Reflections on the Cognitive Research on Reading Comprehension and Translation

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Abstract

Throughout our life we spend an immense time reading. So, it is not unexpected that reading has an influential role in the process of translation.

Reading in its broadest sense could be defined as a conscious process by means of which a written form of a linguistic code is changed into its oral equivalent. In this study, however, reading is taken as the first stage in text processing. It is not an end by itself but a means for comprehension.

Questions that this paper attempts to find answers to are: what information processing skills the reader/ translator should have in order to figure out textual information? What cognitive faculties and knowledge should be recruited to adequately perform the act of reading? What are the main aspects of the cognitive processing during reading?

1. Introduction

Reading is a complex cognitive activity which requires, in addition to the common basic skills, access to higher cognitive skills such as mental representations, inference-making, knowledge of reading strategies, etc. In this regard, van den Broek and Gustafson (in press) point out that "reading provides a window into the mind's workings and into the complexity of cognitive processes"

A lot of Models have been proposed on investigating reading comprehension since the early 1970 's. Due to the limitation of space, these investigations are summarized in Table (1) below.

The ultimate goal of the reading process, as it is the case ,for instance, with the process of learning ,is to link up (or to match between) the textual information (i.e. extracted information from the text and background knowledge on the topic of the text) and the reader's prior knowledge and experience in order to integrate the outcome of this matching with the on-line process of understanding the textual message. The recursive nature of this process is commonly assumed to facilitate current comprehension of the text. That is, when the process is blocked for any reason (e.g. inconsistency or contradiction with the translator's background knowledge) the text or the problematic area in it is read again and again unil agreement with one's prior knowledge takes place .

Generation	Attention	Research Focus and Purpose	Representative Models	Models Focus
First Generation mid-1970's onwards	- The product of reading. - The memory representation	- To determine the features of what readers recall from the texts they read. -To draw conclusions about the nature of the memory representation that result from reading; what factors influence this memory.	1-Story Grammars, Script Theory (for narrative texts) and Hierarchical Theories (for expository texts) 2- Construction of mental Representations that is coherent in terms of their referential and causal structure.	- Top-down influence on memory and the role of text elements in the overall structure of the text -Bottom-up effects on memory and the role that each text element plays in maintaining coherence with other individual elements.
Second Generation mid-1980's onwards	- The actual process of reading itself	- To describe and understand what readers do as they proceed through a text. - The readers balancing act between making inferences in order to comprehend and the limited STM resources to do so. -What information is activated as a reader proceeds through a text; what factors influence these processes.	- The Current State Strategy -The Causal Inference Maker -The Construction - Integration Model -The Minimalist Theory -The Constructivist Theory -The Structure Building Framework	-Describing the cognitive processes that take place on-line.
Third Generation mid-1990's onwards	- The dynamic interaction between the cognitive processes; -The Integration of process and product	-To integrate the on- line and offline aspects of reading. -The comprehension processes and memory representation and the relation between the two. -The mechanisms by means of which on -line processes lead to the construction of a stable memory representation; - How does the developing memory representation in turn influence processes? -What factors affect product, process and their interaction?	The Landscape Model	-To capture the on- line processes and the offline representation as well as their dynamic interaction

Figure (1): Research on Investigating Reading Comprehension since the mid 1970's (Based on van den Broek et al 1998:72-73 :van den Broek and Gustafson, in press)

However, reading with the task of translating a text into a TL differs from reading per se (e.g. for entertainment); it is precisely a goal directed activity. Therefore, it makes understanding deeper and more precise .

A translator, in order to come up with a successful translation, has to perform (consciously or unconsciously) many indispensable cognitive activities, including reading. Reading, in the translation environment, requires many basic cognitive processes and has many functions to perform (Section 2). Our representation of the reading activity will be confined to the identification of some basic higher-order cognitive skills and processes such as concept activations, inference-making, coherent mental representations, and retrieving. (Section 3).

Basic skills centered around morphological, syntactic and semantic knowledge are taken for granted; hence they are excluded from this work. However, it is suffice to mention that the more the basic linguistic skills are developed the less demands are on the reader / translator's cognitive resources. In other words, more energy is spared for more advanced components such as establishing referential and causal/logical connections (van den Broek and Kremer 1998, in press).

2. Cognitive processes in Reading Comprehension

Reading differs from one individual to another ; hence ,different models can be proposed depending on who is reading, what and why. However ,for convenience, depending on the basic headlines proposed by different models of reading comprehension, we can schematize the major processes in reading comprehension (as in figure 1).

The first step is to perceptually encode the visual features of the text. This perception activates the representation of textual elements. Once this representation is fully activated, the corresponding concepts are accessed and inserted into working memory (or Short Term Memory "STM"), or via spreading activation through the individual's knowledge repertoire, viz. semantic and episodic knowledge (in the Long Term Memory "LTM"), or through the successive stages of text processing. Another important processing stage is determining textual semantic relations. This frequently takes place through assigning case roles to the textual events. Once this stage is adequately performed, the textual events must be related to each other coherently. This process requires integrating the currently processed elements with the previously encountered information in the text and/or from the background knowledge through contextual cues or retrieval strategies, respectively.
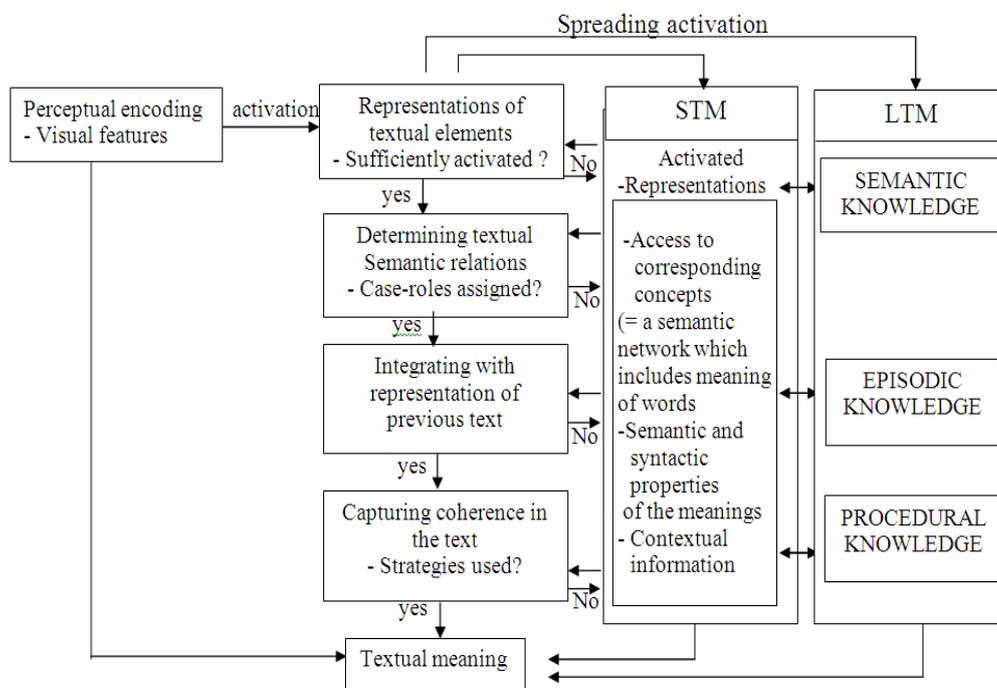
Figure(1): A Schematic Diagram of the Major Processes in Reading Comprehension (modified from Just and Carpenter 1980:331)

3. *Aspects of the Cognitive Processes during Reading /Comprehension*
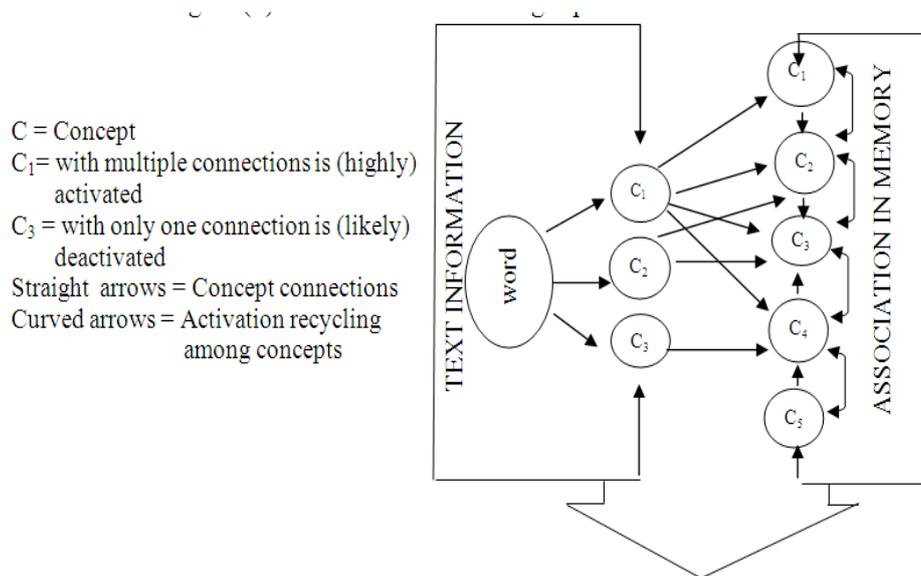
3.1 Concept Activation and Text Representation in a Translation Task

Translators (as specialized readers) differ from one another in the way they proceed through the text to be translated. This difference is partly related to the world view and knowledge structures the translators have about the subject matter of the translation, and partly to the linguistic knowledge of the translators and the translation unit they adopt in approaching the text.

Regardless of the apparent differences in the reading habits, concept activation is the first step towards comprehending the Source Language Text (SLT). It is a concomitant condition of the process of reading and highly associated with the unit that is being read, i.e. the earlier units in the text and/or with the background knowledge (cf. van den Broek et al. 1997:73 ff). A translator, to be noted, could have access to other sources of concept activation: some feedbacks (e.g. instructions, general notes, etc) that the translator may receive from the clients as it is usually the case; or from reference books (e.g. dictionaries, encyclopedia, etc) at the translator's disposal. In Interpreting, however, the whole non-linguistic environment (and the non-verbal behavior of the participants) could be an important source of feedback that accelerates the process of concept activation. Therefore, concept activation (or concept deactivation), as van den Broek et al (ibid., 1998:78) point out, is not just a reflection of the text itself. However, these sources of activation rarely appear as individually distinct. They often overlap during the process of comprehension due to the translator's interaction with the text and his ability to construct a coherent representation of the text. This last factor can not be attained unless a coherent set of referential and causal relations among the concepts being activated is created. Hence, the process of activation is concerned with how a text activates the translator's background knowledge and the way this knowledge is integrated with the text to be translated. However, since the process of activation, as Kintsch (1995:141) points out, is quite unselective and driven mostly by local associations, irrelevant knowledge is also activated. The selection of only the relevant knowledge to the given context is performed through the mechanism of spreading activation.

If activation is spread around the network consisting of the text propositions as well as the associatively activated knowledge elements ,it will tend to collect in those portions of the network that are most strongly interconnected, while isolated elements or elements connected with inhibitory links will tend to become deactivated (Kintsch 1995:141).

Most of the drawbacks in the translation process stem from the inability (or failure) of the translator to control this mechanism which depends mostly on the context of use, prior experience, current situation, pragmatic as well as semantic contexts. Figure (2) shows how the meaning represented for the text reflects context.

C = Concept
C_1 = with multiple connections is (highly) activated
C_3 = with only one connection is (likely) deactivated
Straight arrows = Concept connections
Curved arrows = Activation recycling among concepts

The meaning represented for the text reflecting the context

Figure (2): Based on Kintsch's 1988 Context Integration Model .

So frequently in the implementation of a translation task, the processing of certain translation unit may activate not only one concept but two or more interconnected concepts. This can be related to the way these concepts have been represented and structured in the semantic and episodic meanings of the individual translator. There is, however, a considerable agreement that these concepts take the form of schemas which facilitate, to a large extent, the process of translation. For instance, if a translator is given a text about the recent terrorist activities in Iraq to be translated, terrorism schema and similar awful schemas are unconsciously activated where later on, through the spreading activation process, only the most contextually appropriate knowledge remains activated. This, in effect, facilitates the process of inferencing and decision-making required for the process of translation.

In more real translation situations, if the translator is told in advance that the text to be translated is a particular genre, schema is activated to go 'downwards' (i.e. to processing the details) and s/he will be able to form mental representation of the text much easier than when never given a cue.

3.2 Reading and Translation: Inference Generation

Texts intended for special audience (e.g. a text in reading comprehension) might require 'inferencing' on the part of the reader only when there is new information in the text (Narvaez and van den Broek, forthcoming). However, the case is not always simple like this, for who is intended and who is not cannot be determined easily. Translators, for instance, are not intended readers, rather they are by-standers who are not interested in following up research on reading systematically; they are just on-lookers. Yet, translators frequently interact with the ST as if they were directly addressed by the ST writers.

At any rate, our purpose as translation theorists is to benefit (by extension) from reading and comprehension theories. True a pre-translation stage requires a reading of a given text in a manner similar to normal reading, but during reading the translator's cognitive abilities (or higher mental processes) get interacted in a way that ought to be different from those at work in a non-translator's mind. Therefore, we assume that while reading, understanding and (simultaneously) mentally translating, the translator has the double task of constructing a mental representation of L1 that is compatible with a mental representation of L2, and intending to materialize meaning in L2 words for intended readers who must be different from the originally intended readers of L1. But does a reader like my ex-supervisor Prof. Gorgis have to draw several inferences from a text like this? The answer could be yes or no.

> "l myself had no intention whatsoever to read this text ; it was only passed over to me for consultation although I have had little knowledge about reading theories. My initial purpose of reading it was to find out what the text is all about, and whether the treatment of the subject would be of any help. Having finished it, I realized that l got something! I put it aside for a couple of days because l have been enabled to read three papers on reading (by Paul van den Broek and his collaborators). That something seems to have been brought into consciousness and, hence, reinforced".
>
> (Prof. Gorgis , personal communication)

Much more, indeed, can be said on this kind of reading .But as long as this observation is intuitive it remains hypothesized at the present stage.

3.3 The Translator's Retrieval Task

The basis on which retrieval processes are built is the information in memory and its rapid deployment which facilitates understanding the text that is currently read .In other words, understanding of the input text is realized in terms of knowledge that comes from outside the text⁻viz. associations from concepts in the text to real world knowledge and information from within the text, especially from earlier parts of the text. (Gerrig and Mckoon, 1998:68-69).

The accessibility of a particular information is determined by the degree of the strength of the association. The stronger the association is the easier the access would be.

> " The degree to which any specific cue in short-term memory evokes any specific piece of information in long-term memory depends on how strong an association exists in memory between the two so that something in memory will be evoked to a greater degree than others (Mckoon and Gerrig 1996:920)".

Such a associations which frequently result in automatic knowledge retrieval during reading, are always locally determined and this is why irrelevant information is generated. Therefore, the retrieval of textual information is not unsystematic, especially when the textual information and the semantic relations (e.g. causal, anaphoric and thematic or global relations) are coherently represented in the memory.

In sum, retrieval of information form memory depends either on some cues in a text which evoke information directly and selectively from memory (termed Cue-dependent Retrieval) or through fast ,automatic cognitive processes that are not under the conscious control of the reader /translator (cf. Mckoon and Ratcliff, 1998:28). Consequently, the primary bottleneck for retrieval from LTM is the scarcity of retrieval cues that are related by association to the desired item, stored in LTM (Ericsson and Kintsch 1995: 212); or the information is available in memory, but not accessible for one reason or another (Bourne et al 1979: 90). At any rate, the scarcity (or the profusion) of retrieval cues could deprive the target text from acquiring the same identity and functionality that the source text has.

The retrieval of the required concepts for a translation task (from the newly constructed mental representation of the input text) can be accessed by translators differently due to the level of proficiency they have acquired. Therefore, whereas the qualified translators might access the concepts from the mental representation during the process of reading itself, the novices access them after reading (one reading or more). However, this does not mean that the qualified translators do not resort to retrieval after reading when necessary, without having any serious consequences on the process. When a certain concept in the text is frequently referred to (due to its central role in creating a coherent mental representation of the text), this very concept is easily retrieved when it is required and hence correctly translated. This is why one might predict that reading and translating the abstract or the conclusion of this paper would be problematic, for example, for my students. If, however presented with the whole text, each becomes easier.

It is worth noting that retrieving of concepts from the mental representation itself is an act of translation — a mental translation in the same language. However, for the translator this is a double, but simultaneous, task; that is, mental translation requires retrieval of parallel nature from LTM, e.g. corresponding concept (Prof Dr. Gorgis, personal communication). In this sense, the ultimate goal of an efficient retrieving ,as van den Broek and Kremer (in press) point out, is to free cognitive resources that can be devoted to other processes needed for comprehension. In other words, to avoid a cognitive load in STM .

It frequently happens that retrieval of corresponding concepts is blocked for some reason. In such a case, the concept in question can be withheld while the memory is on alert for finding out an appropriate mate concept even after some time of reading. This is similar to the fact that comprehension processes may be delayed for some time, but not hindered. With delayed retrieval (e.g. if someone has a whole article to translate) there can be a reconsideration of initial hypotheses based on first reading. This 'delay' could take days and weeks.

In sum, a translation problem is seen as retrieval cue of problem-related information from the memory. Therefore, how such information is recalled, processed and applied to the problem in order to solve it is and should be one of the main concerns of any approach to translation. However, since retrieval from memory does not operate in the same way for every reader/translator, we expect that some translators succeed in performing translational task while others fail. Yet, individual differences in retrieving could likely be, at least partly, one reason behind the possibility of creating novelty in the end product of the translation process (MacGorma 1985: 129).

4. Conclusions and Suggestions

To sum up what has been mentioned so far, one might conclude that reading is an act of mental translation where a number of mental processes work together to build a representational model of the ST message. Therefore, reading (in order to translate) is not a passive process in the sense that the translator only receives information as expressed in the text. Rather, it is a dynamic process in which the translator draws upon the linguistic information provided by the text, features of context and knowledge of the world in order to comprehend the message to be rendered into the TL. Therefore, the central role of reading (and reading strategies in particular) in the translation process stems from the fact that unless a text is appropriately read and comprehended, the translation product will suffer from severe drawbacks.

The complexity and peculiarity of the reading situation in a translation task, unlike other types of reading, lies in the fact

- that knowledge structures and knowledge accumulated along the process of reading should be present in two linguistic methods ;
- that the only thing we prescribe in the process of comprehension is that reading is not a one-way process -viz. interpreting the writer's message, rather it must incorporate the active negotiating role of the reader / translator too.

Finally, to test the validity of this theoretical cognitive account on reading comprehension and translation, further research on translators' (or student translators) actual translation products is recommended. Moreover, teaching READING as an information processing skill might help for better understanding the nature of Translation.

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المستخلص

ملاحظات حول الدراسات الأدراكية في فهم عملية القراءة والترجمة

يقضي الإنسان ردحا طويلا من حياته في القراءة، لذا من المؤكد أن يكون للقراءة دور فاعل في عملية الترجمة. فالقراءة بمفهومها الواسع عملية شعورية من خلالها يتغير الشكل المكتوب للغة إلى شكله المسموع.

تعد هذه الدراسة القراءة أول خطوة في عملية معالجة النص. فهي ليست هدفا بحد ذاتها وإنما وسيلة للاستيعاب . لذا يسعى الباحث إلى إيجاد حلول لتساؤلات عدة منها: ماهي مهارات معالجة المعلومات التي يجب أن يمتلكها القارئ/المترجم من اجل فهم المعلومات التي يتضمنها النص؟ ماهي الملكات الأدراكية والمعرفية التي يستعين بها القارئ/المترجم من اجل الوصول إلى قراءة متميزة؟وأخيرا ماهي الجوانب الأساسية للمعالجة الأدراكية أثناء القراءة؟