

# **New Frontiers in Translation Studies**

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# Researching Cognitive Processes of Translation

 Springer

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ISSN 2197-8689 ISSN 2197-8697 (electronic)  
New Frontiers in Translation Studies  
ISBN 978-981-13-1983-9 ISBN 978-981-13-1984-6 (eBook)  
<https://doi.org/10.1007/978-981-13-1984-6>

Library of Congress Control Number: 2018956733

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# Introduction

**Defeng Li and Victoria Lai Cheng Lei**

The last 10 years have seen an upsurge in cognitive translation studies (Halverson 2010). In a recent review of research trends in translation studies based on a survey of published literature in Translation Studies Bibliography, translation process research (TPR) was found to be an area that had received most research attention since 2010, and the total number of publications on TPR almost doubled that of corpus translation studies, which came out as the second most published area in the survey (Li 2017). This seems to suggest that TPR as a field of research in translation studies is well poised for further development and growth in the future years thanks to the unprecedented interest among both cognitive and neuroscience scientists and humanities scholars in how the human brain works and the general enthusiasm about translation processes among translation teachers. This may also be attributable to the current obvious interest in data-based empirical research methods in the discipline, as evidenced in the fast-growing literature on corpus translation studies, interpreting studies, and translator education, which in most instances have adopted qualitative or quantitative research designs and methods.

Translation process research as a research field has come a long way over the last 40 years, from the initial use of think-aloud protocols as the main research instrument to the subsequent adoption of Translog combined with screen recording techniques and technologies, to the ensuing enthusiasm about experimenting with eye trackers, to the application of neurological and neuroimaging tools such as the electroencephalography (EEG), the positron emission tomography (PET), the functional near-infrared spectroscopy (fNIRS), and the functional magnetic resonance imaging (fMRI). As the research instruments have become more sophisticated, so have the topics and issues tackled under the umbrella of translation process research and cognitive translation studies.

As a matter of fact, translation process may be understood in both a broad and narrow sense. Broadly speaking, it refers to the entire process of a translation project, from the initiation of the project to the commissioning of the translation assignment, the authoring of the source text, and the actual translational action in which the linguistic and cultural transfer is realized, to the dissemination, use, and reception of the translated text in the target language and culture. This translation process is

usually studied from a cultural perspective (e.g., Lefevere 1993) and more recently a sociological approach (Gouanvic 2005). Such investigations usually center on the sociocultural factors that have affected the selection of the source text, the production of the translated text, and the dissemination and reception of the translated text in the target language and culture. Often raised are such questions as why the text was selected for translation; what was the purpose of the translation; how factors such as the ideology, patronage, and dominant poetics affected the adoption of translation methods and strategies; and how the power relations, political systems, and cultural preferences influenced the dissemination and reception of the translation after it entered a new language and culture. In a word, the sociocultural approach to translation processes centers on the *external* factors that have impacted the initiation, production, and reception of a translated text.

Translation process can also be understood in its narrow sense. It can refer to the mental process of rendering a text from one language into another. Research on the mental processes of translation seeks to understand the happenings and workings in the translator's brain from the moment a source text enters his brain to the moment the target text comes out in another language and the monitoring and subsequent revision processes, including the use of external resources to assist the translation. This is often referred to as translation process research in translation studies (Jakobsen 2017), and it is also the focus of the present volume.

According to Munoz (2017), translation process research (TPR) began with Paneth's MA thesis on conference interpreting in the 1960s. But it was in the 1970s and early 1980s that TPR was gradually established as a new area of research in translation studies and gained momentum in the past decade thanks to the advances in keylogging, screen recording, eye tracking, and neuroimaging technologies. This line of research is often conducted via experimentation and lab methods. So it may be best described as the experimental approach to translation process research. While TPR is generally lab-based, some researchers have been calling for such research to be moved out of laboratories and taken to the real translation workplace in order to understand what is known as translation cognition in situ (e.g., Ehrensberger-Dow 2014; Risku et al. 2017). Often adopting an ethnographic method, this kind of study seems to have opted for an experiential approach in its research designs.

The experiential-experimental approach to translation process research consists of several sub-approaches including psycholinguistic, behavioral, corpus-textual, cognitive-neurological, situational, and integrated approaches, depending on the research questions raised, the tools used, and the methods adopted for the research. This volume consists of contributions by some leading TPR researchers based on their keynote presentations made at the First and Second International Conference on Cognitive Research on Translation and Interpreting (ICCRTI) held at the Centre for Studies of Translation, Interpreting and Cognition (CSTIC), University of Macau, in 2014 and 2015. They cover an array of topics and represent different approaches applicable for translation process research today and a number of research tools available for investigating translation processes.

*The first part* of the collection features three chapters of theoretical considerations on translation process research as a new research area. The rise of the experiential-experimental approach in translation process research has gotten people to think whether and how it fits in with the sociocultural approach. *House* believes that the growing interest in the strategies of comprehension, problem solving, and decision-making in the translator's mind "does not need to be at the expense of the socio-cultural" (this volume, p. 4). But she opposes any view that offers an excessive role of subjective interpretation in translation by seeing translation as an art and argues that in such a "widespread exaggerated emphasis on the subjective personal, it is necessary to renew a focus on both language and text – the linguistic focus, and on what happens in translators' minds when they engage in translating texts – the cognitive focus" (*ibid.*, p. 4). Following a critical review of current translation cognition research using intro- and retrospection, behavioral experiments, and neuroimaging studies, she argues that looking for "a descriptively and explanatorily adequate neuro-linguistic theory of bilingualism useful for and compatible with a theory of translation" might be "a first step towards a more valid and reliable approach to investigating the translation process" (*ibid.*, p. 12).

*He* takes up what *House* proposes – to seek for a neurolinguistic theory of bilingualism for translation process research. Drawing from universal grammar, computational theory of language processing, neurocognitive bilingualism, and neuro-functional control theory for bilinguals, he presents his initial efforts to construct an integrated and conceptually detailed theoretical framework for understanding translation and interpreting as a bilingual process in the brain. He hypothesizes that memory and computation as two processing mechanisms compensate and complement each other in translation and particularly in simultaneous interpreting, which is a result of the "system design" (*ibid.*, p. 16). He further suggests that some properties displayed in translated texts and interpreted speeches can be explained by what is called the "processing economy hypothesis" (*ibid.*, p. 36).

As translation process research advances, some researchers have argued for a closer integration of translation process research and cognitive science paradigm (e. g., *Alves* 2015). Taking this as their point of departure, *Carl* and *Schaeffer* propose a computational framework for postediting machine translation (PEMT) based on the well-known noisy channel model (*Levy* 2008). They extend the noisy channel model with relevance theory (RT) and believe that such a combination will account for both the unconscious priming effects and the conscious processes in PEMT.

*The second part* of this volume focuses on tools and methods applicable for researching the translation process and presents a few proposals for such applications. Despite that a number of newer technologies have been applied in translation process research, much is yet to be explored and consolidated regarding research methods. For instance, keylogging data can reveal much about the production process of a translation, but they do not tell much about how the translator works on the source text. We have to refer to recorded gaze data for details on the cognitive processing that made the production of a stream of translation possible. *Jakobsen* takes data from the CRITT's TPR database and illustrates how the eye-tracking data and keystroke data of a single translator can be combined in the exploration of the

translator's cognitive processing in translation, indicating that qualitative analysis is important for revealing patterns and themes in eye-tracking and keystroke data.

After many years of translation process research with instruments including TAPs, keylogging and eye trackers, recent years have witnessed an increasing interest among researchers to study the topic from a neurological and neurocognitive approach. Along this line of neuroscientific investigation of translation and interpreting, *Lu* and *Yuan* outline how functional near-infrared spectroscopy (fNIRS) may be used to explore the brain activities in translation and interpreting. fNIRS has been used since the 1970s in neuroscience to investigate brain activities by measuring changes of hemodynamic responses based on the near-infrared light between 650 nm and 950 nm. As a noninvasive technique, fNIRS is often used to localize and monitor the cerebral activities such as visual, auditory, memory, attention, and motor. *Lu* and *Yuan* argue that translation and interpreting, as activities involving many of these subskills and processes, are particularly prone to investigations with the assistance of fNIRS.

While studies utilizing fNIRS are beginning to emerge (*Li* and *Lei* 2016; *Lin* et al. 2018a, b; *He* et al. 2017), studies taking stock of other neuroimaging technologies like fMRI have also appeared. *Alves* et al. share their preliminary thoughts on how the brain imaging technologies can be used to study psychological processes in translation. As facilitators of communication, translators need to construct a hypothesis about the ST author's meanings and the TT readers' cognitive environment. To accomplish this, they need to activate different layers of mind reading and inferential mechanisms. *Alves* et al. therefore propose to integrate behavioral and neurophysiological data in the interdisciplinary investigation of "the inferential mechanisms involved in translation processing" (this volume, p. 131).

Cognitive load and cognitive efforts have often been the object of translation process studies. They tell the difficulty of a translation task and the problems encountered in translating a segment. However, measuring the difficulty of translation has often been a difficult subject. *Sun*, following his earlier work on measuring the difficulty of human translation (2015), discusses his attempt to measure the difficulty of postediting in machine translation (PEMT). He believes that measuring the difficulty of postediting in machine translation can help translators avoid cognitive overload and underload. Furthermore, understanding and selecting tasks of appropriate difficulty levels are conducive to training translation students and turning them into experts of translation and PEMT.

The efforts to understand how a translator's brain works in the process of translation and interpreting are at least partially motivated by the possible implications for translation and interpreting training, even language learning and teaching in general, especially when translation is used and practiced in the classroom either to acquire translation strategies and methods or to learn a second language. *Göpferich* examines the role of translation and translation competence in L2 writing. Through a rather extensive review of related literature, she demonstrates that, on the one hand, suppression of L1 use in L2 writing hampers the knowledge-constructing function of writing but, on the other hand, translation can be detrimental to L2 writing, depending on the learner's translation competence and the methods of using



translation in the process. She also found evidence to support her thesis that academic writers often read and draw on materials from one or more other languages, an ability that she terms *transliteracy*. And she believes all these have serious implications for both translation and L2 writing instruction, suggesting that translation competence, “as a cognitive catalyst for trans- and multiliteracy” (this volume, p. 191), is a “soft skill” that should be acquired by students of all disciplines in multilingual and multicultural societies (*ibid*, p. 192).

Translation process research, after 40 years of growth, has made exciting progress in the issues covered in the investigations. We know more about the translators’ brains and behaviors today than decades ago. We have also adopted or adapted to various new and useful technologies in translation and interpreting process studies. However, as with all kinds of new research, this field of research has also met with its own challenges, such as the development of a coherent theoretical framework of translation processes with strong explaining power, proper triangulation of different data sources, and more efficient methods for analyzing log data and eye-tracking data in fusion, pushing the boundaries by resorting to more advanced and sophisticated research instruments such as fNIRS and fMRI, and so forth. For this area to continue to produce useful results, all these challenges will have to be met head on and addressed effectively. The chapters in this volume may represent one of the collective efforts by translation process researchers the world over to meet such challenges.

**Acknowledgment** We would like to acknowledge the financial support from the University of Macau Multi-year Research Grants (MYRG2015-00150-FAH, MYRG2016-00096-FAH, and MYRG2017-00139-FAH).

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