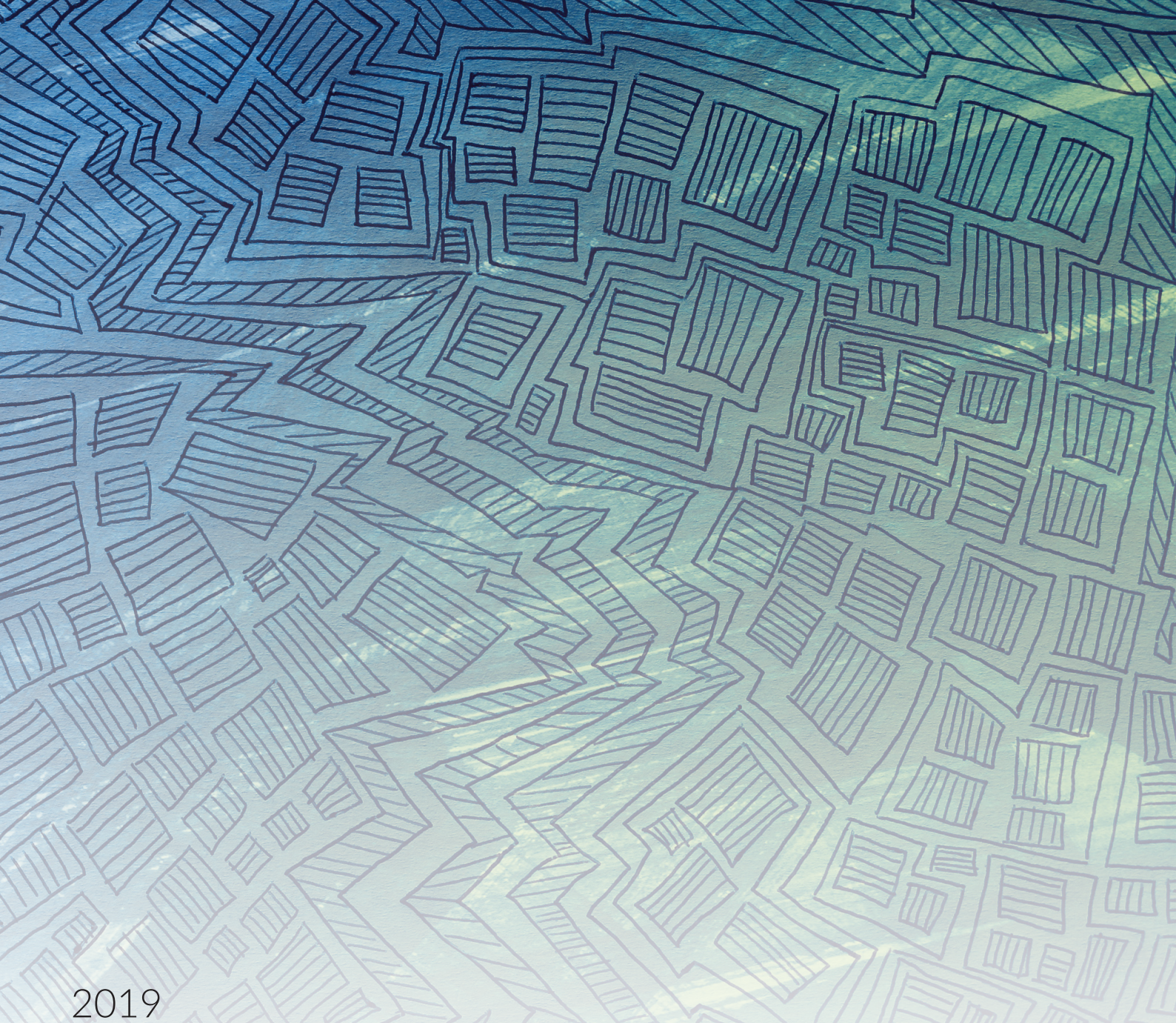

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The purpose of this paper is to explain what is entailed in improving reading comprehension, particularly for primary school students, and to make recommendations as to what schools must do if children are to become proficient comprehenders. As with any endeavour, teaching reading comprehension is best approached from a clear understanding of what it is that is to be taught.

Definition of Comprehension

Perhaps the best current definition of reading comprehension is the one proposed by the RAND Reading Study Group.[1] Reading comprehension is a "process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Snow, 2002). A characteristic that usually distinguishes one definition from another is whether it treats the reader and the reader's actions as the central mechanism of the process or whether it is the text that is most determinate. The power of the RAND definition is that it recognises that in reading comprehension both readers and texts are significant. Comprehending includes those instances when the reader must obtain—"extracting"—the exact message coded explicitly into a text (such as with a stop sign), and those that require inference, interpretation, disambiguation, connection, and other actions that allow the "constructing" of a message based on the partial and imperfect cues to meaning that the author has coded into a text.

Look at this passage from Roddy Doyle's "Guess Who's Coming for Dinner":

[1] In fall 1999, the U.S. Department of Education's Office of Educational Research and Improvement (OERI) asked the RAND Corporation to examine how OERI might improve the quality and relevance of the education research it funds. The RAND Reading Study Group was charged with developing a research framework to address the most pressing issues in reading comprehension.

> Larry Linnane liked having daughters. He got great value out of them, great crack.
>
> The second kid had been a boy and that was great too, having a son, bringing him to the football – Under 7, Under 8, Under 9, all the way up until Laurence, the son, told him he thought he'd play better if Larry stayed at home. (Doyle, 2008, p. 1)

The reader who is "extracting" meaning should learn from those lines that Larry Linnane liked being a father of both sons and daughters. That he had a son named Laurence, that he took his son to football matches, and that his son no longer wanted him to attend those games.

But that, of course, is not all that good readers would gain from this text, because they would also draw logical inferences based on background knowledge. It seems likely, for example, that Laurence was named for his Da, that he is at least nine years old, and has an older sister. Either Laurence has reached the age when children are embarrassed by their parents for no precise reason, or perhaps Larry is such a vociferous "fan" of his boy's football that he is doing something during the games that mortifies his second-born. In either case it appears that Laurence doesn't want to hurt his father's feelings—he isn't saying that he's embarrassed, just that he wants to play his best (which may be a euphemism for embarrassment).

Readers must be able to combine meaning extraction and meaning construction if they are to grasp an author's message, both stated and implied. Readers do this by using the information in a text and the knowledge that they bring to the text. It is not one or the other, but both, in combination.

Theories Relevant to Reading Comprehension

There are several theories of reading and reading comprehension that have been advanced by scholars (McNamara & Magliano, 2009). However, three particular theories are widely used and serve as the foundation of much of what is currently known about reading comprehension and the most effective instructional approaches to improving comprehension. The first of these is a theory of reading itself (the "simple view"), the second is more specifically a theory of reading comprehension (the construction-integration model), and the third (executive functioning and metacognition) are specific aspects of cognitive functioning believed to be implicated in the management or control of reading comprehension.

Simple View of Reading

The so-called "simple view" of reading claims that reading comprehension results from the coupling of efficient decoding with general oral language comprehension (Hoover & Gough, 1990):

Decoding (D) x Language Comprehension (LC) = Reading Comprehension (RC)

Essentially, the idea is that decoding – that is translating print into oral language – is the only unique property of reading, and that once decoding has been implemented then reading comprehension becomes equivalent to listening comprehension. According to the simple view, strong reading comprehension will only result if students have strong decoding skills and strong language comprehension.

The simple view is intentionally simple; it doesn't try to provide a detailed explanation of reading comprehension as much as it posits what the necessary and sufficient enabling skills for comprehension would be. According to the simple view, students must be able to decode print into an oral representation. As such, reading requires an ability to perceive phonemes (the smallest meaningful units of language sound) separate from meaning

(phonemic awareness), to match letters and sounds, and spelling patterns and pronunciations (phonics), and to do these things accurately, with sufficient speed and expression (fluency).

In fact, research shows that teaching phonemic awareness, phonics, and oral reading fluency during the primary grades has a positive impact on students' reading comprehension (National Institute of Child Health and Human Development [NICHD], 2000). Unfortunately, both the research and pedagogical communities have tended to neglect the role of oral language in this equation.

However, the National Early Literacy Panel meta-analysed 63 studies that examined the relationship between early oral language ability and later reading comprehension performance (National Early Literacy Panel [NELP], 2008). When the studies included multi-component measures of oral language (e.g., vocabulary, listening comprehension, syntax), then oral language was a powerful predictor of comprehension. Additionally, infants and toddlers who lag in early language are more likely to suffer from later dyslexia (Snowling & Melby-Lervåg, 2016). These studies provide only correlational evidence, but they reveal a close relationship between oral language and comprehension. As of yet, there have been few studies showing that oral language instruction improves reading comprehension, and these have focused mainly on vocabulary teaching. Vocabulary improvement has been shown to have a positive impact on comprehension, but most of this research has focused on students beyond the primary classes, and with those younger students the comprehension benefits have been rather small (NICHD, 2000). Vocabulary, however, increases in importance as students make progress up through the classes.

In any event, from this evidence it is fair to conclude that schools will not be successful in fostering proficient reading comprehension unless they provide students with the necessary enabling skills. Although these enablers are not necessarily part of the

comprehension process itself, reading comprehension would not be likely to occur without them.

Construction-Integration Model

The next relevant theory is the construction-integration model of comprehension (Kintsch, 2010), This theory doesn't address in detail these enabling or foundational reading skills, but assumes and depends upon proficient decoding, so that it can focus attention on the process of comprehension itself. According to the construction-integration model, the reader has to translate a text base (that is the set of propositions that have been coded into text by a writer) into a situation model (which is a non-verbal mental representation in the reader's mind, the result of the reader's processing and interpretation of the text).

Initially in this model, the reader has to make sense of the semantic properties of the words and the relationships between these words of the text. This process makes vocabulary meaning of prime importance in text interpretation, but also requires that the relations among the words signalled by the grammar and cohesion be interpreted as well. For example, take this text:

The turtle sat on a log. A fish swam under the log.

To make sense of this pair of sentences readers would need to know the definitions of *turtle, sit, on, log, fish, swim,* and *under.* And they would have to recognise that it was the turtle that was on the log and the fish that was under the log—and that this had already taken place (past tense forms of *to sit* and *to swim*); these all being drawn from the syntactic relationships coded into the text. Finally, readers would need to recognise the repetition of the word *log* and the use of the articles (*a*, *the*) as signals that the fish had swum under the same log that the turtle was sitting on.

These lexical (vocabulary, syntactic, and cohesive relations) are what Kintsch and colleagues refer to as the microstructure of the textbase. Next, the reader must come to terms

with the macrostructure. Macrostructure is the term used to refer to the semantic relations that exist among larger sections of text. Thus, when reading a scientific article about the structure of the heart, the discourse might be divided into multiple sections: chambers, heart wall, pericardium, coronary circulation, and nerve supply—and readers have to recognise these structural parts and make sense of the connections among them.

The interpretation of these micro- and macrostructures are essential parts of the comprehension process, and they can easily be explained by various rule-based actions. For instance, in the earlier example, it is possible using lexical knowledge and logic alone to recognise that the fish swam under the turtle, even though the text was not explicit about this point. However, the reading comprehension process—developing a "situation model" from such a text base—requires one more step if we are to describe the actual comprehension process that the human mind implements.

To construct a situation model from text, the reader has to eventually develop a mental image or representation of the situation being described by the textbase. This mental image is based on the text information just described, but also upon a reader's prior knowledge. This necessary reliance upon prior knowledge is the reason why most readers would likely assume the fish that swam under the frog would look more like the fish pictured in Figure B than one in Figure A.

Figure A

Figure B

Texts are incomplete representations of meaning. Authors—whether composing literary narratives or historical or scientific expositions—do not provide complete

descriptions of the protagonists or objects in a text, intentions, nor of the spatial, temporal, or causative relationships (Zwaan & Radvansky, 1998). Readers must add imagery, emotion, and even personal experiences in order to comprehend a text. One can comprehend the "fish-frog story" above with low-level semantic knowledge and limited logical analysis, and without developing a situation model. However, research shows that such comprehension will be severely limited and short-lived, and inconsistent with the actual interpretations of readers under normal circumstances. Constructing situation models depends upon the readers' ability to combine prior knowledge with the text base to construct representations of meaning that instantiate the unspecified information. Research supports the value of teaching students to engage in constructing micro- and macrostructures and in developing situation models that include prior knowledge.

Metacognition and Executive Function

Additionally, there are theories of metacognition and executive function that have relevance to reading comprehension. Metacognition refers to awareness and regulation of one's own thought processes (Flavell, 1979), and executive function refers to the "command and control" function that guides or directs all cognitive skills, including attention, memory, and effort (Butterfuss & Kendeou, 2017). These closely-allied skills play important roles in reading comprehension.

Metacognition (thinking about thinking), for example, allows readers to monitor their comprehension—and when that comprehension isn't satisfactory, to adjust one's approach to the text. Perhaps readers will conclude that they don't know the meaning of a particular word and will look it up in a dictionary or will simply try re-reading the text with more focused attention. Or, readers might decide that given the importance or difficulty of a particular text they will read more carefully than usual, slowing their speed, or summarising each section as they try to enhance their understanding and recall. All of those kinds of intentional cognitive

actions that might be implemented prior to, during, or after reading are considered to be the province of metacognition.

Executive control refers to even more subtle aspects of the management of cognitive processes during comprehension. For example, when reading homonyms (words with identical spellings and pronunciations, but different meanings) a reader has to initially resolve which meaning is the proper one, and then must inhibit the activation of the alternative meanings for the remainder of the text rather than resolving that ambiguity again and again. Or, when a reader confronts an acronym used repeatedly in a text (such as DART for Dublin Area Rapid Transit or DNA for deoxyribonucleic acid) it helps to commit such a term to memory to facilitate comprehension. Or, readers might accord greater or less attention to particular terms, phrases, clauses, sentences, paragraphs or ideas in a given text. These acts of inhibition, memorisation, and attention are all implicated in reading comprehension and all fall within the realm of executive control.

In summation, these theories explain that reading comprehension depends upon an efficient and fluent decoding process that allows readers to translate text to oral language. Additionally, readers need to know the meanings of words, and the relationships among these words as designated by the syntax and cohesive links included in a text. Comprehension then requires the ability to take this information that is stated explicitly or that is implied logically in the text and to combine that information with the reader's prior knowledge in order to create a more complete and meaningful representation of the overall meaning of the text. Finally, during this entire process the reader's cognitive executive functioning must monitor and manage this process, flexibly guiding attention, effort, and memory.

How to Improve Reading Comprehension

These definitions and theoretical foundations describe the nature of reading comprehension and its component processes. Any instructional approach recommended for

improving children's reading comprehension should be consistent with these theoretical considerations and should also possess clear and substantial empirical evidence showing its effectiveness in improving comprehension. Given these criteria the following recommendations would set the best direction for a successful programme of reading education, particularly with primary school children; government policies that encourage and support these kinds of pedagogical directions—through teacher education and professional development, supervision and evaluation, textbooks, programs, and assessment—are likely to be most successful. Table 1 summarises these recommendations, grouping them into three sets: those recommendations aimed at developing the foundational knowledge and abilities, that while not being reading comprehension specifically, are essential to the development of proficient comprehension; those recommendations focused specifically on the instructional emphases and supports needed to teach reading comprehension effectively; and extensions and elaborations that address encouraging students to both use and continue to grow their ability to comprehend text.

1. **Teach foundational skills.**

Most of the points made here will be focused on reading comprehension directly, but as the "simple view" makes clear, readers must learn to translate print to oral language in order to enable comprehension. Given this, one should not be surprised that research finds that instruction in various foundation skills, particularly during the primary classes, has a positive impact on reading comprehension. Specifically, studies show that instruction in phonological awareness, phonics, and oral reading fluency—all skills implicated in decoding print efficiently—improve reading comprehension.

Decoding instruction is important, in part, because of the limitations of the human mind. Neural processing has severe limits in terms of capacity for attention and working memory (Craik & Lockhart, 1972). Brains can only pay attention to so much information at a

given time; if comprehension is going to take place during reading, then the processing of words must become automatic (that is, capable of being carried out without conscious attention). Basically, the more conscious attention needed for decoding print, the less cognitive capacity available to make sense of the meaning or implications of the message being decoded (LaBerge & Samuels, 1974). Readers who are able to process print so fluently that these processes become automatic, will have greater cognitive capacity to devote to comprehension.

What are these essential foundational skills? There are several that deserve mention. Phonological awareness refers to the ability to perceive and operate on the sounds of language separate from meaning. Young children, for instance, usually cannot perceive phonemes, the smallest distinct sounds that distinguish one word from another. That is problematic given that English is an alphabetic language, that is a language in which the written symbols represent the sounds of the language rather than its meaning. Studies show that young children (ages 4-6) can be taught to perceive the sounds of language and that such instruction improves these children's progress with decoding and reading comprehension (Melby-Lervåg, Lyster, & Hulme, 2012; NELP, 2008; NICHD, 2000).

Phonics refers to the knowledge of letters, letter sounds, and spelling patterns and the ability to use this knowledge to figure out the pronunciation of printed words. Studies show that explicit and systematic instruction in preschool, kindergarten, and Grades 1-2 leads to improvements in the ability to read words, nonsense words, oral reading fluency, spelling, and reading comprehension (Jeynes, 2008; Kim, Petscher, Schatschneider, & Foorman, 2010; NELP, 2008; NICHD, 2000).

Oral reading fluency refers to the ability to read text aloud accurately, with sufficient speed, and proper expression. Oral reading fluency is a kind of mash up of decoding and reading comprehension. Reading the words of a text accurately and with sufficient speed

requires a high degree of proficiency in decoding; while proper expression requires that readers be able to pause in ways that reflect the punctuation and meaning of the text. Admittedly, the comprehension noted here is not high-level interpretation of text, but more an initial or immediate, online sense-making that appears necessary if deeper comprehension is to be accomplished (Breznitz, 2008. Research shows that oral reading fluency instruction leads to improved word recognition, oral reading fluency, and reading comprehension in Grades 1-4 (Kuhn & Stahl, 2003; NICHD, 2000).

Reading comprehension benefits from substantial, high-quality instruction in all of these foundational skills during the primary school years. However, these skills are best thought of as being necessary, but insufficient for promoting reading comprehension. Educational initiatives that aim to improve foundational skills alone would be expected to have a very limited impact upon reading comprehension.

2. Support language development including vocabulary.

The simple view holds that once text has been decoded, readers then interpret the oral version of the text in the same manner that oral language is usually interpreted. Consequently, language development should be expected to play an important role in the development of reading comprehension. In fact, research and theory reveal a strong relationship between early language attainment and later reading achievement (NELP, 2008; Pickering & Garrod, 2013; Shanahan & Lonigan, 2012); and young children's language is much more closely related to reading comprehension than to decoding skills. A recent report found that 10- and 11-year-old poor comprehenders (i.e., those with poor reading comprehension despite good decoding abilities) had evidenced weak language skills as early as 15 months of age (Justice, Mashburn, & Petscher, 2013), and a meta-analysis of 86 studies of second-language learners with comprehension deficits—but with good decoding—found substantial oral language deficiencies (Spencer & Wagner, 2018).

Language includes a multiplicity of skills including vocabulary, morphology, syntax, listening comprehension, and so on. These studies indicate that measures of all of these skills are implicated in reading comprehension. Unfortunately, there are not experimental studies showing the effectiveness of instruction in each as an effective way of improving reading comprehension. One important exception to this is vocabulary. Studies show that instruction in word meanings and the meaningful parts of words (morphology) can have a positive impact on reading comprehension (NICHD, 2000; Stahl & Fairbanks, 1986). Effective vocabulary instruction promotes a rich representation of word meanings, focuses attention on the relationships between words, fosters a use of the words in listening, speaking, reading, and writing, and provides plenty of review. Such instruction is beneficial across a wide range of ages and classes. Likewise, morphology instruction has been found to improve student understanding of word meanings, even with younger students (Bowers, Kirby, & Deacon, 2010).

But what about other language components? Research shows that instruction can improve oral language proficiency, at least with younger children, though whether such gains eventually translate into better reading comprehension has not yet been proven (NELP, 2008). Similarly, studies have long shown that instruction can improve the listening comprehension of school-age children (Pearson & Fielding, 1983), but none of these studies checked to see if these improvements translated to better reading comprehension, and there are reasons to expect that such improvements may be supportive, but cross-modal transfer wouldn't necessarily be automatic.

Given this it seems prudent to provide school-age children with explicit instruction in vocabulary and morphology, and to provide language-supportive classroom environments that encourage oral language use (e.g., discussion, oral presentation, storytelling, listening comprehension) and that provide students with sound oral language models. With preschool

children and, perhaps, kindergartners (NELP, 2008) and with second-language learners (Pollard-Durodola, Mathes, Vaughn, & Cardenas-Hagan, et al., 2006) it makes sense to also offer explicit instruction in oral language.

3. Knowledge use and knowledge development.

A key aspect of reading comprehension is the integration of prior knowledge (that is the knowledge the reader already has prior to reading) with the information extracted from the text (Cain, Oakhill, Barnes, & Bryant, 2001). With many texts, the relevant knowledge is likely to be pretty mundane—knowing that a character must have crossed a room or that the sun doesn't shine at night. However, as students move up the grades, the need to read academic texts increases and then the prior knowledge that matters most is academic knowledge (knowledge of literature, science, social studies, etc.).

There are many things that educators can do to enhance students' ability to develop and use prior knowledge effectively in reading comprehension. For instance, it is often stated that it doesn't matter what texts students read as long as they read; the idea being that reading practice is more important than any content considerations. However, to facilitate reading comprehension growth over time, it makes sense that what students are asked to read in school would present high-value content (e.g., excellent literature, informational texts that explore natural and social worlds, cultural touchstones). It would be equally wise to ensure that students learned both the reading skills and the content of these texts. Such knowledge then becomes part of the basis on which students read future texts. One way to increase this likelihood is to have students reading multiple texts on a topic of importance. Of course, reading skills instruction is important, but it is equally important to ensure that content subjects are taught thoroughly as well in order to build coherent bodies of knowledge about a range of information.

Beyond making sure students are increasing their knowledge of the world—even during reading instruction—it also helps to teach students strategies for bringing their existing knowledge to bear on the texts they are trying to read. Various procedures for activating prior knowledge before and during reading have been found to be effective, including previewing the texts prior to reading (Burns, Hodgson, Parker, & Fremont, 2011; McCormick, 1989); making predictions about the text (Loranger, 1997); or using techniques like K-W-L in which students inventory what they already know about a text, what they want to know, and after the reading, what they have learned (Ogle, 1986).

4. Guided practice.

As with any ability, practice is a key to proficiency; reading comprehension is no different. This has long been recognised in reading instruction, in which guided reading practice has been a pillar. Such practice most often takes the form of a group or class reading of a text under the guidance or supervision of a teacher. The group reads a text with the purpose of comprehension, and the teacher, through the asking of questions and other devices, focuses students' attention and facilitates their shared construction of an appropriate text interpretation (the outward manifestation of a situation model). The underlying purpose of this process is that students, with such support, will develop coherent comprehension of a text and will improve the ability to acquire such comprehension independently in the future. There are several models available for guiding such discussions including the directed reading activity (Betts, 1946), Directed Reading-Thinking Activity (Stauffer, 1969), Great Books Discussions (Sandora, Beck, & McKeown, 1999), Guided Reading (Fountas & Pinnell, 2016), Socratic Questioning (Hirsh, 1997), Questioning the Author (Beck & McKeown, 2001), and so on.

For example, guided reading has been promoted for more than 80 years. Within this model, teachers are encouraged to preteach potentially unknown vocabulary so that lack of

word knowledge won't interfere with comprehension; to provide or review students' text-relevant prior knowledge so that this information will be easily accessible during the act of reading; to establish a purpose for the reading to focus the readers' attention on the most relevant and appropriate information (and suppressing attention to less important information); to establish a reading plan, that is setting the amount of text to be read prior to discussion of the information; and to ask questions about the text information, guiding the readers to think about the ideas in the text, to generate appropriate and necessary inferences, and to construct a coherent memory of the text.

Different approaches to guidance emphasise different aspects of the text or of the comprehension process. The purpose here is not to champion any particular guidance approach over another—since research has not distinguished them on the basis of their comparative effectiveness (Stahl, 2008). Instead, it is to encourage the inclusion of one or more of these approaches in any programme aimed at enhancing reading comprehension, and to suggest some quality standards for any guidance of this kind.

The key point is that whatever approach is taken to guiding reading comprehension practice the result should be a coherent representation of the text. This mental representation might be externalised in the form of something like a written summary or retelling of the text, or it could be the discussion itself. Research shows that when good readers talk about a text their comments appear to be an effort to develop a coherent text representation (Coté & Goldman, 1999), and that when the texts themselves are incoherent (e.g., necessary causal or sequential links are absent or ambiguous, incidental ideas or tangents are emphasised too much) then readers have more trouble comprehending (Lien & Chang, 2016; Taraban, 2003). Research has even revealed how the brain processes different kinds of information—processing information of central importance more and in different neural locations than peripheral information (Swett, Miller, Burns, Hoeft, et al., 2013). That suggests that the

guidance and questioning teachers use to lead students through a text should result in the readers' constructing coherent causal or sequential chains of information (Stiegler-Balfour, Benassi, Tatsak, & Taatjes, 2014).

Studies have shown that texts that facilitate the development of coherent mental representations provide a great deal of "argument overlap (i.e., connections between the text constituents) and situational continuity (i.e., connections between the components of the referential situation model)…[for] 3 dimensions of situational continuity: temporal, spatial, and causal continuity" (Zwaan, Magliano, & Graesser, 1995). One would expect that discussions that require students to reiterate or infer such connections would help to develop coherent mental representations.

Unfortunately, often during these text discussions, teachers may get diverted or sidetracked by other issues, such as focusing on decoding or exploring other reading skills, instead of emphasising the content of the text. Or, these discussions might be driven by the desire to ask particular kinds of questions (e.g., Bloom's taxonomy, Question-Answer-Relationships) in order to provide practice with particular kinds of thinking or reading skills, rather than trying to follow the sequence of the text or to connect the ideas in a way that would promote the development of coherent representations of the meaning of the text that are connected to the students' knowledge of the world.

Guided reading comprehension practice should be a mainstay of any reading comprehension programme. However, whatever approach to this is used should lead students to construct coherent representations of the text. This means questioning sequences and writing assignments that guide students to think about the text in ways that would lead to logical and comprehensible summaries or retellings of the information in text, and that represents the key logical and sequential relationships (e.g., causation, intention), including those only implied by the text.

5. Comprehension strategies.

Probably the most researched idea concerning reading comprehension instruction is the teaching of reading comprehension strategies. Good comprehenders think actively about the ideas in a text, just as good learners of any kind can be described as active: active learning entails the use of strategies for remembering, understanding, and solving problems (Bransford, Brown, & Cocking, 2000). Studies show that students—even young students—can be taught ways of thinking or mental actions that improve comprehension and memory for text (NICHD, 2000 Shanahan, Callison, Carriere, Duke, et al., 2010).

A particularly apt example of a "reading comprehension strategy" is summarisation. Studies have shown that children can be taught to actively summarise a text as they read it, and that such teaching leads to higher comprehension performance (NICHD, 2000). Instead of just passively reading the text and hoping that something "sticks", these students learn to read some portion of a text and then to pause and summarise the major points made up to that point. This summing up engages the reader in actively thinking about and reviewing the ideas presented in the text and starts the reader on the way to constructing a situation model (Coté & Goldman, 1999). Then, the reader goes on and reads another section of text, and again summarises what has been revealed to that point—which requires integration of the new information with that which was previously summarised; and so on, until the text is completed.

Another powerful strategy is self-questioning (NICHD, 2000). In this routine, readers again read portions of a text, but this time instead of summarising, they ask themselves questions about what the text said and try to answer their own questions. In other words, with self-questioning, readers engage in a kind of conversation with themselves about the text, which helps both to organise the information and to rehearse it so that it remains in long-term memory. (Similarly, engaging in a "think aloud" about the text, in which one just talks about

the text ideas, helps one to construct a situation model Baumann, Seifert-Kessell, & Jones, 1992). Developing this kind of memory for the text information early in the reading improves comprehension of the later-presented information because it makes it easier to anchor those ideas with the earlier memories.

Another widely-studied comprehension strategy is visualisation (NICHD, 2000). In this, the reader actively tries to "see", spacio-temporally, the event described by the text. For example, read these sentences and try to visualise the scene:

> Danny remembered his father taking him fishing, that first time in the river, when he was a boy, how the water tightened around his body, the thick rubber of the Red Ball waders constricting in the current. It was late March. It was cold and clear and he wondered how his father ever found this place, hours from home, driving in the dark to get to the river at first light. How they stood overlooking the river from the top of the hill, it's multiple interwoven channels his father called "the Braids" because it was in this area the river split and turned and coiled around itself before returning to its orderly flow between two banks below Indian Bridge. (Lynch, 2010, p. 19)

The act of trying to see this event in one's mind's eye requires a conjuring up of prior knowledge: the reader doesn't really see the river and hills described by Thomas Lynch, but a river and hills from one's own past experiences (real or vicarious). The act of seeing the scene likely changes the order of things, too. In the paragraph, Lynch first talks about being in the river, and then about his first sight of it; imagining the scene rather than "just reading" about it may lead one to construct the trip down the hills into the water, though Lynch doesn't attempt to describe that walk down—if it was a walk. (With more abstract texts, the reader is still required to figure out the relationships among parts or to follow causal chains and those, too, can be seen graphically in the mind.)

Previously it was noted that it helps readers to think about what they may know already about a topic prior to reading about it. This, too, is a comprehension strategy, and quite an effective one—if care is taken to not go too far. Readers need to use their knowledge, but they must be cautious not to allow it to contradict or overrule the text. It wouldn't help comprehension of the lines about fishing above if the reader were to supplant Lynch's bucolic and secluded images with prior experiences of a visit to a heavily-populated river complete with swimmers, jet skis, and the like. (This can be a real problem in science reading, since science often presents information that is counter-intuitive.) That points out an important limitation of comprehension strategies. Their use increases the chances of understanding and remembering; it doesn't guarantee it.

Another important thing to know about comprehension strategies, beyond their active and probabilistic nature, is that they are necessarily intentional—at least when being learned. One will not preview a text, review what is already known about the topic, make predictions, or stop occasionally to converse with oneself without choosing to do so. Each of these actions increases the chances of understanding and remembering the text information, but each is an act of volition—an active attempt to better understand and remember.

Not only has research identified a plethora of effective strategies—and determined that readers need to use multiple strategies—but it has concluded that there is a particularly effective way of teaching such strategies. This research-based approach is usually referred to as the "gradual release of responsibility" (Shanahan, Callison, Carriere, Duke, et al., 2010). Basically, the teacher models or demonstrates the use of a particular strategy (or set of strategies in some cases), providing an explanation of what the strategy is, how it is done, and why it is useful. Then, over time, the teacher gradually engages the students in carrying out the strategy. For instance, with summarisation, the teacher initially does all the work: reading the text, picking a place to stop reading, summarising, and explaining. Then, once the

students have a clear idea of what summarising is, the teacher guides them to read a text and to provide the summaries at the appropriate times, but with the teacher making the various decisions about when to stop and which strategy to use, and adding the explanation of why it helps and how it is done. Eventually, step-by-step, the students take over the teacher's role, making the decisions and providing the explanations with less-and-less teacher support and guidance.

It is important to distinguish comprehension strategies from what are often characterised as "comprehension skills" (Afflerbach, Pearson, & Paris, 2008). Strategies, as has already been noted, are intentional actions taken by a learner to try to enhance remembering, understanding and problem solving; they usually work, though not always—since the strategy might not be appropriate to the cognitive situation. Comprehension skills tend to be conceptualised as the abilities that allow one to identify particular kinds of information in a text—information for answering particular kinds of questions. Thus, skills might include inferencing, comparing, main ideas, supporting details, literal recall, and so on. With few exceptions, these "skills" have not been amenable to teaching or to reliable assessment and they appear to be a rather poor characterisation of reading comprehension. The problem is that reading comprehension is not a skilled activity, per se (Willingham, 2017). Texts differ too much in their content and language to allow for readers to automatically (without conscious attention) identify particular kinds of information.

Comprehension instruction should introduce students to the idea that understanding and remembering are choices that one makes, and that there are ways of thinking about texts and operating on them that increases the chances of understanding and remembering. And, these most effective strategies should be taught using a gradual release of responsibility approach.

6. Metacognition and executive processes.

As noted earlier, metacognition and executive processes refer to the ideas of "thinking about thinking". Although it has been shown that there are various choices or decisions made concerning attention and memory during a process as complex as comprehension (the so-called executive processes), research has not identified any instructional routines that provide students with greater purchase on these processes, so there are no recommendations to be made on that account (Meixner, Warner, Lensing, Schieffer, et al., 2018). However, the same cannot be said about metacognition.

Metacognition in reading is usually described as being two-fold: monitoring and strategic control (Flavell, 1979). Strategic control has already been discussed in detail; when a reader decides that comprehension of a particular text is important and then chooses a particular strategy or combination of strategies that seems apt for the text and the task, that is a metacognitive act. Likewise, readers need to be aware of the success of their actions and to know what to do in case they are not successful.

In reading, this aspect of metacognition is usually discussed in terms of monitoring and fix-up strategies (Markman, 1977; Walczyk, 1990). Often, young children come to think of reading as the act of reading words (perhaps due to the heavy emphasis on decoding and oral reading fluency), and the pleasure associated with success in translating print to language. They become enamored with how many pages or books they read, with nary a thought about what was gained from these readings. (It is estimated that adult readers' minds wander about 11% of the time during reading, so this is not just a problem for those beginning to become literate (Moss, Schunn, Schneider, & McNamara, 2013). Successful reading requires comprehension, however, and readers must become self-aware about whether that is being accomplished and what to do when it is not.

Of course, if someone is consciously trying to comprehend and is engaged in strategy use aimed at facilitating such comprehension, mind wandering is less likely. That, however,

still does not always mean that comprehension is being accomplished. Sometimes texts contain errors, or the reader simply misreads a word which changes everything, or perhaps a situation model is constructed that turns out to be discrepant with later text information. Mistakes happen. But good readers are aware of such problems, and they take actions to repair the misunderstanding.

Monitoring is usually taught by stressing to students the importance of comprehension and teaching them to be on the lookout for information that is inconsistent or makes no sense. In some schemes, texts containing anomalies (e.g., blue apples, square tyres) are provided so students get the hang of being self-aware. Then a plethora of fix-up strategies are taught and practised including rereading, looking up a word meaning, comparing text with illustration or other graphics, asking for help, thinking about what one already knows or what one has already read so far, reading the text aloud, and so on.

7. Volume and range of texts.

Reading comprehension takes place in a context; most importantly in the context of the particular text being read. Reading a narrative literary work is a very different experience than reading an expository science text, and both differ from reading an editorial in *The Irish Times.* Such texts differ in purpose, vocabulary, sentence structure, cohesion, text organisation, how explicitly they evoke prior knowledge, use of graphic elements, and so on. Good comprehenders have to develop the ability to make sense of a wide variety of texts, and effective instruction needs to both support high volumes of reading (again, practice matters) and the reading of texts that vary in a plethora of ways.

"Individual differences in exposure to print can predict differences in growth in reading comprehension ability throughout the elementary grades and thereafter" (Cunningham & Stanovich, 1997, p. 934). Basically, better readers read more. The data referred to here are correlational in nature: better readers read more and those who read more

are better readers. As with any correlational data, directionality is impossible to determine. Is it that those students who can read well are able to read more than those who can't or that the practice of reading leads to improvement? One suspects both are likely true.

But what of assigned reading and reading within instruction—that is, reading that students do not choose independently? Studies—again correlational—suggests that the amount students read within their school day is also predictive of reading achievement (Taylor, Pearson, Clark, & Walpole, 2000). This does not get us entirely out of the woods, since presumably this classroom reading time would include the "free reading" periods that many teachers provide. However, when the effects of this kind of non-instructional reading are isolated, the learning payoffs are evidently quite small, particularly in comparison to reading instruction time (Kim, 2006; NICHD, 2000; Yoon, 2002; Yoon & Won, 2001).

These various studies suggest that it is important to engage students in reading within reading instruction—as well as during instruction in the subjects—and that students should be encouraged to read on their own beyond the school day and school year, too.

Additionally, this reading should provide students with opportunities across lots of different contents and lots of different genres. Indeed, students should read literature, including poetry, drama, fiction, and literary non-fiction—and these literary works should include classical and contemporary works, tragedy and comedy, adventures, fables, folk and fairy tales, legends, mysteries, historical and science fiction, and so on. Similarly, it is important for children to have opportunities to delve into various kinds of informational texts—including those drawn from the arts and sciences and history, expositions and arguments, and so on. The point of this diversity is less to try to meet the diverse tastes of a diverse society, but to expose students to a variety of purposes, language, and discourse features that readers have to learn to negotiate in order to comprehend such texts.

Instructional texts also should vary in terms of their lengths and difficulty levels (Mesmer & Hiebert, 2015). Short stories, for instance, typically pose less long-term memory demand than do novels; and sustaining attention over longer stretches of text can be more challenging. Generally—all things being equal—readers tend to find shorter texts easier to read than longer ones (Keenan & Meenan, 2014; Spear-Swerling, 2004). Instruction can help to "stretch out" memory and attention span by providing guidance with progressively longer texts.

Of course, there are other reasons why students may struggle with a text. Texts may vary in the abstractness or difficulty of the subject matter, language complexity, formatting complications, and so on. Historically, teachers have been admonished to teach students to comprehend with relatively easy texts (Betts, 1946). This appears to be good advice for the brief period when decoding is being mastered (Fitzgerald, Elmore, Koons, Hiebert, et al., 2015), but increasingly research is revealing that by the time students can read like a beginning second-grader instruction can profitably focus on texts that students may have trouble reading and comprehending (e.g., Morgan, Wilcox, & Eldredge, 2000; O'Connor, Swanson, & Geraghty, 2010). This seems logical, given that if readers need to learn to negotiate particular barriers to understanding that might be built into a text (such as complex sentences) it seems as if it would be easier to accomplish if children were confronting such features in their texts from which they were being taught. Students should have opportunities both to read what for them are relatively easy texts with little teacher mediation, and more challenging texts that likely will require teacher guidance and support. These latter, more difficult, texts not only give students an opportunity to confront features of text complexity, but also increase their prospect of learning rich content and to master the strategic and metacognitive moves required to deal with these challenges.

8. Discourse instruction.

As essential as reading practice with varied texts and text demands is, such opportunities should be accompanied by explicit teaching and scaffolding in how to deal with the challenges such texts entail. As such, explicit instruction of this type could address any text feature that may serve as a barrier to readers' comprehension. Here only a few of the more important of these text features that would benefit from explicit instruction will be explored.

For example, text genre—the type of written discourse determined by the purpose of the text—is important because different genres include different text conventions. There are general characterisations of genre (e.g., narrative, exposition, persuasion) or of more specific subgenres (e.g., historical fiction, science fiction, romance, action/adventure). Because genres carry with them various structures, features, or conventions, it is essential that readers know about genres, be able to recognise which genre a particular text is, and to adjust their reading accordingly. Research shows that genre awareness can lead to differences in attentional allocation and inferencing effort on the part of readers (Gavaler & Johnson, 2017; Schmitz, Gräsel, & Rothstein, 2017; Zwaan, 1994). Studies also shows that students can be taught to think about genres in ways that improves reading comprehension (Meyer, Wijekumar, Middlemiss, Higley, et al., 2010). Students tend to have more problems with expository text than narrative (and expository text comprehension appears to be more closely associated with students' prior knowledge), probably an issue of familiarity, but one that schools must address (Best, Floyd, & McNamara, 2008).

One particularly potent text feature that tends to accompany genre is text structure or organisation. Authors organise the information in their texts in particular ways, and good comprehenders either adopt this organisational plan in constructing the situation model—or impose some other structure if they can't discern the author's; poor readers tend to do neither. Stories for example have been described as a series of events; each of which includes a

setting, protagonist, problem that the protagonist faces, the protagonist's attempts to deal with the problem, and the outcomes of these attempts (Mandler & Johnson, 1977). Common organisational plans for expository text include description, time sequence, comparison/contrast, and problem-solution; and there are other particular structures like argument (claim, evidence, counterargument, response, evidence), scientific experiment (hypothesis, method/procedure, result, conclusions), or social studies textbooks (culture, history, economics, government, geography). Research has shown that awareness of these arrangements improves understanding and recall—and that teaching students to map stories or to discern other structural schemes improves their reading comprehension (NICHD, 2000).

Another aspect of text worth teaching is also structural in nature: cohesion (Graesser, McNamara, & Kulikowich, 2011; Halliday & Hasan, 1976). Texts are more than lists of sentences; the sentences must cohere. This coherence is accomplished through a series of links that readers must follow. There are various links that readers need to become familiar with, including repetitions, synonyms, pronouns, and conjunctions. Thus, with this simple text:

> John loved football. He was a midfielder and after a good play his
> friends would shout, "That was fierce, Boyo."

Readers would need to connect John, with the pronoun "he" and the nickname or slang synonym for John ("Boyo") if any sense were to be made of the matter. Struggling comprehenders have trouble with different forms and circumstances of reference (e.g., local and global; anaphora, cataphora, exophora; distance, alternative text choices, dependence on prior knowledge; Cain, 2003; MacLean & Chapman, 1989); the complexity or subtlety of cohesion links have been implicated in comprehension difficulty (Hall, Maltby, Filik, & Paterson, 2016), and comprehension strategies aimed at making cohesive links explicit improve reading comprehension (Ozuru, Briner, Best, & McNamara, 2010).

Finally, not only do texts have structures, but so do sentences. Syntax refers to the arrangement of words and phrases in well-formed sentences. Texts with more complicated sentences tend to be harder to comprehend than those with simpler sentences (Barth, Tolar, Fletcher, & Francis, 2014; DiStefano & Valencia, 1980), and readers' grammar awareness appears to be implicated in their reading comprehension. Nevertheless, general grammar instruction has never been found to enhance reading comprehension, at least not in the reading of native language learners, but applied approaches to grammar instruction have been more successful. Essentially, such teaching guides readers to disentangle complex sentences or to reconstruct them with the purpose of getting to the meaning of the sentences (Straw & Schreiner, 1982; White, Pascarella, & Pflaum, 1981).

9. Writing about text.

Although the focus here is on reading comprehension, it is important to consider the role that writing can play in enhancing comprehension and learning. Writing itself is valuable, of course, but here the emphasis is only on how writing can be infused effectively into the reading programme, including in the primary school years.

Previous recommendations have repeatedly highlighted the value of discussion—among teachers and students and of students with themselves—in developing reading comprehension. Such discussion provides opportunities for students to think about the text and text content, for teachers to shape the accuracy and coherence of students' representations of the text, and to promote active rehearsal of the information in the text; all of which have been found to improve learning (Murphy, Wilkinson, Soter, Hennessey, et al., 2009). Research shows that reading and writing are closely related because of their common dependence on cognitive and linguistic processing and knowledge of the world (Fitzgerald & Shanahan, 2000). It has long been surmised that writing provides valuable opportunities for students, especially young students, to make text features concrete by allowing students to

operate on them by trying to use them in their own writing. Even more persuasive, however, is a meta-analysis of 110 studies in which students were asked to write about texts. It found that the impact of such writing on comprehension and learning was impressive (Graham & Hebert, 2011). Writing about text was more effective in this regard than reading alone, reading and rereading, or reading and discussing. Although there is no question that reading and writing can be combined in a number of ways (Hebert, Gillespie, & Graham, 2013) and that these combinations can focus student attention on particular discourse features (e.g., Cox, Shanahan, & Sulzby, 1990), here the emphasis will only be on those combinations of reading and writing activity (students writing about text) that have been found to enhance reading comprehension directly.

Research has identified four particularly useful ways readers can write about text (Graham & Hebert, 2011; Graham & Perin, 2007; Shanahan, 2015). First, there is modelling in which readers read texts and study their genres, structures, and other key features and then attempt to replicate those features in texts written by themselves. Second, writing summaries of the texts being read requires determinations of key ideas and important details. Third, writing analyses or critiques of the texts being read, such as explaining the importance of particular ideas, making comparisons, or evaluating the quality or value of the content. And, finally, writing syntheses of multiple texts—identifying and integrating key information from two or more sources. Of these, summary writing has been found to be particularly advantageous with younger students in terms of improving their reading comprehension (Graham & Hebert, 2011).

10. Motivation and engagement.

Something not addressed in these models and theories of reading comprehension is motivation—students' intrinsic desire or willingness to do something. Research reveals that motivation plays an important role in growth in reading comprehension, at least across the

primary school years (Cartwright, Marshall, & Wray, 2016; Guthrie, Hoa, Wigfield, Tonks, et al., 2007; Stutz, Schaffner, & Schiefele, 2016). Instructionally, students' volition cannot be ignored if the purpose is to attain higher levels of reading comprehension. Research shows that students are motivated to comprehend and to learn to comprehend better by the relevance or interest they have in the texts to be read, the opportunity to exercise choice or control, ultimate success with the challenge level of the tasks, tasks that allow or require collaboration with others, and the depth of the content being explored (Guthrie, McRae, & Klauda, 2007).

Students must actively engage with text to extract and construct its meaning, and they will become better readers if they are taught reading comprehension in an engaging, motivating context (Shanahan, et al., 2010). A teacher can create this context by clearly conveying the purpose of each lesson, explaining to students how the comprehension strategies will help them learn, and impressing on them that the power to be successful readers rests as much with them as it does with their teacher.

Students are motivated in part by their self-images; if they are going to make maximum effort it is important that they see themselves as competent readers and competent learners (Schiefele, Stutz, & Schaffner, 2016). It is essential that students be challenged by the reading texts and tasks in class and that they complete these successfully, no matter the challenge level. Making these successes obvious and providing appropriate praise for these accomplishments is part of the motivation equation, too.

Additionally, students tend to be more motivated when they find the text content to be interesting—something that fulfills their curiosity—and when they are provided with text choices (Guthrie, Wigfield, Barbosa, Perencevich, 2004; Shanahan et al., 2010). It is worthwhile to encourage independent reading beyond the school day or school year in which students should have a wide choice of books, as well as to provide them with some options within instruction to make choices both of topics and specific texts (Ryan & Deci, 2009).

When it is not possible or pedagogically sound to provide such text options, choice may still possible. For instance, children might be able to determine the order in which they will complete their assignments, who they will work with, or where in the classroom they may complete their work.

Collaborative learning opportunities can be particularly motivating. Cooperative activities that depend upon reading comprehension can be completed in pairs or small groups. And, it helps if students find the assigned tasks to be stimulating (Guthrie et al., 2004; Guthrie, Wigfield, Humenick, Perencevich, et al., 2006); reading a text to figure out how to conduct a science experiment or as the basis of a debate is likely to be more stimulating than reading the text just to answer questions.

Conclusions

This paper explored the fundamentals of reading comprehension instruction. First, it provided a definition of comprehension, and summarised three theoretical foundations of reading and reading comprehension that underlie most current empirical and pedagogical work in this area. Then, it offered ten research-based recommendations for what educators and education policymakers can do to improve reading comprehension performance. These recommendations included advocating attention to both foundational or enabling skills, abilities and knowledge that support comprehension (including instruction in phonological awareness, phonics, oral reading fluency, oral language proficiency, as well as content knowledge), and direct instruction in reading comprehension including: increasing the amount and breadth of texts that students read; providing guided-reading opportunities that help students to develop coherent representations of text meaning and enhance their knowledge, opportunities to revisit and reinterpret texts through discussion and writing, explicit instruction in how to negotiate a variety of discourse features, to use comprehension

strategies, and to monitor and ensure success. Finally, the paper emphasised the importance of adopting approaches that support student motivation.

Although each of these ten recommendations was discussed separately, with separate bodies of evidentiary support, it is important to stress the interconnectedness of all of these points in learning to read better. One can imagine a series of lessons based upon a thematic collection of texts that students choose from and read collaboratively with the teacher and other students. The teacher may guide a communal reading of one of these texts, providing explicit instruction in dealing with a particularly difficult text feature or rhetorical move, and then have students write a critique of that work. The point is that reading comprehension is complex, multifaceted, and requires the orchestration of reading skills, language abilities, and knowledge of the world. Effective reading comprehension instruction is also complex and requires attention to multiple aspects of learning and development.

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Appendix A

EXTENSIONS & ELABORATIONS	• Writing about text • Motivation
READING COMPREHENSION INSTRUCTION	• Guided reading practice • Reading comprehension strategies • Metacognition and executive processes • Volume and range of texts • Discourse instruction
BUILDING A STRONG FOUNDATION	• Foundational skills (phonological awareness, phonics, fluency) • Language development including vocabulary • Knowledge use and knowledge development