

50 Years Later.
What Have We Learnt after
Holmes (1972) and Where Are We Now?



Javier Franco Aixelá & Christian Olalla-Soler (Eds.)

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COLECCIÓN
TIBÓN: ESTUDIOS TRADUCTOLÓGICOS

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TABLE OF CONTENTS

INTRODUCTION	
<i>Javier Franco Aixelá & Christian Olalla-Soler. Eds.</i>	7
I. Fifty Years of Hectic History in Translation Studies	
<i>Christian Olalla-Soler, Javier Franco Aixelá & Sara Rovira-Esteva</i>	12
II. The Position of James Holmes in Translation Studies	
<i>José Lambert</i>	38
III. From the Black Box to Cognitive Translation and Interpreting Studies, but Still Part of the Original Descriptive Translation Studies	
<i>Ricardo Muñoz Martín & Álvaro Marín García</i>	69
IV. Translation Technologies – The Dark Horse of Translation?	
<i>Sharon O'Brien</i>	93
V. The Didactics of Professional Translation – A Success Story?	
<i>Gary Massey</i>	105
VI. Interpreting Studies – From a Basically Didactic Orientation in the Conference Mode to a Multiparadigmatic Object of Study?	
<i>Ineke Crezee</i>	135
VII. Functionalism in Translation Studies. Theoretical or Applied Studies?	
<i>Leona Van Vaerenbergh</i>	162
BIONOTES	187

CHAPTER III

From the Black Box to Cognitive Translation and Interpreting Studies, but Still Part of the Original Descriptive Translation Studies

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1. INTRODUCTION

Let us insert a terminological note before we start, at least to explain the title of this chapter. In this text, we will use *translation studies* as an umbrella term to refer to the academic field that includes translation, interpreting, postediting, localization, audiovisual translation, accessibility and any other form of *multilectal mediated communication* (see van Doorslaer 2020 for a recent discussion on the name of the discipline, and Halverson & Muñoz 2020 for a justification for this label). We will also be using *cognitive translation & interpreting studies* (CTIS, cf. Halverson 2010; Xiao & Muñoz 2020: 1-2) to refer to today's state of what Holmes and Toury referred to as *process-oriented translation studies* within their original views on *descriptive translation studies* (DTS).

CTIS is an umbrella term to refer to the bulk of research on cognitive processes underlying multilectal mediated communication events from various research traditions, such as *computational translatology* and *cognitive translatology*. Please note, however, that the term *cognitive* refers to cognition in general but that in the expression *cognitive translatology* it refers to approaches based on situated cognition (Muñoz 2010, 2021)—that is, to a certain strand within CTIS. On the other hand, the term *cognitivist* is used to refer to the classic, standard, computational, information-processing views of cognition, now best represented by *computational translatology*. Much, but not all, research done under the label *translation process research* (TPR) falls within this cognitivist line and can be seen as a former stage in the development of—and now a strand within—CTIS, as we will try to illustrate in this chapter.

We will try to sketch the main lines of the intellectual evolution from cognitive approaches, even before the notion of process-oriented translation studies, to today's cognitive translation & interpreting studies, in order to show that they can still be seen as a part of an updated notion of descriptive translation studies (Toury 1995/2012). In a nutshell, we will contend that, as a university discipline, translation studies started as independent scientific research programs within AI and psycholinguistics, and that the

failure of early MT and changes in the university system led to linguists taking over. Up to this moment, translation studies and cognitive approaches had basically overlapped, since scholarly interest in translation was comparatively scarce and often anecdotal.

A genuine interest in other social science perspectives, such as sociology, prompted the Holmes-Toury proposal of a discipline with several scientific strands, but their bid was short-lived because scholars from comparative literature pushed for their own program. In doing so, they relegated process approaches and other scientific strands to an ancillary position. In cognitive approaches, however, this fostered a slow renewal that came in successive stages, marked by dropping linguistics as a referential framework, improving data-collection methods and research rigor, and finally reconsidering old assumptions inherited from the information-processing paradigm that contributed to its early failure.

This does in no way mean that the more traditional views within CTIS (mainly, those formerly labeled TPR) have disappeared, let alone that they should. Many researchers will still approach translating as a linear bottom-up process focused on problem solving where the translator is all but a passive language processor. This is nevertheless a healthy sign, because now we have several approaches to try to explain the same phenomena, thus competing and helping each other to improve. Thus, even though we stand firm on embodied realism, we support epistemic pluralism (Chang 2012).

Beyond CTIS, the renewed interest in and emergence of new science-based strands is still anecdotal in numbers, but clearly growing. However, with the disciplinary tree being all but obsolete and the humanistic approaches literally leading nowhere (since it is not their goal to build and accumulate applicable knowledge), the time has come to ponder whether parting ways with these humanistic strands that were not envisioned by Holmes and Toury would be in the best interest of knowledge construction. We will try to draw the evolution of process-oriented translation studies and also show how current views within CTIS have outgrown it but still remain within the scope of descriptive translation studies as originally conceived of by Toury.

2. THE ORIGINS

The remote origins of Cognitive Translation & Interpreting Studies (CTIS) have been dated back to the beginning of the 20th century (Olalla-Soler *et al.* 2020). We actually think that the first empirical study on cognitive aspects of translating might even be about 20-25 years older than the 1910 experiments by Gabriele von Wartensleben. Right in Wilhelm Wundt's lab at the University of Leipzig, between 1883 and 1886, James McKeen Cattell expanded on Francis Galton's experiments on word associations to include multilingual combinations. Cattell's curiosity was probably sparked by having to translate texts between English and German in his correspondence with German, British and US psychologists, and by acting as an improvised interpreter for foreign visitors to the lab, at Wundt's request. Already a doctor, and working in Cambridge with Galton, in 1888 he reproduced some of those experiments, including the response times when translating single words from an L1 into a less known L2. One year later, Cattell traveled back to the USA to become the first Professor of Psychology in the country, at the University of Pennsylvania.

This is just an anecdote, but one with an important symbolic value: The antecedent first step of CTIS was taken in the same scenario that witnessed the birth of experimental psychology, and this happened ca. 30 years before Charles Bally and Albert Sechehaye published Ferdinand de Saussure's *Cours de linguistique générale* in 1916, marking the birth of modern linguistics. Yet it was not until the second half of the century that the mental processes associated to multilectal mediated communication started to draw the direct attention of empirical researchers. The academic interest in the process of translation originated not in human translation but in the initial, failed attempts to develop machine translation that, between the 1940s and the 1960s, fell short of yielding the expected quality outputs, and in the use of simultaneous interpreting as a case of “extreme language use” by psycholinguists to tackle the general workings of the mind (e.g. Gerver 1975; Obler 2012).

The first generation of cognitive scientists was inspired by the ideas of John Von Neumann and Alan Turing to develop computer architectures that were assumed to mimic the workings of the mind—as such workings were envisioned at the time (Istrail & Marcus 2013; Lombardo 2018). Noam Chomsky's extremely influential views on language shifted the focus of linguists from languages as systems to a universal mental grammar as a set of structures and mechanisms humans were naturally wired for. When these notions merged, they contributed to the cognitive revolution that took place starting the decade of 1960 (Miller 2003). In very few years, this revolution symmetrically led to view the mind as a computer, and computational models of the mind within the *information processing paradigm* became the only ones to be entertained (cf. Gigerenzer 2002: 26–43). Behaviorist and structuralist approaches that had been prevalent for decades were all but wiped out overnight in the United States. Their impact in Europe was smaller but considerable as well, if somewhat later than across the Atlantic. In early cognitive models, the mind would be made up of modules that would specialize in one aspect of information processing (Bruner *et al.* 1956). Information was assumed to consist of symbolic representations and to be processed according to formal, algorithmic rules (Fodor 1983). This view, called *cognitivism* and *computationalism*, would be and still is very influential in CTIS (Carl 2010; Alves 2015) and all but hegemonic in NLP and machine translation (MT) research.¹

Following the ALPAC report in 1966 that certified the initial failure of machine translation, the interest shifted to human translation, as suggested in the report, as a pre-requisite to reproduce the translation ability in computers. Linguists, including Noam Chomsky, had been called to work in AI teams and now there was a division of labor between engineers working on a trial-and-error basis and linguists who would try to address the *deep core* problems of translation. Thus, it was only natural that linguists took their work back to their language and literature departments, where they became custodians of the nascent translation studies.² However, the initial interest in artificial

1 These terms oversimplify the variety of views and the evolution of cognitivist approaches (see, e.g., Piccinini 2012).

2 This appropriation of the toddling translation studies into linguistics as a university discipline is explicit in the works of many disciplinary forefathers, such as Eugene Nida's (cf. Porter & Ong 2016), George Mounin's—who recommended that linguistics, both theoretical and descriptive, made room for translation as a research topic (Houdebine-Gravaud 2004)—and Jiří Levý's, the founder of Czech translation studies, who chaired the Department of Czech at Brno University.

intelligence left a logic blueprint that would reduce human cognition to sequential information processing applied to language problem solving, leaving out cultural, social and personal variables.³ MT systems but later also approaches to human translation based on logic needed ready-made, canned *equivalent* responses and this led to the early insistence to focus on “pragmatic texts” by, e.g., Leipzig School scholars (see also Zybatow 2008). Other scholars, such as Spillner (1984: 9) warned that “Nevertheless, [...] it becomes apparent that stylistic analysis is by no means limited to literary texts, but that it is equally adequate in the description of everyday language and non-literary text types” (our translation).

Up to this point, several foci of investigation into translation and interpreting had thrived in distant contact with each other, and definitely separated by disciplinary barriers. Machine translation researchers (e.g., Yehoshua Bar-Hillel, Victor H. Yngve, P. L. Garvin, Bozena Henisz-Dostert), psycholinguists (e.g., David Gerver, Frieda Goldman-Eisler, Anne M. Treisman), then linguists (e.g., Roman Jakobson, John C. Catford, Jean-Paul Vinay and Jean Darbelnet, Eugene Nida, Robert de Beaugrande) had ignored the millennia-old scholarly reflection from Cicero to George Steiner—“centuries of incidental and desultory attention from a scattering of authors, philologists, and literary scholars, plus here and there a theologian or an idiosyncratic linguist” (Holmes 1988:67) —and they mistrusted or looked down upon contributions from the few translation practitioners that made it into academia, such as Peter Newmark (see next section).⁴

3. TRANSLATION STUDIES’ FIRST STEPS AS AN AUTONOMOUS UNIVERSITY DISCIPLINE

The disciplinary study of human cognitive processes associated with multilectal mediated communication started in earnest in the 1970s and 1980s, in the wake of the first cognitive revolution. We owe the first attempts to develop a “Science of Translation” (*Translationwissenschaft*) to the researchers working at the Institute for Interpreting at the Karl Marx University in Leipzig during the decade of 1960, often collectively referred to as *the Leipzig School*.⁵ Gert Jäger, Otto Kade, Albrecht Neubert, and later Heide Schmidt and Gerd Wotjak understood translation as a communicative task from the prism of generative linguistics, focusing on the mental processes that enabled the *transfer* of messages across languages (Kade 1964; Jäger 1977; Wotjak 2003). They saw themselves as developers of a new branch of linguistics, and their goal was to develop bilingual transfer grammars. To do so, the multifarious, complex nature of multilingual

3 For instance, both Catford (1965) and Ludskanov (1975) embraced Warren Weaver’s (1949) notion that translation could be conceived of as replacing signs from a source language with the corresponding signs in a target language.

4 For instance, Pym (1992: 305) wrote “Newmark ahoga así toda conciencia crítica de la traducción como una actividad reglada por la comunicación, y no por las exigencias de la autoridad [...] por lo menos en España —por la simple lógica de la oferta y la demanda—, hay una tendencia a conceder a Newmark más importancia de la debida” and Viaggio (1992: 27) would publish “[...] Newmark does indeed have a single, coherent theory of translation, that it is a wrong and didactically dangerous one, [...]. I believe that both Newmark the thinker and translator are better than his theory”. In turn, Newmark would not restrain his scorn when criticizing, e.g., Hönig (Newmark 1997) and Snell-Hornby (Newmark 1999).

5 A few scholars working elsewhere need to be added to this trend, such as Eugene Nida (1964).

mediated communication tasks was collapsed into a narrow view based on contrastive linguistics and logic that would allow for generalizable abstractions of phenomena through deductive and introspective means. Their approach, nevertheless, underscored text features, such as coherence, and their production (e.g., through translation strategies that were implicitly aimed to support formalizable algorithms but that, at the same time, were context-dependent) —thereby mixing competence and performance, in the first of several moves towards breaking away from their generative origins— but it still relegated cultural, personal or social aspects of the translation process.

Literary translation was proscribed from the study, for it was deemed the source of unnecessary variation and confounders. As late as in 2013, in the third edition of *La traduction raisonnée*, Delisle still restricts his theory to “pragmatic texts”.⁶ This stance would cast a long shadow on the future of cognitive approaches, as evident in the decades-long tendency to acknowledge social or emotional aspects of translation processes just to quickly shrug them away under the pretense that they were simply not amenable to reliable empirical study. As scholars in the field started to move away from linguistics-based, generative approaches and towards cognitive psychology and semiotics (see discussion of the Paris School below), the Leipzig School, influential as it was, ceased to inform cognitive-oriented investigations of translation. They left behind the first PhD in translation studies, the first disciplinary translation conferences, a few of the first disciplinary publications through their *Beihfte zur Zeitschrift Fremdsprachen* and an intellectual passion for translation and interpreting that would impact mainly scholars from the (western) Federal Republic of Germany, since the Leipzigers published mainly in German.

In the 1980s, interpreting scholars dissatisfied with the linguistics-based approaches of the Leipzig School found an alternative in other disciplines, and brought meaning and its relation to its scenarios to the fore (Seleskovitch 1980: 403):

En plein essor depuis Saussure, la linguistique synchronique s’est donnée une assise scientifique en dissociant l’étude des langues et de leur fonctionnement de celle de leur emploi (dichotomie langue-parole). Puis à côté d’un approfondissement des travaux sur les mécanismes et le fonctionnement du langage au niveau de la langue, on a vu au cours des trente dernières années se développer la psycholinguistique, la sociolinguistique, les théories de la communication, les recherches empiriques sur les actes de parole et sur les structures de la conversation, sans parler de la linguistique des textes qui étudie les structures transphrastiques de la langue. Toutes ces études dépassent largement le territoire assigné à la langue par la linguistique post-saussurienne, sans pour autant se départir de leur caractère scientifique.

6 “Souvent anonymes, contrairement aux textes littéraires qui, eux, sont signés, les textes pragmatiques ont une utilité plus ou moins immédiate et servent à transmettre une information d’ordre général ou propre à un champ d’activité. L’esthétique n’est pas leur caractéristique dominante, comme c’est le cas des œuvres littéraires” (Delisle 2013: 17). And “[...] Par sa nature et sa fonction, le texte pragmatique se distingue de l’œuvre littéraire (ex.: nouvelle, poème, roman) et de l’écrit de composition libre (ex.: biographie, chronique, mémoires)” (Delisle 2013: 686).

By the end of the decade, Ladmiral (1989: 10) would agree:

Ce qui est vrai, c'est que la linguistique fournit les éléments conceptuels et terminologiques permettant un étiquetage des réalités évidemment langagières dont traite la traductologie, et puis aussi bien sûr les linéaments d'une méthodologie dont il a pu sembler naguère encore que les autres sciences humaines, voire la philosophie elle-même, voulussent imiter la rigueur. Mais, pour l'essentiel, la traductologie doit emprunter à beaucoup d'autres disciplines que la linguistique (à la psychologie, aux sciences sociales... à l'analyse littéraire, à la philosophie, voire à la théologie).

Led by Danica Seleskovitch, the members of what would be called *the Paris School* or *théorie du sens* proposed an idealized model that was intentionally limited to the (oral) interpreting process. The basic assumption was that the meaning of source-language utterances could be detached from the linguistic units and then reformulated for the new addressees thanks to “cognitive complements” contributed by the interpreter, who would pragmatically adjust the *sense* to yield optimal target language utterances — not the invariable *meaning* of written language, that would be merely and automatically *transcodified*, they conceded. Proponents of this *Interpretive Theory of Translation* drew mainly from introspection too, which (also for other reasons) resulted in a natural selection of researchers that replaced psycholinguists with practicing interpreters, or *practisearchers*.

Their three-phase process model of interpreting rested upon the notion of *deverbalization* or conceptualization (Seleskovitch 1975, 1981) as central step, right between comprehending and re-expressing. It was the black box again, and that middle step was crucial because its locus was the mind and it did not consist of language operations. Other scholars, however, heavily contested it, as it was not backed by empirical evidence (Dejean Le Féal 1998). In short, the scholars in the Paris School focused on the interpreters, rather than on what they said, and hence pioneered the study of the process as performed by professionals and trainees.⁷ The Paris School should thus be credited with having been the first to move from languages to their speakers, making interpreters the object of study. It was also the first within the emerging discipline to adopt psychology as a referential framework —as inherited from the preceding wave of psycholinguistic researchers using simultaneous interpreting to shed light on the structure and workings of the mind.

⁷ At the time, Prof Brian Harris' (1976; Harris & Sherwood 1978) candid proposal of studying *natural translation*, i.e., the capacity of children to interpret spontaneously, crashed against the wall under construction to separate translation and interpreting from “other language studies” through implicitly or explicitly identifying the object of study with professional translation: “Wenn man sich anhand der Ausführungen und Beispiele in seinen [Prof Harris] verschiedenen Publikationen vor Augen führt, was er unter *natural translation* versteht, so läuft dies auf die Forderung hinaus, das sinngemäße Übertragen von nichttextuellen, nicht-schriftkonstituierten sprachlichen Alltagsäußerungen und somit eine nicht-professionelle Art der Sprachmittlung zum Hauptgegenstand der Übersetzungswissenschaft zu machen. Ich halte dies wie gesagt nicht für sinnvoll, weil es die übersetzungswissenschaftliche Forschung völlig unnötig auf einen, relativ speziellen Sprachmittlungstyp festlegen würde” (Klings 1992: 106).

As early as 1970, Otto Kade (1973) acknowledged that the Science of Translation had not been able to offer a scientific basis for translation practice. The Leipzig School had turned *equivalence* into the cornerstone of their approach (cf. Albrecht 1987: 13) but now, following the footsteps of Jakobson's (1959: 233) notion of "equivalence in difference" and Nida's (1964: 159ff) distinction between *formal* and *dynamic* equivalence, Jäger (1975: 107) proposed *communicative* and *functional* equivalence, and Catford (1978: 27ff) suggested *textual* equivalence to be sometimes different from *formal* equivalence. Meanwhile, the Paris School had concentrated on interpreting, thereby becoming a *de facto* partial theory—one that would only apply to (conference) interpreting and was thus uninteresting for translation scholars. Later on, through Jean Delisle's 1978 PhD dissertation (Delisle 1984), it came to extend its views to translation, but it also restricted its application to "pragmatic texts", as mentioned.

The general identification of linguistics with the generative-transformational approach, the artificial exclusion of literary texts, and the untenable restriction of meaning to propositional content and of translation to a rule-governed automatic process led to a general debacle of the first disciplinary attempt, the *Science of Translation*. In the 1980s, the field opened up to new approaches—or perhaps just exploded in several directions—such as functionalism (Holz-Mänttari 1984; Reiß & Vermeer 1984) and an empirical literary-based strand (e.g., Even Zohar 1979; Toury 1980). Meanwhile, a few researchers followed Sandrock's (1982) M.A. thesis and gathered in a symposium in Hamburg in 1984 to exchange their first empirical steps with think-aloud techniques (published in House & Blum-Kulka 1986).

Holmes's (1972) article on *The name and nature of translation studies*—only popular when reprinted in 1988—is often considered the foundational text of the field. Departing from his disciplinary map, and following Toury's work (1980, 1995), translation (and interpreting) was to be established as a self-proclaimed *descriptive, empirical* field of enquiry on its own standing. Other scholars, such as Robert Goffin (1971), Brian Harris, Jean-René Ladmiraal (e.g., 1989) and Gerardo Vázquez Ayora (1977) would suggest *translatology* and its translations to underscore the *scientific* nature of the enterprise (Harris 1973, 2011), but science was not popular in the field at the time (cf. Snell-Hornby 1988:14). Translation studies would transcend the limitations of the original schools by moving away from "physics envy" (Veit 2020: 101), that is, from the linguistics-driven willingness to turn translation and interpreting research into a science.

Translation studies has been described as a "success story of the 1980s" (Bassnett & Lefevere 1990: ix) but there may be other ways to interpret this decade. Holmes and Toury's vision of a *descriptive* translation studies was in fact quite short-lived. In spite of the apparent widening of the object of study and the diversification of approaches to tackle it, Hermans (1985) would portray translation studies as a branch of comparative literature (Snell-Hornby 1986: 11, note 2). The purported integrative views (Snell-Hornby 1988; see also Newmark 1999) would soon yield to a "cultural turn" (Bassnett & Lefevere 1990) that would blur the disciplinary borders with cultural studies (cf. Bassnett 1998). Not only was literature now part of the object of study. For many newcomers it would be center stage. Crucially, the study of literature in translation would also welcome new ways to tackle the object of study, non-scientific approaches

as typical in the humanities, exploring complex constructs from a philosophical perspective and that include those drawing from post-modern epistemological stances that have colored a large number of publications in the field ever since⁸.

The new disciplinary venture of *translation studies* was thus born that would slowly become institutionalized, sometimes into formal university departments of translation and interpreting, but much more often as one more line within departments of languages and literatures, and with a new agenda. New cultural and literary dimensions were brought to the table at the same time that translation schools at higher education institutions mushroomed, particularly across Europe. This helped to establish the new academic discipline with a focus on training future professional language mediators, often with a mix of humanities and professional approaches. Many interpreting scholars and some translation scholars did not see a very good fit for interpreting research in this new disciplinary attempt and argued for the development of a separate discipline of *interpreting studies* (e.g., Salevsky 1992, 1993).

4. PROCESS RESEARCH AND THE INSTITUTIONALIZATION OF TRANSLATION STUDIES

While *process research* could pertain to many approaches, such as social, institutional, and workplace perspectives, it was soon mostly linked to the study of short-spanned cognitive processes underlying (mainly, translation) tasks, more or less in laboratory conditions. This roughly corresponds to Holmes' (1988: 73) notion of *translation psychology* or *psycho-translation* studies. Dominated since the 1980s and almost until the turn of the century by the information-processing paradigm and legacy concepts such as the proverbial “black box” (from behaviorist psychology) and *competence* (from generative linguistics), scholars studying cognitive processes in translation focused on problems as instances that would interrupt translating flows (overview in Jääskeläinen 2011). Those studying interpreting would focus on the brain as a machine: multitasking, ear-voice-span, language control and recoding, memory processes, etc. (e.g., Christoffels 2004). Whereas TPR was basically concerned with translation, a general tendency to adopt models and methodologies from psychology initiated a period of extensive borrowing at methodological and conceptual levels from psychology —reaction time experiments, eye tracking, expertise, mental workload, priming, etc.

In translation, the methodology of choice in this period was verbal reports in their transcripts, known as *think-aloud protocols* (TAPs). It was assumed that introspection, whether prompted by the investigators or not, either guided or free, concurrent or retrospective, was the only possible way to gain insights, if indirect, from the black box, i.e., the minds of informants (Ericsson & Simon 1980). TAPs have remained an important data-gathering technique in the field despite justified criticisms (see Jääskeläinen 2017). While TAPs cannot provide us with observational data on the actual mental processes of subjects (for the subjects themselves do not have access to them), there seems to be a general agreement that they are a valid and effective method to

8 See Chesterman & Arrojo (2000) and the subsequent numbers of *Target* for a discussion of the main points of contention between some of these stances and a scientific, empirical stance in TS.

obtain information about subjects' own perceptions on the task and their own performance (e.g. see Pavlović 2007: 39–54; Sun, Li & Zhou 2021).⁹

At the conceptual level, models developed on *cognitivist* theories and constructs dominated the field, many still do: relevance theory, dual, serial processing, language-specific symbolic mental lexicon(s), working memory capacity, etc. Good examples are the monitor model and the very notion of competence (next section). The monitor model (Tirkkonen-Condit 2005) presented the translating process as a sequential set of instances of unproblematic, virtually automatic translated segments punctuated by instances of problem-solving cycles whenever an issue occurred. This view resonates with the classical standard paradigm of cognitive science that depicts cognition as a linear processing of discrete units of information—in this case, language units (see Newell & Simon 1961). Top-down processing does not seem to have a place in the model and mediators are all but passive processors.

The classic computational paradigm also assumes a difference between higher-level and lower-level processing, where the former takes care of actual cognition (understood as logical thinking and computing information) while the latter controls sensorimotor systems —“the sandwich model” (Hurley 1998). Pioneering scholars working on translation as problem-solving followed suit, very much like researchers from Leipzig School had done, and left aside emotional and situated aspects of cognition. This classical view on cognition, particularly the notion of mental representation in a “language of thought”, was contested by some scholars proposing connectionism, a new take on computational modeling of mental representation, storage, and processes as parallel and sub-symbolic, much in the way of artificial “neural” networks (McClelland, Rumelhart & Hinton 1986). Connectionist models have not been applied widely in TPR (but see Alves 2015), but they lie at the foundations of the very welcome and enormous success of “neural” machine translation.

5. COMPETENCE AND EXPERTISE

Competence and expertise were competing notions that illustrate the evolution from TPR to CTIS. The initial boom of process studies developed along the advent of *functionalism* (Holz-Mänttari 1984; Vermeer 1996; Nord 1997) and an increasing interest in the translator. Functionalist scholars in translation studies highlighted translation as a communicative event with a definite purpose or function defined according to the interests and aims of the stakeholders in the process. Interestingly, at the center of the process was the translator as an expert mediator in multilectal communicative events. The notions of expert and expertise in functionalist frameworks correspond to lay or folk notions of experts as go-to people who are particularly savvy or proficient at a given task, normally because of intensive training or extensive experience. Competence as expert knowledge also draws from this view.

9 The direct articulation of recorded phenomena as concrete problem-solving strategies may be considered a form of data, but they depart from the informants' self-reports and, in this sense, they are arguably one more step further removed from reality than observational data. Self-reports tend to be biased, inaccurate, and geared to satisfy the researchers' interests, as assumed by the informants.

Both the influence of psychology and the intended didactic application of process research made developmental changes in informants' performance a central concern for scholars. The still pervasive influence of generative linguistics can be noticed in the adoption of the *competence* construct (Wilss 1976). Readers are probably aware too that the term is still used with slightly to obviously divergent meanings in different disciplines. Originally devised to refer to the innate capacity for language in Chomskian terms, it was borrowed into Translation Studies to refer to the knowledge needed to translate. Competence was key in the development of TPR, and remains to this day a key concept in translation and interpreting didactics (see, e.g., EMT board 2017).¹⁰

As a legacy concept applied to empirical investigations, however, competence poses some challenges for process researchers. On the one hand, it is very difficult to define since, as a construct, it was applied to multifarious contexts, becoming a summative concept (Schäffner & Adab 2000). On the other hand, even when articulated through sub-competences, competence is a model of what needs to be *known* in order to translate—that is, of the *a priori* requisites of a process. Therefore, applying it to explain process data entails an aprioristic view that sets the elements to be discovered in the sample up front, which may compromise inductive empirical data testing. Still, thinking of competence as *expert knowledge* (PACTE 2003) was critical in the development of CTIS. Competence was the model of reference for empirical projects investigating developmental differences, mainly by testing professionals' (allegedly experts) and students' (novices) performance in order to identify performance differences across populations (PACTE 2005; Alves & Gonçalves 2007; Göpferich 2009). The rejection of a deductive model and the interest in developmental differences in performance led to another borrowing, this time from psychology—*expertise*, which would prove instrumental to the development of the field as an explanatory tool of empirical data and as a stepping stone for theoretical advancement (Shreve 2002).

During the first decade of the 21st century, Gregory Shreve published a series of papers introducing the *expertise* construct from expertise studies, a research strand within experimental psychology. Defined as “consistently superior performance on a specified set of representative tasks of the domain that can be administered to any subject” (Ericsson & Charness 1997: 6; see also Shreve 2002, 2006, 2009), the new construct modeled skills acquisition from a different, inductive perspective amenable to the investigation of behavioral indicators as dimensions that did not set any must-haves in advance (cf. Pym 2003: 485–487). Also, borrowing the construct from experimental psychology, a field with a long empirical tradition, moved research into the translation and interpreting processes away from the legacies of initial frameworks and constructs that posed incommensurability issues (Marín 2021).

10 In the pilot Tuning project (2001–2004) to launch the Bologna process of modernization and normalization of European universities, *competence* was understood as qualities, abilities, capacities or skills developed by students, consisting of a dynamic combination of cognitive and metacognitive skills, demonstration of knowledge and understanding, interpersonal, intellectual and practical skills, and ethical values. Competences, however, could not be measured, and were thus replaced in the *Dublin descriptors* by learning outcomes, understood as measurable attainment targets, i.e., results of learning experiences which allows assessors to ascertain to which extent / level / standard a competence has been formed or enhanced.

The 1990s saw the publication of several models of translation drawing on the information-processing paradigm and psycholinguistics (Neubert 1994; Wilss 1996). The same can be said of Gutt's model (1991) based on Sperber & Wilson's (1986) relevance theory. Gutt's model combined a modular view of the mind with Chomskian notions of competence and it was highly idealized. For instance, the definition of translations as texts that yield a sum of explicatures and implicatures equal to their sum in the original cannot be tested because meaning cannot be measured—understanding is often measured as a proxy for meaning, which it is not—and implicatures may or not have been implied by the speaker/writer and may or not be identified and interpreted by the listener/reader.

6. METHODOLOGICAL ADVANCES

By 1995, TAPs had been the main method to indirectly access the mental processes of translators for more than a decade (Jakobsen & Alves 2021). Technological advancement together with increasing criticism on the validity of TAP-based data spurred the development of Translog, a keylogging software that would allow for the machine recording of keyboard and mouse activity (Jakobsen & Schou 1999). This was a genuine breakthrough that opened up new possibilities to identify and measure effort, difficulty, typing rhythms or the role of attention in addressing translation problems.

The colleagues spearheading this new push for empirical research formed several groups (e.g., LETRA, PACTE, PETRA, TRAP), gathered with more informal structures, or were nearly lone wolves in their institutions. There was, nevertheless, one particularly influential center of activity that would be the engine to foster progress in the field in both research production and methodological refinement: the Copenhagen Business School in Denmark, where Arnt Lykke Jakobsen founded in 2005 the *Centre for Research and Innovation in Translation and Translation Technology* (CRITT).¹¹ Jakobsen and his colleagues would lead the way in the use of keylogging and eyetracking software as applied to TPR. CRITT works would become very influential, as they would mark a period of great technological development. The team would also relaunch the publication of collected volumes initiated in Leipzig and retaken by Tirkkonen-Condit, a strategy that would define the publishing practices in the minority TPR community in the years to come. TPR—let us remind the reader—has to date been mainly associated with the cognitivist paradigm.

Empirical research grew exponentially in the next decade, consolidating an incipient CTIS field with an increase in specialized publications and conferences that would set the main methodological concerns in the discipline for years (Göpferich *et al.* 2008; Mees *et al.* 2009; Göpferich 2009, 2010; O'Brien 2011). Research topics diversified considerably and so did data-collection tools, including eyetracking, screen recording, EEG and fMRI (Alvstad *et al.* 2011; O'Brien 2011; Ehrensberger-Dow *et al.* 2015; Schwieter & Ferreira 2017; Lacruz & Jääskeläinen 2018; Risku *et al.* 2019). The volume of available data skyrocketed although, admittedly, projects were not always motivated by theories or models, but technology-driven (Jakobsen & Alves 2021). In Shreve's

¹¹ Today CRITT is in Kent State University, Ohio, led by Michael Carl.

terms, TPR researchers were able to document processes and describe empirical facts in unprecedented ways, but they could not always explain them (cf. Shreve 1997).

In 1997, Danks *et al.* published *Cognitive Processes in Translation and Interpreting*, and scholars around the world were starting to gather around an “invisible college”.¹² A disperse college based on interests and affinities that included experimental psychology and expertise studies, but also and with growing influence, cognitive linguistics, cognitive science, neuroscience and bilingualism. The TPR domain widened to include new topics, such as human-computer interaction, cognitive ergonomics, post-editing and community interpreting; multi-method approaches became nearly the norm; and the cognition of other parties in a multilectal mediated communication event, such as the watchers of audiovisual products, came to be part of this enlarged and diversified object of study.

While TPR and the incipient new approaches followed an empirical agenda (Danks *et al.* 1997; Shreve 1997; Alves 2003), they lacked an empirical tradition like that of the scholars they borrowed their concepts from. In this context, Shreve published a “prolegomenon to an Empirical Translation Studies”, where he emphasizes the need not only to be empirical, but scientifically so: “all scientific inquiry proceeds from observation and description of empirical facts; and all scientific inquiry seeks to explain relationships or patterns observed” (1997:42). Still at its infancy, CTIS had not developed models or gathered the relevant evidence to move beyond mere description of empirical facts, but it did still fit well in the role assigned to cognitive approaches in Holmes and Toury’s disciplinary view.

7. THEORETICAL DEVELOPMENT

The wealth of possibilities for empirical study that new tools offered TPR researchers set the pace for an eminently empirical agenda over the first decade of the 21st century. Researchers addressed mostly empirical problems with increasing accuracy due to multi-method and triangulated designs (Sirén & Hakkarainen 2002; Alves 2003; O’Brien 2011). In parallel, the domain expanded, research topics diversified, and researchers looked again to other disciplines in search of methodologies and theoretical constructs (O’Brien 2013). CTIS experienced an important upsurge in the next two decades, outgrowing TPR and drawing more scholars to the community.¹³ An ever larger community that started to present specialized panels on process research at nearly every TS international conference—focused process and cognitive research conferences and workshops proliferated.

Theoretical development, however, had stagnated. For instance, the alternative accounts of translating as a chain of micro problem-solving instances vs as a single macro problem-solving instance comprising the whole task remained essentially unaltered for decades (e.g., Gaddis Rose 1979 and Krings 1986 vs Nitzke 2019). Empirical works

12 With this we mean that it also hosted cognitive approaches other than those typical of TPR and it welcomed back researchers from neighboring disciplines. An *invisible college* is an informal community of scholars and professionals who communicate and share research and ideas. Participating in an invisible college inspires a sense of purpose and focuses interest on particular issues, and thus it influences the development of ideas (Crane 1972).

13 Muñoz (2014) identifies 11 books between 2006 and 2013, and Xiao & Muñoz (2020), 13 more between 2013 and 2020—that is, 24 edited CTIS books in 14 years.

were oftentimes steered by methodology or simply led by the possibilities that new technologies offered. The creation of Translog and then the use of eyetrackers allowed researchers to gather considerable sets of behavioral data. The data would be described according to constructs borrowed from sister disciplines in small-scale exploratory studies that focused on technical or methodological aspects of research. Mees *et al.* (2009) offer a good summary of the research conducted in the field during the first decade after Translog was developed. This collected volume reflects the central research concerns at the time (mainly related to the practicalities of empirical research rather than to construct and hypothesis development and testing). Translog (developed in 1995) predates the more widely used constructs and models in TPR as we have known them thereafter: the revised version of PACTE Group competence model (2003), Shreve's take on expertise (2002, 2006) or Göpferich's competence model (2009), and the whole novice-expert paradigm used in empirical research at the time would still be contested from a theoretical perspective for more than ten years (cf. Jääskeläinen, 2010). Potential problems derived from the incommensurability of borrowings or the lack of validity of explanatory tools remained unproblematic.¹⁴

In 2010, a collected volume edited by Gregory Shreve and Erik Angelone would mark the beginning of "meta-theoretical turn" in CTIS that would gain strength over the next decade. Contributors to that volume identified theoretical issues that still engage the community today, such as the use of legacy concepts and interdisciplinary borrowings, the validity of long-standing constructs or methods, and the assumptions and tenets of research traditions or referential frameworks that inform our explanations of empirical phenomena (Jääskeläinen 2010; Muñoz 2010; Shreve & Lacruz 2015). These more recent takes on validity, applicability and their relation to referential frameworks take up on disperse, early critical works that were outshone by empirical and methodological developments (e.g., Dancette & Ménard 1996; Malmkjær 2000).

This interest fueled the development of cognitive translatology as an alternative to the information-processing paradigm (Muñoz 2010, 2016; Risku 2014, Rojo & Ramos 2018).¹⁵ The new paradigm, rooted in embodied, embedded, enacted, extended and affective cognition (4EA cognition, Protevi 2010 or, simply, *situated cognition*), has developed over the last decade into theoretical models and empirical projects, moving away from problem-solving and towards explorations of expertise acquisition, workplace practices and ergonomics (Ehrensberger-Dow 2015; Angelone & Marín 2017; Ehrensberger-Dow & Jääskeläinen 2018; Risku *et al.* 2020). However, theoretical contributions just put names on what was already happening. The second decade of the 21st century witnessed a growing interest in the social and emotional aspects of cognition, together with a strong interest in distributed activities and human-computer interaction. Ethnographic approaches spearheaded by Hanna Risku, at the University

14 They still often are, as in the case of *cognitive load*, which has become enormously popular, although nobody seems to be willing or able to define it, whereas the metaphorical thought it facilitates may be plagued with errors (cf. Cañas 2017; Muñoz de Escalona, Cañas & Noriega 2020). Another borrowing growing in popularity that often looks very little like the original psychological notion is that of *priming*.

15 Which had already been formulated by Kiraly (2000) as he proposed a socioconstructivist approach to translator and interpreting education.

of Graz and later Vienna, focused on crucial aspects of actual professional practices that were not amenable to quantification.

Three of the main postulates of cognitive translatology are that (a) cognition is embodied and is not reduced to the brain, (b) cognition is embedded and therefore relies on social and physical underpinnings, and (c) cognition is extended and therefore not bound to the limits of individuals (Robbins & Aydede 2009: 3). In opposition to the linear, sequential view of cognitivist approaches, situated cognition proponents argue that cognitive processes are based on adaptive, probabilistic constructions of the world and the inputs it offers (Spivey 2007). Such a view of the mind poses major challenges to researchers willing to narrow down multilectal mediated communication to operationalized variables. It is therefore not surprising that cognitive translatology started to gain momentum as a theoretical stance. Fortunately, recent empirical applications to the investigation of workplace dynamics (Risku 2010; Risku et al 2019), task structure (Muñoz & Apfelthaler, 2022), cognitive ergonomics (Ehrensberger-Dow & Jääskeläinen 2018) and emotions (Rojo & Ramos 2018) evidence that the paradigm bears promise for finding empirical support.

At the same time that cognitive translatology evolved over the 2010s, computational investigations of the multilectal mediating mind continued to generate theoretical models and empirical evidence and further developed computational translatology with new accounts of human-computer interaction and enactivism (Carl 2013; Carl, Tonge & Lacruz 2019; Carl 2021). CTIS is at an extraordinarily dynamic and exciting juncture in its history: there are two main research traditions or paradigms that inform empirical and theoretical research, evolving in competition as they take up fundamental objects of analysis and overlapping domains that span from audiovisual translation to workplace workflows, from cognitive effort to reception studies. For the first time in its history, CTIS has gained enough disciplinary maturity so that it is no longer only a borrower. It is also a lender, as scholars interested in as varied objects of study as the processual nature of translation (Blumczynski 2021) or auto ethnographic case studies of adaptations or “inter-semiotic translations” (Marais 2021) are turning to CTIS to inform their research.

8. BACK TO DESCRIPTIVE TRANSLATION STUDIES?

There is no such thing as an *autonomous* internal history of a discipline. If we have learned something from post-modern stances, it is that social, political and cultural forces have a definite impact on the dynamics and the evolution of research fields. The convergence with interpreting studies, the growth in publications and the existence of two dedicated conference series, the geographical expansion of the field in universities in, e.g., Argentina, Brazil, China, Ireland, Poland and Turkey, the strengthened cooperation with neighboring fields such as bilingualism and accessibility, point to a field that is flourishing.¹⁶ Xiao & Muñoz (2020) show that CTIS meets Holmes’ (1972) criteria for disciplines to be autonomous and that it is indeed shaping up as such, but

¹⁶ The two conference series are the *International Conference on Cognitive Research on Translation and Interpreting* (ICCRTI), started in 2014 by the University of Macau’s Centre for Studies of Translation, Interpreting and Cognition, and the *International Conference on Translation, Interpreting and Cognition* (ICTIC), supported by the international research network TREC since 2017.

they also caution that only applicable results supported by clear conceptualizations and valid empirical data can legitimate CTIS as a new applied science.

Similar processes seem to be impacting areas such as audiovisual translation, accessibility, didactics, computer-assisted translation and interpreting studies—and also linguistic and literary strands making use of scientific empirical methods, such as corpora translation studies. As argued elsewhere (Muñoz & Olalla-Soler 2021) the problem is that TS at large is a body with two hearts, one in the humanities, and another one rooted in scientific methods, that necessarily beat at different paces: different assumptions, different goals, and different ways. Sweeping these fundamental differences under the rug is an ill service both to scientific and humanistic endeavors in a challenging context for higher education institutions. Rather than rejoicing for the success of CTIS at times when the competition to publish is fierce, the criteria to evaluate research are troublesome, the programs struggle to survive and the universities see their budgets cut rather than enlarged, we should be considering who do we want to travel and compete with. When contemplated from some distance, the bottom line seems to be rather the collective growth and success of TS strands doing scientific empirical research, which seem to have survived countless turns unscathed. The map envisioned by Holmes and Toury needs today to be updated and brushed up. We need, for instance, room for artificial intelligence and NLP, and for neuroscientific approaches as well. But that is a topic for another chapter. CTIS seems ready and able to fulfil its role within the old disciplinary dream laid out by Toury and Holmes: one strand among several contributing to an empirical discipline based on the scientific method.

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