

CHAPTER 2

TRANSLATING PROCESS

1 INTRODUCTION: FROM CONTENT ELABORATION TO GRAPHIC EXECUTION

According to Hayes and Flower's (1980) model, the writer would have built, as an output of the Planning process (*Cf.* Chapter 1), a content plan. This plan, following communicative and eventually rhetorical intentions, lists an organised structure of the main themes or main ideas of the to-be-written text. However this content plan is just a general plan. It can only permit to plan the general text content and to keep the global coherence. It does not provide any detail about this content and, furthermore, any information about the future 'linguistic and physic aspects' of the text, on paper or on a computer screen. In other words, if the Planning process organises and plans, it does not enable the effective composition and realisation of the text. Indeed, after the Planning process, the writer has to (1) elaborate the text content by developing each part of the plan that needs to be developed, and (2) translate this developed content into a linguistic form. It is in this way that Hayes and Flower (1980: 15) consider that *'the function of the translating process is to take material from long term memory under the guidance of the writing plan and to transform it into acceptable written English sentences'*. The general definition of the Translating process they propose is underlined by the fact that these authors consider that the domain knowledge is not linguistic nor linear: *'We assume that material in memory is stored as a proposition but not necessarily as language. By a proposition we understand a structure [...] where concepts, relations and attributes are memory structure, perhaps complex networks or images, for which the writer may or may not have names (p. 15)'*. This claim highlights that the writer, during Translating, needs to bridge the gap between hierarchically organised conceptual thoughts (networks, for instance) and a linearly organised linguistic structure.

1.1 Translating process in Hayes and Flower's (1980) model

In Hayes and Flower's model (1980), the change from a conceptual structure to a linguistic structure is carried out by six Translating operations, respectively labelled: 'Get next part of writing plan'; 'Plan next sentence: Retrieve propositions'; 'Express next proposition part'; 'Repeat first part of sentence'; 'Express proposition part' and 'Interrogative' (*Cf.* Figure 14).

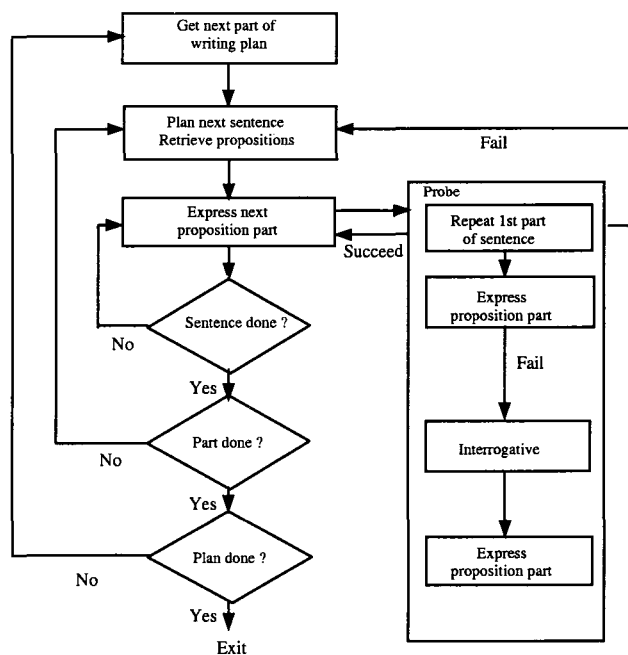


Figure 14: Architecture of Translating process, adapted from Hayes and Flower (1980).
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According to the authors' description (pp. 15-16), the 'Get next part of writing plan' operation would allow the writer to retrieve (and certainly to maintain in Short Term or Working Memory) a new piece of the text plan. The elaboration of a sentence, controlled by this activated piece of plan, would be carried out by the 'Plan next sentence: Retrieve propositions' operation. This operation would have a double function: it would allow (1) to retrieve, from Long Term Memory, some propositions, which can be considered as semantic structures (for example: 'Concept: Horse'; 'Action: To gallop'; 'Attribute: Fearful'), and then (2) to relate these propositions into a sentence plan ('Horse = To gallop' [because] 'Horse = Fearful'). This plan, which can be considered as 'syntactico-semantic', would then be next linguistically translated, part by part, by the 'Express next proposition part' operation.

The linguistic translation could be controlled in order to verify and to optimise the local coherence or the sentences syntactic structure. To do so, the 'Repeat first part of sentence' operation would allow to maintain in Short Term Memory the previously translated part of the sentence (*i.e.*, 'The fear...') so as to retrieve the linguistic form to better express the proposition that is semantically linked through the 'Plan next sentence: retrieve proposition' operation. During this research, the 'Interrogative' operation would select more and more suitable linguistic forms (*i.e.*, '...

the fear, which causes the horse to gallop...'; 'the horse is galloping because he is afraid...'; *etc.*) while the 'Express proposition part' operation would mentally test these forms before their effective transcription, *via* the 'Express next part of proposition' operation ('The fear makes the horse gallop').

1.2 Qualities and limits of Hayes and Flower's (1980) model

1.2.1 Six Translating operations defined

The description Hayes and Flower (1980) have made concerning the nature and the functioning of Translating operations shows that, conversely to Berninger and Swanson's (1994) objection, the Translating box is not so 'desperately empty', as it is observed in the schema of the model. Thus, if Hayes and Flower do not develop the Translating process as precisely as for the Planning process, they define six processing operations. These operations carry out the transformation of a hierarchically organised structure of the domain knowledge into a linear linguistic structure. In addition, it seems important to notice that the description of the nature of these six operations shows that Translating processing does not only carry out the linguistic (*i.e.*, grammatical and lexical) translation, but also conceptual (*i.e.*, non linguistic) processing. This last process elaborates the content of the future text, under the control of the text plan, and transforms this content into a preverbal message that will be linguistically translated. In other words, the different kinds of Translating processing would concern conceptual representations (*i.e.*, retrieving domain knowledge, syntactico-semantic planning) as well as linguistic representations (*i.e.*, grammatical and lexical translating of planned propositions).

1.2.2 The necessity to explain the nature and the functioning of the Translating process

Whether Hayes and Flower's (1980) proposals on Translating operations seem interesting and judicious, the description they made is nevertheless relatively superficial and general. Many points must thus be clarified, concerning both 1) a precised definition and 2) the strategic and recursive functioning of these Translating operations.

To complete the definition of Translating operations: towards four processing stages. The definition of Translating operations by Hayes and Flower (1980) raises a certain number of questions or discussion points:

- The fact that they consider that some memory contents are retrieved, from Long Term Memory (under the control of the text plan), supposes the presence of a retrieving sub-process (or operation) which would function solely during Translating. However, Hayes and Flower (1980) do not explain this retrieving mechanism. Can it be considered as the Generating sub-process, that the authors define as belonging to the Planning process?

- In addition, it is not obvious to consider that the propositions, even if they are retrieved under the control of the text plan, can be directly used to constitute the future sentences. Despite this observation, no semantic elaboration or re-elaboration mechanism of retrieved propositions is found.
- The model is also relatively imprecise regarding principles of proposition insertion into a sentence plan. This processing would be carried out only by one operation, that being labelled 'Plan next sentence: retrieve proposition'. It is nevertheless not so obvious that the proposition retrieval and the sentence semantico-syntactic planning use the same kinds of processing. Another processing distribution, sharing more clearly content retrieving and content planning, could be discussed.
- Beyond the processing distribution, it is important to make it clear that linguistic processes, which are actually the heart of the Translating process, are simply identified through operations such as 'Express next proposition part' or 'Express proposition part' (Cf. Figure 14), with no details, once again, about the nature of the underlying lexical and grammatical processes. It seems nevertheless very important to explain how the matching between a conceptual structure (some semantic propositions) and a linguistic structure (grammatical and lexical) can take place and with what kinds of criteria.
- Finally, Hayes and Flower (1980), opposed to Kellogg (1996, Cf. General Introduction) do not describe handwriting or typewriting operations that carry out the physical output of linguistic processes, that is the transformation of the linguistic mental product into a written trace.

These critical points concerning Hayes and Flower's (1980) model show the necessity to specify the definition of processing led by the Translating process. Some responses can be found in other models (as well global as local) of verbal (oral or written) production. To describe and analyse the nature of Translating operations through these different models, we propose to take into account our previous critics, to distinguish four processing stages. They can be differentiated by the nature of processing operations that compose them, or by the nature of representations that they process. We label these stages 'Elaboration', 'Linearisation', 'Formulation' and 'Execution'.

- The Elaboration stage consists of retrieving and elaborating the text content from a piece or the totality of the text plan. Within Hayes and Flower's (1980) model, this step mainly concerns processing carried out by the 'Get next part of the plan' operation and by a part of processing ensured by the 'Plan next sentence: retrieve propositions' operation, which here focuses on the content retrieval.
- The Linearisation stage enables a first transformation of these contents in a linear semantico-syntactic structure. This transformation would correspond to the other part of processing ensured by the operation 'Plan next sentence: retrieve proposition', which is here the planning of the next sentence.

- The Formulation stage, mainly linguistic, puts into words and into a grammatically correct form the previously planned semantico-syntactic structure. It concerns a linguistic stage of sentence elaboration.
- The fourth stage, called Execution, carries out planning and graphic execution of the linguistic product; it thus concerns handwriting as well as typewriting.

Surrounding the dynamics of the Translating process. Beyond imprecision concerning the definition of Translating operations, few indications are provided of the activation, the progress or the temporal sequencing of these operations. The processing recursion nevertheless appears as a fundamental necessity. The transformation of ideas into text does not obviously operate during one unique process activity, but more likely during recursive processing cycles. Throughout the writing activity, some portions of plans are activated, developed, then expressed in linguistic terms. This is probably realised on small units. The question is then to identify the nature of these units. Hayes and Flower (1980) consider that a sentence is produced part by part. This cycle of processing is however only postulated. Are there experimental results to validate this notion of processing units? The observation of on-line parameters (such as pause duration, Cf. Chapter 1) can represent an interesting investigation means to appreciate the temporal progress of processing cycles during content elaboration and linguistic formulation.

In the following parts of this chapter, the nature of the Translating process is analysed by describing, through different models, each of the four processing stages, which characterise the Translating process (Section 2). Then, the principles of dynamics and recursion of the Translating process are developed (Section 3).

2 THE NATURE OF TRANSLATING OPERATIONS: FOUR PROCESSING STAGES

2.1 *Stage one: elaboration of text content from the writing plan*

During Translating, the writer has to retrieve all the sets of ideas about a topic or a sub-topic, which is defined by a part of the text plan. According to Hayes and Flower (1980: 15), domain knowledge units or structures, which are retrieved from Long Term Memory, are formatted into a propositional structure, labelled 'Argument-Predicate', and built, for example, such as: <(Concept A) (Relation B) (Concept C)> or <(Concept D) (Attributes E)>. This retrieval can be executed by using, as memory probe, the main idea from a part of the text plan. The content, retrieved under the control of the text plan, can thus be considered as an elaboration and a specification of main ideas. This possible definition of the elaboration of the text content raises two central questions as for the definition and principles of content generation. The first question focuses on the possible specificity of the content generation during Translating as compared to the content generation during Planning. The second focuses on the nature of operations that could evaluate and modify the

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