Abstract

Experimental research, theorizing and intuition are different ways to access knowledge in humanities. It is certainly interesting to examine the interdependency between these three avenues commonly used in translation studies. Experimental studies primarily aim at investigating translational behaviours, procedures and strategies. Among other goals, such studies are used to verify hypotheses that would otherwise be unverifiable since arrived at on the basis of intuitions or preconceived ideas. Thus experimental studies contribute to theory.

In this paper, I will look at the theoretical and methodological tools used in experimental studies. I will present the subject, goals and methods of such research and will examine the conditions that hinder or, on the contrary, enhance progress. I will attempt to determine the requirements that will enable replication, generalization and validations of results obtained.

Introduction

The object of this article is to look at the contribution of process-oriented research to translation studies as a scientific or at least prescientific field of study. I will first point out some trends in empirical research and show how such descriptive studies allow us to test hypotheses derived either from broad theories or from intuitive observations such as the concept of deverbalization or the interrelation between linguistic, extralinguistic and pragmatic knowledge. In the second part I will present an example of Thinking-Aloud Protocol to illustrate the interplay between theoretical and empirical work. If theories give rise to ideas for experimental designs, in turn, experimental findings open up new paradigms generating new theoretical propositions. Finally, I will suggest that the norms and conditions of empirical research must be carefully defined by the community of researchers working in the same field, if this new domain of research is to make a valuable contribution to translatology.

The term process-oriented research covers a broad range of studies focusing on the operations at play and the conditions of their execution. The general purpose is to find regularities in the occurrence of events to the point that the researcher can predict
outcomes and establish links, causal links if possible, between one event and another, or at least can identify explanatory factors.

For instance, in a group of first-year students, it might be observed that most students work primarily at the surface level of the sentence and largely depend on dictionaries for every word and expression they are unsure of. It could be predicted that, in a given sentence where deep-level structures are essential to understanding, all those who work with dictionaries will be likely to miss the meaning (and therefore the rendering) of the sentence. My intellectual curiosity about the process as opposed to the product stems from the basic question: Is there anything that all good translators do - or have - that distinguishes them from poor translators? If there is, can it be taught?

I will present different types of process-oriented research: correlational, observational and experimental. For lack of space, I will deliberately leave out research on Machine Translation even though it would logically belong here. Indeed Machine Translation can be a simulation of human processes at both the stages of analysis of the source text and production of the target text, and, as such, it can be seen as an implementation of what is known about human processes.

The Correlational Approach

This approach is used to show statistical relations between different variables. It measures how one variable correlates with another. Though they don't deal with translation, I want to mention two studies. First L. de Serres' study on text comprehension in a second language reading context (1990). She investigated the effect on reading comprehension of two variables in a population of 76 university students: level of knowledge in L2 and familiarity with the text topic. The subjects read two texts: one dealing with a familiar topic in North American culture, and the other discussing an unfamiliar topic from Cameroonian culture. They were then given recognition tests. Results confirm what seems obvious: readers had a better comprehension of familiar texts than unfamiliar ones.

The second study worth mentioning is M. Dillinger's Ph.D thesis (1989) on processes of simultaneous interpreting. Dillinger used experienced conference interpreters and inexperienced bilinguals. He asked them to interpret two texts, a narrative one and a procedure, and then to give a free recall of each text immediately afterwards. A
comparison group of bilinguals performed a simple listening task with the same materials. He studied the effect of the variable experience and how it interacted with text-structure variables. The results showed 1) that experience had a major effect on the accuracy of the interpretation protocol but not on recall; 2) that text and text-structure variables had very strong effects both for the interpreting and the recall measures.

Also, in my own studies on comprehension processes (Dancette 1994), I examined the results of 20 translation students on four different tests: translation of a passage, comprehension of the same text, extra-linguistic knowledge in the broad domain related to the topic of the text, and linguistic competence in the source language. The results showed that -- in this group of respondents, with this text, with the tests I used as measuring tools, in the conditions under which the tests were performed -- linguistic knowledge correlated with both translation and comprehension more strongly than extra-linguistic knowledge did. I found this result quite surprising since the text was very culture-bound and required a great deal of background knowledge for a coherent interpretation.

A more detailed analysis of the subjects' results revealed another interesting fact: when I separated the subjects into two linguistic competence groups, correlations between each variable were very strong in the group of the top performers, but hardly existed at all in the group of poor performers. This tends to indicate that there is a threshold effect: if the level of linguistic competence is low, neither extra-linguistic knowledge nor comprehension of the text will be enough to compensate for the linguistic gap and, as a result, subjects will display incoherent performance patterns. I explained this finding with the hypothesis that it is only when linguistic competence reaches a sufficient level that all the abilities and resources of the performers can be put to their best use and converge to produce acceptable translation solutions. This lends support to the hypothesis that there are preconditions for translating, i.e. linguistic competence and knowledge of the world. (See discussion in Dancette 1992b)

However, as everyone working in social sciences knows, extreme caution must be exercised when dealing with that type of statistical data. First, what is the minimum number of observations necessary to corroborate or verify a finding? How many times must a study be replicated to be validated? Is it at all possible to draw conclusions on any causal link between a given event and another? For example, I could not conclude from the above-mentioned study that translation was impossible without strong linguistic
knowledge. I could not state that there was a causal link between lack of linguistic competence and failure to translate properly. I could only propose such a causal link. So, it must be kept in mind that correlational results can only be used to synthesize tendencies observed in a given group and also to generate new hypotheses.

The Observational Approach

This approach is used to describe the behaviour of subjects while they perform a task. D. Gile's distinction between observational and experimental research is quite relevant (Gile 1991). Observational research is descriptive; it aims to identify the components of a situation or a task, whereas experimental research is based on predictions (expectations or research hypotheses) and aims to explain given phenomena.

Observational research is the most common type of empirical research in translation. It was initiated in the eighties, in the wake of psycholinguistic and cognitive studies on all kinds of tasks: arithmetic problems, playing chess, recalling stories (Kintsch and van Dijk 1975), reading strategies (Scardamalia and Bereiter 1984, Hartman 1990), précis-writing (Grant 1992). In all these studies, the focus was not the result of the task, the arithmetic solution or the linguistic output, but the process itself, the mental operations that respondents activated to process the data pertaining to the task.

The methodological difficulty lies in finding ways to record facts -- be they behaviours, verbal protocols, or the result of the task *per se* -- in such a way as to give information on what is going on in the brain. In studies on translation, the experimental tool *par excellence* has been Thinking-Aloud Protocols. They have been used in Germany since U. Sandrock's first study (1982), then in Finland since S. Tirkkonen's work (1989) and in Canada. Video-taping has also been used in Canada as an additional source of information since C. Séguinot's work (1989). This method allows researchers to collect data such as time and actual behaviours i.e. underlining, circling, erasing words and phrases, pauses, hesitations in typing, consulting dictionaries, what dictionary, what page, etc. (To my knowledge, there have not yet been any studies using eye movement patterns, though it would no doubt provide valuable information on the way translators work their way through a text. But, of course, technical difficulties make it unlikely that such data will be available in the near future.)
The important point here is that processes are not directly observable. They can only be inferred from what people say they do, or what they actually do as demonstrated by their actions and their results. There are, however, two major methodological drawbacks: sometimes TAPs say very little; and what they say might be quite far from what is really going on (hence the necessity for additional sources of information such as videotaping). This limitation can be partly overcome in studies that combine verbal protocols (i.e. TAPs) and semi-directed interviews and questionnaires. Thus, the researcher can verify or reject hypotheses on what took place in the respondent's reasoning. Retrospective questioning in the form of a posteriori tests on the meaning of specific words or knowledge of specific facts can provide quite reliable and valuable information.

Another source of distortion can come from the study setting. It could be argued that experimental settings, which are by definition controlled, rarely reproduce natural conditions. Obviously, it is necessary to be as close to natural settings as possible. However, everybody will agree, there are as many natural settings as events (using dictionaries, data banks, no tools at all, dictating the translation or typing it directly on a computer, etc.) and as many events as texts to be translated.

Despite these limitations, observational studies make it possible to identify and precisely define components of the translational task. In terms of segmentation of the task, the so-called Translation Unit has been the focus of study since U. Sandrock and H. W. Dechert's first empirical studies (1986). The concept of the translation unit has given rise to a long controversy (Mounin 1963, Gouadec 1981, Larose 1989, ) and I will not dwell on it. I will simply say that the concept seems to have some validity when it comes to "measuring" and assessing the adequacy of a translation. However, when it is applied to the description of a process, it loses all validity because it has no set boundaries. Yet, individual processing units or "units of attention" (Rääskeläinen 1993) can easily be traced back.

In terms of the cognitive nature of the task, research has also concentrated on the fundamental issues of translation problems (Krings 1986), translation strategies (Krings 1986, Lörscher 1991) and decision criteria (Tirkkonen-Condit 1989). The classic distinction between reception (analysis of the source text) - and reverbalisation (reexpression in the target text) seems to be verified by the observations. Here are some examples of operations identified in Dupont 1993: dictionary consulting, paraphrasing, alternating between the two languages, hypothesis checking, extra-linguistic
commentary. However, segmenting the task by the nature of the operations has proven to be tricky and a serious criticism is that the code used varies from researcher to researcher and that the coding can be subjective.

If the coding protocol is not objectively defined, observed, and validated by outside observers, then it becomes impossible to verify and compare the results obtained from these various studies. This, of course, limits the reliability for scientific purposes.

The Experimental Approach

This approach, like the previous ones, is mainly descriptive, but it incorporates an additional constraint: the reproduction of the same experience with only one variable changing, i.e. a different type of texts, different groups of respondents, different cultural backgrounds, etc., with the aim of detecting causal links between facts or at least key factors explaining such facts.

For example, suppose the purpose of the research is to test the hypothesis that professional translators have more routine operations than non professional ones, then the same experience would have to be conducted and replicated with large groups of professionals and non professionals, and with different types of texts, in order to isolate the variable which is assumed to be responsible for routine operations, here professional experience.

In designing such experiments, we must keep in mind the difficulty of isolating variables. Even in the so-called exact sciences or natural sciences, the immutability of the phenomena observed has been seriously questioned (I. Prigogine and I. Stengers 1988, among others). What about social sciences? In our field we are dealing with human beings and with things as complex as text comprehension and writing, and are thus far from discrete variables. For example, what is a professional translator? Translators are more or less professional, depending on their experience, the time they have to produce the translation, their familiarity with the topic, their mental or physical state, their motivation, etc. Even if we defined a professional translator using quantitative criteria, as anyone who can translate 300 words an hour with a maximum of two minor mistakes (which is sometimes presented as the norm by the Secretary of State in Ottawa), it would still be a very relative norm. Moreover, when it comes to analyzing operations and abilities, some variables are difficult to isolate. Which abilities belong to the lexical, as
opposed to the semantic or syntactical level? What is linguistic as opposed to extra-linguistic knowledge? This distinction has been challenged, for example, by R. Jackendoff (1985) and by C. Schäffner (1993). I would say that it is possible to define these variables, but the criteria used must be clear.

Providing norms of replicability are carefully defined and observed, experimental research is the only method that could truly raise process-oriented research to the level of scientific research. It is the most promising approach that would benefit all other empirical work and theory as well.

Thinking-aloud protocols, new applications

Now let us turn to a short text. The translators were given a copy of the entire article but were asked to translate only the paragraph starting with Second.

(...) BUSINESS WEEK is proposing a bold three-pronged attack (...). First, encourage (...) Second, over the next three years, shift an ambitious $240 billion of federal spending from uses that don't boost productivity into much needed infrastructure, civilian R & D, and worker training.

The table below shows the protocol of one subject on the left with the analysis on the right and her translation at the bottom.
(Fig. 1) Analysis of a Thinking-Aloud Protocol

**Written translation**: Deuxièmement, il faut, sur une durée de 8 ans transférer un 240 milliards une partie des dépenses publiques de la manière suivante: réduire de 240 milliards de dollars les postes qui n’influencent pas la productivité ne favorisent pas une augmentation de la productivité.

I distinguish the nature of the operation, the locus-focus of attention (i.e. the textual unit in the source-text that prompts an operation) and the levels of analysis. So, in line 1 the translator starts reading; she focuses on the whole text, concentrating her attention on intratextual analysis. In line 2, the word *second* prompts a search for *first* in a previous sentence. In line 3, she stops on *shift*, identifies it as a verb in the imperative form. In 4, scanning the whole sentence, she looks for potential lexical problems. In 5, she translates. In 6, she chooses between two equivalents.
an/année. In 8, faced with billion, she recognizes the British meaning *-billion* - and the American one - *milliard* -; and in 9, she looks for the co-text (on the bottom of the page the source of the article is indicated *Business Week*; she knows it is an American publication, therefore she decides on *milliard* as the translation.

This protocol seems to indicate that the operations fall alternately into two broad categories: comprehension and translation. (Roughly speaking, we can say that the purpose of operations 1 to 3 is comprehension. It is not absolutely clear in 4, but from 5 to 8 it is translation.)

The double helix

In previous writings, I used the metaphor of the Double Helix to represent the parallel process of both comprehension and expression (Dancette 1992a, 1993). Now the model has become more concrete as it can be directly and fully applied to the analysis of Thinking-Aloud Protocols. If we were to transpose the data from the previous table, i.e. the TAP and its coding, onto the double helix, we could record intratextual, morphemic, lexical, lexico-semantical and extra-linguistic operations on the Comprehension curve (in light color on the graph below), and syntactical and lexical operations on the Expression curve (in dark color).
This model illustrates how the units in the source-text (locus) have been used as prompts for different operations taking place at various levels of analysis depending on the focus. The example is billion, prompting both an operation of semantic differentiation on a lexico-semantic level, and an operation of search in the knowledge base at the intratextual and extra-linguistic levels. This model helps to classify the data successively processed by the subject and shows the very tentative, sometimes shaky, way translation takes place. In particular, it shows the relations between linguistic operations (such as decoding, analyzing, interlingual rendering) and cognitive ones (such as linguistic judgments, plausibility checks of possible interpretations). It illustrates the dynamics of the process, the scope and diversity of the operations, in a real-life situation.

The example I used was rather straightforward. Very often, however, translation requires very complex operations because of ambiguous structures, difficult concepts, vague expressions, the
need to choose between competing formulations, thus pushing the translator to go to deeper levels of comprehension, etc. In such cases, comprehension and expression are intertwined and cannot really be distinguished because elucidation (the process by which the subjects try to explain the meaning of the text to themselves) is already part of expression in the target language. In such cases it becomes much more complex to analyze the process.

The Double Helix model is a way of metaphorically representing a piece of the "Translation Act." The Translation Act, a phrase mirroring Grice's "Speech Act" (1975) accounts for the dynamics of translation, in its cognitive and pragmatic complexity, with its psychological and intellectual constraints. It is defined as the product of the act and the act itself. This act is submitted to principles and rules, and results from some kind of "transactions," in Grice's meaning. The locus-focus I identified in my analysis is the expression of the intentionality (I could even say rationality) of the subject. The public face is what is written (or said, in interpreting), but the hidden face, i.e. the judging, the assessing, the rejecting, might be just as important as the result itself. It certainly is a different kind of study as, surprisingly, the product does not always bear much resemblance to the process. For instance, in my example, in spite of a specific operation on the perceived difference between an and année, the translator simply omits the unit in her translation.

I have used this model because I am most familiar with it. Other translation models would certainly be worth experimenting with as well. In any case, by keying on on the "hidden face" of translation (the private process) as opposed to the public one (the textual input and output), this model reveals that most of the time translation solutions do not proceed from a single or simple operation, but rather from complex strings of operations, that may or may not be organized in the form of conscious strategies.

Conclusion

By highlighting the process, we might expose our thinking to a new set of theoretical propositions. Translation might belong to a theory of cognitive behaviour. Focusing more on the process might help detect strategies, identify those that are most conducive to success. At the same time, it can shed light on one of the most complex cognitive activities. I would like to conclude this presentation on the place of empirical research in translation by saying that, despite all the difficulties I have presented, translation is an excellent field of investigation. Translation experiences certainly cannot be replicated in the exact same conditions and therefore many experiences are needed to reveal something valid, but, on the other hand, the norms and
conditions of translation can be very well defined. This is an advantage over observations on such activities as reading or recalling stories. So, when the factors are well isolated, the effect of variation of such factors can be seen in either the protocol or the translated text, or both. Because of this very constrained situation, to a certain extent, it becomes possible to observe, analyze and formalize behaviours and problem-solving strategies. These observations will likely result in practical applications for translator training.

REFERENCE

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