

The Reading Brain

We are what we read!



Reading does not come naturally to the brain, it is not genetically programmed like vision or spoken language (standard features), it is an optional extra. Children are wired for sound, but print must be painstakingly bolted on. New circuits and pathways in the brain have to be created, which requires hundreds if not thousands of times of exposure to letters and words.

Reading depends on the brain's ability to connect and integrate various sources of information, specifically visual with auditory, linguistic and conceptual areas. This integration depends on when each area of the brain matures and the speed with which these regions can be connected and integrated. This in turn depends on the myelination of the neuron's axons. Myelination of the neuron's axons has a developmental schedule that differs for each region of the brain and research tells us that full myelination of the regions of the brain needed for reading happens between five and seven years of age. It is hypothesised that this myelination happens more slowly in some boys, which is why girls are faster than boys on many timed naming tasks until around eight years of age. Research concludes that efforts to teach a child to read before age five are biologically precipitate and potentially counterproductive for many children.

Decade after decade of research shows that the amount of time a child spends listening to parents and other loved ones read is a good predictor of the level of reading attained years later. Why? The 'ideal lap' experience provides most of the pre-cursors for reading and emotional development in children. As soon as a child sits on a care giver's lap the child learns to associate the act of reading with a sense of safety and being loved. Happy hormones are released which help the brain to process what the senses are taking in. While the child is looking at colourful pictures and listening to stories they are learning gradually that lines on a page make letters, letters make words, words make stories and stories can be read again and again. They learn that everything has a name, and are banking a vocabulary of words and meanings which will enhance decoding. They start to understand pictures and visual images, developing their attention and conceptual systems, while helping the brain to bolt on the reading circuits. When children hear stories they are also developing emotional responses, learning about other points of view, developing empathy, learning appropriate behaviour and exploring feelings.



Programs that support an explicit and systematic teaching of phonological awareness (PA) and letter sound correspondence are the most successful in supporting reading development. In young children we can predict reading performance using rapid automatic naming (RAN) tasks. This is where the child names rows of repeated letters, numbers, colours or objects as fast as possible. If you consider that the whole development of reading is directed towards the ability to decode so rapidly that the brain has time to think about incoming information, you can understand the significance of naming speed. We know that the great majority of children with dyslexia and other language learning difficulties are significantly slower in retrieving names of both letters and objects early in Kindergarten. Their brain simply does not have the time to process at a high level. If we used object or colour rapid naming as a pre-reading brain screen and letter naming as a post reading brain screen we could identify weaknesses at an early age. If difficulties with PA are also evident specialist intervention should be investigated.

There are known principles that need to be incorporated into intervention programs for all children with reading difficulties: semantic families of words (vocab), awareness of sounds within spoken words (phonemic awareness), connections between sound and letter representations (phonics), automatic learning of orthographic letter patterns (conventional spelling patterns), syntactic knowledge (grammatical relationships) and morphological knowledge (plurals, prefixes, suffixes). In other words, a structured, synthetic phonics program such as PLD or Letters and Sounds.

By five years of age children from impoverished language backgrounds (word poverty) have heard 32 million fewer words spoken to them than the average middle class child. Children who come to kindergarten in the bottom 25th percentile of vocabulary generally remain behind other children in both vocabulary and comprehension through school. The average household has ample opportunities to give a child everything necessary for the normal development of language. The importance of simply being talked to, read to and listened to before the age of five, is what much of early language development is about.

