



Automatic Dynamic Reader Program

Research based, home computer software, designed to help improve reading fluency, for students aged 6 to adults.

The Benefits

Reading fluency is the ability to read text quickly and accurately. It is the bridge between word recognition and comprehension.

The Automatic Dynamic Reader program will help reduce regressions (the tendency to look back while reading), and fixations (multiple eye stops during reading). Both these actions affect fluency, speed and comprehension.

Attention, concentration and reading rate will improve when the Automatic Dynamic Reader program has been completed. Reading will be more comfortable, productive and enjoyable.

Does this sound like your child or young adult?

Natalie and Thomas are both 10 year olds who do not have any trouble with word identification, nor any trouble understanding what individual words mean. They are good at reading words. They are both of slightly above intelligence, have no significant physical or emotional problems, and get on well with their peers.

Significantly however, both have severe problems with comprehending what they have just read themselves, even though they have a good understanding, when a parent or teacher reads out loud to them.

This lack of comprehension is quite evident, when they are asked simple questions on what they have just read, and their typical responses are, “I don’t know” or “I can’t remember”

When asked to read aloud to their teacher or parent, Thomas reads in a slow and laboured, word by word manner, and his reading rate is only 58 words per minute. He feels that because he reads so slowly he cannot understand what he is reading.

Natalie zooms through her reading text at a fast 178 words per minute, paying little attention to sentence juncture or other punctuation.

Both seem to read without any appropriate phrasing, expression or interest, and may have to read material several times in order to comprehend what is written.

These children have a problem with poor reading fluency.

Reading Fluency

Reading fluency is the term used to describe the ability to read connected text rapidly, accurately, effortlessly, and automatically with little conscious attention to the mechanics of reading such as decoding.

It is the bridge between word recognition and comprehension.

We generally think of disfluent readers as reading in a very slow and disjointed manner. Disfluency however, can come from readers who read too fast, and fail to pay attention to punctuation marks, or the meaning of the text.

For years teachers thought that if students could learn to decode words accurately, they would be successful in reading printed text. While it is true that accuracy in decoding is important for fluency, it is not the entire story. Readers not only need to decode the words accurately; they also need to decode them effortlessly or automatically. The ability to read with appropriate phrasing and expression (interpretation) is also important for fluency. In essence, reading fluency refers to accurate and automatic decoding of the words in the text, along with expressive interpretation of the text, to achieve optimal comprehension. Fluency is important in reading, then, because it affects how well readers understand what they read.

Some students with dysfluent reading, read slowly, with many hesitations and poor expressive interpretation of the text. Others read very rapidly, but pay little attention to sentence juncture or punctuation. In both cases reading comprehension is well below normal. Dysfluent readers read less text than their peers, and have less time to remember, review or comprehend the text. They expend more cognitive energy than their peers, have poor attention skills, are less able to retain text, and less likely to integrate those segments with other parts of the text.

The problem is widespread with a significant number of children not achieving the minimal level of fluency in their reading, which is associated with significant difficulties in comprehension while reading silently. This is having a profoundly negative effect on their education, as reading fluency is a critical component of all aspects of learning.

The Dynamic Reading Program massively improves reading fluency.

The Latest Research

The preceding discussion concentrated on the conventional wisdom in educational circles which attributed the problem of reading fluency primarily to poor decoding skills.

Fluent readers decode words accurately and automatically, without (or with minimal) use of their limited attention or conscious cognitive resources. The theory that supports this aspect of fluency begins with the notion that readers have limited attentional resources. If they have to use a large portion of those resources for word decoding, those resources will not be available for use in comprehension. The theory of automaticity in reading suggests that proficient word decoding occurs when readers move beyond conscious, accurate decoding to automatic, accurate decoding. At the automatic level, readers are able to decode words with minimal attention to the activity of decoding. Most adult readers are at this level of processing. They do not have to examine closely or sound out most of the words they encounter; they simply recognize the words instantly and accurately on sight. This type of processing frees the reader's conscious attention to comprehend or construct meaning from the text.

While it is good for readers to have the additional cognitive capacity that comes from automaticity in word decoding, they also need to actively use that capacity to make sense of the text. Readers can employ their attention for comprehension or for other tasks. All readers have had the experience of accurately and automatically decoding words while thinking about something else and, as a result, not comprehended the passage.

This is the point where fluency connects directly to comprehension. The prosody component of reading fluency

stresses the appropriate use of phrasing and expression. When readers embed appropriate volume, tone, emphasis, phrasing, and other elements in oral expression, they are giving evidence of actively interpreting or constructing meaning from the passage. Just as fluent musicians interpret or construct meaning from a musical score through phrasing, emphasis, and variations in tone and volume, fluent readers use cognitive resources to construct meaning through expressive interpretation of the text.

In a sense, then, reading fluency is multidimensional – one dimension stresses the importance of accuracy in word decoding, a second dimension focuses on quick and automatic recognition of words in connected text, and a third dimension stresses expressive and meaningful interpretation of text. These dimensions are related to one another – accurate and automatic reading creates the conditions for expressive reading. All three are important for effective comprehension and overall good reading. All must be taught, and all must be monitored.

While these factors, decoding, automaticity and expressiveness, are undeniably important factors, the therapy in this area has been predominantly limited to educational techniques. These factors will continue to be important and we emphasise their importance to parents and teachers. Expressive oral reading to students is an important part of the learning curve towards excellent reading fluency.

However converging evidence has indicated a number of other underlying components affecting reading fluency that must be addressed.

1. Perceptual Information Processing Speed

Perceptual or information processing speed is analogous to the operating speed of the central processing unit (CPU) of a computer. Differences between CPU's in rate of processing are explained in terms of the complexities of the electronic circuitry. Similarly, perceptual speed can be linked to the complexities of neural development and function. Research has shown that speed is clearly associated with reading.

The person who processes visual information slowly is at a disadvantage in reading. Because information can be held in short term (working) memory for only a very short period of time, the faster this information is processed the more capacity will be left over to devote to reading comprehension. That is why the better fluency is, the more information is likely to be retained.

2. Temporal Processing and Magnocellular Vision Deficit

Reading ability may be compromised by a deficiency in the visual magnocellular (M) system. The M system controls the ability to change visual fixation from word to word as we read. Magnocells are large neurons in the lateral geniculate body within the brain, that are responsible for timing visual events, not identifying their form. An efficient M system enables us to read smoothly, rapidly and fluently.

Developmental dyslexics often complain that small letters appear to blur and move around when they are trying to read. Anatomical, electrophysiological, psychophysical and brain imaging studies have all contributed to elucidating the functional organization of these and other visual confusions. They emerge not from damage to a single visual relay, but from abnormalities of the magnocellular component of the visual system, which is specialized for processing fast temporal information. The m-stream culminates in the posterior parietal cortex, which plays an important role in guiding visual attention.

There is evidence that as many as 75% of children with reading disability may have an impairment in the magnocellular pathway. In a substantial number of patients it is found that the transient mechanism deficit results in weak inhibition, giving rise to longer visual persistence. After-images seem to persist too long, and so an image is still being processed when a subsequent image overlaps with it and causes confusion. These individuals need a longer period without interference from a new stimulus in order to interpret what they have seen. It is these problems that are believed to create perceptual deficits and reading difficulty. One important function of the magnocellular system is to help control eye movements. The impaired magnocellular system of poor readers can create visual instability. Patients report that letters appear to move around, overlap, blur, and create visual confusion.

3. Rapid Automatised Naming

Rapid automatized naming (RAN) is the ability to name visual stimuli quickly. RAN testing has been shown to be highly predictive of dyslexia at even early ages. The RAN test involves the rapid naming of a visual array of 50 stimuli arranged in 5 lines of 10 symbols on an 11x14 page. The symbols used are objects, colours, numbers, and letters. The subject is asked to name each stimulus item as quickly as possible without making any mistakes. Scores are based on the amount of time required to name all of the stimulus items on each test.

This speed of processing variable has been shown to be a very important predictor of reading performance. It also seems that it is the automaticity of retrieval that gives the predictive power in rapid naming.

Specific optometric vision therapy is successful in improving RAN deficits as well as magnocellular vision deficits. ADR vision therapy overcomes these visual processing deficits, helping to significantly improve reading ability.

How does the Automatic Dynamic Reader Program work?

ADRP uses a unique 3 step process to improve reading fluency and comprehension.

- 1. Moving Text Dynamic Reading. – The material to be read remains in the centre of the screen and does not move down the page from top to bottom; therefore saccadic eye movements are not required. This prevents the loss of place and visual attention that may occur when the print moves down to the next line. This step introduces the concept of Dynamic Reading with its emphasis on fluency and education of fixations and regressions. This step is valuable because it is easier to achieve success which will then encourage the patient to continue the program.
- 2. Standard Dynamic Reading –The print moves left to right and top to bottom. The reading rate starts at level that should be comfortable for the patient. It increases as the patient progresses. This step continues the emphasis on fluency and reduction of fixations and regressions. It introduces the added complexity of top to bottom reading.
- 3. Whole Line Dynamic Reading – The material to be read does not move left to right but is presented an entire line at a time. The patient must self- generate left to right eye movements while processing the information. The reading material moves down the page one line at a time to the end of the passage. The speed is determined by the patients reading rate and comprehension level. This is a critical bridge to normal reading.

After each story is read, 10 comprehension questions are presented and the student must score 70% correct answers to progress to the next level.

The ADRP automatically determines the beginning reading grade level and initial words per minute for each patient. As performance improves, the program automatically advances the grade level reading material, as well as the words per minute.

Conclusion

As discussed above, patients with fluency problems may have automaticity, perceptual speed, visual attention, temporal visual processing (magnocellular) deficit, and rapid automatized naming problems. These can be treated concurrently with the Dynamic Reader Program.

The Dynamic Reader Program is designed to be a stand-alone program for increasing fluency. Fluency, however, is a complex phenomenon with significant underlying factors. It may be advisable to include other therapy along with Dynamic Reading.

If the patient has significant visual skill deficits, binocular, accommodative, or oculomotor, they must be addressed first. Alternative vision therapy programs would be instigated in order to treat these fundamental visual skills, before reading fluency therapy is started.

A comprehensive eye examination would determine any of the above deficits, and most importantly, also determine any uncorrected refractive error which would be additionally compromising reading fluency.