

Comprehension and memory processes in translation and interpreting

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Data de recepció: 10/1/2000

1. Objectives and hypotheses

Our research team has spent the last few years studying the cognitive processes involved in simultaneous interpreting. The results of this research have shown that professional interpreters develop specific ways of using their working memory, due to their work in simultaneous interpreting; this allows them to perform the processes of linguistic input, lexical and semantic access, reformulation and production of the segment translated both simultaneously and under temporal pressure (Bajo, Padilla & Padilla, 1998). This research led to our interest in the processes involved in the tasks of mediation in general. We understand that linguistic and cultural mediation involves not only translation but also the different forms of interpreting: consecutive and simultaneous.

Our general objective in this project is to outline a cognitive theory of translation and interpreting and find empirical support for it. From the field of translation and interpreting there have been some attempts to create global and partial theories of the processes of mediation (Gerver, 1976; Moser-Mercer, 1997; Gile, 1997), but most of these attempts lack empirical support. On the other hand, from the field of psycholinguistics there have been some attempts to make an empirical study of the tasks of translation (De Groot, 1993; Sánchez-Casas Davis and García-Albea, 1992) and interpreting (McDonald and Carpenter, 1981), but these have always been partial, concentrating on very specific aspects of translation and interpreting.

The specific objectives of this project are:

- 1) to continue our research with interpreters and to continue exploring the differences in their processes of attention and memory. This line is important from both a theoretical and a teaching point of view, since it indicates which aspects of attention and memory are susceptible to training and practice.
- 2) to identify the processes in which a series of linguistic variables affect translation. Our objective is to understand the task of translation and identify its basic components and the variables that affect them.
- 3) to explore the processes of linguistic conversion involved in translation/interpreting. There is great controversy about the relative importance that recoding

from one linguistic input to another represents in the processes of translation. Our objective is to contribute with empirical data to resolve this controversy.

A detailed description of these three objectives

- 1) *The processes of attention and memory in interpreters.* Our interest in researching the processes involved in the interpreting of languages arose because it seemed a natural field in which to research individual differences in a series of linguistic skills and the way in which these skills are developed. Cognitive psychology has just recently begun to show interest in the processes involved in the translation and interpreting of languages (Danks, Shreve, Fontan and McBeath, 1997). This interest arises, in many cases, because of the especially difficult conditions that these tasks impose on the processes of comprehension and speech production, since they must be performed simultaneously, in different linguistic codes and under temporal pressure. The theories proposed from the field of interpreting particularly emphasise the efficient use of the working memory and the processes related to comprehension to produce quality interpreting (Gile, 1995). In fact, it is estimated that an interpreter must devote 80 % of their effort or cognitive ability to listening and comprehension and only 20 % to speech production.

For this reason our research concentrates on different aspects of the comprehension process and how it relates to the working memory. Because of the difficulty of the task they have to perform, interpreting students receive very intensive training which progressively introduces the task of interpreting and attempts to improve their cognitive skills, above all those related to comprehension. Evidently, at the end of their training, the students become interpreters and therefore capable of performing the task of interpreting. The question we asked ourselves was whether this training also contributes to improving performance in tasks involving different aspects of comprehension and memory. We believe this question to be important because it would indicate that these processes are not fixed but can be modified by experience. Three aspects have particularly interested us. Firstly, the ability to distribute efficiently the capacity of the working memory so that the processes necessary to understand, translate and produce discourse can be performed simultaneously. Secondly, the ability to suppress irrelevant information. Finally, the processes of access to the information in the long-term memory and the integration of information in the discourse.

The data available at present (Bajo, Padilla, Padilla, 1998) indicate that interpreters develop their ability to process information in the working memory in a general way, while their articulatory loop is occupied (Baddeley, 1986). However, the current data do not clearly indicate whether this skill is due only to the special use of the phonological component (articulatory loop) or to a general ability to efficiently divide attention (the central executive component of the working memory). One series of experiments aims to clarify this question. Another series of data shows that the skill of comprehension is related to the processes of suppressing information. In our current project (PB95-1108) we have studied

whether professional interpreters are more highly skilled at suppression, since they show superior comprehension skills. However, in a task of visual suppression (stroop), although the interpreters showed a tendency to be better suppressors than a control group, this tendency was not statistically significant. We think that the lack of significance was more due to the characteristics of the task used than to a real absence of effects, so at the moment we are exploring this issue by varying the task used. Finally, a third series of experiments aims to study the processes of information integration in simultaneous and consecutive interpreting. Cantor and Engle (1993) have also shown that those subjects who differ in their comprehension skills also differ in the ability to integrate the information. We think that this skill must be particularly developed in interpreters and especially when the task is consecutive interpreting.

- 2) *The effects of linguistic variables on translation/interpreting.* One objective common to both translation and interpreting is to produce the same reaction in the readers of the translated language as in those of the source language. In order to do this it is essential to understand the meaning of the original message. From a psycholinguistic perspective, understanding means creating an adequate mental representation of the meaning. To get this, both translation and simultaneous or consecutive interpreting share the analysis of the linguistic input at different levels (orthographic/phonological, lexical/semantic, syntactic/propositional, etc.) in order to achieve an adequate mental representation of the text or discourse (Kintsch, 1988). However, the tasks differ in several aspects that make the processes of comprehension and analysis different: 1) The temporal parameters are different: whilst the translator can analyse the text and understand it with no temporal pressure, the simultaneous or consecutive interpreter must understand the discourse quickly. 2) The conditions of simultaneity differ. Whilst the processes of comprehension and translation occur serially in translation, they are simultaneous in interpreting. These differences in the characteristics of the tasks can mean that the processes involved in the tasks differ. For instance, the processing unit can be different; the structure of expectations (Muñoz, 1995) or the mental model (Garham and Oakhill, 1989) that direct comprehension and subsequent translation can be different; the processes of attention and memory can also differ, etc. These differences can create qualitative changes in the way the processes of comprehension and production of the discourse are performed. For these reasons, we are also exploring the specific way in which these differences modify the processes of comprehension. In one series of experiments we aim to compare the tasks of comprehension and translation and manipulate a series of variables which normally affect comprehension (lexical and syntactic ambiguity, syntactic structure etc.). This manipulation will allow us to determine to what degree different temporal parameters and simultaneity affect the processing unit (segmentation of the text) and the construction of micro and macrostructure of the text in the processes of comprehension (Kintsch, 1988).
- 3) *The processes of linguistic recoding in translation and interpreting.* There are two conflicting postures regarding the relative importance of the processes of

recoding from one linguistic code to another in translation. Firstly, the posture upheld by Seleskovich (1978) maintains that the processes of linguistic recoding are minimal. Comprehension of the discourse in the source language implies the construction of the meaning and the loss of the specific linguistic form in which it was produced. Therefore, once comprehension is produced, the task of the mediator consists of producing the message in the second language (vertical translation). However, the second posture implies direct processes of change from one linguistic code to another, in other words from the lexical representation in L1 to the lexical representation in L2 (horizontal translation). Psychological research (De Groot, 1997) seems to show that at least for the bilingual the step from the comprehension of the meaning to the form of the word in L2 depends on the characteristics of the word (if they are cognates, the degree of familiarity, how specific/abstract they are, etc.). So, depending on the linguistic input, the translation process can vary in verticality or horizontality. However, Seleskovich has questioned whether interpreting is produced using processes of horizontal translation, arguing that these are only relevant to translation or in the case of inexperienced interpreters. Nevertheless, there are very few data that either support or refute Seleskovich's position, but the question can be experimentally addressed using procedures in which the characteristics of the linguistic input can be systematically varied (both words and syntactic, semantic and pragmatic structures of the same) and in which translators, interpreters and bilinguals are compared.

2. Research strategies

Our approach is that, once a theory that formulates accurately the processes involved in the tasks of translating and interpreting has been elaborated, these processes can be studied empirically using the same experimental methodology that Cognitive Psychology has been using for years.

In the field of translation and especially in that of interpreting, much of the empirical research done to date has been criticised for its lack of ecological validity. Gile (1995) has made a detailed study of the problems encountered by this type of interdisciplinary research. Our approach is that, despite the fact that many of the problems pointed out by Gile are valid (they are also valid for many other areas of research: computer programming, medical diagnosis, etc.), this does not invalidate the experimental method in translation and interpreting. However, they are factors to bear in mind and try to overcome. It is precisely the diversity of experimental methods and of the indicators of processes (dependent variables) that makes it possible to study different aspects of tasks as complex as those that we are dealing with. The contrast and convergence of the data obtained with different methodologies are what makes the results valid. To make rigorous and realistic research possible, our proposal considers it necessary to use different research strategies and methodologies, or even the combination of some of them.

Our research group has followed two research strategies in experimentally addressing the processes involved in translation and interpretation:

- 1) *The method of cognitive components* consists of the analysis and comparison of tasks in which different components of the more complex task are involved. When applied to the case of translation/interpreting the process would consist of comparing the performance of the task of translation or interpreting with other tasks containing all but one of these components (processes). If the task of translation or interpreting and the task compared share all processes except one, any difference in performance in the two tasks can be attributed to this component. If we systematically compare translation and interpreting and a group of other tasks that contain all but one of their components, we can isolate and learn the demands of each individual component and its participation in the task as a whole.
- 2) *The method of cognitive correlations*. This method begins by selecting a group of subjects that have different levels of skill in the process or cognitive component of interest and then compares their performance in a series of simple tasks which are involved in this process. For example, in psycholinguistics this approach has been successfully used to study the processes of reading. The research strategy would begin by selecting subjects of high and low reading skills and comparing their performance in simple tasks that involved processes believed to be the basis of this skill (short-term memory capacity, processes of lexical and semantic activation, suppression, etc.). In interpreting/translation the method would consist of comparing the performance of subjects with different levels of skill in translation or interpreting (professional translators or interpreters, interpreting or translation students, bilingual subjects) in different tasks that involve subprocesses of the same (comprehension, memory). The superiority of the highly skilled subjects in one of the simple tasks indicates that the process involved is present in the performance of the more complex task.

3. Summary

The work presented here is a piece of interdisciplinary research which tries to bring together developments and experiences both in the field of cognitive psychology and in the field of translation and interpreting. Its main objective is to contribute, somehow, to a better understanding of the cognitive processes implied in translating and interpreting. So far, we have proposed, an outline of a comprehensive theory of language mediation combining psychological work on comprehension with research approaches on translation and interpreting that stress the role of attention and memory capacity.