



The International Journal for  
Translation & Interpreting  
Research

[trans-int.org](http://trans-int.org)

# Directionality in translation: Investigating prototypical patterns in editing procedures

*Norma Barbosa de Lima Fonseca*  
Federal University of Minas Gerais  
[normafonseca@gmail.com](mailto:normafonseca@gmail.com)

DOI: [ti.106201.2015.a08](https://doi.org/10.106201.2015.a08)

**Abstract:** This article aims at investigating the impact that directionality—Brazilian Portuguese into English and English into Brazilian Portuguese—may have on editing procedures performed by translators when processing translation units (TUs) during the drafting and revision phases. Eight professional translators participated in the study. The data consist of keystroke log files, eye-tracking data, questionnaires, and verbal protocols and are triangulated (Jakobsen, 1999b, 2006; Alves, 2001, 2003) during analysis to provide a more comprehensive view of the observed phenomenon and to allow for possible generalizations to be made. The analysis in particular focuses on the identification of macro TU categories as well as translators' profiles and subprofiles. The results indicate that directionality did not affect the number of macro TU categories; however, directionality appears to have an impact on the identification of profiles and subprofiles. Moreover, the results suggest a different translator profile or subprofile during inverse translation. These results may be applicable to translator pedagogy and highlight the importance of deliberate practice in direct and inverse translation and its relationship to the translators' monitoring of the translation process.

**Keywords:** directionality in translation; prototypical patterns; editing procedures; micro/macro translation units, translators' profiles and subprofiles.

## 1. Introduction

In the field of translation process research, there is a need to further investigate cognitive processing of professional translators in order to complement previous studies (Jakobsen, 2005a, 2005b; Dragsted, 2004, 2005; Alves & Vale, 2011). Research in this area may include the identification of prototypical patterns of editing procedures according to a number of variables, such as linguistic pair, specific translator profiles and subprofiles, or the translation process phase. Here, prototypical patterns are understood to be the shared attributes or properties that are specific to editing procedures.

This article explores the impact that directionality may have on editing procedures in micro/macro translation units (Alves & Vale, 2009, 2011; Alves & Gonçalves, 2013) and aims to identify translators' profiles and subprofiles. To do so, a study was conducted with a group of eight professional translators who perform four different translation tasks—two translation tasks into their first language (L1), i.e., direct translation, and two into their second language (L2), i.e., inverse translation, during two data collection sessions (DC).

Editing procedures refer to changes made in micro/macro translation units (TUs) during the drafting and revision phases of the translation process. If no changes are introduced in the translation, we consider this type of translation unit to be a P0 micro/macro translation. If revisions only occur during the drafting

phase, this can be considered a P1 macro translation unit. A P2 macro translation unit, in contrast, implies changes made only in the revision phase. Finally, if there are revisions in both phases (drafting and revision), then we consider this a P3 macro translation unit.

Our analysis adopts formulas first proposed by Alves & Vale (2011) that use the number of macro TU categories to identify professional translators' profiles and subprofiles. In this investigation, we seek to answer the following research questions:

- Are the patterns of macro TU categories similar in direct and inverse translation?
- Does directionality impact the translation process and lead to a higher occurrence of P3 macro TUs in inverse translation?
- What is the relationship between directionality and the identification of profiles and subprofiles in direct and inverse translation?

To answer these questions, different tools were used to analyze data collected during the performance of both direct and inverse translation tasks. Keystroke log files, eye-tracking data, questionnaires, and verbal protocols were triangulated (Jakobsen, 1999b, 2006; Alves, 2001, 2003). By analyzing this data, we were able to investigate the impact of directionality on editing procedures during the drafting and revision phases of the translation process. Likewise, we identified translators' profiles and subprofiles of the professional translator participants, which in turn contributes to our understanding of translation expertise.

## **2. Theoretical framework**

### **2.1 Directionality in translation**

It is still widely believed that one should only translate into one's L1, despite inverse translation having been practiced for ages in certain environments (e.g., with languages of limited diffusion). This belief can be related in part to the assumption of some translators and translation scholars that inverse translation tasks are more difficult for most translators. One such scholar is Campbell (1998, p. 57), who asserts what is easy and difficult in both translation tasks:

The two activities are in a way mirror images. In translating from a second language, the main difficulty is in comprehending the source text; it is presumably much easier to marshal one's first language resources to come up with a natural looking target text. In translating into a second language, comprehension of the source text is the easier aspect; the real difficulty is in producing a target text in a language in which composition does not come naturally.

Some studies have already investigated several aspects of the translation process that may indicate the potential influence of directionality on the translation task. In Pavlović's (2007, p. v) study, for example, the participants are novice translators—"university students who have just passed their final translation exam." Participants were asked to perform direct and inverse translation tasks, either in groups or individually. This particular study aims to isolate possible indicators that directionality impacts the translation process and does so in an effort to improve translation pedagogy. Pavlović assumes that the direct and inverse translation tasks manifest differences that can be attributed to the direction of translation. Moreover, these differences can be identified not only

in the translation product, but also in translation process data. Pavlović (2007, p. iv) points out some aspects that she considers relevant, such as the number and type of problems the subjects face, the tentative solutions, how solutions are evaluated and the final decisions made, the resources consulted, subjects' actions and interactions, the arguments used in decision making and the quality of the final product. Pavlović concludes that individuals and groups tend to find the same problems: "Novice translators working collaboratively on non-domain specific source texts were found to encounter similar problems to comparable novice translators working individually on the same texts" (p. 185). Moreover, solutions for those problems are similar, regardless of the direction of translation: "Novice translators working on comparable non-domain specific source texts tend to encounter similar problems, and respond to them with a similar blend of actions/interactions, regardless of direction of translation" (Pavlović, 2007, p. 187). These findings will be discussed further at the end of this article.

Furthermore, the assessment of translation quality in her study indicates that translations were scored higher when performed in groups. Likewise, the product of direct translation task tended to be considered of higher quality, while participants exhibited greater monitoring (evaluation) of their output when translating in this direction. Target text solutions produced during direct translation are more fluent and novice translators showed more internal support — the use of automatic and non-automatic cognitive resources (Alves, 1995) — in this direction. This contrasts with inverse translation, in which external support — the consultation of different sources of documentation (Alves, 1995) — is employed more often, which corroborates studies that suggest it is easier to translate into L1.

Jakobsen (2003) also investigates direct and inverse translation.<sup>1</sup> The participants in his study are four semi-professional translators (MA translation students in their final university year) and five expert translators with at least two years of postgraduate professional experience. The experiment involves the translation of four short texts (two from Danish into English, and two from English into Danish). Jakobsen hypothesizes that inverse translation would be slower for both groups of translators in comparison with direct translation. Second, more revisions were expected in the inverse translation task than in direct translation for both groups, because the author assumes that subjects would struggle more to find equivalents in inverse translation. The third hypothesis addresses segmentation. According to Jakobsen, more segments would be present in inverse translation than in direct translation. The results support two of the three hypotheses, namely that inverse translation was slower than direct translation and there were indeed a greater number of segments in inverse translation. With respect to the number of revisions, Jakobsen (2003) found that there were more revisions in direct translation than in inverse translation, contradicting his initial hypothesis, although the difference was small.

Jakobsen's (2003) findings about segmentation and translation speed are supported by Buchweitz & Alves's (2006) study. In their study, participants were divided into two groups. The first group comprised translation studies graduate students with limited professional experience. The second group consisted of students with heterogeneous professional experience who were enrolled in a graduate diploma course. All of the participants translated two texts—one from English into Portuguese and one from Portuguese into English. Both groups took

---

<sup>1</sup> When referring to direct translation Jakobsen (2003) uses the term 'L1 translation' in contrast with 'L2 translation,' which we refer to here as inverse translation.

more time when translating in the inverse direction, regardless of the group, and their translation processes presented more segments in this direction.

Ferreira (2012) replicates Buchweitz & Alves's (2006) study by investigating directionality in translation using a group of ten professional translators as participants. In her study, Ferreira (2012) controlled for several variables including the task order in an attempt to better isolate directionality as the independent variable. The results show, with respect to total task time, that five professional translators took more time to perform inverse translation and five spent more time in direct translation. Furthermore, Ferreira noticed the existence of what she called a "facilitating effect," which consists of the impact of the order of task execution in the total time spent to perform the tasks. Hence, she observed that when the participants performed direct translation first, they tended to spend less time in performing the second task (inverse translation). However, if participants performed the inverse translation task first, they took less time to perform direct translation. On average participants spent more time on inverse translation than on direct translation. Concerning segmentation, the results of Ferreira's (2012) study indicate an increase of segments in inverse translation.

## **2.2 Editing procedures in translation units**

Alves & Gonçalves (2013) take a different approach to examine directionality in translation. In contrast to Jakobsen (2003), who observes the impact of think-aloud protocols on the amount of revision undertaken in direct and inverse translation tasks, Alves & Gonçalves instead focus on the changes made in translation units during the drafting and revision phases.<sup>2</sup>

Alves's (1995) definition of the translation unit is nuanced further by Alves & Vale (2009, 2011) to describe the concepts of micro and macro translation units. Initially, Alves (1995) defines translation units as source text segments that draw the translator's focus of attention during the translation process. These can be of any size and any nature, and their observation is dependent on the pause interval the researcher wants to investigate. For example, Jakobsen (2005b) proposes the pause interval of 2.4 seconds in Translog files to study instances of peak performance in translation processes.

When Alves & Vale (2009, p. 257) refine the translation unit concept and describe micro and macro translation units, they define a micro translation unit "as the flow of continuous TT production – which may incorporate the continuous reading of ST and TT segments – separated by pauses during the translation process as registered by key-logging and/or eye tracking software." Macro translation units are defined "as a collection of micro TUs that comprises all the interim text productions that follow the translator's focus on the same ST segment from the first tentative rendering to the final output that appears in the TT" (Alves & Vale, 2009, p. 257).

Using the Litterae tool,<sup>3</sup> Alves & Vale (2011) describe target text revisions by grouping macro translation units into three different macro TU categories on the basis of the translation process phase in which the translator modifies the translation units: P1 – a macro translation unit that contains micro units processed

---

<sup>2</sup> The drafting phase, as described by Jakobsen (2002), "runs from the first text production keystroke until the first typing of the final punctuation mark (or equivalent keystroke)" while in the revision phase, "the text that was drafted in the middle phase is reviewed (...) until the translator decides that a translation is ready to be submitted as finished." (Jakobsen, 2002, p. 192–3).

<sup>3</sup> This tool is freely available at [http://letra.letras.ufmg.br/litterae/?locale=pt\\_BR](http://letra.letras.ufmg.br/litterae/?locale=pt_BR).

only in the drafting phase; P2 – a macro translation unit that contains micro translation units produced once in the drafting phase (without any revisions) and changed in the revision phase; and, P3 – a macro translation unit that contains micro units changed both in the drafting and revision phases.

Since changes must be introduced in two different phases of the translation process in order to constitute a P3 macro translation unit, it seems to follow that this macro TU category would imply more cognitive effort during the translation process, especially in inverse translation. Therefore, we draw on Alves & Gonçalves (2013), who assume that the allocation of cognitive processing effort progressively increases from P0 to P3 macro TU. The authors argue that cognitive effort may be smaller for P0 macro TUs because “their implementation takes place in the cognitive flow, with no interruptions that could signal problem-solving activity” and point to automatic, routinized processes taking place in the so-called *Adhoc Block* (Königs 1987 as cited in Alves & Gonçalves, 2013, p. 116; Alves, 1995). When referring to the allocation of cognitive effort in other macro TUs, Alves & Gonçalves (2013) relate it to metacognitive monitoring:

P1 also shows similar automatic processes to P0 but entails some level of metacognitive monitoring. P2 and P3 macro TUs, on the other hand, involve progressively higher degrees of metacognitive activity taking place in the so-called *Rest Block* (Königs 1987; Alves 1995) and point to more conscious and reflective cognitive activity related to problem-solving and decision-making processes. (p. 116)

To contextualize the concept of macro translation units, Figures 1–3 illustrate an example of each:

Aplicar etiqueta	Nome da Etiqueta	P1 \u02
, with little side effects   , with		440246: , with little side efe↵ects
little toxic side effects   , with		449856: ←←←←←←←←←←toxic ←←←←←←←←←←
few toxic side effects		458765: ↵↵↵↵↵↵few

Figure 1: Example of a P1 macro translation unit

Aplicar etiqueta	Nome da Etiqueta	P2 \u02
por inteiro ~ por completo		119310: por inteiro.
		883010: [Mouse][Mouse, 9]completr↵o.

Figure 2: Example of a P2 macro translation unit

Aplicar etiqueta	Nome da Etiqueta	P3 \u02
it is easily used ~ It is easily		422899: it is easily ←←↵↵↵↵used
used		1295691: [Mouse][Mouse]↵

Figure 3: Example of a P3 macro translation unit

As shown in Figure 1, three chunks of the target text are being produced. Each chunk is considered a micro TU,<sup>4</sup> and when grouped together, these constitute a P1 macro TU since all changes are implemented during drafting phase. The second figure shows two micro TUs in the translation process. The first is typed during the drafting phase at 119310 ms without any changes, while the second occurs in the revision phase. Jointly these micro TUs constitute a P2 macro TU since a macro TU is produced in the drafting phase and subsequently

<sup>4</sup> Please note that we use a “|” symbol to separate different micro TUs produced in the drafting phase.

changed in revision phase<sup>5</sup>. Figure 3 illustrates the third macro TU category, with two micro TUs shown. The first micro TU is edited during the drafting phase; once the translator reaches the revision phase of the translation process, he or she introduces additional changes. This generates the final translation product “It is easily used.” As such, this behavior constitutes a P3 macro TU, as a macro translation unit comprising one or more micro TUs that are edited in the drafting phase and are again taken up during the revision phase.

In a more recent publication, Alves & Gonçalves (2013) broaden the classification of macro TU categories and create P0, which corresponds to either micro or macro translation units that are not modified during the translation process as shown in Figure 4:



Figure 4: Example of a P0 macro translation unit

### 2.3 Identification of translators’ profiles and subprofiles

Alves & Vale (2011) use the number of macro TUs to determine a translator’s profile and subprofile. To do so, the authors developed several formulas to specifically identify three types of translator profiles: (1) Drafter; (2) Reviser; and, (3) Drafter/Reviser. The authors also describe two subprofiles: Recursive and Non-Recursive.

According to Alves & Vale’s (2011) classification, a Drafter refers to a translator whose editing procedures consist primarily of P1 macro TUs. This type of translator reviews the target text more than six times in the drafting phase rather than in the revision phase. In contrast, a translator with a Reviser profile is one who reviews the target text more than six times in the revision phase, producing mainly P2 and P3 macro translation units instead of P1 macro translation units. A Drafter/Reviser, in turn, can be described when the sum of P2 and P3 macro translation units multiplied by 6 is greater than the number of P1 translation units, such that macro translation units are more widely distributed. In Alves & Vale’s (2011) formula, only a Drafter/Reviser profile can be further classified using the Recursive or Non-Recursive subprofiles. A translator with a Drafter/Reviser profile and Recursive subprofile edits the same micro translation units in the drafting and revision phases, that is, he or she presents more macro P3 translation units, while a translator with a Drafter/Reviser profile and Non-Recursive subprofile edits different micro translation units in the drafting and revision phases.

Alves & Vale’s (2011) formulas were subsequently reviewed by Daniel Vale after Fonseca’s (2012) pilot study demonstrated that the formulas required modification. The new formulas are reproduced in Table 1. Translators with Drafter or Reviser profiles can have Recursive or Non-Recursive subprofiles. For these profiles to be further classified with a subprofile, however, the translator has to present at least one P3 in the translation process.

Carl et al. (2011) have developed a different method to help to describe similar features in human translation processes. Instead of identifying translators’ profiles and subprofiles based on editing procedures made during the drafting and revision phases, the authors investigate what they call a taxonomy of translation styles. Characteristic styles of a translator’s behavior are determined based on a

<sup>5</sup> In order to represent a change within a macro unit in the revision phase, we use a tilde “~” symbol.

Table 1: Revised formulas for identification of translators' profiles<sup>6</sup>

Profile/Subprofile	Formulas
<i>Drafter</i>	$(P2 + P3) \div P1 < 1/6$
<i>Reviser</i>	$P1 \div (P2 + P3) < 1/6$
<i>Drafter/Reviser</i>	$(P2 + P3) \div P1 \geq 1/6 \ \& \ P1 \div (P2 + P3) \geq 1/6$
<i>Non-Recursive</i>	$P2 \div P3 < 1/6$
<i>Recursive</i>	$P2 \div P3 \geq 1/6$

qualitative and quantitative assessment of a translators' activity. They distinguish translators' style by analyzing "(1) how they initially orient themselves in the ST, (2) how they plan translation drafting, and (3) whether they prefer online revision or end revision" (Carl et al., 2011).

To determine different translators' styles, the authors combine the translator's behavioral characteristics in the initial orientation, drafting, and revision phases. For example, in the initial orientation, they highlight four styles based on what the translators do at the beginning of this phase: systematic initial orientation, skimming, quick planning, and head start.

Carl et al. (2011) identify four translation styles in the drafting of a translation: large-context planning, small-context planning, backtracking, and non-backtracking. Carl et al. (2011, n.p.) describe a tendency for translators to prefer a specific type of planning during the drafting phase:

The translators may show traces of different kinds of behavior during drafting, but the data provide evidence for an overall preference for one of the two kinds of planning ahead (small context or large context planning) as well as a preference with respect to looking back at previously translated ST words.

In the revision phase, three different translation styles are observed: online revision, end revision, and constant revision. If the translator engages in online revision, he or she revises the text during the drafting phase itself. End revision is a preference in which he or she spends at least 20% of the total task time reviewing the target text after the drafting phase has concluded. In contrast, there are translators who make online revisions as well as end revision. Carl et al. (2011) refer to behavior exhibited by translators as constant revision when the translator spends not only more than 20% of translation time on end revision, but who also makes a large number of online revisions.

Since both Carl et al.'s (2011) and Alves & Vale's (2011) seek patterns in professional translators' behavior during specific translation process phases, we believe these studies to be complementary and provide more evidence of how translators behave in those phases during direct and inverse translation tasks.

<sup>6</sup> The constant 6 appearing in these formulas was empirically determined as a boundary between groups of participants that displayed different behaviors intuitively observed during data analysis performed by Alves & Vale (2011). The participants were then clustered into three groups (Drafter, Reviser and Drafter/Reviser) by splitting the number of revisions undertaken during one phase of the translation process by the other. A translator with a "Drafter" profile reviews the target text six times more during the drafting phase than during the revision phase, a "Reviser" translator profile reviews the target six times more in the revision phase than during the drafting phase, and a translator with a "Drafter/Reviser" presents a more distributed amount of revisions in both drafting and revision phases.

### 3. Experimental design and methodology

The participants in this study were eight professional translators. The first stage of data collection had participants complete a questionnaire prior to the experiments. This questionnaire aimed to identify suitable participants and to ensure a more homogenous group. Questions were included about the participants' professional and academic qualifications as well as their experience in translation and knowledge of English. All participants had at least five years of experience as translators and worked in a variety of domains.

In the experiments, the participants completed four translation tasks (two direct translation tasks and two inverse translation tasks) that were performed in two data collection sessions. Each session included a direct and an inverse translation task.

During the translation tasks, Translog 2006 was used to record all the key presses pressed and mouse movements made by the participants (Jakobsen & Schou, 1999; Jakobsen 1999a; 1999b), while a Tobii eye tracker recorded their eye movements and all the actions performed in sequence. Some of the data collected during these tasks are not analyzed in this study.

Qualitative data was also collected by asking participants to use the Translog replay function after they had finished each task. The replay function allows the participant to view their own translation process and reflect on their own performance. First, the participants were asked to report freely, i.e., a free verbal protocol, about their performance after each translation task. Next, they answered some questions for a guided verbal protocol. Fonseca (2012) analyzed that data along with Translog files and eye tracking data, which revealed which options were considered by participants during the translation process, as well as how participants ultimately solved translation problems and the decisions made to reach these solutions.

Litterae was used to analyze the collected data. As described by Alves & Vale (2011, p. 108), "LITTERAE is an annotation and search system designed and implemented as a research tool that is used for storing, annotating and querying corpora of translations comprising both texts and process data." Thus, we used the system to mark and annotate micro and macro translation units (P0, P1, P2, and P3), so that we could determine prototypical patterns of editing procedures in drafting and revision phases and employed the methodology proposed by Alves & Vale (2011) and Alves & Gonçalves (2013). Then we identified translators' profiles and subprofiles based on Alves & Vale (2011) and on the previously-mentioned formula reviewed by Daniel Vale. A pause interval of 2.4 seconds (the same threshold adopted by Jakobsen [2005b]) was used to delimit translation units in Translog and for data analysis in Litterae. In order to increase ecological validity, we conducted the experiment in a location similar to the work environment in which translators usually work.

In the first data collection session (DC1), two source texts were used, one English text (247 words) that was to be translated into Portuguese (direct translation), and one Portuguese text (255 words) to be translated into English (inverse translation). Both texts were scientific texts about sickle cell disease. During the translation process, the participants could use any type of documentation (Internet, dictionaries etc.) as an aid to the translation process. In the second data collection session (DC2), two source texts were used in the same language pairs as in DC1. However, they were popular science texts about different themes—one is about crumpling a sheet of paper (direct translation) and



the other about an electronic tongue (inverse translation). The Portuguese source text had 189 words, while the English text had 187 words. Unlike the first data collection session, the participants in this session were not allowed to use the Internet and other type of documentation with the exception of Babylon dictionary. This reference is an online dictionary commonly used by professional translators. By collecting data in two data collection sessions, we believe we could provide more evidence of the impact of directionality in translation in different experimental settings.

To investigate the impact of directionality, in the Portuguese-English language combination, on the translation process, we tested the following hypotheses:

1. There will be more occurrences of P3 macro translation unit in inverse translation than in direct translation, since the former may entail more cognitive effort than the latter.
2. There will be a predominance of Drafter profile and Non-Recursive subprofile in direct translation since participants seek to achieve a reliable task output at the end of drafting phase in their L1 (the direction in which they usually translate).
3. As inverse translation implies editing procedures in both drafting and revision phases, the predominant profile and subprofile in inverse translations will be Drafter/Reviser and Recursive.

Based on Buchweitz & Alves (2006) and Ferreira (2012), the independent variable was directionality in translation and the dependent variables were: (a) the number of each macro TU category (P0, P1, P2, and P3) to identify prototypical patterns of editing procedures in drafting and revision phases; and, (b) the number of P1, P2, and P3 in formulas created by Alves & Vale (2011) and reviewed in Fonseca's (2012) study to determine translators' profiles and subprofiles.

#### **4. Data analysis**

After uploading the .xml Translog files to Litterae, macro translation units were marked and annotated, and a total of 1,597 macro translation units were classified as P0, P1, P2 or P3. The frequencies of those macro translation units are relevant to establish the potential influence of directionality in translation regarding editing procedures and determination of profiles and subprofiles.

In order to generalize the results further, to statistically validate them and to determine if there was a significant difference between the expected frequencies and the observed frequencies of P3 macro translation units in direct and inverse translation tasks, of Drafter profile in direct translation and Drafter/Reviser profile in inverse translation, we used the chi-squared test. This test is suitable when the researcher is analyzing contingency tables, which is the case here. Moreover, all statistical tests use an alpha level of .05, and chi-square statistics are reported with degrees of freedom and sample size ( $N$ ) in parentheses, followed by the Pearson chi-square value and the significance level ( $p$  value).

##### **4.1 Hypothesis 1**

Based on the number of macro translation units, reported in Table 2 below, we tested the three reported hypotheses. The mean number of macro translation units in each direct (DT) and inverse translation (IT) task in both data collection sessions (DC1 and DC2) is presented in the table below:

Table 2: Mean number of macro translation units

	<b>DC1</b>	<b>DC2</b>	<b>Means</b>
<b>DT</b>	139.50	59.00	99.25
<b>IT</b>	123.50	76.50	100.00
<b>Means</b>	131.50	67.75	

As the texts were shorter in DC2, it is unsurprising that both direct and inverse translation in set of data present fewer macro translation units. However, the total mean numbers of macro translation units in direct and inverse translation tasks of the two sets of data are very similar: 99.25 in DC1 and 100 in DC2. Thus, the results concerning mean number of those macro translation units are not statistically significant,  $\chi^2(1, N = 8) = 3.23, p = .07$ .

We hypothesized that inverse translation is more difficult than direct translation, which would ultimately lead to a higher occurrence of P3 macro translation units occurring in the inverse translation task. We based this conjecture on the assumption by professional translators and translation scholars that inverse translation is more difficult than direct translation; the logic would then follow that most of professional translators prefer direct translation rather than inverse translation. However, when we compare the mean number of total micro/macro translation units classified as macro TU categories (P0, P1, P2, and P3) in the four translation tasks, the most frequent macro translation unit was P0, which presented the highest mean number (22.28). By comparing the number of macro translation units by each translation task, it is possible to notice that P1 had the higher mean number in both translation tasks in DC2. Besides, as Table 3 shows, in DC1 there is no difference in the mean number of P3 in direct and inverse translation tasks, while the difference is very small in DC2, pointing to a higher number of P3 in inverse translation. Nevertheless, this difference is not statistically significant,  $\chi^2(7, N = 8) = 2.97, p = .89$ .

Table 3: Mean number of macro TU categories

		<b>P0</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>
<b>DC1</b>	<b>DT</b>	34.13	26.25	2.25	7.13
	<b>IT</b>	28.88	21.75	3.63	7.13
<b>DC2</b>	<b>DT</b>	10.75	12.75	1.88	4.13
	<b>IT</b>	15.38	16.50	0.88	5.50
<b>Means</b>		22.28	19.31	2.16	5.97

When analyzed as percentages, P0 and P1 easily represent approximately 80% of macro TU categories in all translation tasks, with P0 (83.35%) being the most representative category in DC1, and P1 (92.30%) in DC2. Moreover P3 represents an average of 16.61% of all categories, having a modest increase of it in inverse translation in DC1 (17.26%) and in DC2 (19.67%). However, these results are not statistically significant,  $\chi^2(7, N = 8) = 3.77, p = .81$ .

When we analyze the data based on the direction of translation and do not consider the data collection session, we find that the percentages of macro translation units are very similar in both the direct and inverse translation tasks.

P0, P1, P2 and P3 represent 38.01%, 41.77%, 5.64% and 14.58% in direct translation tasks, while the same macro TUs represent 35.71%, 41.94%, 3.77% and 18.58% in inverse translation tasks.

#### 4.2 Hypotheses 2 and 3

To identify profiles and subprofiles using the number of macro TU categories, we assumed that there would be a predominance of Drafter profile and Non-Recursive subprofile in direct translation, since participants usually seek to achieve a “reliable task output, particularly at the end of drafting phase” (Alves & Gonçalves, 2007, p. 49 ) in their L1. However, as Figure 5 shows, the Drafter/Reviser profile and Recursive subprofile is most prevalent in direct translation.

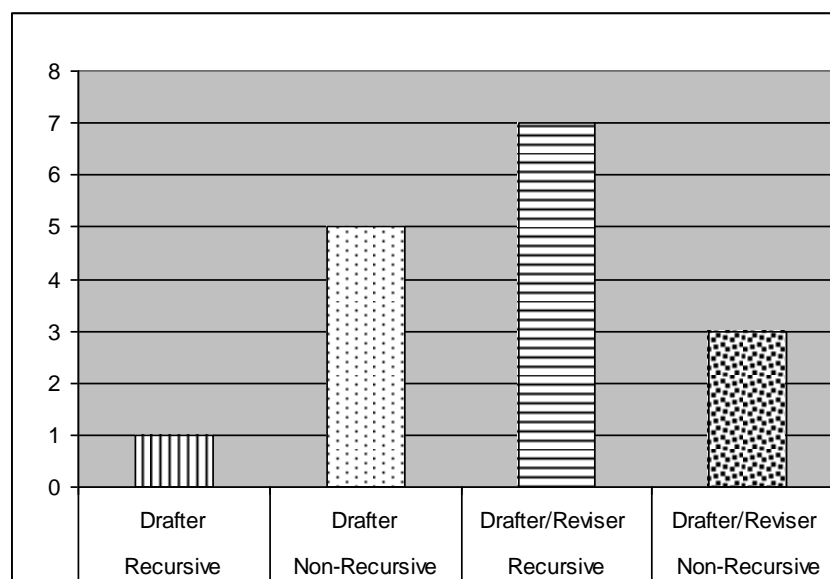


Figure 5: Identification of profiles and subprofiles in direct translations in DC1 and DC2

Based on Jakobsen’s (2003) findings, we hypothesized that inverse translation would require more revisions in both the drafting and revision phases. As a result, we expected the predominant profile and subprofile in inverse translation to be Drafter/Reviser and Recursive. As expected, the results in Figure 6 indicate a tendency during inverse translation tasks to require more revisions in drafting and revision phases. This conclusion stems from the predominant profile being Drafter/Reviser and subprofile is Recursive for 6 out of 16 translation processes. Nevertheless, the results obtained related to the identification of translator profiles and subprofiles in both the direct and inverse translation tasks are not clearly distinct, and further analysis would be required to differentiate the two,  $\chi^2(4, N = 8) = 2.08, p = .72$ .

When identifying the profiles and subprofiles, one translator was classified with a single profile. In this case, the participant was not classified with a subprofile because no P3 macro TU was marked and annotated in the participant’s translation process.

Moreover, the Drafter/Reviser profile occurs in 10 out of 16 translation processes in direct translation, and in 11 out of 16 translation processes in inverse translation.

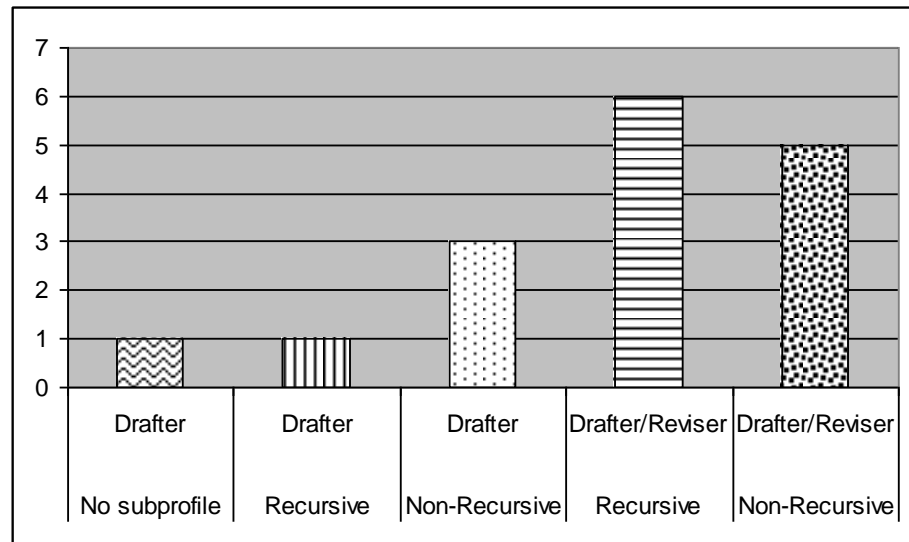


Figure 6: Identification of profiles and subprofiles in inverse translation in DC1 and DC2

Overall, the Drafter/Reviser profile with a Recursive subprofile shows the highest relative frequency in both directions as Table 4 shows. This finding suggests that translators tend to make revisions in both the drafting and revision phases regardless of the directionality. Those results appear to run counter to the commonly accepted assumptions. In fact, inverse translation may not be considerably more difficult than direct translation in light of the fact that these tasks seem to present a number of commonalities. Therefore, despite slight differences, further investigation with a larger participant pool and a greater number of direct and inverse translation tasks may provide a clearer view of potential generalizations.

Table 4: Percentage of profiles/subprofiles in direct and inverse translation tasks

	<b>Drafter No subprofile</b>	<b>Drafter Recursive</b>	<b>Drafter Non- Recursive</b>	<b>Drafter/Reviser Recursive</b>	<b>Drafter/Reviser Non-Recursive</b>
<b>DT</b>	0.00%	6.25%	31.25%	43.75%	18.75%
<b>IT</b>	6.25%	6.25%	18.75%	37.50%	31.25%

In addition, one pronounced difference between direct and inverse translation tasks is the occurrence of a Drafter profile with a Non-Recursive subprofile in direct translation and a Drafter/Reviser profile with a Non-Recursive subprofile in inverse translation. Those two profiles show the same relative distribution in both translation directions. This observation could imply a tendency in participants to seek a reliable task output in direct translation as we have assumed in one of our hypotheses, although the Drafter profile and Non-Recursive subprofile is not the most frequent profile/subprofile in this direction.

## 5. Conclusions

The aim of the investigation reported in this article is to better understand the impact of directionality may have on editing procedures in micro/macro

translation units (Alves & Vale 2009, 2011; Alves & Gonçalves, 2013) and in the identification of translators' profiles and subprofiles.

First, we expected that P3 macro translation unit would occur more often in inverse translation than in direct translation, which we base on the general assumption among translators and translation scholars that inverse translation entails more cognitive effort—is more difficult—than direct translation. However, our results provide evidence that this assumption should be questioned. We observed that direct and inverse translation show some similarities regarding the occurrences of macro TU categories. For example, in the analysis of the P3 occurrences, we note that in some cases they may occur as a strategy rather than being an indication of more cognitive effort. In other words, participants that presented a greater number of P3 during the translation process tend to delay the solution of problems until the revision phase—e.g., they may leave terms in the source language initially in the drafting phase to then revisit the translation unit in the revision phase. This strategy can be related to postponing decisions as a means of managing uncertainty (Tirkkonen-Condit, 2000). Moreover, the greater number of P1 macro TU occurrences in the translation process in both direct and inverse translation show that professional translators work more in the drafting phase regardless of the translation direction.

Second, we expected participants to have a Drafter profile and Non-Recursive subprofile during direct translation because they would try to have a reliable task output at the end of drafting phase in their L1. In the inverse translation task, we hypothesized that Drafter/Reviser profile and Recursive subprofile would be the most predominant due to the increased cognitive effort required in this direction. The results indicate, however, that the professional translators tend to have a Drafter/Reviser profile and Recursive subprofile in direct and inverse translation tasks, which supports one of our hypotheses. Nevertheless, it seems that these profiles do not result from an increased demand of cognitive effort in inverse translation. Instead, professional translators tend to improve their text by monitoring their translation processes during both the drafting and revision phases, regardless of the direction in which they are working. This is true for 21 of the 32 translation processes analyzed in this investigation.

Moreover, we assert that the identification of translators' profile is quite solid, insofar as seven translators presented the same profiles and subprofiles in at least three of the four translation tasks across both translation directions. The results indicate that changes in the profile or subprofile tend to occur in inverse translation. This observation suggests that translators appear to behave differently when performing inverse translation. This does not, however, necessarily mean that inverse translation is more difficult than direct translation.

Despite the relatively miniscule impact of directionality in translation, the study shows that there are prototypical patterns of editing procedures with regard to profiles and subprofiles among participants. Therefore, the results may be applied to improve translator pedagogy by promoting deliberate practice (Shreve, 2006) in direct and inverse translation tasks and to increase students' awareness of the patterns in both directions. This leads us to what Ericsson (2002, p. 518) asserts: "In order to support an attribution to the stable characteristics' of a person, ideally one would require a series of outstanding achievements under different circumstances." These could include tasks that ask students to perform direct and inverse translation of different textual genres, to use CAT tools, or to think aloud during the translation task.

Furthermore, group work, i.e., collaborative translation, should also be encouraged in promoting deliberate practice. Although Pavlović's (2007) findings

show that individuals and groups tend to find the same problems when working in groups, her study also suggest that a greater number of solutions can be generated and explicitly discussed by group members. Another argument in favor of this practice in classroom is the translations produced in groups in Pavlović's (2007) study scored higher mean grades than translations produced individually, given that collaborative work apparently imply more output monitoring as evidenced by comments provided by her participants.

### About the author

Norma Fonseca is currently a PhD candidate in Applied Linguistics at Graduate Program in Linguistics and Applied Linguistics (POSLIN) at Federal University of Minas Gerais (UFMG) in Brazil, where she develops empirical-experimental research in Translation Studies. She obtained a master's degree in Applied Linguistics from the same Program. Her bachelor degree in English and Portuguese Languages was received from Federal University of Viçosa (UFV)

### References

- Alves, F. (1995). *Zwischen Schweigen und Sprechen: Wie bildet sich eine transkulturelle Brücke? Eine psycholinguistisch orientierte Untersuchung von Übersetzungsvorgängen zwischen portugiesischen und brasilianischen Übersetzern*. Hamburg: Dr. Kovac.
- Alves, F. (2001). A triangulação como opção metodológica em pesquisas empírico-experimentais em tradução. In A. Pagano (Org.) *Metodologias de Pesquisa em Tradução* (pp. 69–92). Belo Horizonte: FALE-UFMG.
- Alves, F. (Ed.) (2003). *Triangulating translation: perspectives in process oriented research*. Amsterdam/Philadelphia: John Benjamins.
- Alves, F., & Gonçalves, J. L. V. (2007). Modelling translator's competence. In: Y. Gambier; M. Shlesinger; R. Stolze (Eds.). *Doubts and Directions in Translation Studies*. Amsterdam and Philadelphia: John Benjamins, 41–55.
- Alves, F., & Gonçalves, J. L. V. (2013). Investigating the conceptual-procedural distinction in the translation process: a relevance-theoretic analysis of micro and macro translation units. *Target* 25(1), 107–124.
- Alves, F., & Vale, D. (2009). Probing the unit of translation in time: aspects of the design and development of a web application for storing, annotating, and querying translation process data. *Across Languages and Cultures* 10(2), 251–273.
- Alves, F., & Vale, D. (2011). On drafting and revision in translation: a corpus linguistics oriented analysis of translation process data. *Translation: Computation, Corpora, Cognition* 1(1), 105–122.
- Buchweitz, A., & Alves, F. (2006). Cognitive adaptation in translation: an interface between language direction, time, and recursiveness in target text production. *Letras de Hoje*, 41, 241–272.
- Campbell, S. (1998). *Translation into the Second Language*. New York: Longman.
- Carl, M., Dragsted, B., & Jakobsen, A. L. (2011). A Taxonomy of Human Translation Styles, *Translation Journal*, 16(2). Retrieved from <http://translationjournal.net/journal/56taxonomy.htm>
- Dragsted, B. (2004). *Segmentation in translation and translation memory systems: An empirical investigation of cognitive segmentation and effects of integrating a TM system into the translation process*. København: Samfundslitteratur. (Ph.D. series; No. 5, Vol. 2004).
- Dragsted, B. (2005). Segmentation in Translation: Differences Across Levels of Expertise and Difficulty. *Target* 17(1), 49–70.

- Ericsson, K. A. (2002). Attaining excellence through deliberate practice: Insights from the study of expert performance. In M. Ferrari (Ed.), *The pursuit of excellence in education* (pp. 21–55). Hillsdale, NJ: Erlbaum.
- Ferreira, A. (2012). Investigando o processamento cognitivo de tradutores profissionais em tradução direta e inversa no par linguístico inglês português. *Cadernos de Tradução*, 29, 73–92.
- Fonseca, N. B. L. (2012). Padrões prototípicos de segmentação na descompactação e recompactação de unidades de tradução em tarefas de tradução direta e inversa. Unpublished Master's thesis, Federal University of Minas Gerais. Retrieved from <http://www.bibliotecadigital.ufmg.br/dspace/handle/1843/LETR-96NRFX?show=full>
- Jakobsen, A. L. (1999a). Translog Documentation. In G. Hansen (Ed.), *Probing the process in translation: methods and results* (pp. 149–184). Copenhagen Studies in Language 24. Copenhagen: Samfundslitteratur.
- Jakobsen, A. L. (1999b). Logging target text production with Translog. In G. Hansen (Ed.). *Probing the process in translation: methods and results* (pp. 9–20). Copenhagen Studies in Language 24. Copenhagen: Samfundslitteratur.
- Jakobsen, A. L. (2002). Translation drafting by professional translators and by translation students. In G. Hansen (Ed.). *Empirical translation studies: Process and product* (pp. 191–204). Copenhagen: Samfundslitteratur.
- Jakobsen, A. L. (2003). Effects of think aloud on translation speed, revision and segmentation. In F. Alves (Ed.). *Triangulating Translation: Perspectives in process oriented research* (pp. 69–95). Amsterdam/Philadelphia: John Benjamins.
- Jakobsen, A. L. (2005a). Investigating expert translators' processing knowledge. In H. V. Dam, J. Engberg, & H. Gerzymisch-Arbogast (Eds.), *Knowledge systems and translation* (pp. 173–189). Berlin: Mouton de Gruyter.
- Jakobsen, A. L. (2005b). Instances of Peak Performance in Translation. *Lebende Sprachen*, 50(3), 111–116.
- Jakobsen, A. L. (2006). Research methods in translation: Translog. In E. Lindgren & K. P. H. Sullivan (Eds.), *Computer Keystroke Logging and Writing: Methods and Applications* (pp. 95–105). Oxford: Pergamon Press. (Studies in Writing, Vol. 18).
- Jakobsen, A. L., & Schou, L. (1999). Translog Documentation. In G. Hansen (Ed.). *Probing the process in translation: methods and results* (pp. 21–42). Copenhagen, Samfundslitteratur.
- Königs, F. G. (1987). Was beim Übersetzen passiert. Theoretische Aspekte, empirische Befunde und praktische Konsequenzen. *Die Neueren Sprachen* 86(2), 162–185.
- Pavlović, N. (2007). *Directionality in Collaborative Translation Processes. A Study of Novice Translators*. Unpublished Ph.D. dissertation. Tarragona: Universitat Rovira i Virgili. Retrieved from <http://www.tdx.cat/bitstream/handle/10803/8770/THESIS.pdf?sequence=1>
- Shreve, G. M. (2006). The deliberate practice: translation and expertise. *Journal of Translation Studies* 9(1), 27–42.
- Tirkkonen-Condit, S. (2000). Uncertainty in translation processes. In S. Tirkkonen-Condit & R. Jääskeläinen (Eds.), *Tapping and Mapping the Processes of Translation and Interpreting* (pp. 123–142). Amsterdam/Philadelphia: John Benjamins.