and that phonic knowledge cannot truly develop without the underlying phonological awareness. Too often in schools, we can see children doing endless letter-sound activities, without any attempt to develop phonological awareness itself. There's no point trying to teach phonic knowledge if the learner can't identify and process sounds in the first place! And yet phonological awareness is both a key difficulty in dyslexia and an effective predictor of literacy success (Bryant & Bradley 1983, Perfetti et al., 1981, Tunmer & Nesdale, 1985, Stanovich, Cunningham & Cramer, 1984)

Brain processes in reading

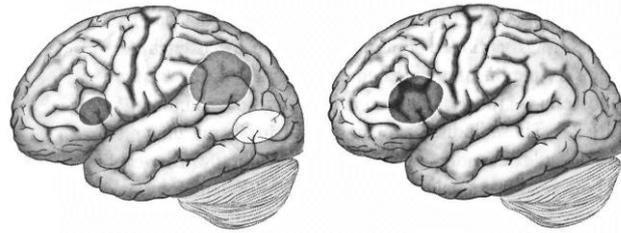
Recent research by Sally Shaywitz using fMRI scanning has identified that there are three key areas of the brain for reading. These are all in the left hemisphere. Broca's area and the parieto-temporal area are involved in decoding (word analysis) and the occipito-temporal area is involved in recognising the word holistically from its visual pattern. To read fluently, the occipito-temporal must be functional.



When a word is first met, Broca's area and the parieto-temporal are initially employed to decode it. However, after several repetitions, a neural model of that word is created, which is then stored in

the occipito-temporal. Once this has happened, the word can be accessed automatically and reading fluency has been attained. Now when the word is seen, it can be immediately recognised without conscious decoding. This is a process which happens at a relatively early stage with non-impaired readers.

Sally Shaywitz's research has also identified that dyslexic learners have an impaired occipito-temporal and are unable to develop the same fluency and automaticity. As a compensatory measure, Broca's area overdevelops – in other words, the wrong strategies are being employed. We may end up with



readers who are competent decoders and encoders, but who have never developed the instant visual recognition skills to become genuinely fluent readers.

Illustrations from Overcoming Dyslexia, Sally Shaywitz, 2003

Pulling the threads together

This is where we start to see where some learners fall through the cracks. The above sections on the processes involved in the *Five Big Ideas of Beginning Reading* can be summarized as follows:

- Comprehension depends on fluency, which in turn depends on phonic knowledge.
- Phonic knowledge cannot develop effectively without phonological awareness
- Phonological awareness (not surprisingly!) has been shown to be a key predictor of reading success - but phonological awareness is also a key weakness in dyslexia and some other learning difficulties

However, we have also seen from Shaywitz's research that the ability to transition from the decoding stage to the reading fluency stage also depends on the efficient functioning of the occipito-temporale. Again, there is a strong link to dyslexia, because the neurological research shows that this area is non-functional in many impaired readers.

So, with a learner with dyslexia, we usually have a situation where phonological awareness in the early stages is poor, which affects the ability to develop phonic knowledge and therefore decoding/encoding skills. However, even once the learner has achieved this level, he or she still has the challenge of transitioning to the Fluency stage because of an inactive occipito-temporal.

Compounding this whole situation is the issue of the 'Matthew Effect in Reading'. A number of studies have analysed the number of words to which a struggling reader is exposed, compared with the number seen and read by a 'normal' reader. One study (*Allington, 1984*) found that the total number of words read during a week in a Year One class ranged from 16 for one struggling reader to 1,933 for a high-achieving reader. "The average skilled reader read approximately three times as many words in the group reading sessions as the average less skilled reader" (*Stanovich, 1986*). By the time a child is in Years 5-7, one estimate (*Nagy & Anderson 1984*) put the number of words read by a struggling reader as approximately 100,000 a year, compared with an average reader at 1,000,000, or a voracious reader at 10,000,000+. And which one most needed the practice?

The myth of 'reading readiness'

It's important to clarify here exactly what the title means! Reading readiness is crucial, of course – the myth bit comes when we sit back and expect it to magically appear. Many assessors in this field will be familiar with parents bringing their 7-8 year old children for an assessment, saying that the school has fobbed them off for years. Teacher feedback along the lines of "he's not ready for reading yet" or "he'll read when he's ready", is commonly reported and it is frequently not until the child is 7 or 8 that the school finally decides that, yes, there is a problem. Yet, by this stage, it's too late for many children. Dr John Hattie has been quoted as saying that, if a child is not reading by 8, he probably won't read (The Listener, Feb 2014). Obviously this is a bit of a sweeping statement, but in essence, he's absolutely correct in a tragic number of cases.

If we have allowed a child to reach the age of 7 or 8 without being able to read at least functionally at an appropriate level, we have created a problem which most schools and parents simply don't have the resources to solve. A child who is, in effect, 2-3 years behind his peers is not going to catch up with two or three half hour sessions a week with a teacher-aide – or even with one or two lessons a week from a specialist teacher. The unfortunate reality is that most of the children who get to that stage by age 7 or 8 will never effectively catch up, partly because the 'system' simply does not have the resourcing to make up such a huge deficit. "Children with reading disabilities show word-level reading problems from the beginning of reading instruction, and in the normal course of development, they almost never acquire average level skills in this area (Francis, Shaywitz, Stuebing, Shaywitz & Fletcher, 1996; Juel, 1988).

And it's not only the literacy area which suffers. Research shows huge knock-on effects on other areas of learning as this quote from Stanovich shows:

"A specific cognitive deficit prevents the early acquisition of reading skill. Slow reading acquisition has cognitive, behavioural and motivational consequences that slow the development of other cognitive skills and inhibit performance on many academic tasks. In short, as reading develops, other cognitive processes linked to it track the level of reading skill. Knowledge bases that are in reciprocal relationships with reading are also inhibited from further development. The longer this developmental sequence is allowed to continue, the more generalized the deficits will become, seeping into more and more areas of cognition and behaviour."

Stanovich, Keith.E. Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy

By the time a child has reached the age of 7-8 without being able to read functionally, he is so out of touch with what is happening in the classroom that he has already labelled himself a 'failure' – and tragically, may have had that label applied by the school, as well!

So what do we do?

There is a considerable body of evidence showing the effectiveness of phonics-based early literacy teaching and an early emphasis on phonological awareness. The important thing here, though, is that this is an approach which is being used with *all* children right from the beginning, not just with children who have been identified as 'struggling'. However, it is crucial that children at risk of reading failure are identified well before they reach the stage of 'failing' readers and given extra help to prevent them from falling behind in the first place. It is perfectly possible to screen children for phonological difficulties from the age of 4, in other words, even before they start the process of reading acquisition. This can be done using face-to-face screening tools or computerized assessment

tools such as the Lucid range of assessment software. Research would suggest that this should include rapid naming and phonological memory (Torgesen et al, 1999).

Children identified as having deficits then need a much stronger emphasis on phonological skills and early phonic skills, ideally in a small-group situation. This can be done with a variety of resources, which should include hands-on game and activity resources aimed at developing phonemic awareness, phonic knowledge, awareness of rhyme and syllabification, phonological memory and rapid naming. Alongside this should be a structured literacy programme which explicitly teaches and contextualises phonic knowledge, decoding and encoding skills and sight word recognition.

To facilitate the transition to the fluency stage and hopefully activate the occipito-temporal, it is also important to incorporate activities which develop instant whole-word recognition. This can include sight vocabulary games (hands-on and computerized), speed-reading activities and reading practice geared to developing fluency rather than decoding ability. In practice, this means providing the learner with reading material he is reasonably familiar with, so that he can apply instant word recognition, rather than over-relying on decoding skills. This can be achieved by pre-teaching key words before the reader tackles the passage, or by ensuring that the reading level is slightly below the reader's actual level.

It is also crucial to ensure that the critical language and comprehension skills do not suffer in this process. One of the main criticisms of a phonic-based approach is that it does not develop comprehension skills, but this need not be the case if a balanced approach is taken. There are a number of things we can do. It is certainly possible to include comprehension strategies and vocabulary development by integrating these elements into sentence-level materials and short passages, ensuring that words or phonic patterns are first taught using phonic and word-recognition strategies, but then seen and read in context. However, one drawback of relying only on this is that, with learners with more severe difficulties, there are often significant discrepancies between 'intellectual level' and the material which that learner can independently read for himself.

If we try to compensate for this by giving the learner 'age-appropriate' texts, rather than 'reading-level' texts, we run the risk of totally demoralising that learner, and also may encourage a guesswork strategy, which runs completely counter to the strategies we are teaching through word-level and phonological work. Paradoxically, this also misses the target in terms of developing comprehension, because a learner tackling texts at the limit of his current reading level will, by definition, be employing mainly decoding strategies, rather than being able to instantly visually recognise words. This means he is not able to effectively follow the sense of the text anyway.

At this stage in the reader's development, the only effective way of continuing to develop comprehension, inferential thinking, vocabulary and other language skills, is actually by incorporating oral language. Listening to texts at an age-appropriate or intellectually-appropriate level is just as effective for language development as reading them, and considerably more appropriate for those learners who are, at that stage in their development, unable to read effectively at their intellectual level. Of course the ultimate aim is that the learner's reading ability will eventually enable them to 'catch up' and be able to read age-appropriate material for themselves. However, while this is happening (which may be an extended period for some learners), some compensatory strategies are needed and listening to texts may be the only way to enable access to an appropriate level of material. Of course, this is where technology can also help, by incorporating reading programmes where the learner can click to hear a word or sentence, or by employing text-to-speech functionality on reading pens or even smartphones.

When we consider the writing aspect, it is clear that the same principle applies. We need to enable the learner to write at his intellectual level, not be restricted by his current literacy level. Again, a variety of strategies can be employed. One obvious one is allowing a parent or teacher aide to scribe for the learner, which is a direct equivalent to providing a reader-writer in examination situations. However, this can be cumbersome and not always possible in a school situation, which is where technology can again come to the rescue. There are a number of software programmes, including Word-Q and Dragon Naturally Speaking which enable the learner to dictate his work, which enables that learner to access the curriculum at an appropriate intellectual level, despite the current constraints of his literacy.

In this way, we are in effect working in parallel. It is crucial that we continue to develop the core literacy skills, including fluency and comprehension and for this, we need to work at the learner's current literacy level. However, at the same time, we employ assistive technology and other strategies to ensure that the learner can access the curriculum at an intellectually appropriate level.

To summarize, research and current practice show that it is far easier and less damaging to prevent a child from failing in the first place, rather than employing considerable resources providing extensive periods of remediation. Core literacy principles for all learners, plus early identification of learners at risk can achieve this relatively easily in most cases, particularly when combined with an understanding of the neurological issues and potential barriers to fluency.

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