**Lesson 2 : How reading works**

When we recognize the complexity of reading, its multiple purposes, and its many properties, it becomes clear that the cognitive processes that operate when we read must also be complex.

**1- Lower-level processes**In understanding the fluent reading process, it is essential to recognize the role played by lower-level processes. These processes include word recognition, syntactic parsing (using grammatical information), and semantic-proposition encoding (building clause-level meaning from word meanings and grammatical information). These processes are carried out as part of working memory, the framework in which cognitive processing and knowledge resources are integrated for comprehension. Comprehension cannot occur without the smooth operation of these processes.

1. ***Word recognition***

In reading, the singular recurring cognitive activity is the identification of words. From this follows two other, related observations about reading: Comprehension depends on successful word reading. Skill differences in comprehension can arise from skill differences in word reading. (Perfetti, 2007: 357).

In order for fluent word recognition to occur, a reader must recognize the word forms on the page very rapidly, activate links between the graphic form and phonological information, activate appropriate semantic and syntactic resources, recognize morphological affixation in more complex word forms, and access her or his mental lexicon.

**a.1- Orthographic Processing**

One of the key subskill processes in reading is the visual recognition of word forms from the text (Cunningham, Perry, & Stanovich, 2001). These forms include letters, letter groups, visual word shapes, and key shapes that are letter parts (like the long vertical line in “*l*” or “*b*,” or the right-hand curve in “*b*” or “*o*” or “*p*”). In current connectionist theories of word recognition, all of this information is processed simultaneously in word groups rather than in letter-by-letter fashion.

**a.2- Phonological Processing**

Most words build phonological activation prior to lexical access as part of the process that combines interactions among orthography, phonology, and meaning. For the very large majority of words that are processed while reading, phonological activation of the form plays a major role (Hulme et al., 2005; cf. Van Orden & Kloos, 2005).

**a.3- Semantic and Syntactic Processing**

All researchers agree that semantic and syntactic information becomes available after word recognition and is used for word-integration and comprehension processes.

The effect of semantic and syntactic processing in other respects is less apparent because semantic activation processes are slower than phonological and orthographic processes, though they are observable with nonfluent readers and with words that are unusual or difficult to process.

**a.4- Lexical Access**

As word forms are being processed visually, the potential matches in the reader’s mental lexicon are activated. For example, as a reader begins to process the form lake, orthographic and phonological processing begin to store the letters shapes, the syllable rhyme unit (-ake), the two long vertical lines, the rounded shapes of the two vowels, and so on. This information activates all the words in the lexicon that have many of these visual and sound features (e.g., rake, take, late, like, leak, fake, fate, and lake).

**a.5- Morphological Processing**

the importance of morphological processing for word recognition, independent of phonology, is argued for in
a range of research studies. The suffixes and prefixes of a language are processed as part of word recognition and those readers who have greater knowledge of affixes perform better both in word-recognition measures and in reading comprehension. The recognition of morphological markers helps to cue syntactic information associated with the word and isolates the base form.

**a.6- automaticity and word recognition**

Word-recognition skills must become very rapid and automatized for fluent reading to occur. The distinction between speed and automatization is important. Many processes are fast but not automatic. The key characteristics associated with automaticity, aside from speed, are that we cannot stop ourselves from carrying out the process and we cannot introspect on the process. For example, when we see the noun “bug” while reading, we will automatically activate the meanings for insect and for a listening device, and only after about 100–200 milliseconds will we begin to suppress the irrelevant word meaning. Moreover, we cannot, if asked, explain exactly how we accessed the two word meanings or how we began to suppress one of them, regardless of how long we might think about it.

**a.7- context effects**

Under normal reading conditions with fluent readers, context information provides relatively little support for word-recognition processes. The most straightforward reason for this is that context information takes some time to register and become available. There is simply no need for a fluent reader to wait to make use of contextual information. Context information is, however, a useful support for word recognition when a reader slows down because of processing difficulties, or a word that is confusing or not well known or well learned

1. ***Syntactic parsing (word integration)***

It should be obvious to anyone who reflects on sentences in a text that syntactic processing is essential to comprehension. For example, Sentence 1 below tells much more than Sentence 2:
**1. The man who broke the antique vase will be washing dishes all night.
2. Broke antique washing night the all the be man will vase dishes who.**We also see that reading does not rely solely on nouns and verbs without the other cueing systems (such as tenses, articles, prepositions, quantifiers, modal verbs). We understand much more from Sentence 4 than we
do from Sentence 3:
**3. Man fired rifle factory screamed boss.
4. The man fired from the rifle factory screamed at his boss.**
It is also obvious that word ordering in Sentences 5 and 6, though
comprising the same words, produces very different meanings:
**5. Tom chewed on the dog’s leg.
6. The dog chewed on Tom’s leg.**Finally, while Sentence 7 is easy to process, we have to use our tacit
knowledge of grammar to sort out the meaning of Sentence 8 (a gardenpath sentence):
**7. The man lent the money to a needy friend.
8. The man lent the money to gamble lost it all.**The point to be made here, and one that is often overlooked, is that grammatical information is continuously involved in comprehension, and the process of syntactic parsing, whereby we access meaning information from words and sentence structure, is essential to reading.

1. ***Meaning proposition encoding***

At the same time that the first words are being activated during reading and the first structural grouping of the words is parsed for its syntactic information, information being extracted from the words and structures is used to build semantic meaning units that are approximately equivalent to phrase and clause units. These units are called semantic propositions. Semantic propositions are formed simultaneously with word recognition and syntactic parsing and they are the building blocks of text comprehension.

Semantic propositions are described for text analysis and research purposes in ways similar to the functional meanings of clause structures. For example, the following Sentence 9 has the Propositional Information
10 below:

9. The man ate the apple.
10. ATE (man, apple)
In this example, the predicate (ATE) represents the activated node of information that makes us think of eating. The predicate is linked to “*man*” and “*apple*,” the two arguments of the predicate (in formal terms). The syntactic information will add the idea that “*man*” is singular and identifiable, as is “*apple*.” As a person reads Sentence 9, the semantic proposition, the activated network, is formed simultaneously with the structural parsing of the sentence. We should note here that propositions are heavily oriented toward the information provided by verbs
(and other possible predicates), reflecting a traditional logical semantics of predicates and arguments.

 **d- *Working memory***

Memory is usually divided into long-term memory and working memory as the two major components:

* Long-term memory is the total set of permanent records of our experiences and our efforts to understand our environment.
* Working memory includes information that is active for processing operations as well as the processing directions themselves. Working memory thus has both active storage and processing functions. Working memory is generally described as a limited-capacity system. It has limited storage, limited linkages to long-term memory, and limited abilities to carry out multiple processes simultaneously, or nearly simultaneously. Working emory usually maintains information actively for one to two seconds, but information can remain active for longer periods of time through mental rehearsal and reactivation

The role of working memory in lower-level processing for reading is,relatively direct and well established. Working memory supports phonological, orthographic, and morphological processing for word recognition. It stores and combines words that have been activated, it carries out syntactic and semantic processing at the clause level, and it stores the relevant information for building text comprehension. It also is the likely mechanism, through the executive control, that suppresses unwanted information quickly and efficiently, without the reader having conscious awareness of this ability.

**2- Higher-level processes**

1. **Building a text model of reader comprehension**

The text model calls for understanding what the text itself is trying to signal.

To demonstrate how a text model network might be created, the following four-sentence (six-clause) episode is used as the beginning of a text to be read:
1. The man could not find the map to the treasure.
2. He saw an edge of paper under the professor’s chair

3. and looked the professor in the eye.
4. Give me the map, said the man.
5. The professor raised a gun,
6. and the man leaped out the window.
Assume that the reader is processing Sentence 1 of the text: The words are recognized and the sentence structure is used to produce a set of propositions. Without worrying about details, the sentence can be represented by the propositions in (1′):
1′. NOT FIND (man, map); TREASURE (map)
As Sentence 2 is read, the next proposition is formed (2′): 2′. SAW (he, edge of paper); LOCATION-under (chair); HAS (professor, chair)
At this point, the reader connects “he” to “the man,” and “the man” (in 1) receives more activation (i.e., receives more chemical-electric energy). “Paper,” “chair,” and “professor” are all introduced and linked to “the
man” by appearance in the same clause. “Edge of paper” may also be linked to “map” by a bridging inference.
As Sentence 3 is read, the empty subject forces a link back to “the man,” activating “the man” even further. “Professor” now is introduced as a person rather than as the owner of “the chair,” and is given more,activation. By this time, the reader also knows that the text is a story narrative, most likely of the action adventure sort, with the first episode already begun; both characters are given more activation as potential main protagonists. The propositions in (3′) could be represented as
follows:
3′. LOOKED ([he], professor); DIRECTION (he, eye); MANNER (directly)
At this point, the two main characters are taking center stage and are full of activity; “the chair” is probably beginning to fade in activity; and “the eye” has some activity.
As Sentence 4 is read, the following proposition may be assembled and the main protagonists become even more active:
4′. GIVE ([you], map, me); SAID (man)
The two people are now strongly activated. “The map” is given strong activation, including the inferential link to “the edge of paper.” At this point, the reader should sense an ongoing chain reaction generated by
lexical-item overlap. We will let the reader work out the linkages of the last two sentences in the episode. It should be evident that the key to forming the text model of comprehension is assembling a network from the ongoing processing of words, sentences, and propositions.

This extended example is intended to illustrate how the notions, listed below, represent straightforward operations in building a text model of comprehension:
1. Linkages into a network
2. Overlap of elements
3. Suppression of less important information
4. Simple inferencing
5. Summary restructuring

1. **Building a situation model of reader interpretation**

The situation model refers to the understander’s representation of the circumstances to which a discourse refers. The situation model reflects the integration of prior knowledge with the information explicitly “in” the text.

The situation model calls for the reader to combine background knowledge with text information and assists in an effective interpretation of the text in line with the reader’s goals. Thus, a situation model of reader interpretation
accounts for how readers construct independent interpretations of a text while also agreeing generally on what a text is about.

In situation-model construction, we take into account a number of factors that reflect the context, the attitudes
of the reader, the reader’s prior knowledge, and so on. These factors are:

1- Reader purpose
2. Task expectation
3. Genre activation
4. Similar story instances
5. General background knowledge resources
6. Evaluation of the importance of information, its enjoyment value, its interest value
7. Attitudes (and inferences) toward writer, story, genre, episode
8. Inferences needed for interpretation (of genre, episode, hierarchical organization, purpose)

1. **A two-model account of comprehension**

A two-level text-processing model incorporates both a view of text as representing an author’s meaning and as incorporating a reader’s construction of text meaning. Different levels of reading ability, different purposes for
reading, and different types of texts (or text genres) being read will also lead to more emphasis either on a text model of comprehension or a situation model of interpretation (Kintsch, 1998).

For example, a manual for shutting down a nuclear reactor in the event of overheating is not intended to be interpreted in ten distinct ways by ten different readers. It is the nature of that genre to emphasize a single interpretation, and the interpretation should match the information intended by the author of the manual. Thus, for this particular genre, the goal is to emphasize the text model of comprehension. In contrast, a literary poem often purposefully allows for interpretive gaps, vague language, and ambiguous symbolism that invite personal interpretation.

The combination of a text model of comprehension and a situation model of reader interpretation reconciles many of the competing views of reading comprehension. It accounts for all of the following:
1. Constructivist interpretations of comprehension, particularly with literary and narrative texts
2. The importance given to discourse signaling provided by texts as
support for comprehension processing, particularly with expository
texts
3. Background-knowledge use during comprehension, offering an effective alternative to simple schema-theoretic accounts of comprehension
4. The use of inferences, strategies, goal setting, and evaluation of comprehension in a plausible way.
5. Learning difficulties that are commonly encountered as well as implications for improving comprehension instruction.

In short, the two-model account of reading-comprehension processing provides explanations for many issues that arise when describing reading comprehension and its development.

**Reference:**

**Reading in a Second Language:**Moving from Theory to Practice by ***William Grabe (*** Northern Arizona University). Cambridge University Press 2009