"Look at the picture": cognitive load theory and Reading Recovery

Using cognitive load theory, this article seeks to explain the failure of Reading Recovery as an effective instructional technique.

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What is Reading Recovery?

Reading Recovery (RR) is a one-to-one reading intervention for six- to seven-year-olds. It is based on a 'constructivist' belief that reading is a natural, meaning-making process, akin to learning to speak, of which phonics and decoding are only an incidental aspect. _Early readers are encouraged_ to make use of a 'multi-cueing' system, wherein they are taught to process the semantic, syntactic and visual information in highly predictable and repetitive (mostly narrative) texts, in order to able to read with increased fluency. The text is often 'speech-like' and words are often remembered as whole units. In practice, if readers can't process particular words, they are most often directed away from the grapho-phonic information. Instead, they are prompted to look at the corresponding picture, to consider, "What would make sense here?", to look at the first letter of a word and 'strategically reason' what the word could be, to think about what is happening in the sentence or narrative or about how the character is feeling, and so on. The above instruction in attending to 'meaning, structure and visual' (MSV) elements is made explicit to learners and is used in preference to them being systematically and explicitly taught sound-letter correspondence. _The latter is regarded_ as essential for writing, but not for reading.

What is the evidence?

There is, in fact, a paucity of quality evidence supporting RR. _The National Clearing House in the US_ found that only three studies out of 202 were sufficiently well-constructed to be included in their resource base. Those three (with a total of 227 students) all showed short-term benefits, but did not measure long-term effects. As a NSW-based teacher, this author is familiar with, and shall summarise below, _a quality NSW study_ published in 2015 by the Centre for Education Statistics and Evaluation (CESE) part of the NSW Department of Education (NSWDoE). This study was a longitudinal evaluation of the reading progress of thousands of children – one group treated by RR and another cohort matched for achievement and socio-economic status but not treated by RR.

The study found that, after receiving RR in their second year of schooling, these students, having ended their first year of schooling with the same broad level of reading achievement as the matched non-RR cohort, were significantly worse off by the time a nation-wide, standardised reading assessment was administered in the fourth year of schooling.

The table opposite, from the CESE evaluation, summarises the relatively poor reading performance of the cohort treated by Reading Recovery.

Reading Texts level at Term 4 K	RR effect of NAPLAN Reading score	p-value
Level 1 or below	-25.2	<.001
Level 2	-24.9	<.001
Level 3	-53.1	<.001
Level 4 or above	-86.7	<.001

Note. Results coloured in red show that RR students achieved lower NAPLAN reading scores compared to non-RR students.

Cognitive load theory and Reading Recovery

Which tenets of cognitive load theory (CLT) could explain this failure?

Biologically primary and biologically secondary learning

This concept, *introduced by Geary* and now enmeshed within CLT, holds that biologically primary skills such as speaking grammatically in one's native language, walking, recognising faces etc. do not need to be taught. Any skill that humans have not evolved to learn effortlessly may be difficult to acquire and need specialised instruction. Schools were invented to teach these biologically secondary skills, which include reading. By regarding learning to read as similar to learning to listen to a first language, advocates for RR are ignoring the distinction between biologically primary and secondary knowledge. As a consequence, instead of explicitly teaching phonemic awareness leading to word decoding skills, RR proponents encourage learners to talk and guess their way through books, often at the expense of accurate word reading. For example, it would be appropriate in RR for a reader to utter "home" when the word is actually "house". Learners thus fail to develop word decoding skills they will later need when texts are less repetitive and predictable, and where the context is less obvious. *"Constructivist" teaching deliberately withholds important information*, such as sound-letter correspondence, from learners. It is clear that reading is not acquired naturally and needs to be taught directly, explicitly and systematically for the vast majority of early readers.

The problem with problem solving

Beginning reading is problem solving. CLT has pointed out – and in fact owes its genesis to the observation – that solving a problem does not necessarily lead to learning. Problem solving is a biologically primary skill. Humans are primed to use means-end analysis, a generalised attempt to reduce the difference between goal states (e.g., finishing and understanding a simple book, reading and understanding a simple word or sentence) and present states (e.g., seeing a series of squiggles

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on a page). A means-end analysis approach to problem-solving means that learning may not occur if the learning goal is to solve the problem itself (reading and understanding the text), rather than to enhance long-term memory storage about how to solve that problem (learning how to decode written text).

By effectively being prompted to talk and guess their way through books by referring to pictures and a highly predictable and repetitive storyline in an obvious context, RR pupils are often at risk of being left with little or nothing in long-term memory at the end of a learning sequence. They have uttered the words "look(ing)" and "owls" because they are repeated multiple times in *a highly predictable story with corresponding pictures*, but will not recognise "took/cook" or "howls/down" in a different context, because these are beyond their word-reading ability and they have been taught nothing about the sound-letter correspondence. Of course, failure of long-term memory storage can happen with any learning, but the multi-cueing system of RR instruction, the lack of explicit instruction in phonics and the high level of text predictability make this failure more likely.

Redundancy effect

Providing unnecessary information comes at a cost, as a learner has to devote precious cognitive resources to processing information that is actually not needed for the task. Somewhat

counter-intuitively, *several researchers have found* that beginning readers learn to read better when there is no picture provided. By continually expecting readers to refer to pictures that correspond closely to the written text, RR requires readers to do additional mental processing, imposing a higher cognitive load than desirable.

Requiring learners to attend to irrelevant, redundant foci on a page is encouraged through RR instruction. It directs students to take their attention away from the written word towards a picture, or to cogitate on semantic, syntactic or contextual information, then expects students to mentally integrate them. Attending to irrelevant information makes automatic word reading less achievable. *As Stanovich et al. have noted*, automatic, context-free word recognition is the fundamental difference between weak and strong readers. Anyone who has sat with a struggling 6- or 7-year-old reader knows that the first thing most do when they don't recognise a word is to look at the picture. The second thing is to appeal to the teacher. Neither assists in learning to decode written text but for many students treated with Reading Recovery-type methodology, this happens so automatically, it presents like disordered learning behaviour.

Element interactivity/isolated elements effect

Requiring beginning readers to simultaneously consider diverse elements of language (semantic, syntactic, contextual, grapho-phonic) in order to 'read' words imposes a heavy cognitive load, as readers then have to process these elements simultaneously in working memory. Conversely, beginning reading instruction is more successful when element interactivity is kept low, i.e., by only requiring readers to consider one element at a time when word reading – primarily the grapho-phonic information. *Word recognition needs to quickly become* a low-cognitive-demand skill – stored in long-term memory and accessed automatically. The acquisition of such skills should not be over-complicated by using working memory for other purposes more than is necessary.

Intrinsic and extraneous cognitive load

All of the above factors contribute to the imposition of an extraneous cognitive load. *Intrinsic cognitive load* refers to the content to be learned, while extraneous cognitive load refers to the instructional procedures used to learn/teach that content.

Learning to read necessarily comes with a high intrinsic cognitive load; that is to say, the process of deciphering an alphabetic code to automaticity is long and daunting. A greater than desirable extraneous load is placed upon RR pupils, who are subject to instructional procedures which overload working memory and withhold important information. Start trying to learn to read Russian, Hindi, Thai, Chinese etc. without being given sufficient information about what the symbols mean and you will walk in the shoes of a RR student.

Learning science or an educational flat-earth?

No one, least of all this author, is claiming RR pupils learn nothing, but it is clear *they make less reading progress* than early readers who are explicitly and systematically taught phonics or even than readers who are taught anything but RR methodology, as the NSW study makes clear. RR proponents are like the historical believers in a flat earth. The science has continued to move beyond them, but they can't accept the evidence. They teach weak readers the word-reading methods that are used by weak readers – to guess, to be over-reliant on context and to ignore grapho-phonic information in words.

Unfortunately, the above reading pedagogy has become dominant in the early years of school in most anglophone countries, leading to high levels of unnecessary reading failure. Even where teachers do not receive Reading Recovery training, they too often learn to teach reading as a multi-cueing guessing game, sometimes through whole-class offshoots like Language, Literacy and Learning (L3) in NSW.

Cognitive load theory is an important contribution to the scientific framework which can account for both the failure of Reading Recovery-based pedagogy and the greater efficacy of phonics-based reading instruction for beginning/struggling readers.

Notes

1   The quote "Look at the picture" from this article's title comes from a common prompt given to RR pupils, and also to their common response when asked what they should do if they can't read the word.

2   The NSWDoE evaluation was the first and only time they had attempted to determine the value of the tens of millions of dollars spent every year for decades on RR. The NSWDoE, to its credit, accepted the evidence and stopped centrally funding the program, although still permits schools to spend taxpayer funds on RR if they so choose. How many (or few) RR teachers in NSW have read this evaluation, much less accepted its findings?

3   Reading Recovery spawned a whole-class offshoot, Language, Literacy and Learning (L3) in NSW, where all students in a class/school are treated with a RR methodology. Until very recently, this approach was generously funded, despite having no evidentiary basis.

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