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Acknowledging connections between Reading and Translation Studies: a bibliographical review

O reconhecimento das conexões entre a Leitura e os Estudos da Tradução: uma revisão bibliográfica

Claudia Marchese Winfield*

Lêda Maria Braga Tomitch**

Abstract: This article presents a bibliographical review of cognitive process-oriented research in translation, focusing on the intersection of the areas of Translation Studies (TS) and Reading. The objective of the study is to identify points of contact between the fields in terms of theoretical and methodological aspects. A broader account of process-oriented research in TS is carried out (FERREIRA; SCHWIETER 2014; HURTADO ALBIR *et al*. 2015, among others), followed by a review of reading and translation (SHREVE *et al*. 1993, and others). Overall, findings indicate that task purpose and translators' experience influence reading in translation, yet reading, translation, and reading during translation entail parallel processes of a different nature that are associated in reading during translation.

* Professora do Departamento de Letras e do Programa de PósGraduação em Letras da Universidade Tecnológica Federal do Paraná. E-mail: claudiam@utfpr.edu.br http://orcid.org/0000-0002-3215-2506)

** Doutora em Letras (Estudos da Linguagem) (UFSC). Professora Titular do Departamento de Língua e Literatura Estrangeiras da Universidade Federal de Santa Catarina, atuando no Programa de Pós-Graduação em Inglês: Estudos Linguísticos e Literários. E-mail: leda@cce.ufsc.br

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Resumo: Este artigo apresenta uma revisão bibliográfica sobre pesquisas orientadas a processos cognitivos em tradução, tendo como foco a intersecção das áreas de Estudos da Tradução (ET) e Leitura. O objetivo do estudo é identificar os pontos de contato entre os campos em termos de aspectos teóricos e metodológicos. Desenvolve-se uma apresentação mais ampla da pesquisa em processos em Estudos da Tradução (ET) FERREIRA; SCHWIETER 2014; HURTADO ALBIR *et al*. 2015 entre outros), seguida de uma revisão sobre leitura e tradução (SHREVE et al. 1993, e outros). De modo geral, os achados indicam que fatores como propósito da tarefa e experiência dos tradutores influenciam a leitura na tradução; todavia, tradução, leitura e leitura durante a tradução compreendem processos paralelos de naturezas diferentes que são associados quando se lê durante a tradução.

Palavras-chave: interface; processo tradutório, processo de leitura.

Introduction

Not just as common sense indicates, research confirms that translation requires reading processes (DRAGSTEAD 2010; HVELPLUND 2017; JAKOBSEN; JENSEN 2008; SHREVE *et al*. 1993). Yet, process-oriented research in TS may seem to have benefitted from investigations about reading during translation. In this article, we review studies focusing on reading and translation interface. Therefore, the objective of this article is to discuss the connection between studies in the aforementioned fields, considering points of contact between the cognitive processes involved in reading and translation activities. Some of the convergence points examined in the present paper include reading and/or translation purposes, participants' experience as L2 readers and/or translators, and as well as data collection and analysis methods employed in the two areas of research.

This qualitative bibliographical review stems from readings developed during a doctoral study about inferential processes investigating the reading and translation interface (WINFIELD 2014). From that basis, studies in the literature about the reading process in translation have been selected for this paper departing from research on inferences in reading GRAESSER; TRABASSO; SINGER 1994; GOLDMAN; GRAESSER; VAN DEN BROEK 1999; VAN DEN BROEK; RISDEN; HUSEBYE-HARTMANN 1995; VAN DIJK; KINTSCH 1983), as well as studies about

reading in translation (SHREVE *et al*. 1993, GÖPFERICH; JAKOBSEN; MEES 2008, JAKOBSEN; JENSEN 2008).

The review has been extended and updated to include recent contributions to the theme, hence, the present authors searched *www-periodicos-capes* using the following keywords: reading and translation interface, reading and translation cognitive processes filtering studies from 2019 to 2022. From that search, four articles were found. After reading the title and abstract of those articles, three articles were chosen considering the closeness of the articles to the topics searched (DOTTORI *et al*. 2020; GONÇALVES 2020; WINFIELD; FONSECA; TOMITCH 2019). Furthermore, John Benjamin's database on Translation Studies was consulted using the search words: reading and translation, 121 articles, and 17 books were found. In order to refine the search, the word "type" was included and a filter for articles published since 2015 was applied. From that search, four articles were found, and after reading the article's title and abstract and an article by Hvelplund (2017) was selected due to its relevance to the present study.

After explaining the method used to update the sources used in the review, the following section presents a brief overview of process-oriented TS. Currently, researchers refer to the area as Cognitive Translation Studies (CTS), given the materialization of the recent field. Therefore, contributions from TS are described to contextualize the emergence of studies examining reading in translation.

1. A brief account of process-oriented research

Although TS is a relatively recent field of knowledge, considering that the establishment of TS as a field of study is marked by Holmes' article (1988), TS research has been quite prolific during the last decades, and studies on cognitive aspects of translation seem to have matured considerably. As previously mentioned, for the scope of this article, the review of the literature in TS is intended to contextualize the reading and translation processes interface. As a result, this is not an extensive account of studies in the field,

but it presents an examination of similarities between reading and translation processes. For a comprehensive review, the present researchers strongly recommend the following publications: *Translation and Cognition* (SHREVE, ANGELONE 2010), *The Routledge Handbook of Translation* edited by Alves and Jakobsen (2020) and an issue published by John Benjamin's journal entitled *Translation, Cognition & Behavior* (2021).

For an overview of experimental and cognitive approaches to TS, it is worth drawing on Hurtado Albir *et al*. (2015), since the authors published a comprehensive account of translation research according to a cognitive perspective of empirical and experimental nature. In terms of theoretical development, Hurtado Albir *et al*. (2015) explain that several models of translation processes have already been proposed and tested. For instance, Bell's linguistic and psycholinguistic model (1991), Kiraly's sociological and psycholinguistic model (1995), Gutt's model (1989), Gile's effort model (1995/2009) as well as the Translation Competence Model (PCTE 2003) among others, and opened possibilities of further research. As for methodological aspects, Hurtado Albir *et al*. (2015) divided the area of research into three phases concerning data collection methods and tools. The first phase focused on text translation processes that used introspective methods such as think-aloud protocols (TAPs). The second phase is characterized by triangulation methods using retrospective protocols, questionnaires, interviews, and the use of new data collection possibilities with key-logging software. Amongst the software available, we highlight Translog © (JAKOBSEN; SCHOU 1999, as cited in HURTAO ALBIR *et al*. 2015), which was developed initially in 2000 at Copenhagen Business School and has been used in several empirical studies. New versions of the software were launched in 2006, then in 2012, with the latter including eye-tracking facilities. Additionally, data screen capture software such as Camtasia and Proxy, among others, have been used in empirical studies (HURTADO ALBIR *et al*. 2015). Translog © has enabled researchers to collect behavioral data and triangulate it with other data collection instruments previously mentioned, including TAPs, retrospective protocols, questionnaires, and interviews, therefore strengthening research findings with behavioral data.

Similarly, the authors describe the third phase as characterized by new research tools that exerted an impact on processes-oriented translation research as eye-tracking tools were developed, especially because they could unveil information that keystrokes could not show. Eye-tracking tools have been used by several research groups such as CRITT (Centre for Research and Innovation in Translation and Translation Technology), LETRA (Laboratory for Translation & Experimentation in Translation, PACTE (Process in the Acquisition of Translation Competence) among others (HURATO ALBIR *et al*. 2015; BEVILAQUA 2018).

All in all, after reading Hurtado Albir *et al*.'s (2015) review of process-oriented research in TS, readers are likely to conclude that the field has gone through rapid development in terms of research methods, tools and findings, but since this is a relatively new area, further developments are expected. Studies have generated translation competence models, as well as findings about the cognitive effort involved in translation, considering professional and non-professional translators and translation students.

Topics of research interest in process-oriented TS encompass descriptive models of translation processes, cognitive issues related to the translation activity, translation tasks, models of translation competence, translators' decision-making processes, translation sub-processes, translators' individual differences, and data collection methods among other issues (SCHWIETER; FERREIRA 2014). Research in TS from a cognitive perspective has increased considerably in the last three decades; therefore, scholars have recently proposed to refer to the area as Cognitive Translation Studies (ALVES, JAKOBSEN 2020; CHEN 2020).

Recently, advances in the area have been discussed in terms of research methods, findings, and potential for generalizations (MELLINGER; HANSON 2022). Mellinger and Hanson (2022) stress the challenges of accessing mental processes in translation research, especially the factors that may influence Cognitive Translation and Interpreting Studies (CTIS). Behavioral, cognitive, emotional, social, and affective dimensions are involved in translation phenomena and influence theories and methods of research. Bearing that in mind, Mellinger and Hanson (2022) focus on the issue of ecological validity and distinguish internal

from external ecological validity. According to the authors, internal validity is connected to adequate control of variables so that research provides reliable results and may be achieved in well-structured experimental design. External validity, on the other hand, is associated with generalization and extrapolation of results to real-life contexts, situations, or activities, which may be possible in qualitative paradigms.

The authors contend that the field needs more reflection about the ecological validity of research since they have identified problems associated with results from experimental studies that are based on samples that are not representative of the diversity of translation phenomena in the real world. In contrast, qualitative research may not provide hard data that is necessary for generalizations. To deal with that dilemma, the aforementioned authors recommend the examination of factors connected to the environment in which studies are conducted, as well as tasks, materials, data collection, and analysis methods in order to safeguard ecological validity. In addition to ecological validity, the authors suggest more varied research paradigms, contexts and purposes may benefit research quality in TS. Lastly, the authors advise replication of studies and exploratory research of naturalistic conditions followed by experimental designs to test naturalistic research findings.

All in all, the areas of Cognitive Translation Studies (CTS) and Cognitive Translation and Interpreting Studies (CTIS) have opened new opportunities for researchers, also current studies indicate that the field is maturing. After this contextualization, the connection between reading and translation is discussed in the next section of this paper.

2. Reading and Translation Interface

The starting point of this section is the article entitled "Is there a special kind of 'reading' for translation?" (SHREVE *et al.* 1993) published in *Target*. Shreve and his group were among the first scholars to investigate the reading and translation interplay. The study departed from the following hypothesis: "If reading for comprehension is embedded in a translation task, quantitative measures of the reading process will indicate the influence of the translation

task" (SHREVE *et al*. 1993: 27). An experimental approach was used to test the hypothesis involving three participant groups named as follows: TRANS (professional translators studying for their M.A.), PARA (M.A. and Ph.D. students of English), and COMP (13 M.A. and Ph.D. psychology students). Each group was assigned a reading task with a specific reading purpose. The TRANS group was supposed to read a text to translate it; the PARA group was to read a text to paraphrase it and the COMP group had to read a text for general comprehension purposes. As the investigation attempted to identify reading as a component process of the translation process, measures of the reading phase such as reading times and identification of problems in clauses in translation were taken to examine whether reading would influence the translation task.

Study procedures involved the presentation of 97 clauses on a computer screen so that readers could backtrack whenever necessary during data collection. There were no time controls for either task, apart from the task starting time. Participants were asked to read each sentence at a time and while reading, mark any potential problems they found in them if they would be translated or paraphrased/comprehended. Results indicated that translators seemed to become aware of the potential problems for the tasks, but did not attempt to solve them because the study design was based on the exhibition of sentences a computer screen one at a time. Nevertheless, results corroborated previous research findings in reading research about comprehension progressing while reading.

The main findings relate to a higher variety of comprehension processes applied by the translators, compared to general readers across the study tasks, which may, in turn, suggest that translation practice may impact readers' profiles. Also, findings seemed to confirm that comprehension processes took place while participants in the TRANS group translated and read the text simultaneously. Although differences across groups and tasks were not remarkable, Shreve *et al*. (1993) suggested the possibility of different strategies applied in reading for translation, such as reading the whole text for general comprehension, then subsequently translating it, or reading for detail and solving translation problems as they appeared, but that point remained opened for future research.

We contend that more detailed definitions and descriptions of translation and reading strategies could elucidate findings in future research intended to reexamine these research findings. On the whole, reading purposes appeared to influence the way participants read the study text in Shreve *et al*. (1993), in the sense that participants who read for translation seemed to engage in reading in-depth to a greater extent, in comparison to reading for general comprehension. The influence of this factor is also noticeable in other studies that examined the effect of reading purpose across translation and comprehension tasks ranging from reading aloud (MACIZO; BAJO 2009) to answering comprehension questions (ALVES; PAGANO; DA SILVA 2011), or summarizing (WINFIELD 2014; WINFIELD; FONSECA; TOMITCH 2019).

With technological advances provided by eye-tracking tools for data collection, studies could investigate comprehension processes in translation in more detail since these tools can illustrate what the human eye does when reading takes place. Eye fixation studies in the field of Reading date back to the beginning of the twentieth century (JUST; CARPENTER 1980) and inspired this fundamental article in the field. Just and Carpenter (1980) carried out an experimental study about eye fixations over text segments, which they have denominated as *gaze* to propose a model of reading comprehension. According to the model proposed in the study, "gaze durations reflect the time to execute comprehension processes" (JUST; CARPENTER 1980: 330). In addition to that, these researchers have considered saccades, which can be understood as the eye movements along the text while reading, as indicative of text processing, since they can be backward well as forward, and may characterize reading paths.

The influence of studies involving eye fixations has influenced process-oriented translation research as can be observed in Jakobsen and Jensen (2008), who have reported their study comparing student and professional translators in four cognitive tasks, namely, reading for comprehension; reading for translation; sight translation and written translation. This subdivision of translation into four sub-processes allowed for a detailed examination of the complexity of activities involved in translation. The study used eye-tracking tools, which enabled thorough analysis of reading processes considering

variables such as pauses, gaze time, and fixations on source text (ST) and target text (TT) as evidence of reading behavior during the performance of the study tasks. A very remarkable result is the fact that gaze times increased in the second task, reading for translation, in all the study's participants, which indicates in-depth or detailed reading when reading for translation. On the other hand, longer times spent on fixations during TT production were observed among professional translators. Findings suggest that there were longer revision processes on the part of professional translators in comparison to students' data (JAKOBSEN; JENSEN 2008).

Moreover, it is worth pointing out that the research carried out by Jakobsen and Jensen (2008) was published in Göpferich; Jakobsen and Mees (2008), a two-volume publication about empirical research of cognitive processes in translation. The 2008 volume compiles articles about reading and translation research carried out using eye-tracking and key-logging tools that have managed to change the way reading for translation has been understood in the field. One of the main assumptions challenged by Göpferich, Jakobsen and Mees (2008) is the notion that segmentation processes in translation are mostly linear. Empirical data with gaze patterns suggest that comprehension and production may overlap in a segment that is being read and translated. Another relevant finding is related to pauses since, according to eye-tracking data, pauses appear to signal peaks of effort spent on coordinating comprehension and production processes.

Incidentally, there have been studies using eye-tracking data in which fixations were not interpreted as indicators of comprehension processes exclusively, but were also seen as indicators of translation planning before TT production (DRAGSTEAD 2010). That research has discussed a possible interface between reading and writing processes with translation processes from a cognitive perspective. Two groups of participants performed four cognitive tasks, that is to say, reading for translation, translation with no time constraints, translation with time constraints, and a vocabulary task. Eye-tracking and key-logging were recorded from a computer screen split into two parts approximately equal in Translog II. Results from reading for translation differed from students to professional translators because translators seemed

to plan their rendering of the ST into TT while reading the ST. Furthermore, professional translators presented constant and fast shifts of attention from the ST window to the TT window as a new unit of text translation was typed and back to the ST, thus Dragstead (2010) inferred that professional translators processed ST and TT online. The author referred to this pattern of behavior as *integrative coordination*. In other words, one could state that a pattern of *integrated coordination* is, characteristically, a pattern of parallel processes. In contrast, student translators first read the text to comprehend it, and only when they appeared to be satisfied with the meaning constructed from reading did student translators engage in TT production. Dragstead (2010) called this pattern *sequential coordination*.

The distinction between sequential and parallel processing had been previously established in Danks and Griffins (1997) in a study that compared reading for comprehension and reading for translation. The authors considered that task variables could influence cognitive processes in reading for comprehension and reading for translation. They also assumed that most professional translators did not read the ST before starting to translate it, instead, they proposed that translators developed ST comprehension along with the ST translation. To examine the study assumptions, task, text, and the participants were analyzed. The participants of the study were Spanish-English bilinguals and Spanish-English translators. Those participant groups were formed to consider two different views of language learning: language as object and language as meaning.

Danks and Griffin, (1997) define language as object as the view of language learners have when they are learning a given language. In this case, language is seen as an object and its characteristics, for instance, phonetic features, syntax, and word formation or structural features are the focus of interest. In contrast, language as meaning is the understanding of language in its communicative, pragmatic, and meaning construction potentials. The focus of interest is on the meaning expressed in language, rather than on language structures. Study results showed a slight increase in reading times when translators anticipated translation difficulties. This result does not seem to converge with the view of language as an object of study being typical of

language learners, since translators are supposed to be experienced language users. Therefore, they would view language as an object of meaning. However, translators often encounter moments when the source language is not only a source of meaning, but an element that translators may need to analyze when transforming ST into TT.

Bearing that in mind, it may be possible to assume that in the interface between reading and translation, both experiences of language occur, as the following quote implies: "Maintaining this dual perspective – language-as-object and language-as-meaning – is a critical aspect of the translator's task" (DANKS; GRIFFIN 1997: 168). As readers develop their reading skills, they will experience language as a source of meaning as they did when developing their first language. When dealing with a text for translation, translators will often experience language as an object again. Another aspect of the reading and translation interface resides in Danks and Griffin (1997) claim that more skilled comprehenders are more likely to process ST at higher levels of processing.

Other previous studies which have investigated reading and translation processes have noticed a difference between them. For instance, Macizo and Bajo's (2006) study compared the horizontal approach to translation processes with the vertical approach by examining reading for repetition and reading for translation in a study involving the Spanish-English language pair. According to the authors, horizontal processing relates to the assumption that in translation, target language processing begins while the source language is still being processed. On the other hand, the vertical view is based on the understanding that target language processing begins only after the source language completes processing. The researchers carried out a sentence-level study with two experiments using two reading tasks that involved reading for comprehension and reading for translation on the Spanish-English language pair. Results from the two experiments indicate that comprehension was faster for reading for comprehension than reading for translation. The research has confirmed that the horizontal view of translation processes predicts that target language processing begins before the conclusion of source language processing is achieved. It has suggested a dynamic view that presumes parallel processing.

The horizontal approach foresees online reformulation processes, while the vertical approach presumes offline reformulation.

Additionally, studies have identified more skilled processing by examining reading times for three phases of translation, namely, the reading phase, the drafting phase, and the revision phase by recognizing a tendency for higher reading times spent on TT production in more experienced translators in contrast to general readers (ALVES 2003, BUCHWEITZ; ALVES 2006, JAKOBSEN 2002), in the sense that these results may relate the effect of experience on translation performance. The aforementioned differences between the way general readers and translators process a text are justified because translators who participated in the study presented more detailed and deliberate reading behavior in comparison to the other readers; also, translators varied more in the type of reading they presented.

In a similar vein, Alves, Pagano and da Silva (2011) performed a partial replication of Jakobesen and Jensen's (2008) research that investigated the influence of reading processes on translation, triangulating eye-tracking, and key-logging data with introspections from participants' retrospective verbal protocols. Reading for three purposes was analyzed, involving reading a text to answer comprehension questions, reading to orally summarize a text, and reading a text to subsequently sight translate it.

The first study assumption tested claimed that eye fixations/gaze would be longer as a function of task complexity. Reading for comprehension questions was considered the least demanding task, while reading for sight translation was seen as the most demanding task. The second assumption was about tendencies of gaze in the terms of eye fixation results being similar regardless of the two study conditions, namely, text topic and rhetorical structure. Task order was altered across the study groups consisting of translation students and professional translators. The study encompassed two conditions, with text complexity as the first condition and text topic as the second condition. Reading times, and quantity of eye-fixations/gaze were recorded and analyzed. Results have identified students' longer task times across the study tasks, in line with Jakobsen and Jensen (2008). In general,

results confirmed the first assumption that reading purpose exerted an influence on eye-fixations/gaze times.

Reading times increased as a function of task complexity, but, differently from Jakobsen and Jensen's (2008) results, reading for comprehension seemed to be more demanding than reading for oral summarization. Perhaps the study tasks used in Alves, Pagano and da Silva (2011) impacted their partial replication study results equivalently to Jakobsen and Jensen's (2008), since tasks in the latter entailed reading for comprehension, reading for translation, reading during oral translation, and reading during written translation, whereas the research by Alves, Pagano and da Silva (2011) consisted of reading for comprehension, reading for oral summarization and reading for oral translation.

Although the impact of task purposes was considered, data collection tools could have influenced results, since the software used in Alves, Pagano and da Silva (2011) was not identical to that used in Jakobsen and Jensen (2008). Also, unexpected results could be related to individual differences in the study's participants. Nevertheless, the fact that the study was a partial replication producing valid results represented an important contribution to research about Reading and TS.

Another study that relied on summary and translation tasks was carried out by WINFIELD (2014). It was a small-scale research with six participants divided into non-professional translators and professional translators performing two different cognitive tasks: reading for summaries and reading for translation. Quantitative data collected from summarization and translation scores were triangulated with behavioral data involving total task time from Translog©, which provided key-logging data. Results revealed that translators had higher scores for the translations produced, while students had higher scores for the summaries produced, however, results were not statistically significant due to the small number of participants. The researcher interpreted these results as indicative of the effect of practice on performance because translators have practice in translation and undergraduate students are very likely to practice summarization in their academic activities. Total task times were shorter for translators for all study tasks across the two texts, but as with the scores for the task products, quantitative results did not reach statistical

significance given the limited number of participants. However, qualitative data collected through retrospective verbal protocols were analyzed to clarify quantitative results. Participants' verbalizations were analyzed to identify participants' inferential processes in both study tasks across the two study texts under the light of the literature from process-oriented research in TS (ALVES 2001, 2003, 2005; GUTT 1989, among others) and reading (GRAESSER; TRABASSO; SINGER 1994; VAN DEN BROEK; RISDEN; HUSEBYE-HARTMAN 1995; VAN DIJK; KINTSCH 1983).

From the qualitative data analysis, four inferential profiles were identified as follows: a *dynamic, coherent, and comprehensive situation model - builder inferential profile;* a *somewhat dynamic, coherent, and comprehensive situation model - builder inferential profile; an insufficient inferences and incomplete situation model builder inferential profile; a not sufficiently coherent or comprehensive inferential profile* as described below. The characteristics observed in the profiles were in line with models of reading comprehension (VAND DEN BROEK *et al*. 1995; VAN DIJK; KINTSCH 1983) and with previous studies in TS (ALVES 2003, 2005; ALVES *et al*. 2001; GUTT 1989, among many others).

A *dynamic, coherent, and comprehensive situation model-builder inferential profile* referred to participants who were able to construct a coherent situation model during the two study tasks across the two texts used in the study by drawing plausible inferences at local and global levels who had high standards of coherence and demonstrated the ability to update their situation models as their comprehension processes developed while reading for summaries, as well as reading for translation.

A *somewhat dynamic, coherent, and comprehensive situation model - builder inferential profile* related to participants who were able to construct a coherent representation of the two study texts under the two study conditions, but inferences were mostly at local levels when performing the reading for translation task, but generated global, elaborative inferences for the summarization task.

Insufficient inferences and incomplete situation model builder inferential profiles were observed in those participants who presented more general and vague situation models. Inferences were mostly at global levels,

evaluative in general, and in smaller quantity compared to the two aforementioned profiles.

Finally, *a not sufficiently coherent or comprehensive inferential profile* presented few inferences and vague situation models as in the previous profile, but, additionally, exhibited certain inaccurate comprehension of the texts caused mostly by non-plausible inferences.

The abovementioned profiles illustrate points of contact in reading for translation and reading for summaries, based on the situation models constructed in the processing of both reading purposes. Therefore, convergence points concerning the effect of task purpose on text processing may be acknowledged between the fields of Reading and Translation according to the aforementioned studies, as well as the identification of parallel processes of reading and translation during the drafting phase of translation.

More recent studies about reading and translation are in line with the horizontal view as they appear to tackle parallel processing. This leads to Hvelplund's (2011) study on automatization and expertise because considering that proficient typing is automatic, attention can be given to comprehension of the ST and mental encoding of the target language. It is also possible to propose that the next ST unit is being read and its corresponding structure is being constructed according to data collected in Hvelplund's (2011) research. Further developments are present in Hvelplund (2017), an experimental study about the distribution of attention and cognitive effort in translation for subtitling which has provided a categorization of four reading types conceived within the perspective of reading during translation.

The four reading types are as follows: reading the source text, reading the source text while one translates it, reading the target text while it is still in progress, and reading the final target text. In contextualizing this categorization, the author refers to purpose as a "universal factor" (HEVELPLUND 2017: 55) and proposes that this factor influences reading more than text type and familiarity in the context of reading for translation. It is worth considering that in addition to reading before translation, reading also refers to reading the target text in production to monitor its emergence, as well as reading the final target text. Therefore, one can say that reading for translation and during

translation are cognitively complex activities; fortunately, this complexity has been more open to examination due to technological advances, especially with the advent of eye-tracking tools.

Having said that, it is fair to understand that cognitive resources play a fundamental role in reading for translation and reading during translation, hence effective reading may require momentary word meanings associations that are not too extensive because not every possible interpretation of a word on lexical, syntactic or semantic level is possible to be kept active in working memory since working memory capacity of human beings is limited (JUST; CARPENTER 1980b and many others).

Hvelplund (2017) points out that monolingual reading and reading for translation or while translating differ. Typically, monolingual reading flows steadily, with short, limited fixations of approximately 205-225 milliseconds, while reading while translating fixations are of approximately 212-218 milliseconds, and flow is interrupted for several actions including looking up words in the dictionary, monitoring typing and reading the ST (JAKOBSEN; JENSEN 2008). Research findings indicate that reading during translation presents more cognitive processes on local and global levels between ST and TT in comparison to reading for comprehension (HVELPLUND 2017).

Hvelplund (2017) reports significant differences between reading during translation and monolingual reading in terms of the number of propositions constructed, held active, and selected. Additionally, attention seems to be distributed to ST reading and TT production, a fact that has cognitive and processing implications since Baddeley (2007, as cited in HEVELPLUND 2017) states that according to his model of working memory structure, attention cannot be focused on two tasks at the same time. A possible assumption is that attention is shifted from ST reading to TT typing quickly throughout the translation process.

Although not directly examining reading in translation, it is worth referring to Gonçalves (2020) as the researcher who carried out an examination of inferential processes in translation observing the relationship between processing effort and cognitive effect using eye-tracking, key-logging, and

retrospective protocol data. Results have demonstrated a correlation between eye fixations, processing effort, and cognitive effect.

Lastly, the connection between reading and translation as integrative mechanisms of interpreting is present in a recent study that has triangulated behavioral from study tasks and neural data from EEG (DOTTORI *et al.* 2020). Participants in the study were divided into professional simultaneous interpreters and non-professional bilinguals who performed L1 and L2 reading, forward translation (L2 to L1) and back-translations (L1 to L2). Behavioral data has shown faster response times in the translation tasks by the professional simultaneous interpreters' group, while neural data has indicated higher delta-theta (1-8Hz) power in that group, compared to non-professional bilinguals in all study tasks. Moreover, back-translation tasks exhibited more extensive power in brain areas compared to the other study tasks, strengthening previous studies' claims that professional training in back-translation may influence neural activity. Nevertheless, considering professionals' performance across the study tasks, Dottori *et al.* (2020) have interpreted overall results as evidence that when processing demands were high both reading and translation, professionals' brain activity was distinctively marked.

Final Remarks

This review has examined process-oriented research in the field of TS that investigated the interface between reading and translation processes. Given the scope of the article, we selected studies that had influenced the field's understanding of what reading and translation points of convergence and divergence are.

Findings from this bibliographical review point to the consolidation that both reading and translation are complex cognitive activities that entail parallel processes of different natures. In contrast to reading, translation requires coordination of reading and writing processes, whereas proficiency in reading and translation seems to correlate with parallel processes that occur online for both activities. In terms of factors that influence processing, the present study has identified a consensus as regards the effect of purpose and translators' experience, observed in most studies analyzed in this review.

Moreover, this study acknowledges advances in data collection tools such as eye-tracking and key-logging software that have enabled the gathering of more detailed behavioral data, especially eye-tracking tools as they offer a closer examination of reading. Future research may benefit from these tools and the knowledge built by studies similar to the ones presented in this bibliographical research. Although this review has not focused on screen-recording tools or neuroscience tools, it suggests further bibliographical research that has used these tools since they promise new findings about what happens in the human brain and mind when reading and translation are performed.

Finally, we hope that this contribution motivates new investigations and that knowledge constructed in research will be applied to translators' education. Above all, it seems clear that the body of knowledge from the field of CTS and Reading can "converse" and exchange, methods, tools, theories, and new insights.

References

ALVES, F. A triangulação como opção metodológica em pesquisas empírico-experimentais em tradução. In: PAGANO, A. S. (Ed.). *Metodologias de pesquisa em tradução*. Belo Horizonte: UFMG, 2001: 69-92.

ALVES, F. Tradução, cognição e contextualização: triangulando a interface processo-produto no desempenho de tradutores novatos. *D.E.L.T.A.*, v. 19, 2003: 71-108. https://doi.org/10.1590/S0102-44502003000300006.

ALVES, F. Cognitivo e efeito contextual em tradução: relevância no desempenho de tradutores novatos e expertos. *Linguagem em (Dis)curso*, v. 5, Tubarão, 2005: 11-31. Retrieved from https://www.researchgate.net/publication/277124067_Esforco_cognitivo_e_efeito_contextual_em_traducao_relevancia_no_desempenho_de_tradutores_novatos_e_expertos.

ALVES, F.; PAGANO, A. S., DA SILVA, I. Towards an investigation of reading modalities in/for translation: An exploratory study using eye-tracking data. In O'BRIEN, S. (Ed.). *Cognitive Explorations of Translation*. London: Continuum International Publishing Group, 2011: 175-196.

ALVES, F.; JAKOBSEN, A. L. *The Routledge Handbook of Translation and Cognition*. 1st Ed. Oxon: Routledge. 2020.

BELL, R. T. *Translation and translating*. London: Longman, 1991.

BEVILAQUA, C. R. As propostas de Nord e Hurtado Albir: aproximações teóricas nos estudos de tradução. *DELTA*, 34 (1), Jan-Mar, 2018: 435-448. Available at https://doi.org/10.1590/0102-445047386154652671 (10/09/2022).

BUCHWEITZ, A.; ALVES, F. Cognitive adaptation in translation: an interface between language direction, time, and recursiveness in target text production. *Letras de Hoje*, v. 41, n. 2, 2006: 241-272. Retrieved from https://revistaseletronicas.pucrs.br/ojs/index.php/fale/article/view/601. (15/09/2022).

CHEN, Y. An overview of Cognitive Translation Studies. *Canadian Social Sciences*. Vol. 16, 5, 2020: 39-43. DOI: 10.3968/11732. Available at http://www.cscanada.net/index.php/css/article/view/11732/11572. (19/09/2022).

DANKS, J. H.; GRIFFIN, J. Reading and translation. In DANKS, J. H.; SHREVE, G. M.; FOUNTAIN, S. B.; MCBEATH, M. (Eds.). *Cognitive processes in translation and interpreting*. Thousand Oaks, CA: Sage, 1997: 161-175.

DOTTORI, M.; HESSE, E.; SANTILLI, M; VILAS, M. G.; CARO, M. M.; FRAIMAN, D.; SEDEÑO, L.; IBÁÑEZ, A.; GARCÍA, A. M. Task-specific signatures in the expert brain: Differential correlates of translation and reading in professional interpreters. *NeuroImage*, Volume 209, 2020: 01-10. ISSN 1053-8119. https://doi.org/10.1016/j.neuroimage.2020.116519. Retrieved from https://www.sciencedirect.com/science/article/pii/S1053811920300069. (19/09/2022).

DRAGSTEAD, B. Coordination of reading and writing processes in translation: an eye on uncharted territory. In: SHREVE, G. M.; ANGELONE, E. *Translation and Cognition*. Amsterdam/Philadelphia: John Benjamins Publishing Company, 2010: 41-62. https://doi.org/10.1075/ata.xv.04dra.

FERREIRA, A.; SCHWIETER, J. W. *The development of translation competence: Theories and methodologies from psycholinguistics and cognitive science*. Newcastle upon Thames: Cambridge Scholars Publishing. 2014.

GILE, D. *Basic concepts and models for interpreter and translator training*. Amsterdam/Philadelphia: John Benjamin's. 1995/2009.

GOLDMAN, S.; GRAESSER, A. C.; VAN DEN BROEK, P. (Eds.). *Narrative comprehension, causality, and coherence: Essays in honor of Tom Trabasso*. New Jersey: Lawrence Erlbaum Associates Publishers. 1999.

GÖPFERICH, S., JAKOBSEN, A. T. (Eds). *Looking at eyes: eye-tracking studies of reading and translation processing*. Frederiksberg: Samfundslitteratur, 2008.

GRAESSER, A. C.; TRABASSO, T.; SINGER, M. Minimal or global inference during reading. *Journal of Memory and Language*, v. 33, 1994: 421–441.

GUTT, E. A. *Translation and Relevance*. 1989. (Dissertation of Master). University College London Doctoral, London, 1989. 309 p. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://discovery.ucl.ac.uk/id/eprint/1444666/1/U591975.pdf. (18/09/2022)

HOLMES, J. S. The Name and Nature of Translation Studies. In HOLMES, J. S. *Translated Papers on Literary Translation and Translation Studies*. Amsterdam: Rorodopi, 1988: 67-80. https://doi.org/10.1075/target.1.2.10gor. (19/09/2022).

HVELPLUND, K. T. Four fundamental types of reading during translation. In: *Translation in Transition: between cognition, computing and technology*. USA: John Benjamin's publishing Company. 2017. https://doi.org/10.1075/btl.133.02hve.

HURTADO ALBIR, A.; ALVES, F.; DIMITROVA, B. E.; LACRUZ, I. A retrospective and prospective view of translation research from an empirical, experimental, and cognitive perspective: the TREC network. *Translation & Interpreting*, v. 7, 2015: 5-25.

JAKOBSEN, A. L. Orientation, segmentation, and revision in translation. In: *Empirical translation studies: process and product*. Copenhagen: Studies in Language Series. 2002: 191-204.

JAKOBSEN, A. L, JENSEN, E. H. Eye movement behaviour across four typed of reading tasks. In GÖPFERICH, S., JAKOBSEN, A. L. (Eds). *Looking at eyes: eye-tracking studies of reading and translation processing*. Frederiksberg: Samfundslitteratur. 2008: 103-124.

JAKOBSEN, A. L; SHOU, L. Translog Documentation. HANSEN, G. (Ed). Probing the Process of Translation. Methods and Results. *Copenhagen Studies in Language*. Copenhagen: Samfundslitteratur. 1999.

JUST, M. A.; CARPENTER, P. A. A theory of reading: from eye fixations to comprehension. *Psychological Review*, v. 87, n. 4, 1980: 329-354.

KINTSCH, W.; VAN DIJK, T. A. Toward a model of text comprehension and production. *Psychological Review*, v. 85, 1978. https://doi.org/10.1037/0033-295X.85.5.363. (19/09/2022).

KIRALY, D. C. (1995). *Pathways to translation: Pedagogy and process*. OH: The Kent State University Press.

MACIZO, P.; BAJO, T. M. Schema activation in translation and reading: a paradoxical effect. *Psicológica*, v. 30, 2009. https://pesquisa.bvsalud.org/portal/resource/pt/ibc-73742

MACNAMARA, D. S.; MAGLIANO, J. Toward a comprehensive model of comprehension. In: ROSS, B. (Ed.). *The Psychology of learning and motivation*. Burlington: Academic Press, 2009: 297-384. https://doi.org/10.1016/S0079-7421(09)51009-2.

MELLINGER, C. D.; HANSON T.A. Considerations of Ecological Validity in Cognitive Translation and Interpreting Studies. *Translation, Cognition, & Behavior* 5(1), 2022: 01-26. https://doi.org/10.1075/tcb.00061.mel.

PACTE. Building a Translation Competence Model. In: ALVES, F. (Ed). *Triangulating Translation: Perspectives in process oriented research*. Amsterdam: John Benjamin's. 2003: 46-66. https://doi.org/10.1075/btl.45.06pac.

SHREVE, G. M.; ANGELONE, E. *Translation and Cognition*. Amsterdam/Philadelphia: John Benjamin's Publishing Company, 2010. https://doi.org/10.1075/ata.xv.01shr.

SHREVE, G.; M.; SCHÄFFNER, C.; DANKS, J. H.; GRIFFIN, H. Is there a special kind of "reading for translation": an empirical investigation of reading in the translation process? *Target*, v. 5, n° 1, 1993: 21-41.

TRANSLATION, COGNITION & BEHAVIOR. John Benjamin's Publishing Company. Available at https://benjamins.com/catalog/tcb. (15/09/2022).

VAN DEN BROEK, P.; RISDEN, K.; HUSEBYE-HARTMANN, E. The role of readers' standards for coherence in the generation of inferences during reading. In: LORCH, R. F.; O'BRIEN, E. J. (Eds.). *Sources of coherence in reading*. New Jersey: Lawrence Erlbaum Associates, 1995: 353-373.

VAN DIJK, T. A.; KINTSCH, W. *Strategies of discourse comprehension*. New York: Academic Press. 1983.

WINFIELD, C. M. *Inferential profiles emerging from Reading for summarization and Reading for translation tasks: an exploratory study*. Doctoral Dissertation. Universidade Federal de Santa Catarina, Florianópolis. 2014:376 https://repositorio.ufsc.br/handle/123456789/129094.(19/09/2022). (19/09/2022).

WINFIELD, C. M.; FONSECA, N. B. L; TOMITCH, L. M. B. Analyzing the influence of reading purpose and translation experience on summary and translation tasks: an exploratory-experimental study. *Domínios de Lingu@gem*, v. 13, 2019: 712-742. DOI: 10.14393/DL38-v13n2a2019-1.