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THE ROLE OF TRANSLATION EXPERIENCE IN SYNTACTIC COMPLEXITY AND THOUGHT ORGANIZATION IN THE WRITTEN PRODUCTION OF ENGLISH-PORTUGUESE TRANSLATORS

PORTO ALEGRE
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Dissertação de Mestrado em Psicolinguística apresentada como requisito parcial para a obtenção do título de Mestra em Psicolinguística pelo Programa de Pós-Graduação em Letras da Universidade Federal do Rio Grande do Sul.

Orientadora: Profa. Dra. Ingrid Finger

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Each individual uses language in a unique way. [...] Indeed, bilingualism may open additional space for individual variation and expand the range of linguistic diversity than what is typically seen for monolingualism. Consistent with this conjecture, bilinguals vary in meaningful ways regarding the social use of language that have been related to changes in brain and behavior.

(TIV; GULLIFER; TITONE, 2020).

ABSTRACT

Bilinguals working as translators are considered to be experts in their languages of work (KROLL; DUSSIAS; BAJO, 2018). More recent literature on bilingual advantage has been focusing on the dual-language context, seen as a crucial aspect for advantages to be identified in bilinguals (GREEN; ABUTALEBI, 2013; VAN DER LINDEN *et al*., 2018). Hence, the present study investigates to what extent translation experience affects syntactic complexity and thought organization in written and oral texts produced by English-Portuguese translators and bilinguals. A total of 64 participants integrated this study, divided into three groups: experienced translators (n = 28), translation students (n = 7), and non-translators bilinguals (n = 29). The three groups were compared in two linguistic tasks that involved different language modalities (Written Production Task and Oral Production Task) and two languages (English and Portuguese). Syntactic complexity and thought organization in linguistic tasks were measured through the analysis of T-Units (HUNT, 1965) and the Speech Graphs tool (MOTA *et al*., 2014), respectively. For syntactic complexity in written texts, our hypotheses were that the group of translators would have higher levels of syntactic complexity – measured by the number of T-Units – than translation students and bilinguals in their written texts in both Portuguese and in English, along with a difference between translation students and bilinguals, with translation students obtaining higher levels of syntactic complexity. As for oral texts, no significant differences were predicted to be found in the comparison of the three groups of participants in the assessment of the levels of syntactic complexity in both Portuguese and English. For thought organization in written texts, the expectation was that translators would show better scores in both Portuguese and in English than translation students and bilingual participants, and that translation students would show better scores than bilinguals as well. For oral texts, no significant differences were expected to be found among the three groups in their oral texts in Portuguese and in English. In the comparison between translators and bilinguals, results indicated translators produced more syntactically complex texts by producing fewer T-Units in the written task in English, but not in Portuguese. In the oral task, translators produced fewer clauses in Portuguese, but no other significant result was found for other conditions or for English. For thought organization, groups performed similarly on all written and oral tasks, indicating they are comparable and translation experience did not affect their performance on this variable. In the subgroup analysis comparing translators, translation students and bilinguals, no significant difference was found for syntactic complexity in written texts. For oral texts, translators continued to produce fewer clauses than translation students and

bilinguals in Portuguese. For thought organization analysis, no significant results were found, meaning all groups performed similarly and were too comparable for differences to be found. This research contributes to a better understanding of bilingual experience and how bilinguals working in specific contexts of language use perform when compared to other bilinguals, as we found results indicating that different contexts of use of language can differentiate bilinguals among themselves regarding linguistic differences. Furthermore, our findings indicate that different bilingual experiences do not necessarily lead to differences in thought organization during the analysis of their written texts, although the different experiences possibly led to differences in oral texts. A combination of our results and discussions can be a valuable addition to theoretical discussions on bilingual experience and more specifically on translation experience, while also having pedagogical implications, as they can help with teaching strategies for general L2 learning and with specific training for translators.

Keywords: Translation experience. Bilingual experience. Syntactic Complexity. Thought organization.

RESUMO

Bilíngues tradutores são considerados expertos em ambas as suas línguas de trabalho (KROLL; DUSSIAS; BAJO, 2018). A literatura recente tem focado o *dual-language context* como essencial para que sejam identificadas vantagens em bilíngues (GREEN; ABUTALEBI, 2013; VAN DER LINDEN *et al*., 2018). Nesse contexto, o presente estudo tem como objetivo investigar em que medida a experiência tradutória afeta o nível de complexidade sintática e de organização do pensamento em textos escritos produzidos por tradutores português-inglês, e se textos orais produzidos pelos mesmos participantes são comparáveis aos textos escritos. Para este fim, foram coletados dados de três grupos: tradutores profissionais (n = 28), tradutores em formação (n = 7) e bilíngues não tradutores (n = 29). Os três grupos foram comparados a partir de duas tarefas linguísticas que envolveram diferentes modalidades (Tarefa de Produção Escrita e Tarefa de Produção Oral) e línguas (português e inglês). A complexidade sintática de todos os textos produzidos foi analisada considerando-se T-Units (HUNT, 1965) e a análise da organização do pensamento foi feita através da ferramenta SpeechGraphs (MOTA *et al*., 2016). Para a complexidade sintática em textos escritos, nossas hipóteses eram que esperava-se que o grupo de tradutores apresentasse níveis maiores de complexidade sintática – medida pelo número de T-Units – do que os grupos de tradutores em formação e bilíngues em seus textos escritos, tanto em português como em inglês, e que uma diferença entre tradutores em formação e bilíngues também seria encontrada, com tradutores em formação apresentando níveis maiores de complexidade sintática. Para textos orais, esperava-se que não fossem encontradas diferenças significativas na comparação dos três grupos na análise de complexidade sintática, tanto em português como em inglês. Para a organização do pensamento em textos escritos, esperava-se que tradutores apresentassem níveis melhores, tanto em português como em inglês, do que tradutores em formação e bilíngues, e que tradutores em formação também apresentassem níveis melhores do que bilíngues. Para textos orais, esperava-se que não fossem encontradas diferenças significativas na comparação dos três grupos, tanto em português como em inglês. Na comparação entre tradutores e bilíngues, os resultados indicaram que tradutores produziram textos mais sintaticamente complexos ao produzir menos T-Units na tarefa de produção escrita em inglês, mas não em português. Na tarefa oral, tradutores produziram menos *clauses* do que bilíngues, mas não foram encontrados outros resultados significantes para as demais condições ou no inglês. Para organização do pensamento, os grupos tiveram performances semelhantes tanto nas tarefas escritas como nas orais, indicando que os grupos são comparáveis entre si e que a experiência tradutória não afetou essa variável. Na subanálise

comparando tradutores, estudantes de tradução e bilíngues, não foram encontradas diferenças significativas para a complexidade sintática na tarefa escrita. Na tarefa oral, tradutores continuaram a produzir menos *clauses* do que estudantes de tradução e bilíngues em português. Para organização do pensamento, não foram encontrados resultados significantes, mais uma vez indicando que todos os grupos tiveram performances semelhantes e que os grupos são muito comparáveis para que diferenças sejam encontradas. Esta pesquisa contribui para um melhor entendimento da experiência bilíngue e como bilíngues trabalhando em contextos específicos de uso de língua se desempenham quando comparados a outros bilíngues, visto que nossos resultados apontam para a possibilidade de identificar-se diferenças relacionadas a aspectos linguísticos entre grupos de bilíngues com diferentes contextos de uso de suas línguas. Além disso, nossos resultados indicam que diferentes experiências bilíngues não evidenciam, necessariamente, diferenças na organização do pensamento na análise de textos escritos, apesar das experiências diferentes possibilitarem a identificação de diferenças em textos orais. Com nossos resultados e nossas discussões, podemos acrescentar novas informações às discussões teóricas sobre experiência bilíngue e, mais especificamente, sobre experiência tradutória, além de ter implicações pedagógicas, já que a pesquisa pode ajudar a melhorar estratégias gerais de ensino de L2 e de treinamento específico para tradutores.

Palavras-chave: Experiência tradutória. Experiência bilíngue. Complexidade sintática. Organização do pensamento.

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LIST OF ABBREVIATIONS

ACH	Adaptive Control Hypothesis
CTS	Cognitive Translation Studies
E	Edges
EEN	Written English
EPT	Written Portuguese
L1	First Language
L2	Second Language
L3	Third Language
LCC	Largest Connected Component
LHPAQ	Language History and Professional Activity Questionnaire
LHTAQ	Language History and Translation Activity Questionnaire
LSC	Largest Strongly Connected Component
N	Nodes
OEN	Oral English
OPT	Oral Portuguese
PE	Parallel Edges
RE	Repeated Edges
SLA	Second Language Acquisition
UFRGS	Universidade Federal do Rio Grande do Sul
UFRN	Universidade Federal do Rio Grande do Norte
VLT	Vocabulary Language Test
WM	Working Memory

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1 INTRODUCTION

Bilingualism and multilingualism can be studied from numerous perspectives within the large area of Linguistics, such as Sociolinguistics and Psycholinguistics, as well as from other areas such as Cognitive Psychology, Neurolinguistics and Education (ORTEGA, 2009). The opportunity to approach the theme from different perspectives may be one of the reasons why interest in bilingualism in academic research has grown so much in recent decades. Another reason seems to be the increase of bilingual populations: Bialystok, Craik and Luk (2012) and Bialystok (2017) report that more than half of the world population seems to be bilingual, with some continents and countries possessing even higher numbers, such as Europe, where 56% of the population declares themselves as bilinguals, and the country of Luxembourg, where this number rises to 99%. In Toronto, for example, "63% of households reported using a non-English language as the primary language of the home." (ANDERSON; HAWRYLEWICZ; BIALYSTOK, 2018, p. 1), indicating bilingualism and multilingualism are very present in some countries and cities.

However, not only was bilingualism not always seen in a positive light, but for many decades it was believed to cause detrimental effects. Al-Amri (2013) provides a historical perspective on the effects of bilingualism on personality as well as on cognitive and educational development. According to the author, in the first half of the 20th century, bilingualism was believed to have negative consequences for children, and such an opinion was held by many until recently. Studies at the time mostly investigated the relationship between bilingualism and cognitive aspects, notably with IQ measures, as Hakuta (1989) notes while providing an extensive compilation of references of works about bilingualism and intelligence, along with personal annotations for each reference.

It was also believed that the negative effects extended to personality development, often being said to cause conflict between the child's language and their personality and emotions (APPEL; MUYSKEN, 1987 *apud* AL-AMRI, 2013). The method used in these studies could be the reason for such negative results, as the field of linguistics, and even more so, psycholinguistics, can still be considered relatively new, which means that appropriate research methods are still being discovered and tested. In addition, results of those and even newer studies cannot be considered by themselves, as the group of participants, method and analysis procedures are also essential for the credibility of the study (NAVARRO-TORRES *et al*., 2021).

Thus, in the last few decades, researchers have been trying to find what are the most appropriate approaches, methods and theoretical discussions to explain the effects a bilingual experience can have on individuals. Grosjean and Li (2013), for instance, sought to explore and explain the bilingual mind from different perspectives, to help both experienced researchers and beginners in the field. Bialystok (2018) discusses and investigates bilingual education for young children, still trying to find evidence that bilingualism does not cause harmful effects and to encourage bilingualism education in the midst of controversial results in the field.

Here, bilingualism will be approached from a specific context of use: translation. In 2000, Gobet already discussed the importance of studying expert groups, saying that "The study of expert behavior is currently an important area of research in cognitive science." (p. 3). In addition, Anderson, Hawrylewicz and Bialystok (2018) say that "Linguistic contexts have been shown not only to affect the expression of bilingualism (e.g., Grosjean, 1998) but also to influence how context maps onto cognition in a moment-to-moment manner (Green & Abutalebi, 2013)." (p. 9). Translators fit into these descriptions of participants as they work in a unique context of using both their languages within the same context, which will be further explored in the following sections, making them relevant participants in a study, adding to research on adult bilinguals and on bilingualism effects in specific contexts.

These specific contexts of bilingual experience have recently been viewed as an important path for us to better understand how different types of bilingual experiences are characterized and how these bilinguals make use of their languages (BIALYSTOK, 2021; BEATTY-MARTÍNEZ; TITONE, 2021). According to Freitag (2019), both the L1 and the L2 of bilinguals "constantly interact among themselves [...]" (p. 35), possibly creating different and complex demands for bilinguals, which can also apply to a strictly linguistic level, as they must engage in different processes such as lexical selection. Beatty-Martínez *et al*. (2020), for example, while investigating to extent to which distinct contexts of bilingual language use impact the ability to produce words in each of the individuals' languages, found that these different contexts were directly affecting bilinguals' cognitive control – and these results can also be viewed as positive results towards linguistic research on different bilingual experiences.

As we look into bilingual experience, it is important to note that several different bilingual experiences exist, and moreover, each bilingual experience is likely unique, as even individuals living in the same contexts and environments are bound to engage in different activities and interact with different people at some point. These different experiences and details within the experiences are worth exploring so we can better comprehend different types of bilingual experiences. There are also some bilinguals who can be studied within their specific

contexts and bilingual experiences of work – which is the case for translators. Considered to be "a form of extreme bilingualism" (KROLL; DUSSIAS; BAJO, 2018, p. 62), translation experience can be considered as different from most general bilingual experiences because translators have to work with both their languages in the same context, which can be called as a dual-language context.

Schwieter and Ferreira (2017) highlight the importance and the magnitude of translators' – along with interpreters – experience, as they "are able to switch back and forth between languages and successfully complete the task without obvious intrusions from the other language" (p. 144), while also dealing with possible interferences and competition between linguistic elements of each language.

Furthermore, Bialystok (2017) argues that fluent linguistic performance for bilinguals requires a high demand of our control system, independently of the levels of linguistic performance by those bilinguals. As bilingualism and all its cognitive consequences begin with the introduction of a linguistic change by introducing an L2 to our system, it is important for us to study how language-specific aspects behave and present themselves in distinct groups of bilinguals. Experiences such as translation appear to be prime candidates for further characterization of bilingual experience and, furthermore, for the investigation of whether their constant experience with written texts in two different languages impacts their linguistic performance in both of their languages or if they remain similar to other bilinguals with high proficiency levels.

Thus, we will investigate if translators' specific skills regarding the translation process overall can also be observed in their own, self-produced written texts. Although translating a text to its target language requires the translator to adapt and sometimes even modify it, writing a text without any source material to base yourself on is a very different process and requires different strategies. As we investigate if translators' particular bilingual experience also causes a difference between their linguistic skills when compared to other groups of bilinguals who are highly proficient in English while studying their texts and, therefore, their linguistic experience, we may find information that can help us better understand if and how different uses of language are identifiable and present themselves.

Therefore, we will investigate whether translation experience influences two aspects: first, if there is a difference between the level of syntactic complexity in written texts in Portuguese and English produced by translators when compared to translation students and non-translators bilinguals. And second, if a difference can be identified between attributes of thought organization and connectivity in texts produced by translators, translation students and non-

translators bilinguals. At a grammar level, a syntactic complexity analysis may be very informative on the development of language, as well as on the use and a comparison of complex structures in one or more languages (GAIES, 1980). Furthermore, at a mental processing level, it is possible to analyze thought organization and language connectivity, enabling a description and subsequent analysis of the written and speech language patterns of individuals (MOTA *et al.*, 2014, 2016), in addition to allowing a comparison between both languages of a bilingual.

We also consider it relevant for the field to investigate aspects of the level of syntactic complexity and thought organization in texts produced by translators, as they are considered experts in their working languages (KROLL; DUSSIAS; BAJO, 2018). It could be inferred that translators might present a higher level of syntactic complexity in their texts by using their knowledge more effectively with language structures – with subordinate clauses structures, for example, when compared to other bilinguals, which in this study will be groups of translation students and proficient bilinguals who do not work as professional translators. In this analysis, two factors are important: conducting tasks both in written and oral modalities and in the two languages of the translator, which in this study are Portuguese and English, so we can investigate if their experience and expertise refers to written language only or if their skill also occurs in oral language. Thus, it will be possible to investigate how translators deal with each of their languages, since it has been reported that the two languages of a bilingual are always present (BIALYSTOK, 2017) and that the translator does not necessarily inhibit one of the languages while using the other (FREITAG, 2019).

Furthermore, this study will investigate participants' thought organization, also based on written and oral tasks, seeking to investigate whether experienced translators, translation students and proficient bilinguals who do not work as professional translators present similar levels of attributes of thought organization and language connectivity by producing clear and well-structured thoughts. During oral speech, we tend to make more repetitions, interruptions and even mistakes while speaking. In writing, however, the expectation is that thought organization and language connectivity will tend to be more linear and sophisticated, especially if we consider the group of bilinguals who work with both languages in their professions as translators. By analyzing the production of participants through attributes measuring thought organization using the principles of Graph Theory, which enables us to investigate and represent the relationship between different and varied elements, such as airline systems, road networks, or even computer systems, we hope to contribute to the field by presenting concrete data on how experienced translators, translation students and bilinguals deal with the structures of their languages, both in written and oral modality.

Data collection for the study occurred during the COVID-19 pandemic, directly affecting our procedures. All data were collected via online platforms, to ensure the safety of participants and the researcher. Collection procedures were adapted to fit into online platforms – questionnaires and a proficiency test were administered through websites, while the two tasks being used – a written production task and an oral production task, with both tasks occurring in Portuguese and English – were administered during individual video calls between participants and the researcher.

Next, the organization of the thesis will be presented. This thesis is divided into five chapters. Chapter 1, this chapter, is the introductory chapter, presenting the justification of the theme and research goals. Chapter 2 provides a literature review, and is divided into three sections. Section 2.1 provides an overview of bilingualism, different studies on the field and more recent discussions about the role of bilingual experience in bilinguals' daily lives and how to measure it. Section 2.2 focuses on the specific type of bilinguals being studied here and their specific bilingual experience – translators and translation experience, in which we explore in more depth how translators use their languages in their profession, how research has been approaching their specific bilingual experience considering translation experience to be a different context of use than those in which other bilingual groups are normally immersed in, and how experienced translators have been compared to students and novice translators. The following sections explore subjects related to the tasks being used in this study: section 2.3 explores aspects of writing, which directly correlate with our tasks; section 2.4 develops on the idea of syntactic complexity, one of the variables being investigated in participants' texts; section 2.5 describes in more detail T-Units, a measure of syntactic complexity which will be adopted in our analysis; and lastly, sections 2.6 and 2.7 explore graph theory and thought organization, which is the other variable being investigated in participants' texts, and the tool being used to measure thought organization – SpeechGraphs, respectively.

Objectives and guiding hypotheses are presented in Chapter 3, which also contains a detailed description of all procedures and instruments used in the data collection of this research, in addition to describing and explaining the process of data analysis. Chapter 4 is divided into two sections: section 4.1 presents descriptive results and section 4.2 presents inferential results after a statistical analysis, along with a discussion regarding our objectives and hypotheses considering our groups of participants. Section 4.2 was divided into three subsections: subsection 4.2.1, which presents results from the comparison between translators and bilinguals, and is divided into four subsections: written syntactic complexity, oral syntactic complexity, written thought organization, and oral thought organization; subsection 4.2.2,

which presents results from the comparison between translators, translation students, and bilinguals, and is divided into four subsections as well: written syntactic complexity, oral syntactic complexity, written thought organization, and oral thought organization, and subsection 4.2.3, which presents results from the correlation between syntactic complexity and thought organization measures in both written and oral texts.

Finally, Chapter 5 provides final remarks and considerations on this study considering the review of literature and results found in our data collection, in addition to limitations and suggestions for further research.

2 LITERATURE REVIEW

This chapter presents the literature review that aims to justify and substantiate the present study. Here, concepts and discussions will be presented, linking them with this study and its goals and hypotheses. It is divided into three main sections: Bilingualism, Translation and Translation Experience, and lastly, Writing, Syntactic Complexity, Thought Organization and their measurements – divided into five subsections: Writing, Syntactic Complexity, T-Units, Graph Theory and Thought Organization, and finally, SpeechGraphs.

2.1 BILINGUALISM

Bilingualism has not always been seen and known for its positive side. The most commonly accepted theories were that bilingualism had negative consequences, especially for children (ANASTASI; CORDOVA, 1953), and bilinguals were even believed to be inferior, both on a cognitive and an educational level, as explained by McLaughlin (1978). However, many researchers and studies trusted their own instincts and prejudices when reaching these conclusions, while only a minority carried out studies that actually assessed the cognitive abilities of bilinguals (STEWART, 1951 *apud* GROSJEAN, 1982).

After some time and with more detailed methods being used, new studies involving bilingual populations began to find constant positive results (LAINE; LEHTONEN, 2018), showing that, in fact, bilingualism can have positive effects on learning, intelligence and cognitive tasks, and that there is no reason to assume that bilinguals could be considered as somehow inferior to monolinguals (PEAL; LAMBERT, 1962).

More recently, bilingualism research has been exploring different aspects of language and cognition with the focus of pinpointing what aspects exactly we need to be looking at and how the methods being used until now can be improved. Having a better understanding of bilingualism and bilinguals themselves can help the fields of second language learning and teaching for different age groups and provide better chances of taking advantage of the benefits bilingualism can possibly provide.

While trying to investigate the unique experiences of bilingualism, Schereschewsky, Alves and Kupske (2019) explored language transfer in a multi-directionality approach, stating language interference occurs not only from L1 to L2, but also from L2 to L1, and this could also occur with other subsequent languages of a speaker. Focusing on a phonological view, the authors propose that language is a complex and dynamic system and that different experiences

of language use and context may result in interference between languages. By studying bilinguals (L1 – Portuguese, L2 – English) and trilinguals (L1 – Portuguese, L2 – English, L3 – German), the authors found significant differences in their analysis of oral production between groups. It was also highlighted that the premise of interconnection between languages comprises not only phonetic-phonological studies, which was their focus, but also all other grammatical aspects.

Similarly, De Groot (2019) briefly discusses the presence of "accents" in bilinguals, referring not only to a phonological aspect, but to a general aspect as a consequence of the two languages of a bilingual. The author mentions these "accents" may occur due to the parallel activation of the two language elements, and that grammatical accents can be seen in structurally ambiguous sentences, for instance. Studies about linguistic aspects of bilinguals' productions have surely been contributing a great deal to the field of bilingualism by helping us identify and understand more aspects of bilinguals and bilingualism itself.

As for how bilinguals deal with languages, Gullifer and Titone (2021) state that

> Fundamentally, bilinguals make choices about which languages to speak when and with whom, and they must appropriately engage their language systems to realize these choices. Even once an intended language has been chosen, bilinguals continue to experience lasting cross-language activation and competition within their linguistic subsystems that can help or hinder comprehension and production" (p. 4).

Even for highly proficient bilinguals, these difficulties of language competition are still present. They must adapt themselves in order to cope with the differences their bilingual minds are now presenting and produce their languages in an appropriate manner according to the context they are inserted in. The bilingual mind and bilingual experience differ from a monolingual experience, but different groups of bilinguals also have different bilingual experiences amongst themselves – De Groot (2019) seems to confirm that idea by saying "[…] that the frequent use of two languages produces a specific linguistic competence […]" (p. 1), meaning different uses of language result in different, specific experiences.

More recently, Bialystok (2021) explored a theoretical discussion about bilingualism being a slice of Swiss cheese, meaning "bilingualism is not a binary category" (p. 2) but rather a complex experience with holes, much like a Swiss cheese. Among so many controversies between bilingualism actually having an effect on cognition or whether the small effect sizes found in research are sufficient or not, we need to look into or at least consider different parts and characteristics of bilingualism and bilinguals themselves, so that we can try to cover the

holes of the Swiss cheese or, at the very least, know where they are so we can conduct more appropriate studies.

Nevertheless, past literature appeared to be firm on believing bilingualism is a binary concept and that it should have a straightforward definition, and thus numerous concepts for bilingualism were discussed and created over the years. In some definitions the differences are mere details, while in others the characteristics for bilingualism and bilinguals are completely different. According to Kroll and Bialystok (2013, p. 2), the bilingual mind is different not because bilingualism creates advantages or disadvantages, but because bilinguals recruit mental resources differently from monolinguals. In Bialystok (2017), the author points out that "The key point comes from overwhelming evidence that both languages in a bilingual's repertoire are always active to some extent, even if one of them is not required for the current context." (p. 234).

There are a few other definitions of bilingualism and bilinguals, mainly older definitions, which only consider second language proficiency, such as the definition proposed by Bloomfield (1935, p. 56), which states that bilingualism is the “native control of two languages". Some definitions can be considered to be less exclusive, such as the one proposed by Grosjean (1996), who considers bilinguals to be those who use two or more languages or dialects in their daily lives.

However, there are other factors that can influence the use and even the degree of bilingualism of an individual. Bloomfield's definition, presented above, is usually seen as common sense, leading many to believe that a person can only be considered bilingual or fluent in a language when they speak as a native speaker, which is often perceived as having full command of the language and speaking without an accent. More recently, definitions have become less exclusive, such as in Grosjean (2013), in which the author presents data about frequency of use and fluency in a language being related, along with data that confirms individuals usually do not use all the languages they know in the same situations or contexts or with the same frequency. In Grosjean and Byers-Heinlein (2018), the authors follow this same concept, further exploring the main factors that we must consider when defining bilingualism – language proficiency and use. Thus, a person can be considered bilingual or even multilingual without having the same level of command as a native speaker.

Another concept of bilingualism that considers several factors is the one presented by Zimmer, Finger and Scherer (2008, p. 5, own translation), which embraces both the possible differences in degree of fluency in a person’s languages and the difference in frequency and contexts for those who use them:

> [...] we can understand bilingualism as the ability to use two languages, and multilingualism as the ability to use more than two languages. This definition, based on usage, implies a view of bi/multilinguals as people with *different degrees of competence in the languages they use*. Thus, bilinguals and multilinguals may have more or less fluency in one language than in another, as well as different performances in languages depending on the context of use and communicative purpose, among other reasons.[1]

Regarding different degrees of competence in languages and contexts of use, it is important to highlight those individuals whose professions require them to have a very high degree of proficiency in all their languages and in different contexts, such as interpreters, translators and teachers. Since this study will focus on translators and their expertise, this subject will be further explored in section 2.2.

Continuing to analyze the literature for bilingualism studies, while results began to confirm bilingualism could have positive consequences, a discussion began about the possibility of bilinguals also having a cognitive advantage over monolinguals. Thus, in recent decades, several researchers have been looking for methods and theoretical discussions that can adequately measure the possible cognitive advantages in bilinguals and justify the results.

Still, recent discussions have been leading us to believe that bilingualism alone may not be enough for cognitive advantages to emerge, or that the bilingual advantage may not exist at all (LAINE; LEHTONEN, 2018). The discrepancy in survey results has led some researchers to believe that there is, in fact, no cognitive advantage to bilingualism. Thus, the context of use of bilinguals' languages has become an important topic in discussions. There have already been some results in the literature showing that, apparently, a cognitive advantage can be identified in bilinguals with specific contexts of use, which is the case for interpreters (FERREIRA; SCHWIETER; FESTMAN, 2020). What this means is that only specific profiles of bilinguals would benefit from cognitive advantages, contrary to what researchers have been focusing on for the last decade or two.

However, in this search for confirmation on differences on cognitive aspects, it seems that we have been neglecting studies on linguistic aspects. As we discover that bilinguals with specific contexts of language use may present different characteristics than other groups of

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[1] Original quote: [...] poderemos compreender o bilingüismo [*sic*] como a habilidade de usar duas línguas, e o multilingüismo [*sic*] como a habilidade de usar mais do que duas línguas. Essa definição, calcada no uso, implica uma visão dos bi/multilíngües [*sic*] como pessoas com *diferentes graus de competência nas línguas que usam*. Assim, os bilíngües [*sic*] e multilíngües [*sic*] podem ter mais ou menos fluência numa língua do que em outra; podem ter desempenhos diferentes nas línguas em função do contexto de uso e do propósito comunicativo, entre outros motivos.

bilinguals, we should continue to try to understand if these differences occur on a linguistic level as well. Findings about how their languages present themselves can be very informative towards a better understanding of these different groups and experiences, and having more knowledge about linguistic aspects can help research about other aspects as well, such as the cognitive one.

According to Van der Linden *et al.* (2018), who looked for cognitive advantages in interpreters, bilingual experience can vary in several factors – L2 proficiency level, frequency of change in the use of one language or another, and so on. Even more, some of these factors may be essential for a cognitive advantage to be identified in bilinguals. The authors also discuss the dual-language context approach, in which bilinguals use both their languages in the same context, possibly providing a higher cognitive load and increasing other abilities, differing from bilinguals who use each language at different times or in different contexts. Since these variations are provided from different uses of language itself, dual-language context research could benefit from more studies looking for the existence of differences on linguistic aspects, or at least from a more complete characterization of different groups of bilinguals regarding their linguistic background and current uses of their languages.

Thus, what research on bilingualism has been strongly discussing and using in more recent research is that we cannot simply look to the binary division between "speaks one language" and "speaks more than one language", but rather look for other factors, such as sociocultural aspects, that characterize individual differences, possibly explaining what makes bilinguals different (BAKER; BORTFELD, 2021) and, moreover, what makes them different among themselves.

Furthermore, day to day usage and interactions of bilinguals need to be considered for us to be able to explain who these bilinguals being tested are and what their bilingual experiences mean. Having positive results confirming bilingual advantages may be our ultimate goal, but we also need to understand in more detail the characterization of the bilingual population. Beatty-Martínez and Titone (2021), while defending the identification of bilinguals' phenotypes, state that "[...] characterizing speakers in terms of their profile and trajectory through different contexts is essential if we are to understand the limits and boundary conditions of putative bilingualism effects." (p. 2).

This also initiates another discussion: sample size. Studies usually look for large samples to have a better and more reliable statistical power, but research in bilingualism has shown that a large sample size does not always lead to finding positive results for a bilingual advantage, and that small sample sizes can be just as informative or, perhaps, even more, if we

decide to look for information such as phenotypes (NAVARRO-TORRES *et al.*, 2021). Some authors even propose that we should possibly not look at research through the quest for finding a bilingual advantage, and instead take a step back and look for the differences between these populations and analyze more thoroughly these different bilingual experiences, which could be difficult to find in large samples, as bilingual experiences vary a great deal between individuals.

In 2013, Green and Abutalebi made an important contribution to the bilingual experience discussion by introducing the adaptive control hypothesis (ACH), in which the use of a bilingual's languages in the same context "requires a high level of cognitive control to keep their languages separate" (VAN DER LINDEN *et al.*, 2018, p. 2). Henrard and Van Daele (2017) also discuss and test the dual-language context, arguing that this "frequency of use, language switching, interactional context (dual, single, or dense code-switching), and amount of experience in managing the bilingual demands are crucial variables in the development of executive control in bilinguals [...]." (p. 2). Once again, although the dual-language context and the ACH deal with cognitive aspects, we consider it important to continue to analyze linguistic aspects of different groups of bilinguals based on this concept. Bilingual experience involves linguistic experience as well, and the basis of cognitive change as a result of bilingualism is related to linguistic aspects. The manner in which bilinguals use their languages has recently been discussed as an important aspect for cognitive and brain changes (BIALYSTOK; CRAIK; LUK, 2012; GRANT, DENNIS; LI, 2014; PILATSIKAS *et al.*, 2020), and thus we should not ignore the linguistic aspects that are present in our entire bilingual experience.

Since translators appear to be different from most bilinguals, as the nature of their profession requires them to constantly work with their languages in the same text, this study will be mainly working with a group of translators. In the following chapter, translation experience and translator’s education will be further explored and discussed.

2.2 TRANSLATION AND TRANSLATION EXPERIENCE

Translators can be considered as an extreme form of bilingual, since in addition to having a very high level of fluency and proficiency, the nature of the use of their languages differs from that of other bilinguals (KROLL; DUSSIAS; BAJO, 2018). In their work, they must make expert use of a pair of languages, working with different aspects of these languages – grammar, precision of meanings, cultural elements, and so on.

The translator profession is not yet a regulated profession, at least not in Brazil. Therefore, in theory, anyone who speaks two languages can become a translator. Nevertheless,

it is still possible to follow one or more of the following options to become one: you can take an undergraduate course, a translation course, or simply transition directly to the job market, without taking a specific course. According to Pym *et al*. (2012, p. 3) *apud* Rodríguez-Castro (2011, p. 124), 74% of translators work as "independent contractors or freelancers" in a European context. The data can be outdated by now and is possibly not true for worldwide translators, but it provides an average about the magnitude of freelance work in the translation field. Being able to work as a freelancer from home is often seen as a great advantage, bringing a lot of people to the field, even if they do not have previous training or familiarity with translation.

However, translator training and translation experience can be considered essential to achieve an extreme level of bilingualism and expertise in a language pair, and speaking a language with a certain fluency does not automatically mean someone is qualified to translate texts. Experience through practice can definitely bring great benefits, but prior training also seems to play an important role. According to De Groot (2000) *apud* Freitag (2019), translation "requires training, as it is a complex activity that involves several subtasks, such as reading, writing and decision making" (p. 16).

Furthermore, it is important to briefly discuss the background of studies regarding translation and translators themselves. This field of investigation is called Translation Studies, comprising studies about translation theory and practice as well. However, as in most, if not all fields, it is divided into several subfields of research. Apart from the general distinction in translation itself for literary translation x technical translation, and for translators (written language) x interpreters (oral language), Translation Studies can focus on several aspects, such as cultural (HEYDON; KIANBAKHT, 2020), computational (CARL, 2021) and, according to Chesterman (2009), we can even distinguish Translator Studies from Translation Studies: Translator Studies focus on studying translators themselves, as is the case of this research, and not their translations.

Another important subfield of Translation Studies is the Cognitive Translation Studies (CTS). According to Jakobsen and Alves (2021) in their introductory chapter,

> Despite the rapid development of CTS, or possibly because of it, CTS is not at present a unified discipline with a shared grand theory, methodology, epistemology or even ontology. The very nature of what is the subject or object studied is contested, and therefore a variety of research methodologies are used, some of which explore translational language as a way of getting to know about the mind, while others attempt to explore the mind from behavioural observation of either body or brain. (p. 1).

Such a statement shows us that, as a field, there is still a lot to be decided on and that indeed many different approaches and methodologies can be used to conduct theoretical and empirical studies about translation and translators.

From the point of view of cognitive studies, both through a psycholinguistic and a neurolinguistic approach, papers have been looking for a relationship between training, experience and cognitive advantages. Even though this research is not looking for cognitive advantages, but linguistic advantages, it is important to review the methodologies being used and results being found in these studies so we can have a better understanding of why it is worth investigating translators' abilities and skills and how to do so.

Studies such as Stead and Tripier (2016) and Dong and Liu (2016) searched for cognitive advantages in interpreting and translation students, and although the group of translators was a control group rather than an experimental group in the first study, interesting results were found. Stead and Tripier (2016) investigated the nature of working memory (WM) advantages on interpreters and if interpreters improve their WM advantages while working or if students with a higher WM capacity are naturally attracted to the profession. They used translation students as a control group, but results did not show significant differences between experimental and control groups.

Dong and Liu (2016), on the other hand, investigated if translators' and consecutive interpreters' bilingual experiences had different cognitive effects on young adults taking classes for interpretation and translation. Materials used included a background questionnaire, tasks of inhibitory control, shifting and WM, and the executive function tasks were conducted in the beginning of the semester and then again at the end of the semester. For inhibitory control, interpreters had better results. For shifting, only interpreters improved their scores at the end of the semester, while in WM both groups obtained better results. Both studies had limitations with their sample sizes and study time, reinforcing the need for more studies with this topic.

There are already studies in the literature that mention or report the need for training – which can also be viewed as experience, not only theoretical training – in order to exercise the profession of a translator and its relevance for cognitive development, such as Freitag (2019), which supports the idea about translation being a complex activity requiring a high cognitive demand. And if we continue to consider translation as a complex activity, it is worth studying and investigating several aspects of the professions and professionals – considering both cognitive and linguistic aspects.

Still, it may be difficult to find results that corroborate translators having cognitive and linguistic advantages over other bilinguals even if we can state that translation itself is a

complex activity. As we have discussed in prior chapters, many researchers have been suggesting and finding that simply speaking two languages is probably not enough to exhibit advantages. Studies have been contemplating the possibility of advantages appearing on context-specific advantage bilinguals (WOUMANS; DUYCK, 2015), which can lead us to the dual-language context debate, and whether or not translators can be considered a part of such context and what advantages they present.

Regarding the dual-language context debate, we count on the premise that "a dual-language context imposes more demands on language control than a single-language context does." (WU *et al*., 2020, p. 1). It appears, by reviewing the literature on the topic, that it has gained more attention in the last decade and a half, often in the language control field, perhaps becoming more popular as studies looking for advantages in bilinguals had been finding inconsistent results and questioning if bilingualism does in fact creates such advantages, or if they even exist at all (VAN DER LINDEN *et al*, 2018). Kroll, Dussias and Bajo (2018), while talking about bilingualism, state that "The two languages change in response to the way in which they interact. Those changes are mediated not only by the contexts in which language is learned and used but also by the requirements to draw on cognitive resources to enable bilingual performance." (p. 61), complementing the importance of looking further into context-specific bilinguals and their history and experience with their languages.

Now, there is already a body of work exploring the dual-language context with different tasks and populations, often comparing the same bilinguals on single-language and dual-language situations. Wu *et al*. (2020) tested unbalanced Chinese-English bilinguals in picture tasks while undergoing fMRi, and Krefta *et al*. (2015) tested highly proficient Polish (L1)-English (L2) childhood bilinguals with read-aloud tasks of one of the two laterally presented action verbs. Gross and Kaushanskaya (2020), on the other hand, tested Spanish-English bilingual children with an interactive scripted dialogue to describe pictures. These studies used different groups of bilinguals and different tasks, further confirming how each bilingual experience is unique and the need to study and analyze different groups.

An important contribution to this topic is Green and Abutalebi's (2013) adaptive control hypothesis (ACH), already mentioned in section 2.1. The ACH is a great theoretical basis for studies with interpreters and translators, although there are still less studies about translators than interpreters. The latter profession seems to be more heavily investigated in the Psycholinguistics and Neurolinguistics areas, probably due to interpreter's having the distinct feature of working under a strict time limit, posing an important and interesting aspect for research. Nevertheless, translators and translation should still be considered a valuable study

subject, since they fit in the category for extreme language proficiency and, supposedly, language control, as they use both their languages within the same context while working.

Kroll, Dussias and Bajo (2018) say that "while translators have to understand and reformulate a message from one language to another, they must also maintain the two relevant languages actively and switch continually between them, while avoiding interference" (p. 69), suggesting, according to their literature review, that translation does entail a higher cognitive demand. Other than that, their unique context of language use can help us understand if linguistic aspects are also affected by this demand and specific use – if their linguistic abilities are comparable to other types of advanced bilinguals and do not display any advantages or if their expertise cannot be identified in aspects such as grammar, for instance.

Considering these hypotheses and discussions about extreme language control, we have the possibility of also using the dual-language context for discussions of possible linguistic advantages. That is precisely what this study investigates – if a group of experienced translators exhibits advantages on syntactic complexity and thought organization over translation studies and non-translators bilinguals.

Along with the context and dual-language discussions, there is the expertise discussion. As already mentioned, translators are considered as experts in their languages (KROLL; DUSSIAS; BAJO, 2018), but research may need to further clarify what is expertise and if there are certain criteria to be achieved in order for someone to be considered an expert.

Expertise is considered to be a general domain concept which can be observed in certain specific concepts, such as in translation. According to Sirén and Hakkarainen (2002), research usually studies translation expertise from a translation process point of view, adding to either general theory or to the teaching and learning field.

Since this expertise seems to be acquired (SHREVE; ANGELONE; LACRUZ, 2018 *apud* RODRÍGUEZ-CASTRO, 2011), looking into students and novice translators could provide valuable insights into what is expertise in translation and how it is acquired. Another topic to debate is how to measure if someone is already an expert – we could classify translators as experts based on their time as translators or workload hours. In this research, translators are going to be considered as experts if they have been working professionally as translators, combining this criterion with other information such as formal education, work modality (working at a company or as freelancer) and monthly hours of work.

Along with a linguistic advantage discussion, another very important topic is the comparison between experienced translators, translation students and novice translators. Many studies have investigated what differences can be identified between these groups during a

translation process and in their final translation texts. Alves (2005), for instance, investigated expert and novice translators' procedural performance in English-Portuguese and English-Spanish looking for a relationship between cognitive effort and contextual effect. Results indicated there are differences between novices and experienced translators while talking about how they deal with solving translation problems. According to the author, "[...] novice translators usually focus their efforts in retrieving lexical chains. Expert translators, on the other hand, present an ease in solving problems of linguistic nature and usually focus their efforts in macro textual aspects."[2] (ALVES, 2005, p. 17, own translation). Such findings are informative on both a cognitive load perspective and a linguistic perspective due to the study's objective and findings.

Rodríguez-Castro (2011) proposed a different comparison between expert and novice translators, investigating their professional satisfaction, meaning their satisfaction toward their profession and their recognition as a translator as a whole, and task satisfaction, meaning the work itself and activities that come with their profession. According to the author, "Newcomers entering the language industry with limited training and knowledge are struggling to rapidly develop skills while increasing their productivity to meet the continuous pressures of the growing translation services market." (p. 124), which could possibly imply that training can be a differential upon entering the translation market and that there are many clear differences between experienced and novice translators. As for the author's study, "a multifaceted questionnaire that included questions on specific aspects of task and professional satisfaction" (p. 129) was used to assess participants' satisfaction. Results indicated that differences could be found in some of the investigated aspects, such as experts having higher levels of satisfaction for perceived role in the industry, occupation status, being professionally appreciated, occupational flexibility, and having new projects from long-term business relationships, while novices found the need to update their skillset, to have clearer details for their task description to be able to complete a task or job and are not as satisfied "with the level of terminological complexity observed in projects" (p. 133) as experts are. So, even though this is more of an exploratory study and a lot more would need to be discussed and investigated, Rodríguez-Castro's study provides us with more detailed information through a different approach about differences between experts and novices translators, which could be useful while analyzing

[2] Original quote: [...] tradutores novatos tendem a concentrar seus esforços na recuperação de cadeias lexicais. Tradutores expertos, por outro lado, resolvem com facilidade problemas de natureza lingüística [*sic*] e tendem a concentrar seus esforços em questões de caráter macrotextual.

their translations and texts, since personal satisfaction regarding the activity they are working with may affect the final product.

Braga and Silva (2006) also compared expert and novice translators, looking into their English-Portuguese translations while investigating thematic organization and cohesion. The authors analyzed the final translated texts from 10 novice and 2 expert translators, finding differences on cohesion, the subject aspect of their translated texts, and thematic organization, which can be seen in examples such as choice of translation for conjunctions and how to connect clauses. Even though the study had a very small sample, this difference found in thematic organization can be a good indicator of possible results for this research and what could be found by looking into different aspects of participants' texts in the comparison between experienced translators and translation students.

Freitag (2019) investigated professional translators and translation students from Brazil, seeking to find a relationship between literality in English-Portuguese translations, executive functions (updating, inhibitory control and shifting) and three aspects of translation experience (time of experience, months of work in a translation company, and weekly hours of work). Analysis did not find a relationship between literality and updating and inhibitory control, but a relationship between literality and shifting was found – however, such a relationship appeared in the opposite direction than what was expected. Results indicated that the bigger the shifting ability, more literality was found in translations. As for aspects of translation experience, a relationship was found between literality and months of work in a translation company and weekly hours of work, but no relation between literality and time of experience.

Although Freitag's (2019) study investigates translation mainly from an executive control perspective, this study can benefit from the author's findings about aspects of translation experience. If months of work in a translation company and weekly hours of work appeared to have influenced their translations text, we could infer that they will probably influence other aspects as well, such as linguistic complexity. Another aspect to consider between Freitag (2019) and this study is using both professional translators and translation students as a sample. The main difference is that the former used both types of translators as one group, while the latter divided them between two separate groups, providing a clearer comparison and analysis of how much translation experience affects linguistic abilities and their final texts.

Buchweitz and Alves (2006), on the other hand, investigated other two types of groups of translators. The first group consisted of translators who had completed their undergraduate studies in Languages (emphasis on foreign language and translation) and were, at the time of the study, enrolled in a Translation Studies graduate program. All participants had some

experience with translation. The second group consisted of a few students enrolled in a graduate diploma course ministered at Center for Translation Studies of Federal University of Minas Gerais. Some participants had experience with translation and some did not.

The study investigated the translation process of both groups through a quantitative analysis for English-Portuguese and Portuguese-English translations, and the authors also used a think-aloud protocol process to corroborate their results with a qualitative analysis. Lastly, they looked for "measurable definition for the concept of recursiveness (online revision of the text)" (BUCHWEITZ; ALVES, 2006, p. 241). They found that translating from their L1 (Portuguese) into their L2 (English) was more time-consuming than the other way around, in addition to having a more detailed process for dividing the text into segments. Revision, however, increased only for the group of translators with experience.

Although the current study will not look into translation process and revision, it is important to look at studies comparing experienced and non-experience translators, and that they have been finding results favoring experienced translators. Also, it is worth considering – and maybe developing future studies – that if experienced translators use revision as a way to improve their translations, they might also use that process in other general texts they write. We could also engage in a debate about several linguistic translation abilities becoming general linguistic abilities and, possibly, advantages.

Jakobsen (2005) also looked into the translation process, investigating expert translators' processing knowledge by using the Translog tool. This study used the data found in Jakobsen (2003) and the author also compared experienced translators to translation students. An analysis found that translators were about 25% slower when translating from their L1 to their L2 than when translating from their L2 to their L1 – result also found by Buchweitz and Alves (2006).

In addition, Jakobsen (2005) also found that experienced translators were faster than translation students by about 20%. Translog data was able to explain why the time difference was not as significant as one might expect: experienced translators finished their first draft translation much faster than students, but spent more time revising their final text, with Buchweitz and Alves (2006) confirming such results found by Jakobsen (2005). Since revising and refining their texts is an important aspect, or, possibly, ability for translators, it could be an important factor of explanation to why translators supposedly produce better texts on linguistic aspects. Studying and comparing experienced translators' first draft and final text would be a very interesting and enlightening study as well, for both translation tasks and general writing tasks.

And lastly and perhaps more closely related with the present study's methodology, we can discuss the study by Al-Jabr (2006), who conducted an experimental study with ten Arab students who were enrolled in an undergraduate English and Translation course, divided between an experimental group and a control group. Al-Jabr analyzed syntactic complexity in students' translations from English to Arabic and from Arabic to English, using "ten multi-clause sentences, five in each language" (AL-JABR, 2006, p. 211). Sentences came from different textual genres: fictional narrative, journalistic, commercial, legal and academic.

For the translation task, the experimental group had a one and a half hour session before the actual translation task, in which sentences were analyzed and explained to the participants, with the goal of sentences becoming clearer and presumably resulting in translations with higher syntactic complexity. The control group, on the other hand, did not receive a preparatory session, receiving only the sentences and instructions to translate them. The translations for both groups were carried out in two sessions of one and a half hours each. For the syntactic complexity analysis, the author invited two Linguistics and Translation teachers to analyze, evaluate and assign grades to the translations made by the students, with the maximum grade for each sentence being stipulated as 10. Results did not present a statistically significant difference, although data presented a difference between scores of both groups. The author could identify a difference in the perceived difficulty by translators for all five genres of text, in addition to a difference in difficulty for both languages, with both groups finding English sentences more difficult than the Arabic ones.

Despite also studying syntactic complexity in translators' texts, the study by Al-Jabr (2006) works with a very different method from the one used in the present study, such as by using translated texts and not original texts. Moreover, the criteria used by the professor evaluating student's texts was not quite clear, making it difficult to compare and replicate the study.

Overall, studies investigating translators and translation experience as well as studies comparing experienced translators and novices or students have been investigating and finding distinct and perhaps inconsistent topics and results. Studies with comparisons between groups seem to generally find differences between the groups, whether they are significant differences or only differences for results of each group. However, the object of investigation and methodology used by the presented studies are very different from each other – which could be seen as positive, since we can explore more about these two groups, but also as negative, since we still have not explored and investigated each matter more deeply, thus not creating very reliable results and discussions.

The next sections will present theoretical concepts and discussions regarding the variables being analyzed in this study and its measurements.

2.3 WRITING

Writing texts is an important part of language expression. To produce well-written texts, learning and practice are necessary, whether they come from more formal instructions or from practical experience (MYLES, 2002). The ability to write requires control over several aspects – language proficiency, knowledge over the given subject to write about, being able to combine and organize ideas, and so on. Limpo and Olive (2021) state that writing is indeed a complex task with high cognitive demands by saying

> Since the 1980s, sound theoretical claims and empirical demonstrations supporting the complexity of writing have been provided. In part, this complexity is ascribed to the numerous processes involved in the act of producing written text that have to be orchestrated [...], from the need to proficiently use a writing tool (e.g. a pen or a keyboard) or correctly spell words (Abbott & Berninger, 1993) to the importance of generating adequate ideas coherently organized to fulfill rhetorical goals (Hayes & Nash, 1996) and translated into an adapted language, while simultaneously dealing with external demands (e.g. audience) and internal beliefs (e.g. self-efficacy). (p. 4).

Such writing complexity can be approached in different manners. According to Cumming (1989, p. 81),

> Writing expertise proved to relate to: qualities of discourse organization and content in the compositions produced; attention to complex aspects of writing during decision making; problem-solving behaviors involving heuristic searches; and well-differentiated control strategies. Second-language proficiency proved to be an additive factor, enhancing the overall quality of writing produced, and interacting with the attention that participants devoted to aspects of their writing.

Even though this research does not aim to describe and control the writing process itself, it is important to discuss if and how writing occurs in individuals' L1 and L2, and if and how language proficiency can impact the finished product – a text. Furthermore, we can discuss if translation experience and expertise are correlated with writing expertise.

Regarding writing in an individual's L2, Bulté and Roothooft (2020) state that "One of the main questions in second language acquisition (SLA) research relates to the nature of the (linguistic) changes taking place in the second language (L2) system of the learners as they develop or, in other words, as they become more proficient." (p. 1). Analyzing how highly

proficient bilinguals develop their texts can provide valuable insights to what occurs when proficiency level increases, especially when compared to their L1 texts.

In addition, according to Tiryakioglu, Peters e Verschaffel (2010), writing in our L1 is already "a complex and demanding process" (p. 1), while writing in our L2 "is considered to be more difficult" (p. 1), since L2 proficiency may not be as advanced as L1 proficiency. In their data collection and analysis, authors found "that there are significant differences between EFL students' L1 and L2 composing processes in writing an argumentative text." (p. 16). Barkaoui (2016) also states that individuals with less L2 proficiency can produce texts "with more linguistic problems" (p. 322), since their language knowledge is still not very advanced and they may lack skills both in vocabulary and in grammar aspects.

Looking to schematize and explain writing and all the processes involved in it, Hayes and Flower (1980) introduced what is now considered the first cognitive writing processing model. The model was acclaimed for presenting the phases of the writing process and for "[...] not assuming fixed and sequential phases and [...] allowing feedback between the stages" (BARCELLOS, 2021, p. 23). Over the years, the authors modified and updated the model, which were presented in Hayes and Flower (1983), Hayes (1996) and, more recently, Hayes (2012). In the last update in 2012, Hayes divided the model into three levels and updated some of its aspects, those being: control level, which uses aspects of motivation and goal setting (plan, write, revise) to influence the current plan and writing schemas of a text; process level, which takes into account the writing processes (proposer, evaluator, translator, transcriber) as well as the task environment (collaborators and critics, transcribing technology, task materials, written plans, and task-written-so-far); and resource level, which embraces aspects related to ability (attention, long-term memory, working memory, reading). Hayes' dedication to updating the model and modifying its aspects confirm that writing comprises several different aspects and variables and is indeed a complex process, and that we still have much to discover regarding the writing process, both in an individual's L1 and L2.

Here, we are studying different groups of bilinguals, but all with advanced L2 proficiency. However, the main group – translators – is considered to have a highly advanced proficiency, in addition to working with the written language, supposedly increasing their linguistic abilities even more. Translators are not required to create their own texts from scratch, and even though the translation process as a whole usually requires text adaptation, which can range from small changes in vocabulary to completely changing a sentence, it is still very different from creating an entire text based on your own knowledge and having to decide the content, text organization, text formality and other grammatical aspects. Nevertheless, this

proximity with the language that the profession requires and the skills a translator must have are worth exploring, and whether or not these linguistic skills can also be identified in translators' original texts.

According to Tiryakioglu, Peters and Verschaffel (2010), "the majority of studies found a positive relationship between L2 proficiency and writing performance" (p. 2). On the other hand, there are also studies which have not identified such a relationship, meaning we still need to further explore how this relationship occurs, in which situations and, also, with which type of bilinguals. In this research, a comparison between translators, translation students and bilinguals who do not work with the written language will be conducted, possibly helping the writing and the L2-writing fields to understand more about how proficiency and context of bilingualism can influence writing.

Here, this possible relationship is going to be explored by analyzing syntactic complexity in L1 and L2 texts created by participants from three different groups. In the following two subchapters, the subjects of syntactic complexity and one of its measurements, T-Units, are going to be discussed.

2.4 SYNTACTIC COMPLEXITY

Syntactic complexity has been seen as an important construct and analysis for language assessment, especially in the L2 field (LU, 2010). And yet, finding a definition or a more detailed description of this concept still seems to be a challenge. According to Szmrecsányi (2004), researchers tend to focus on measurements of syntactic complexity and what they are trying to find and/or compare, and not so much on a definition for the concept itself. For the author, the closest we got to a definition, even if an unsatisfactory one, is that complex aspects of language “[...] are for some reason more difficult, more complex, less entrenched, less frequent, less accessible or in any way cognitively more complex” (MONDORF, 2002, p. 252 *apud* SZMRECSÁNYI, 2004, p. 1031). Casal and Lu (2021) also provide us a brief definition, saying syntactic complexity is "seen by many as a multidimensional construct and generally defined as the range and sophistication of structures used." (p. 95). When discussing L2 writing, Lu (2017) states that "Broadly speaking, syntactic complexity is construed as the variety and degree of sophistication of the syntactic structures used (Ortega, 2003), where variety refers to the range of syntactic structures, and sophistication refers to the extent to which the syntactic structures are complex." (p. 497).

Use of this concept for language analysis has occurred in studies for decades, and it is possible to see an interest in continuing such studies while improving and creating more sophisticated methods and measurements. While reviewing some of the literature, we can find several papers using different measurements and different ways to assess and evaluate syntactic complexity. Some studies choose to not use any specific measurement, but rather assign judges to review and score participant's texts on their complexity (AL-JABR, 2006), which might not always be the most objective choice, while other studies decide on more specific measurements. Lu, Casal and Liu (2020) chose to use multiple measures of global complexity, finite subordination, clausal elaboration, and phrasal complexity to analyze introduction sections of social science research article, while Stauder and Ustaszewski (2020) chose syllable counting and dependency parsing to compare subtitles of a TV show with original lines from the characters. On the other hand, Mylläri (2020) used seven syntactic complexity measures – mean length of sentence, mean length of T-Unit, mean length of clause, mean number of T-units per sentence, mean number of clauses per sentence, mean number of clauses per T-Unit, and mean number of dependent clauses per clause – to assess written texts by adults and adolescents learning Finnish, looking for a more complete view of complexity. Thus, we can see there are certainly more than enough options to choose from when studying syntactic complexity.

Another advantage is that syntactic complexity and its measurements can be used to assess texts with several different themes and participants or corpora. Lu and Ai (2015), for example, investigated syntactic complexity in English writing with participants at a college-level who had differente L1s, an important topic since a great deal of academic research is published in English. Lu, Casal and Liu (2020), on the other hand, decided to explore introductions from social science research articles, finding significant variation between texts and how authors were able to use syntactically complex sentences. With a different approach, Casal and Lu (2021) explored how students responded to activities focusing on syntactic complexity in an English writing course, finding possible benefits with this instruction intervention.

Looking for more sophisticated analysis tools for syntactic complexity, Lu (2010) developed an automatic analysis tool in second language writing called L2 Syntactic Complexity Analyzer. The computational system is able to provide an English written text with fourteen different syntactic complexity measures. According to the author and presented data in the study, results for the automated analysis are reliable, and the tool was initially created for research on advanced second language proficiency.

Another automated analysis tool is the Coh-Metrix (MCNAMARA *et al.*, 2014). In the Coh-Metrix website[3], the tool is explained as "[...] a system for computing computational cohesion and coherence metrics for written and spoken texts. Coh-Metrix allows readers, writers, educators, and researchers to instantly gauge the difficulty of written text for the target audience.".

There is also an online tool based on Coh-Metrix that provides web analysis for Portuguese texts, the NILC-Metrix[4] (SCARTON; ALUÍSIO, 2010). According to their website, NILC-Metrix began as an adaptation of Coh-Metrix to Portuguese, and now the online tool can assess 200 metrics, divided into 14 larger categories.

For this study, the syntactic complexity measurement chosen was the T-Units analysis, which will be theoretically explained in the next subsection and described in the Methods section.

2.5 T-UNITS

The term "T-Unit" was coined by Kellogg Hunt (1965), who also presented its definition as a measure of syntactic complexity in texts. According to Street (1971, p. 13) *apud* Larsen-Freeman (1978, p. 441), an explanation and definition for a T-Unit is that "Very simply, units slice a passage up into the shortest possible units which are grammatically allowable to be punctuated as sentences. The T-unit can be described as one main clause plus whatever subordinate clauses, phrases and words happen to be attached to or embedded within it.".

In a more simplified explanation, according to Finger, Brentano and Ruschel (2019), a T-Unit "is formed by a main clause and the subordinate clauses that are dependent on it."[5] (p. 194). With a T-Units analysis, it is possible to conduct linguistic analysis of the complexity of texts, which can be produced in the written modality or even transcribed texts in the oral modality (O'DONNELL; GRIFFIN; NORRIS, 1967; LOBAN, 1976). Furthermore, T-Units analysis can also be a good ally for studies investigating second language development indices (GAIES, 1980).

And ever since Hunt introduced the T-Unit, many studies have been using it as a method of analysis. Studies have also started to use different measures related to the T-Unit, such as

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[3] http://cohmetrix.com

[4] http://fw.nilc.icmc.usp.br:23380/metrixdoc

[5] Original quote: [...] é formada por uma oração principal e as orações subordinadas que são dependentes dela.

Mylläri (2020), who used seven syntactic complexity measures, out of which three were based on T-Unit count – mean length of T-Unit, mean number of T-units per sentence, and mean number of clauses per T-Unit.

Many studies have also used T-Units to investigate second language development. Kim (1998), for example, conducted a single-case study with a foreigner student who was learning English in an immersion context at college. T-Units and number of clauses per T-Units were used to look for syntactic maturity in the participant's texts from different moments and in different levels of English. The author found it was possible to observe L2 complexity maturity through this analysis and even supported Hunt's theory from 1965 about writing development and the use of T-Units as a valid measure.

More recently, Finger, Brentano and Ruschel (2019) used T-Units to compare the syntactic level of children enrolled in a bilingual curriculum in texts written in both Portuguese and in English. The authors found that children wrote more words and produced more T-Units in Portuguese texts, their L1. There was also no significant difference between subordinate clauses in the two languages, revealing they were still in the development phase for learning both languages – although another analysis revealed a possibility that as their writing in Portuguese became more complex, so did the one in English.

Kang (2013) also used measures of T-Units (error-free T-unit, total number of clauses, T-unit complexity ratio) as measures of grammatical resource in their analysis of audio speech files from learners of English taking the Cambridge English Language Assessment. Although participants in our study are already all advanced learners, they also produced oral samples which will be examined through T-Units. Kang was investigating what were the linguistic features which "distinguish speaking Levels B1-C2 on the Common European Framework of Reference for Languages (CEFR) [...]" (p. 40). Other measures of grammatical resource, discourse management, lexical resource and pronunciation were also used in the analysis. The author found that the measures of error-free T-units, total number of clauses, T-unit complexity ratio, and total number of dependent clauses, related to grammatical complexity, "[...] were significantly different for each level" (p. 44). The only measure related to T-Units that did not exhibit significant differences was total number of T-Units.

Therefore, a T-Unit analysis will be used in this study as a method of evaluating the syntactic complexity of texts produced in written and oral modalities by participants, both in Portuguese and in English. This analysis was chosen because "In addition to taking into account subordination, a T-unit also preserves coordination between words, phrases, and clauses." (COOPER, 1981, p. 158), allowing us to investigate if there is a difference between groups in

syntactic complexity of the texts and also if there is a difference between the written modality and the oral modality.

2.6 GRAPH THEORY AND THOUGHT ORGANIZATION

Graph theory, according to Luz (2018),

> [...] consists of a ramification of Mathematics which occupies itself with the relationship between elements of a set (WILSON, 1996); it is usually used by works seeking to describe distribution of information between regions, elements or any given point that are inter-related inside a network, in which information transits through these points through the connections linking them (ROCHA, 2015; TRUDEAU, 1976).[6] (p. 59, own translation).

Leandro (2021) also provides definitions and explanations about graph theory, stating graphs are "used to represent complex systems" (p. 53). The author also describes the achievement of mathematician Leonhard Euler, "who is considered to be the father of graph theory, as he used it to solve the puzzle of the bridges of Königsberg" (p. 53). This puzzle began with a discussion in the city of Königsberg of whether it was possible or not to cross all seven existing bridges in the city without going through the same one more than once. Euler found the solution by designing those bridges into graphs – land masses were represented as nodes and bridges as edges. After doing so, the mathematician concluded the answer to the puzzle was negative (LEANDRO, 2021).

As it was seen by Euler's representation, nodes can be considered as the paths, and edges as the linking elements between these paths, completing a graph, and these graphs could be directed or undirected. An undirected graph shows the link between the nodes, but does not specify the direction of those links, while a directed graph uses arrows to specify in which direction each node is connected to another. Figure 1 shows examples of an undirected graph of the sentence "Não existe trabalho ruim, o ruim é ter que trabalhar", in Portuguese[7], and a directed graph of the sentence "You catch more flies with honey than with vinegar", in English. Nodes are represented in red dots, while edges are represented by the black strokes connecting the red dots.

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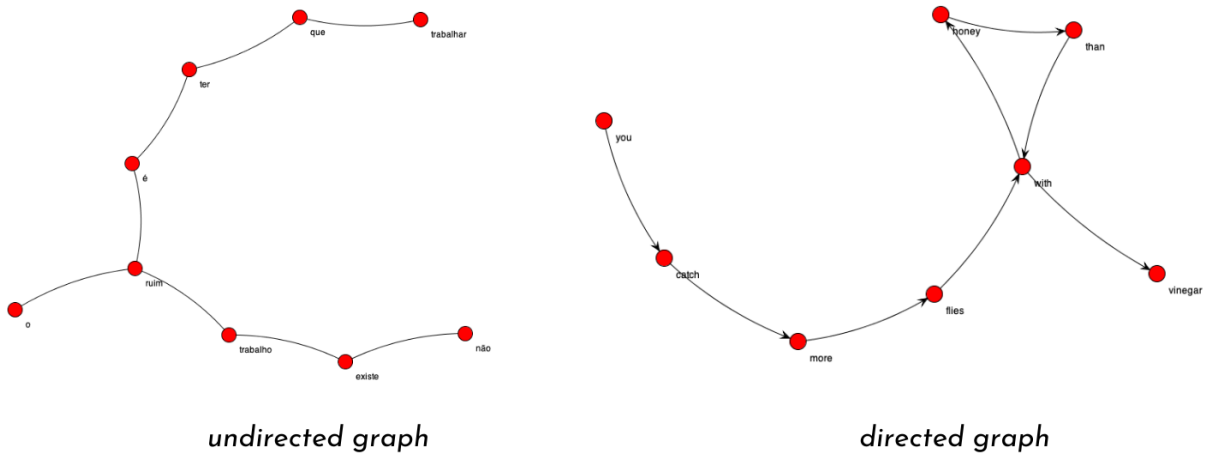
[6] Original quote: [...] consiste em uma ramificação da matemática que se ocupa da relação entre elementos de um conjunto (WILSON, 1996); costuma ser adotada por trabalhos que buscam descrever a distribuição de informações entre regiões, elementos ou pontos quaisquer inter-relacionados dentro de uma rede, na qual transita informação entre esses pontos, por meio das conexões que os ligam (ROCHA, 2015; TRUDEAU, 1976).

[7] Free translation: Working isn't hard, hard is having to work.

Figure 1 – Undirected and directed graphs



Source: author (2021).

Directed graphs seem to be more informative, since they allow us to visualize and analyze the directions in which words are being connected – or not. Undirected graphs, on the other hand, can be a little confusing. On Figure 1, for example, the undirected graph does not make it very clear how "o" and "ruim" are connected to other words, since "ruim" appears more than once in the sentence and is represented by only one node, while in the directed graph it is clear to what other words "with", which also appears more than once in the sentence and is represented by only one node, is connected.

Mota (2017) describes graph theory in a more detailed manner and explains how it has been used in current research, claiming it “has been widely employed in the study of natural or technological phenomena” (p. 8) and that “Graph theory as a tool may not only help to tackle problems in the basic sciences, but can also be applied to solve complex problems in everyday life, otherwise difficult to characterize and measure” (p. 8). Thus, graph theory can be adapted and used in research from different areas.

One possibility of use for Graph Theory is looking into thought organization through language connectivity. Mota *et al.* (2016) state that “language can be understood as a window into the organization of thoughts” (p. 63), meaning language analysis can show us interesting insights on how thought organization occurs and how it can relate with other measures.

Thought organization has been reviewed in literature over the years through a thought disorder perspective, investigating individuals with conditions such as psychosis and schizophrenia (MOTA *et al.*, 2014; SPENCER *et al.*, 2020). According to Mota (2017), “Organized, healthy mental activity allows old and new information to interact in order to

support different actions that take experience into account in an integrated manner." (p. 9), whereas individuals with psychosis, for example, "can experience the feeling of fragmentation of thoughts having difficulty to organize ideas or to follow a flow of memories, impacting the way to express what they are thinking or feeling, creating meaningless speech [...]" (p. 10)

Hinzen and Rosselló (2015), while reviewing the linguistics aspects of schizophrenia, state that "[...] it is clear that we cannot separate 'what language has to say' (meaning) from 'language.'" (p. 2). Taking this perspective into account, it would be interesting to further explore how thought organization, which can also be viewed as a language connectivity when analyzing speech and texts, presents itself and how it can be represented in healthy populations as well.

Looking for a direct and accessible way to investigate thought organization, Mota *et al*. (2012, 2014) developed a computational tool which allows us to conduct such an analysis. This tool will be described in the following subsection.

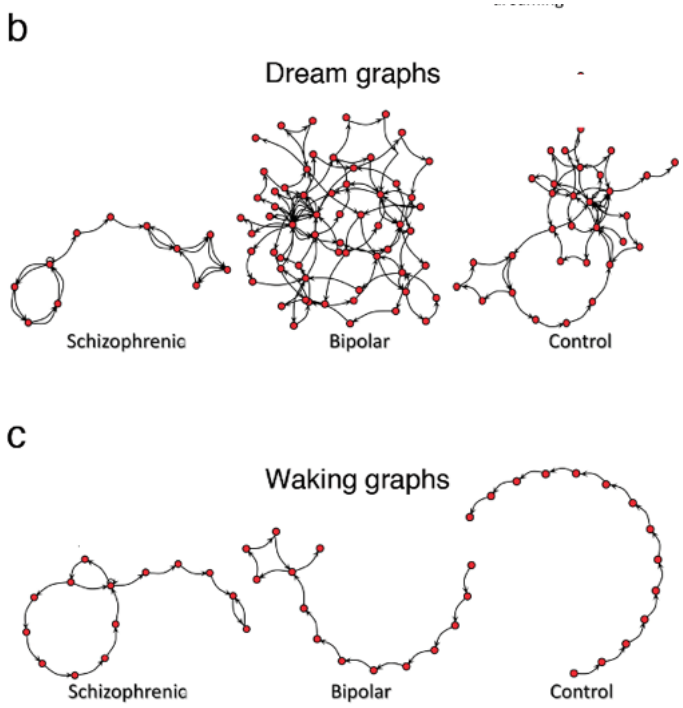
2.7 SPEECHGRAPHS

SpeechGraphs[8] (MOTA *et al*., 2012, 2014) is a tool developed at the Brain Institute of Federal University of Rio Grande do Norte (UFRN) in Natal, Brazil. It was initially developed to help diagnose individuals who have psychopathologies and mental disorders, such as schizophrenia, through a quantitative analysis by using oral reports to create graphs that analyze speech connectivity and thought organization (MOTA *et al*., 2014, 2016, MOTA; COPELLI; RIBEIRO, 2017). Publications that have used the tool so far have mainly worked with dream reports, which are transcribed and then analyzed through the tool.

To explain it in more detail, SpeechGraphs is a language analysis tool which analyzes speech trajectories, whether oral or written, and establishes them through graphs. These graphs are composed of edges and nodes, where edges represent connectivity of speech and nodes represent words. In Figure 2, taken from Mota *et al*. (2014), we can see an example of six graphs, generated from the analysis of the discourse of three participants: one schizophrenic, one bipolar and one from a control group. The three top graphs were generated from the analysis of dream reports, and the three bottom graphs were generated from waking reports:

[8] https://neuro.ufrn.br/site/index.php/speechgraphs/

Figure 2 – Graphs generated from dream reports and waking reports



Source: Mota *et al*. (2014).

Through graphs, it is possible to see the difference in the trajectory of the discourse of these three participants, especially in the first three graphs, in which the difference between edges and nodes seems easier to identify. Loops can also be identified in these graphs, in which the individual repeats the same constructs, forming a self-loop, similar to a hoop form, which can be better identified in the first dream graph of the schizophrenic individual, indicating a repetition in speech. And as the main studies using this tool confirm graphs are very informative, especially for the diagnosis of individuals with psychosis, we believe that they can also be informative in the search for other characteristics and assessments in language aspects.

Regarding the validation and language characteristics of SpeechGraphs, Mota *et al*. (2014, p. 1) state that:

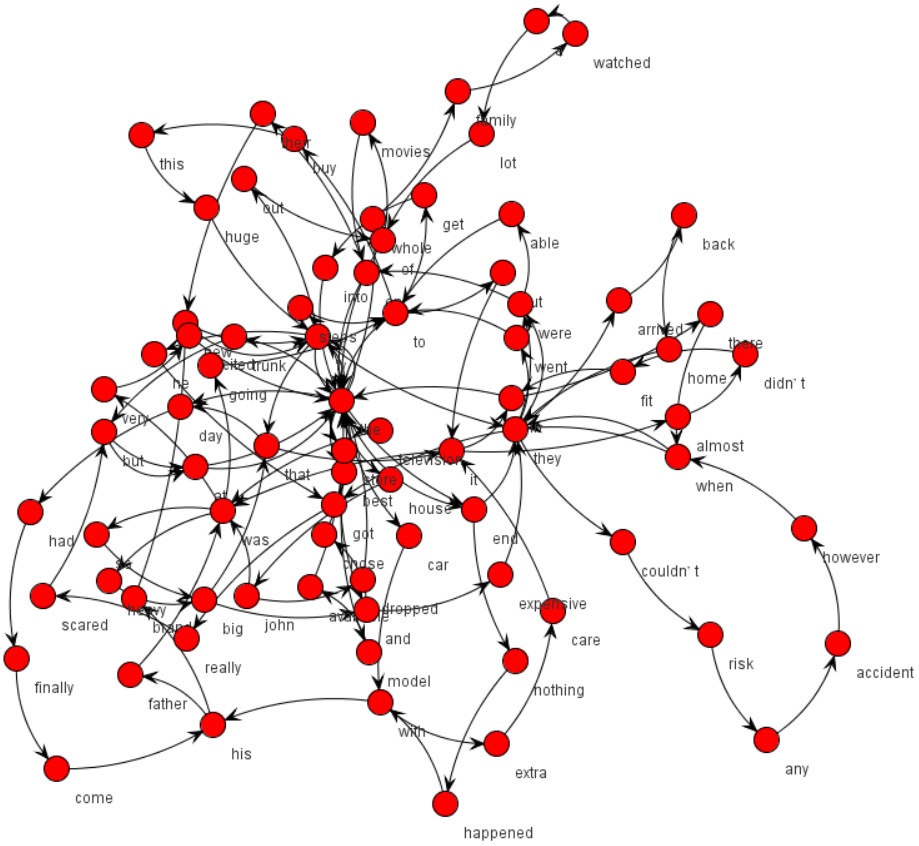
> [...] we have recently shown that the graph-theoretical analysis of dream reports produced by psychotic patients can separate schizophrenic from manic subjects. This was possible because their speech features are usually quite different. [...] These differences in symptomatology led us to hypothesize that schizophrenic and bipolar subjects would produce less connected word graphs than control subjects, in correlation with negative symptoms.

Mota *et al*. (2019) also state that "computational measures based on psychopathological descriptions of symptoms now allow for a deeper assessment of the question." (p. 2), based on

the results of studies that found a positive relationship through quantitative analysis between SpeechGraphs attributes and mental disorders diagnoses.

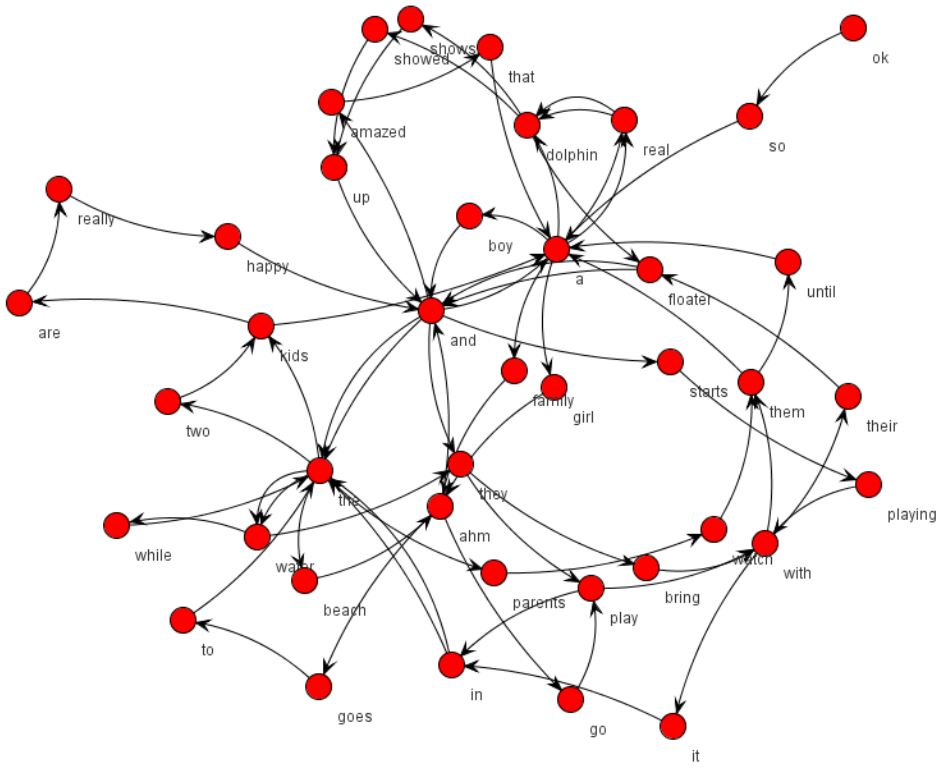
However, graphs generated from written texts and from a healthy population can look quite different from the ones presented in Figure 2. In Figure 3, we have a graph from a participant of the pilot study of this research (described in section 3.7) from the translators group. This graph does not present any self-loop and is fully connected, with the same number of nodes (80), LSC (80) and LCC (80), which will be explained in more detail as follows. In Figure 4, a graph from an oral text generated from a participant from the translation students group is presented, but this graph has different values for each attribute: number of nodes (41), LSC (41) and LCC (39). The difference for the number of LCC can be seen on the graph through two words on the upper right size, which are not connected to the rest of the text: "ok" and "so".

Figure 3 – Written text graph



Source: research data (2021).

Figure 4 – Oral text graph



Source: research data (2021).

Analyzing data from written texts may need a different approach from the ones being used in the body of literature with oral texts, since written and oral texts are differently represented. Also, since participants in this research have a high domain of the languages they speak, some differences may appear and need to be considered as well during analysis of both types of texts.

In addition to visual graphs, SpeechGraphs presents information regarding a few attributes. These can be *general attributes* (number of nodes (N), number of edges (E), word count (WC)), *recurrence attributes* (repeated edges (RE), parallel edges (PE), loops of one, two and three nodes), *connectedness attributes* (average total degree (ATD), largest connected component (LCC), largest strongly connected component (LSC)), and *global structure attributes* (diameter, average shortest path (ASP), density, average clustering coefficient (CC)).

Here, we will be focusing our analysis on a few of the general attributes, recurrence attributes and connectedness attributes. Table 1 presents which of these attributes will be explored and both its mathematical and psycholinguistic definitions. This information began with Mota *et al*. (2016) and were later adapted by Luz (2018) and Leandro (2021).

Table 1 – SpeechGraphs atributes

Attributes	Mathematical definition	Psycholinguistic Definition
General Attributes		
N (Nodes)	Number of nodes	Expresses the number of distinct lexical items in the texts; measures lexical diversity
Edges (E)	Number of edges	Number of links between lexical items; measures the amount of relationships that lexical items establish with each other
Recurrence Attributes		
RE (Repeated Edges)	Sum of all edges linking the same pair of nodes	Number of links between two words; measures recurrence
PE (Parallel Edges)	Sum of all parallel edges linking the same pair of nodes given that the source node of an edge is the target node of the parallel edge	Number of links between two words with opposite directions; measures recurrence
Connectedness Attributes		
LCC	Number of nodes in the maximal subgraph in which all pairs of nodes are reachable from one another in the underlying undirected subgraph	Measures how well connected the words in the text are
LSC	Number of nodes in the maximal subgraph in which all pairs of nodes are reachable from one another in the directed subgraph (node *a* reaches node *b*, and *b* reaches *a*)	Measures how well connected the words in the text are

Source: adapted from Leandro (2021).

And although the tools it is still mainly used in studies that seek to learn more about thought organization of individuals with psychopathologies and even help with diagnoses (MOTA *et al*., 2014), SpeechGraphs, being a language analysis tool, can be used in studies in other fields as well.

Mota *et al*. (2016) is an example of a study that used SpeechGraphs with different measures. The relationship between memory and performance in the early years of school was investigated through autobiographical memory reports from different times and from a dream, in addition to a report based on three affective images (one positive, one negative and one neutral). Furthermore, Theory of Mind (ToM) tests were applied: the Sally-Anne tasks, and

three versions of the Picture Sequence Test (PST; BARON-COHEN; LESLIE; FRITH, 1986). Later, Raven's Progressive Matrices Test (ANGELINI *et al*., 1999; RAVEN, 1936) was used as a measure of IQ, and finally, the results of Provinha Brasil[9] were used. For the analysis, memory reports and PST test reports were transcribed and analyzed using SpeechGraphs, and results indicated IQ and ToM had a positive correlation with word diversity word-to-word connectivity, while word recurrence had a negative correlation, successfully demonstrating there is a relationship between "between the structure of children's memories and their cognitive or academic performance." (p. 1).

Mota *et al*. (2019) also investigated a similar theme, investigating whether LSC (speech graph attribute) can be a good predictor for memory measures and if such relationship presents a correlation with reading. The study focused on the analysis of short-term memory. To this end, verbal reports based on short-term memory about images presented to the children were collected, following Mota's *et al*. (2016) protocol. A few weeks later, Raven's Progressive Matrices Test, a non-verbal measure of IQ, was also applied, and the children's reading fluency was tested using a Words and Pseudowords task. One year later, the researchers collected once again oral reports and performed the reading fluency task, in addition to four memory tasks, using the Portuguese version of Pearson's Automated Working Memory Assessment (AWMA). SpeechGraphs was then used to analyze oral reports, calculating the number of LSC. Results found a relationship between speech connectedness and short-term memory in the verbal domain.

Recently, Leandro (2021) worked with the relationship between working memory capacity, pre-task planning and oral L2 production. Participants were English learners and teachers, all speakers of English as a L2. For tasks, the author used "a picture-description task aimed at eliciting speech in the L2; a delayed verbal protocol aimed at assessing planning processes; and the SST, aimed at measuring verbal WMC." (p. 74), but advanced bilinguals (teachers) performed only the first task. The picture-description task was performed under three pre-task planning conditions: non-planning condition, oral planning condition, and written planning condition. Their speech performance was then analyzed for "complexity (number of t-units), accuracy (errors per 100 words), weighted lexical density (proportion of novel words) and fluency (speech rate)." (p. 6), in addition to being represented through graphs using the

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[9] More information on Provinha Brasil can be found on http://portal.mec.gov.br/provinha-brasil-sp-1596279807 and http://portal.inep.gov.br/provinha-brasil#:~:text=Composta%20pelos%20testes%20de%20L%C3%ADngua,em%20matem%C3%A1tica%2C%20oferecidos%20nas%20escolas

SpeechGraphs tool. Results indicated that oral and written conditions provided better results than the no-planning condition and the oral condition provided better results than the written condition, and working memory capacity appeared to influence participants' planning skills. As for graphs results, the author was able to see that the pre-task planning had a positive effect on participants' speech, also being able to identify results relating to the two groups L2 proficiency (learners vs teachers).

These previous studies enlighten us about SpeechGraphs' possibilities to analyze languages from different approaches and combine it with other tests and measures. However, it is important to highlight that SpeechGraphs has been mainly used as an analysis tool for oral texts, while we intend to use it for both written and oral texts. The tool's specifications and characteristics allow it to analyze written texts as it does with transcribed oral texts, the only difference being the amount of publications using it for the different modalities of text. We might also still need to investigate more and clarify how each of SpeechGraphs' attributes are related – or not – to specific language aspects and how they can explain written texts characteristics.

As an example of the possibility of using SpeechGraphs with written production, Luz's (2018) study explored this method of use. The author proposed to analyze the patterns of textual connectivity (in this study, the term thought organization is being used) in good readers, bad readers, and dyslexics, and participants were children and adolescents from the ACERTA project. A written text production task was conducted with all participants, and, more specifically, "The objective of the textual analysis performed was to reveal whether these arrangements of lexical items are recurrent among the participants of the same experimental group and if there are, therefore, patterns of textual connectivity associated with reading fluency."[10] (p. 79, own translation). SpeechGraphs' role in this study was to check if its attributes, associated with Machine Learning techniques, predict reading fluency levels and if the tool can be helpful in identifying developmental dyslexia. Results indicated a positive association between textual connectivity and groups according to their reading fluency, concluding that Graph Theory and SpeechGraphs can be a useful methodology to assess reading fluency and, of great value to this research, to assess written texts.

In another study, Pinheiro *et al*. (2020) analyzed literary texts (canonical texts and poetry texts) spanning around 4,500 years under the proposal that "Bronze Age literature has

[10] Original quote: O objetivo da análise textual realizada consistiu em revelar se estes arranjos de itens lexicais são recorrentes entre os participantes de um mesmo grupo experimental e se há, portanto, padrões de conectividade textual associados à fluência de leitura.

been proposed to contain childish or psychotic features, which would only have matured during the Axial Age [...]" (p. 1). These literary texts were also compared with oral reports from six distinct groups: literate adults, illiterate adults, psychosis, literate children, preschool children, and Amerindian adults. Results indicated "Bronze Age texts are structurally similar to oral reports from literate typical children and literate psychotic adults, but distinct from poetry, and from narratives by preliterate preschoolers or Amerindians." (p. 1), also indicating "The educational pathways of oral and literate traditions are structurally divergent [...]" (p. 1). With this comparison between different types of texts and with different populations, it was possible to confirm that the study and analysis of the organization of thought can be enlightening in different contexts and enable a more detailed understanding of the texts of different individuals.

In the present study, SpeechGraphs was employed to analyze texts produced in both Portuguese and in English, in written and oral modalities by experienced translators, translation students and bilinguals.

3 METHOD

This research involves the application of experiments in order to investigate to what extent translation experience affects the level of syntactic complexity and thought organization in written and oral texts produced by Portuguese-English translators and bilinguals. The study was approved by the Ethics Committee of the Federal University of Rio Grande do Sul (CAAE 44424021.1.0000.5347) and all participants signed an informed consent form.

3.1 OBJECTIVES AND HYPOTHESES

In this section, the general objective and specific objectives of the study will be explained, as well as its guiding hypotheses.

3.1.1 Main Objective

The main objective of this research is to investigate to what extent translation experience affects the level of syntactic complexity and thought organization and connectivity in written and oral texts produced by Portuguese-English translators and bilinguals. For this purpose, the performance of three groups of participants will be compared: (a) experienced translators, (b) translation students enrolled in an undergraduate course in the area, and (c) non-translators bilinguals with a high level of English proficiency whose professions do not demand a lot of written language use in both English and Portuguese. The three groups will be compared in two linguistic tasks that involve different language modalities (Written Production Task and Oral Production Task) and two languages (English and Portuguese). The levels of syntactic complexity and thought organization in linguistic tasks will be measured through the analysis of T-Units (HUNT, 1965) and the Speech Graphs tool (MOTA *et al*., 2014), respectively. From here on, group (a) will be referred to as "translators", group (b) as "translation students", and (c) as "bilinguals".

3.1.2 Specific Objectives

From the main goal, the following specific objectives were outlined:

(A) To investigate to what extent translation experience affects the level of syntactic complexity in written texts in Portuguese and in English produced by experienced Portuguese-English translators, translation students, and bilinguals who do not use the written modality of both languages in their profession.

(B) To investigate to what extent translation experience affects thought organization and connectivity in written texts in Portuguese and in English produced by experienced Portuguese-English translators, translation students, and bilinguals who do not use the written modality of both languages in their profession.

(C) To investigate to what extent translation experience affects the level of syntactic complexity in oral texts in Portuguese and in English produced by experienced Portuguese-English translators, translation students, and bilinguals who do not use the written modality of both languages in their profession.

(D) To investigate to what extent translation experience affects thought organization and connectivity in oral texts in Portuguese and in English produced by experienced Portuguese-English translators, translation students, and bilinguals who do not use the written modality of both languages in their profession.

(E) To investigate to what extent aspects of syntactic complexity and attributes of thought organization and connectivity are correlated to each other in written and oral texts in Portuguese and in English produced by experienced Portuguese-English translators, translation students, and bilinguals who do not use the written modality of both languages in their profession.

3.1.3 Hypotheses

In order to verify the specific objectives presented above, the following hypotheses were outlined:

(A1) The group of translators were expected to have higher levels of syntactic complexity – measured by the number of T-Units – than translation students and bilinguals in their written texts in both Portuguese and in English. A difference between translation students and bilinguals, with translation students obtaining higher levels of syntactic complexity, was also expected. In other words, experienced translators were expected to have a higher subordination rate in the count of T-Units in texts written in Portuguese and in English than translation students and bilinguals, and

translation students were expected to have a higher subordination rate in the count of T-Units in texts written in Portuguese and in English than bilinguals.

(B1) With respect to the analysis of thought organization and connectivity, the expectation was that translators would show better scores in both Portuguese and in English than translation students and bilingual participants. A difference between translation students and bilinguals, with translation students showing better scores, was also expected. This particular analysis of thought organization and connectivity considered the measure of a number of graph attributes in the participants' written texts. The chosen attributes for the graph analysis in the present study were nodes, edges, repeated edges, parallel edges, LCC, and LSC.

(C1) In oral texts, no significant differences were predicted to be found in the comparison of the three groups of participants in the assessment of the levels of syntactic complexity in both Portuguese and English. In other words, since translators normally have experience with dealing with written texts, a similar subordination rate in the count of T-Units was expected to be found in participants' oral texts in Portuguese and English.

(D1) With respect to the analysis of thought organization and connectivity, no significant differences were expected to be found among the three groups in their oral texts in Portuguese and in English. The same graph attributes adopted in the analysis of written texts were used in the analysis of oral texts: nodes, edges, repeated edges, parallel edges, LCC, and LSC.

(E1) It was expected that measures of syntactic complexity (number of clauses, number of T-Units) would correlate with attributes of thought organization regarding general attributes (nodes, edges) and connectedness attributes (LCC, LSC), and would not correlate with attributes of recurrence (repeated edges, parallel edges) in both written and oral modalities and in both Portuguese and English.

3.2 PARTICIPANTS

The initial research sample consisted of 70 participants who were divided into three groups: (1) translators; (2) translation students; and (3) bilinguals. Out of the 70 participants, 6 were part of the pilot study – 2 participants for each of the three groups. The final sample consisted of 64 participants, whose data will be discussed in chapter 4, and participants were divided into the three groups: (1) 28 experienced Portuguese-English translators; (2) 7

translation students enrolled in the Languages and Translation – Portuguese and English undergrad course at Federal University of Rio Grande do Sul (UFRGS); and (3) 29 proficient bilinguals who reported not to do not use written languages in both Portuguese and English as an essential part of their profession and/or work.

The research sample was selected by convenience. In other words, participants were individuals who fit in the inclusion and exclusion criteria outlined below and were willing to participate in the study after being contacted by the researcher or who contacted the researcher after seeing fliers posted on social media accounts and sent through emails by professors at UFRGS. The exclusion criterion was to have lived in English-speaking countries for 6 years or more. The general inclusion criteria for sample selection were:

(a) being over 18 years of age at the time of data collection;

(b) having attended or be currently attending a higher education course;

(c) having an advanced level of proficiency in English;

(d) having Portuguese as their first language.

The following set of selection criteria was used for the composition of each group of participants in the experimental study:

(a) to be a part of Group 1, formed by experienced Portuguese-English translators, participants should report having work experience in translation companies or as a freelance translator, with a monthly workload;

(b) to be a part of Group 2, formed by translation students, participants should be enrolled at the Languages and Translation – Portuguese and English undergraduate course at UFRGS for at least 2 years, and have no more than 6 months of experience as professional translators at the time of data collection;

(c) to be a part of Group 3, participants should be advanced Portuguese-English bilinguals who reported not to make intense use of written language – both in Portuguese and English – as an essential part of their profession and/or work.

3.3 RECRUITMENT

Recruitment of professional translators occurred through social media such as Facebook and Instagram, and through direct contact with professionals who work independently or in translation companies after being recommended by the researcher's acquaintances and by email. The same message, shown in Appendix B of this essay, was used in all cases. The Facebook groups in which the message was posted were: LETRAS – UFRGS, Letras UFRGS, Tradutores

/ Intérpretes, Tradutores, Intérpretes e Curiosos, Tradutores e Intérpretes de Porto Alegre, and Tradução das Minas. As for translators who are acquaintances of the researcher, an individual email was sent, using the same invitation text shown in Appendix B. Before posting the invitations on Facebook groups, an invitation and permission request was sent to the group's moderators. This invitation is included in Appendix E.

For translation students, recruitment occurred through direct contact by the researcher's acquaintances and by email. For acquaintances, an individual email was sent directly. In other cases, an email was sent individually to UFRGS professors requesting that they forwarded the invitation to their students. The invitation text is presented in Appendix C. In the case of emails sent by professors, after the students who wished to participate got in touch with the researcher, the same invitation text presented in Appendix C was sent to them.

Lastly, recruitment for the bilingual group occurred by asking for volunteers from the researcher's personal acquaintances and through the researcher's social networks (Facebook and Instagram). In addition, the invitation was posted at the UFRGS – Federal University of Rio Grande do Sul group on Facebook. In all cases, the invitation text used was the same one, as shown in Appendix D.

3.4 INSTRUMENTS

The following instruments were used in this research: (1) an Informed Consent Form, through which participants agreed with the terms and procedures of the research, as presented in Appendix A; (2) a Language History and Translation Activity Questionnaire (LHTAQ), for experienced translators and for translation students, or a Language History and Professional Activity Questionnaire (LHPAQ), for bilingual participants, as presented in Appendix F and Appendix G, respectively; (3) VLT, an online English proficiency measurement; (4) a Written Production Task in Portuguese and in English; and (5) an Oral Production Task in Portuguese and in English. Each of the materials used during data collection are described next.

3.4.1 Language History Questionnaire - LHTAQ and LHPAQ

The Language History Questionnaire was adapted from the model created by Scholl and Finger (2013) and from the adaptation used by Freitag (2019), and it intends to better understand the linguistic background of participants and it was also used to verify if participants fit in the inclusion criteria for the research. Also, recent research has found that bilingualism

and language experience are multidimensional, and therefore using arbitrary criteria only such as age of acquisition and proficiency cannot be considered as sufficient anymore to understand and test bilinguals (LAINE; LEHTONEN, 2018; CHUNG-FAT-YIM; SORGE; BIALYSTOK, 2020), making the use of longer and more specific questionnaires a more appropriate approach.

As we have three distinct groups of participants – translators, translation students and bilinguals -, there was a need for different questions in order to better understand participants' bilingual experience and professional experience. Thus, two questionnaires were used: a Language History and Translation Activity Questionnaire (LHTAQ) for the groups of translators and translation students, which were similar to each other in most educational and professional aspects, and a Language History and Professional Activity Questionnaire (LHPAQ) for the bilinguals group. Each questionnaire had two sections: the first one was related to participants' language history, containing questions about languages they spoke, age of acquisition of English, age of achieved fluency in English, where they learned English, frequency in which they use both Portuguese and English in daily tasks (speaking, writing emails, writing papers, reading websites etc.). The second section for each questionnaire was related to their educational and professional background – for translators and translation students, a "translation activity" section was added, and for bilinguals, a "professional activity" section was added.

The second section of the LHTAQ had specific questions about the translation practice and training of participants, such as education information, time working as a translator, monthly hours of work, work modality (working in a company or as a freelancer), and for translation students, questions about which translation courses they had already taken at their undergrad course were added. For the LHPAQ, specific questions about the participants' education and professions, such as which course they graduated in, what is their current job, if they had any experience working with languages, and how they make use of written Portuguese and English during their daily work, which was mainly relevant to identify the inclusion and exclusion criteria of the sample.

3.4.2 Proficiency Measure: Vocabulary Level Test (VLT)

The Vocabulary Level Test (VLT) is an English proficiency test that measures vocabulary level and lexical knowledge. Developed by Nation (1983, 1990), it proposes that English vocabulary can be divided into five levels according to the frequency they are found in the English language, from level 1000 to level 5000. Following such reasoning, levels increase

according to words' frequency – words from level 1000, for example, appear much more frequently in English than words from level 5000, which is considered an academic level, representing words that appear with less than 1% of frequency in English. Due to its level-like nature, the test can be used in parts, by asking participants to complete only to a certain level (i. e., until level 2000. If using VLT with learners, it is probably not necessary to have participants take all five levels, since it is highly unlikely they will know words from the last levels as they are considered as more advanced vocabulary. However, if you are testing participants with a higher proficiency, which is the case of this study, VLT can be used with all its levels. Thus, our participants were requested to complete the entire test – all 5 levels.

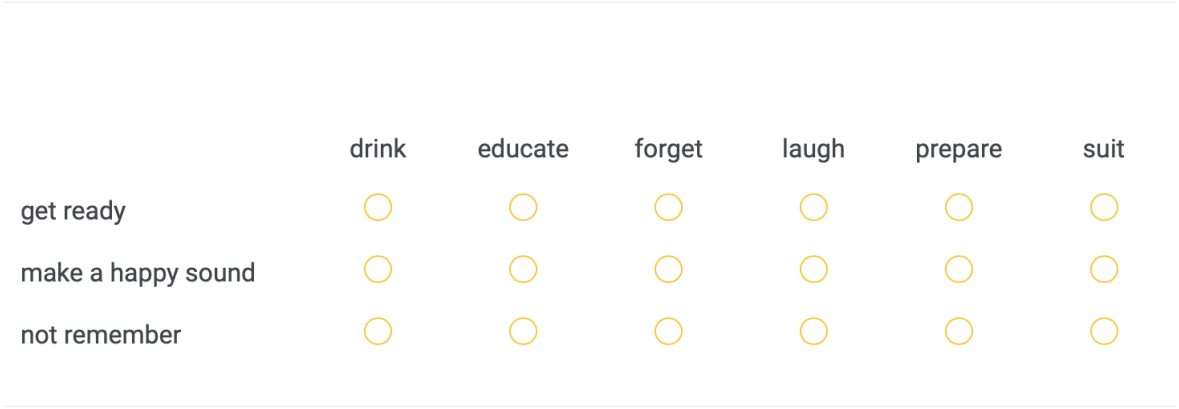
More recently, Webb, Sassao and Ballance (2017) updated the VLT and created an online version for the test[11], consisting of five different levels: 1000, 2000, 3000, 4000 and 5000. Results are provided in percentage for each level, and scoring 86% or above indicates the test-taker is familiar with enough words from that level. If the score is less than 86%, it means they still do not know sufficient words from that level. Results do not indicate what wrong answers were provided by the test-taker, only the final score for each level.

The online version by Webb, Sassao and Ballance (2017) was used with all participants of this research. Since the main goal here is to analyze written texts, a vocabulary test was deemed sufficient to check if all study participants, considering the three groups (experienced translators, translation students and bilinguals), had a comparable proficiency level and sufficient vocabulary knowledge to complete the written and oral production tasks.

Each of the 5 levels of the test consists of 10 blocks with 3 words, as shown in Figure 5. In this example, test-takers need to decide which of the vocabulary options shown in 6 columns – drink, educate, forget, laugh, prepare, suit – is better suited to explain the first 3 explanations shown in different lines – get ready, make a happy sound, not remember.

[11] https://vuw.qualtrics.com/jfe/form/SV_6Wrb5aUvXjIAs6h?Q_JFE=qdg

Figure 5 – Example of VLT



Source: VLT website.

Participants were requested to complete the entire online test using the link provided by the researcher and then share their results with her via email.

3.4.3 Written Production Task

The Written Production Task consisted of producing a written narrative in English and a written narrative in Portuguese with a 15-minute time limit. Participants created both narratives after being presented with a cartoon strip – one for each language –, shown in Annex A. Each cartoon strip consisted of four frames: the first two frames represented the beginning of the cartoon strip story, the third frame was blank, and the fourth frame represented the ending of the story, with an unexpected twist from the previous frames. Participants had to create a narrative to fill in the blank frame according to the beginning and end of the story presented in the strip. It is important to note that tasks using a sequence of images for eliciting written production with children and adults have already been used in studies, such as Salles (2005) and Luz (2018).

The narrative genre was chosen because "[...] these essays do not require prior content knowledge of a particular domain. This allows us to more easily tease apart our results in terms of their relationship to writing proficiency, rather than greater knowledge of a particular domain" (ALLEN, SNOW, MCNAMARA, 2016, p. 914). Thus, the created cartoon strips had general themes that could be elaborated on through narratives by all participants without a particular need for previous instructions or additional specific knowledge.

Instructions began with the researcher explaining that participants would visualize a cartoon strip for 1 minute, that it contained a beginning and an end, but not the middle part of the story, and that participants were supposed to create a written narrative for the cartoon strip by completing that part of the story. It was also explained to them that there were no correct or wrong answers – they could create any type of narrative, as long as it made sense with the rest of the cartoon strip. For their writing of the narrative, participants were given only a 1-minute planning time, because as we write we continue to plan and are able to stop, organize our ideas and even change what was already written, thus not needing much previous time to plan a written text. In addition, the pilot study (described in section 3.7) conducted before data collection confirmed 1 minute was sufficient time for initial planning.

After the 1-minute planning time passed, participants were informed they would have 15 minutes to write their narrative on a Google Docs document, with the link being provided by the researcher, and that their narrative should contain between 250 and 300 words. If the participant did not use the entire 15 minutes for their narrative, they were not prompted to continue writing, but the researcher would inform them they still had remaining time left and they could use it to revise their text and make any changes that seemed fit. If they decided not to revise it, the task was finalized. However, if their text had less than 250 words or more than 300 words, they were asked to revise it and make sure it was within the word limit. During the narrative time, the cartoon strip was left on the screen, using a here-and-now method.

This protocol was performed two times, once for the English written production and once for the Portuguese written production. The order of the cartoon strips and of the languages was decided randomly to avoid task-related effects. Participants' texts are presented in Annex B.

Oral texts were filed separately and organized for the subsequent analyses to be performed using T-Units (HUNT, 1965; FINGER; BRENTANO; RUSCHEL, 2019), for syntactic complexity, and SpeechGraphs (MOTA *et al*., 2014), for connectivity, on the basis of protocols used in previous studies (MOTA; COPELLI; RIBEIRO, 2017; MOTA *et al*., 2018; LEANDRO, 2021).

3.4.4 Oral Production Task

The Oral Production Task consisted of participants producing an oral narrative in English and an oral narrative in Portuguese with a 1-minute time limit. Participants created both narratives after being shown a cartoon strip – one for each language –, presented in Annex A.

As in the Written Production Task, each cartoon strip consisted of four frames: the first two frames represented the beginning of the cartoon strip story, the third frame was blank, and the fourth frame represented the ending of the story, with an unexpected twist. Participants had to create an oral narrative to fill the blank frame according to the presented beginning and end of the story.

Instructions began with the researcher explaining participants would be presented with a cartoon strip that contained a beginning and an end, but not the middle part of the story, and they were supposed to create a narrative for the cartoon strip by completing that part of the story. It was also explained that there were no correct or wrong answers – they could create any type of narrative, as long as it made sense with the rest of the cartoon strip. Participants were given 2 minutes to plan their narratives. Leandro (2021) used a planning time for oral tasks as well, but decided to use a 1-minute time frame. According to the author, that amount of time

> [...] was decided based on research by Mehnert (1998) and Pang and Skehan (2014). [...] Mehnert's (1998) study demonstrated that L2 oral performance could already benefit from one minute of pre-task planning. [...] Pang and Skehan (2014) suggest that *ambitious planning*, i.e., trying to do too much while planning, may be the cause of weak performance (Skehan, 2015). (p. 78).

However, since this study did not have any practice time for participants to familiarize themselves with the task and in the pilot study participants mentioned 1 minute was a very short time to plan, we decided to use a 2-minute time frame for planning. Afterwards, it was instructed that after the planning time they would have one minute to tell the narrative they created, following the research protocol designed by Leandro (2021). Participants were also informed that the researcher would start recording their narrative with a voice-only recorder. If the participant did not use the entire 1 minute for their narrative, they were not prompted to continue speaking, except if the narrative had less than 30 seconds. During the planning time and narrative time, the cartoon strip was left on the screen, using a here-and-now method.

This protocol was performed two times, once for the English oral production and once for the Portuguese Oral production. The order of the cartoon strips and of the languages used was decided randomly to avoid task-related effects. Participants' oral productions appear in Annex B.

Narratives were recorded and then transcribed by the researcher in text files for subsequent analysis using T-Units analysis (HUNT, 1965; FINGER; BRENTANO; RUSCHEL, 2019), aiming a syntactic complexity analysis, and also using SpeechGraphs

(MOTA *et al*., 2014), following protocols used on previous studies (MOTA; COPELLI; RIBEIRO, 2017, MOTA *et al*., 2018, LEANDRO, 2021).

3.5 DATA COLLECTION PROCEDURES

After participants expressed an interest in participating in the investigation, the researcher provided them with more information about the study and made an individual appointment with each participant for data collection. Participants were invited through individual emails or direct messages. Data collection was also carried out individually and occurred online, through Google Forms and Zoom platforms. For the zoom video call, an individual room was created by the researcher for each of the participants.

Data collection consisted of three steps: (1) sending the link for the LHTAQ or the LHPAQ, depending on the participant group, containing the Informed Consent Form, and the VLT link via email; (2) scheduling a meeting via Zoom; (3) performing all four tasks via Zoom on the same day.

For the first step, the Informed Consent Form and the Language History Questionnaire were filled out online, through Google Forms, individually, as each participant received the link to the questionnaire that had to be filled out before the scheduled zoom meeting. Participants were informed that they needed to have access to the internet in order to complete the questionnaire. If the participant did not have internet access when filling out the questionnaire, they could fill it out at another time or day, or, if the participant desired, they could withdraw from the research as a whole without suffering any consequences. In addition, the VLT test link was sent along with either the LHTAQ or the LHPAQ. Each participant had to complete the VLT proficiency measure and send the final results to the researcher via email. Only the participant and the researcher had access to their results, although results can most likely be accessed in the platform database by its developers.

Before participants started the LHTAQ or the LHPAQ, in the first stage of the Google Forms they saw an Informed Consent Form. Participants were asked to read the text and check either the “I accept to participate” or “I do not accept to participate” options. If they checked the second option, Google Forms automatically terminated their participation. If they checked the first option, they were sent to the following page to fill out the questionnaire. A copy of the responses given by participants was automatically sent to the email provided by the participant at the beginning of the form.

For the second stage of data collection, a time and a date were scheduled with the participants to hold a Zoom meeting to carry out the Written Production Tasks and Oral Production Tasks. Participants were informed that they had to have internet access on the day the meeting took place. If the participant or researcher did not have internet access on that day, the meeting could be rescheduled, or, if the participant so desired, they could withdraw from the study and not decide on another day for data collection, without suffering any consequences.

For the third stage of data collection, an individual Zoom room was created by the researcher, and then a link was sent to the participant. A different room was created for each participant, in order to guarantee only the researcher and the participant had access to the room. Participants were briefed about the procedures for collecting the Written Production Tasks and Oral Production Tasks before starting the tasks, as described in sections 3.4.3 and 3.4.4, and at the end of the explanation of each task the researcher asked if the participant had any questions. If no doubts were presented, the data collection for the four tasks began. Data collection for all tasks lasted 40 to 60 minutes.

Tasks were applied randomly in order to avoid unwanted effects of tiredness and effects of task and/or language (Portuguese or English). Upon completion of the tasks, the researcher informed the participant they had completed all tasks and once again asked if they had any question or comments. If they did not express any questions or comments, the researcher thanked them for their participation and expressed she was available at any time in the future in case they remembered or realized something they needed to clarify.

3.6 DATA ANALYSIS PROCEDURES

For the analysis process, the data obtained in the Written Production Task and in the Oral Production Task went through two stages, the first being the analysis through T-Units (HUNT, 1965; FINGER; BRENTANO; RUSCHEL, 2019), and also using SpeechGraphs (MOTA *et al*., 2014) based on previous protocols used in other studies (MOTA; COPELLI; RIBEIRO, 2017; MOTA *et al*., 2018; LEANDRO, 2021).

3.6.1 Syntactic Complexity Analysis

All oral and written texts created by participants were filed separately for the analyses. The oral texts were all transcribed by the researcher and the transcriptions were used for the

analysis. The written narratives were created on individual Google Docs files, which were stored in a large folder.

Each oral and written text was transferred to a new file so the T-Units analysis could be conducted. First, the texts were divided into two columns, one containing the main clauses, which generated the number of clauses, and another containing the main clauses combined with their subordinate clauses, generating the T-Units number. Both numbers (clauses and T-Units) were used in the statistical analysis.

As described in section 2.5, a T-Unit consists of the main clause plus all of its subordinate clauses. For example: in the sentence "John was into Mary, but he lacks the courage to talk to her, until that day.", taken from the written English task produced by participant P14, there are three clauses: John was into Mary, [1] // but he lacks the courage [2] // to talk to her, until that day [3]. However, when we combine the main clause + its subordinates, we have two T-Units: John was into Mary, [1] // but he lacks the courage to talk to her, until that day [2].

3.6.2 Thought Organization and Connectivity Analysis

In order to assess thought organization and language connectivity, SpeechGraphs tool was used following the same protocol employed by Mota *et al*. (2016, 2019), Leandro (2021) and Luz (2018).

For written texts, the Google Docs files were saved as .txt files, which is the format accepted by the tool, without any alteration to the content of the text. Alterations were made only if there were spacing errors, such as extra spaces between two words or if there was a missing space, such as no space between a full stop and the first word of a new sentence, since these errors can lead to mistakes as the tool considers spacing and removes all punctuation from the text. That was deemed important because such errors occur from lack of attention and not lack of knowledge or poor thought organization by participants.

For oral texts, the audios recorded by the researcher were transcribed into .txt files without any punctuation, since the tool would remove them in analysis and deciding on punctuation from oral reports can lead to mistakes. All texts were transcribed and then revised by listening to the audio again and checking the words in detail to guarantee all words and sentences were correctly transcribed.

After files were prepared, they were loaded into SpeechGraphs in four different blocks: written English, written Portuguese, oral English and oral Portuguese. For written texts in both languages, it was requested that the tool provided directed graphs for each text and a parameters

table with its attributes analysis, but rather than using the entire texts for the analysis, we used the "Split text" function and requested the tool to analyze a moving window of 30 words per text with a step of 3 words. This decision was based in previous studies (MOTA *et al*., 2019) to guarantee that written texts could be more comparable to oral texts. It was necessary to use the moving windows of 30 words with a step of 3 words for oral texts because they varied greatly regarding the amount of words spoken by participants, as some spoke for less than the time required (1 minute) and some spoke for more time. Thus, the moving window function was used for both written and oral texts to be similar to each other. Chosen attributes for the graph analysis were nodes, edges, repeated edges, parallel edges, LCC, and LSC. For oral texts in both languages, it was also requested that the tool provided directed graphs and a parameters table using a moving window of 30 words with a step of 3 words as well. Using the 30-words window allows for more homogenous lengths of text. Chosen attributes for the analysis of oral narratives were also nodes, edges, repeated edges, parallel edges, LCC, and LSC.

3.6.3 Statistical Analysis

After performing the syntactic complexity and the SpeechGraphs analysis, a statistical analysis was conducted in order to investigate the relationship between groups and variables. RStudio (2015) software was used for such analysis.

Firstly, a Shapiro-Wilk test was conducted in order to check data distribution. Secondly, a Levene's Test was conducted to check variance homogeneity. Following the results of both tests, non-parametric tests were conducted. It was also decided to perform a subanalysis to include the group of translation students, as their number of participants was considerably smaller than the groups of translators and bilinguals.

The first analysis occurred between the groups of translators and bilinguals by using a Mann-Whitney test to investigate both syntactic complexity and thought organization in written and oral texts. Afterwards, the second analysis occurred between the three groups: translators, translation students and bilinguals. A Kruskal-Wallis test was conducted for this comparison, investigating, once again, both syntactic complexity and thought organization in written and oral texts.

Lastly, a Spearman correlation was performed to investigate the relationship between measures of syntactic complexity and thought organization. The correlation was also investigated for both written and oral texts.

3.7 PILOT STUDY

Before conducting the experimental study, an online pilot study was conducted by using the Written Production and Oral Production tasks, the LHTAQ and the LHPAQ, and the VLT. The pilot study used the same tasks and protocol designed to be used in the final experimental study in order to assess if they were adequate and if any changes were still necessary.

Participants for the pilot study represented the same three groups as in the experimental study: translators, translation students and bilinguals. For each group, 2 participants were tested, with a total of 6 participants. Participants were recruited through individual emails, presented in Appendix H, following the same steps described in section 3.3 of this dissertation.

If participants agreed to participate in the research, a date and time were scheduled according to the availability of both participant and researcher for the video call to take place. Participants were also asked, via email, for their permission to record the video call. A confirmation of the request was also requested at the beginning of the call. Recordings were kept in the researcher's laptop, which is password-secured, and were used to check if task explanations and procedures were appropriate.

Data collection used the same instruments described in section 3.4 and the same procedures described in section 3.5, with the exception of the cartoon strips used for the Written and Oral tasks. For the pilot study, four sequences of logical images from the *Cambridge English First*: Young Learners English Tests were used, presented in Annex C. Data analysis also used the same procedures described in section 3.6.

Even though the pilot study had a very small sample size (6 participants), it was still considered to be very relevant and provided important information about instruments and procedures of the study. After participants agreed to participate in the pilot study, the researcher asked them to take notes in case they had any doubts or comments while answering the LHTAQ and the LHPAQ, as well as asked if they had anything to comment after the Written and Oral Production tasks were conducted. Participants were able to give the researcher feedback about questionnaire items that were confusing or even items with wrong settings, such as one item which instructed to "select as many answers as you see fit", but participants could only select one answer.

In addition, participants expressed their feedback about the sequence of logical images used. They stated there was not much to be said about the images and they were very direct, not leaving an opportunity to create longer or more complex stories. This was reflected in their texts, which generally had only a small paragraph. It is important to note there was no

minimum or maximum of words for them to write, but when asked participants confirmed they would not be able to expand their texts based on the used cartoons.

After this feedback, it was decided to use a different approach with the cartoon strips for the final study – creating them with only the beginning and the end, leaving the middle part blank, thus providing room for participants to create and expand their story. A minimum of 250 words and a maximum of 300 words was decided for the use of the cartoon strips, and the time-limit for the written task was increased for the final study. Instead of using 5 minutes, participants would then have 15 minutes to complete the written task.

4 RESULTS AND DISCUSSION

This chapter presents the results of the quantitative analysis performed to address the specific goals and hypotheses that have guided the present study. The statistical analysis regarding syntactic complexity and thought organization and connectivity were performed through the RStudio (2015) software.

First, in section 4.1, a general characterization of the sample of three groups is presented. Then, in section 4.2, quantitative results are presented and discussed.

4.1 DESCRIPTIVE RESULTS

The final sample was formed by 64 participants from three distinct groups: translators (n = 28), translation students (n = 7), and bilinguals (n = 29). All participants were Brazilian, had Portuguese as their L1, were over 18 years of age and had completed or were enrolled in a higher education course. Data presented in this section were gathered through the LHTAQ and the LHPAQ, and VLT results were sent to the researcher after participants completed the test and received their results.

Table 2 presents data regarding sex and age of all participants according to their groups.

Table 2 – Sex and age for all three groups

	Sex			**Age (mean; SD)**
	Female	Male	Prefer not to identify myself	
Translators (n = 28)	50.0%	46.4%	3.6%	29.5 (5.89)
Students (n = 7)	57.1%	42.9%	0.0%	21.42 (1.39)
Bilinguals (n = 29)	69.0%	31.0%	0.0%	33.51 (8.56)

Source: author (2021).

Participants were asked to select one of four options regarding sex: female, male, prefer not to identify myself, or other. The translators group was the only one with "prefer not to identify myself" as a chosen option, and remaining participants from the two other groups chose only "female" or "male". All groups presented more female participants, but the bilinguals group presented the larger difference between "female" and "male" among the three groups.

As for years of age, the group with the highest average of years and higher variability was the bilinguals (*M* = 33.51; *SD* = 8.56), followed by the translators (*M* = 29.5; *SD* = 5.89) and then the translation students (*M* = 21.42; *SD* = 1.39).

For translators, the younger participant was 22 years of age and the oldest participant was 42 years of age. For translation students, the younger participant was 20 years of age and the oldest participant was 24 years of age. And finally, for bilinguals, the younger participant was 24 years of age and the oldest participant was 62 years of age. Since translation students are the youngest group, it appears they entered University soon after graduating from High School, while translators and bilinguals are, on average, older.

Regarding proficiency level, in the two versions of the Language Background Questionnaire that were used, participants were asked to self-assess their proficiency level in four aspects (reading, writing, speaking, oral comprehension), which were provided in a scale from 1-7 (1- very low, 2- low, 3- average, 4- good, 5- very good, 6- fluent, 7- proficient). Results for all three groups of participants are described in Table 3.

Table 3 – Self-assessed proficiency results for all three groups

	reading		**writing**		**speaking**		**oral comprehension**		**all 4 assessments**	
	mean	**SD**	**mean**	**SD**	**mean**	**SD**	**mean**	**SD**	**Mean**	**SD**
Translators (n = 28)	6.82	0.39	6.57	0.74	6.46	0.79	6.71	0.53	26.57	2.20
Students (n = 7)	6	1	4.85	1.46	4.28	1.11	5.42	0.53	20.57	3.15
Bilinguals (n = 29)	6.34	0.72	5.58	1.26	5.86	1.18	6.27	0.84	24.06	3.68

Source: author (2021).

Translators presented the higher average among the three groups for all four assessments, as well as the lowest SD, except for oral comprehension, in which SD value was the same for translators and students. Furthermore, all three groups assessed their reading skills as the best among the four assessments, followed by oral comprehension. As for third and fourth values of self-assessment, translators and translation students ranked their skills as writing and then speaking, while bilinguals reported to have, on average, better skills on speaking and then writing, presenting a difference between groups' perceptions of their own skills. Regarding the average for the sum of all 4 assessments, translators still had the higher value, along with the

lowest SD. Bilinguals presented the second highest average, but the highest SD value, followed by translation students with the lowest average value and second lowest SD value.

In addition, participants were also asked to provide their results from the VLT assessment, described in section 3.4.2. For VLT, the maximum score for all 5 levels is 500%, while for the mean of all 5 levels the maximum score is 100%. Results for all three groups of participants are described in Table 4.

Table 4 – VLT proficiency results for all three groups

	VLT (all 5 levels)		**VLT (mean 5 levels)**	
	mean	**SD**	**Mean**	**SD**
Translators (n = 28)	496%	0.052	99%	0.01
Students (n = 7)	488%	0.10	98%	0.02
Bilinguals (n = 29)	489%	0.15	98%	0.03

Source: author (2021).

Translators presented the higher scores for both measures of VLT – all 5 levels and mean for 5 levels, as well as the lowest SD. Results for mean of 5 levels presented a smaller difference among groups than the results for all 5 levels, but nevertheless, translation students and bilinguals presented themselves as very similar to each other regarding this measure of proficiency.

For both proficiency measures, self-assessed and VLT, translators exhibited higher results than the other two groups. However, the VLT measure appears to show that all three groups are very similar to each other regarding vocabulary proficiency, while the self-assessed measure shows a wider gap between participants' proficiency, especially for writing and speaking assessments. The group of translators is probably more confident in assessing themselves with a higher level for writing due to their experience with written texts and to the requirement to having a high proficiency level in order to work with translation, whereas the group of translation students is likely still insecure as they are still developing their translation skills and studying the English language. Bilinguals are between the other two groups for these two assessments – it is possible they are not as confident in their skills as translators are because they do not use English as often.

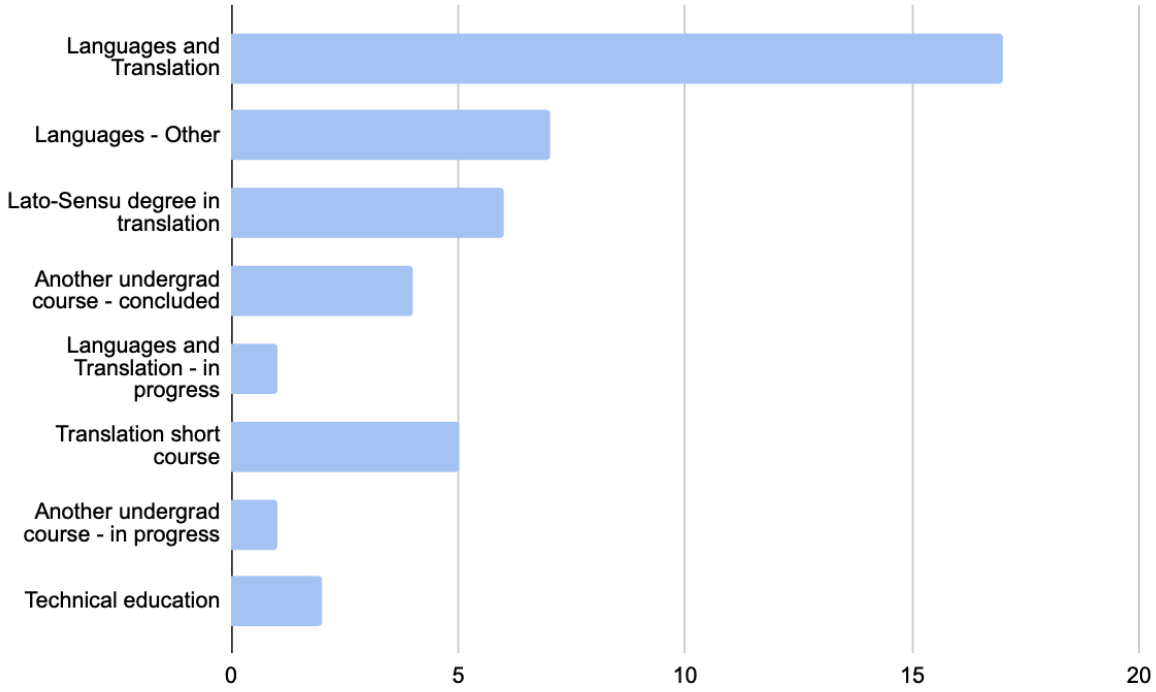
In the following subsections, further descriptive results specific about the sample participants of each group will be presented and described.

4.1.1 Translators

The translators group was formed by 28 translators who reported to have experience as translators and to be currently working as translators with a monthly workload. The information reported in this section was gathered from the answers given in the LHTAQ.

As for formal education, as seen in Figure 6, most participants in the translators sample had an undergraduation in Languages and Translation (39.5%). In addition, 16.3% graduated from another Languages course (such as Teaching), 14% have a *Lato-Sensu* degree in Translation, 11.6% have completed a Translation short course, 9.3% have graduated from another undergrad course, 4.7% have a technical education, 2.3% are currently enrolled in another undergrad course other than Languages, and 2.3% are currently enrolled in a Languages and Translation undergrad course.

Figure 6 – Translators' Education

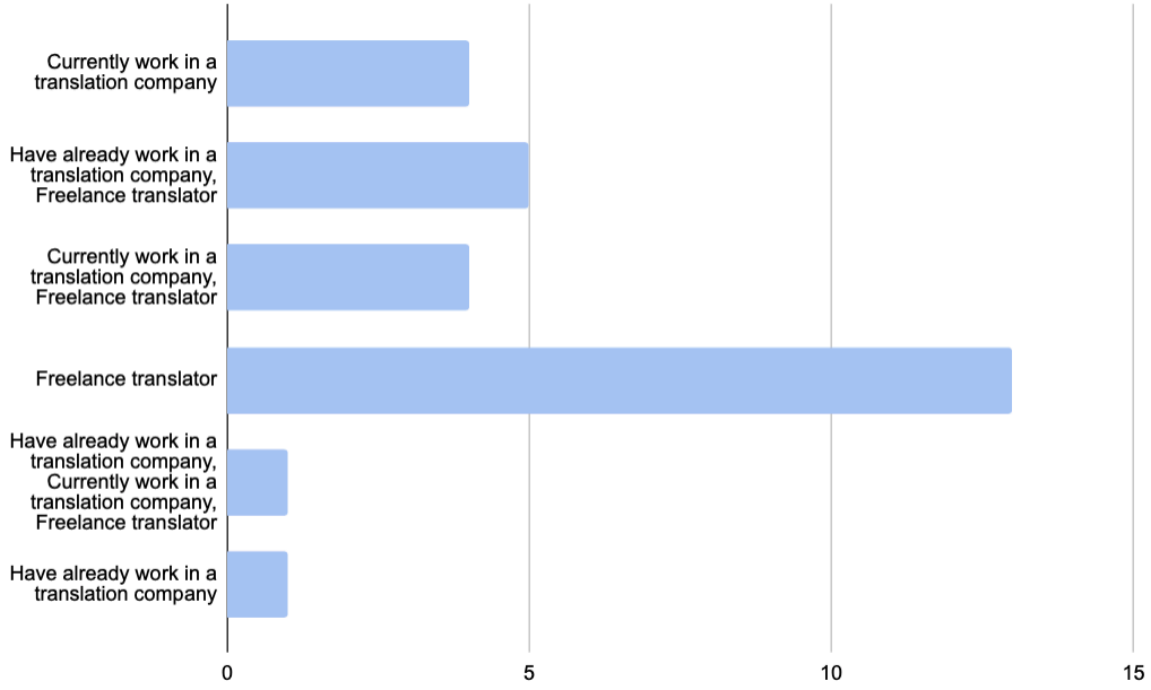


Source: author (2021).

As for time working as a translator, the average was 5.29 years (SD = 3.72). The participant with the longer working-time has been working as a translator for 15 years and the participant with the least working-time has been working as a translator for 4 months. It is also important to highlight that participants have very different monthly workloads, since those who work in translation companies have a set number of hours per day while translators who work as freelancers usually do not have a constant number of working hours, both for hours per day and per month. These differences between time working as a professional translator and number of hours working per month could have an effect on analysis results.

As for their modality of work, as seen in Figure 7, 46.4% work as freelance translators, 17.9% have already worked in a translation company and currently work as freelancer, 14.3% currently work in a translation company, 14.3% work both in a translation company and as a freelancer, 3.6% have already work in a translation company and 3.6% have already work in different translation companies and work as a freelancer.

Figure 7 – Work modality

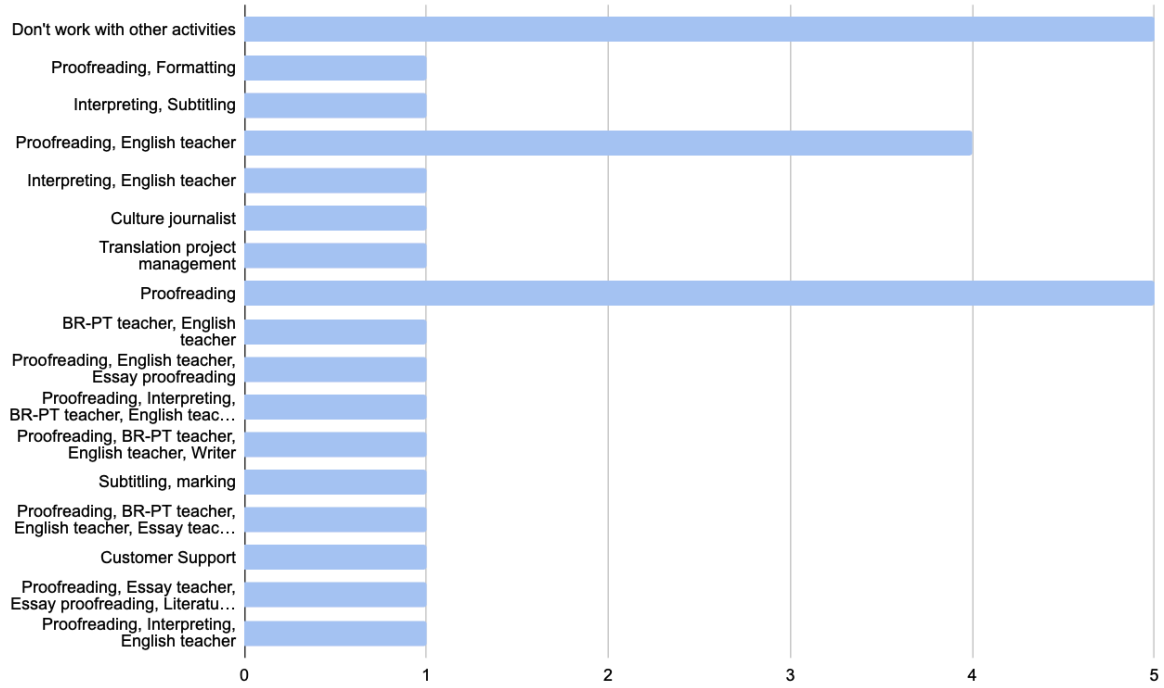


Source: author (2021).

In addition to working as a translator, some participants also work with other activities. In the LHTAQ, participants were requested to inform if they worked with other activities and which activities they were. Participants could select multiple activities. Results show that 8.9% say they do not work with other activities, while 26.8% work with proofreading, 19.6% as an

English teacher, 7.1% as a Portuguese teacher, 7.1% work with essay correcting, 7.1% work with interpreting, 5.4% work as an essay teacher, 5.4% work with subtitling, 1.8% work as a culture journalist, 1.8% work as a translation project manager, 1.8% work as a literature teacher, 1.8% work with marking, 1.8% work with formatting, and 1.8% work with customer support. Results are shown in Figure 8.

Figure 8 – Other activities



Source: author (2021).

From Figure 8, it is clear that the majority of translators from the sample do not work solely with translation, but also with other activities involving languages. Since the majority of participants work as freelancers, it is likely they work with other activities to increase their income, as translation jobs may not always be available.

Participants also informed which text genres they usually work with while translating and the source and target languages they usually use. Answers revealed participants do translate both from English to Portuguese and from Portuguese to English. Table 5 indicates the percentage of participants for each. Participants could select both pairs of languages (English-Portuguese and Portuguese-English) or does not apply, when they did not translate that specific genre of text.

Table 5 – Language pair for translation

TEXT GENGRE	ENGLISH-PORTUGUESE	PORTUGUESE-ENGLISH	DOES NOT APPLY
literary texts	14,28%	17,85%	71,42%
scientific texts	57,14%	57,14%	14,28%
advertising texts	42,85%	25%	46,42%
audiovisual texts	50%	7,14%	46,42%
technological texts	35,71%	28,57%	50%
technical texts	50%	21,42%	42,85%
legal texts	35,71%	10,71%	60,71%
business texts	39,28%	21,42%	53,57%
texts as a sworn translators	10,71%	7,14%	89,28%

Source: author (2021).

Data indicates that the majority of participants work with scientific texts, such as academic papers, since it had the smaller percentage for the "does not apply" option, with 14.28%. In addition, both pairs of languages (English-Portuguese and Portuguese-English) had the same percentage for scientific texts, with 57.14% for each pair.

As for their preference regarding source and target languages, participants could choose between English-Portuguese (*tradução*) or Portuguese-English (*versão*). Results are shown in Table 6.

Table 6 – Language preference for translation

ENGLISH-PORTUGUESE (***tradução***)	PORTUGUESE-ENGLISH (***versão***)
82.14%	17.85%

Source: author (2021).

The majority of the translator participants (82.14%) reported they prefer to translate from their L2 (English) to their L1 (Portuguese), performing a direct translation. Only 17.85% reported preferring to translate from their L1 to their L2. However, their preference does not necessarily mean that they translate more from their L2 to L1 than from their L1 to L2 –

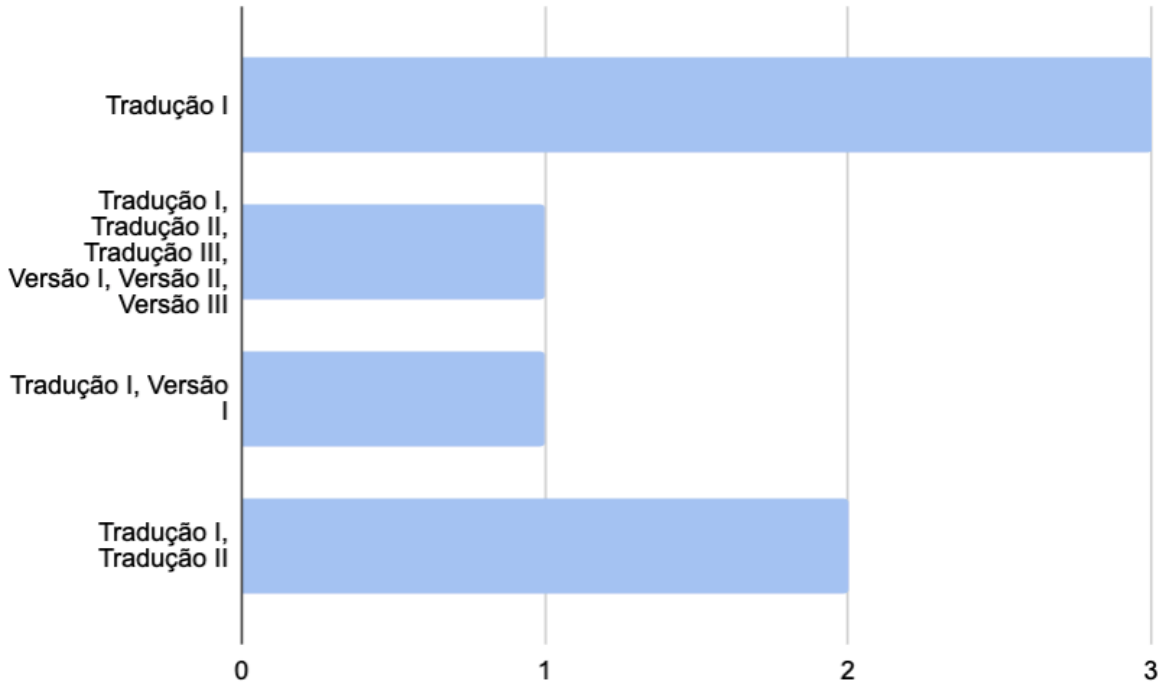
unfortunately, our questionnaire items did not cover this frequency, only if they use one or the other options of translation languages and with which genres of texts.

4.1.2 Translation students

For the translation students group, 7 participants participated in the research. They were required to be enrolled in the Languages and Translation – Portuguese and English undergraduate course at UFRGS, which lasts for a total of 4 years (8 semesters), and not to have more than six months of experience as professional translators. The information reported in this section was gathered from the answers given in the LHTAQ.

Since all students are enrolled in the same Translation undergrad course, it was asked which Translation courses they had already taken, and results are seen in Figure 11. There are six courses currently being offered: *Tradução* (English-Portuguese) I to III and *Versão* (Portuguese-English) I to III. All participants had already taken at least *Tradução* I, with 14.3% also having taken all six courses, 14.3% *Tradução* I and *Versão* I, and 28.6% *Tradução* I and II.

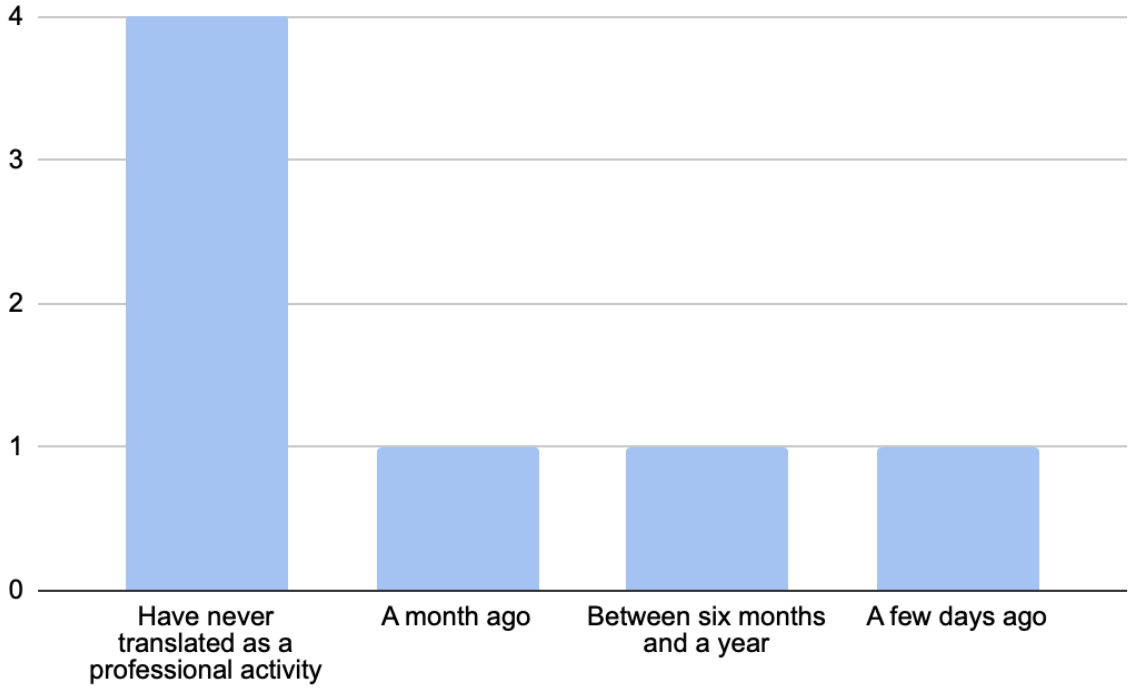
Figure 9 – Courses



Source: author (2021).

As for translation experience, translation students were required to not have more than 6 months of intense experience. Nevertheless, participants were inquired about the last time they engaged in translation as a professional activity – they had a "Have never translated as a professional activity" option. Results are shown in Figure 10.

Figure 10 – Frequency of working with translation

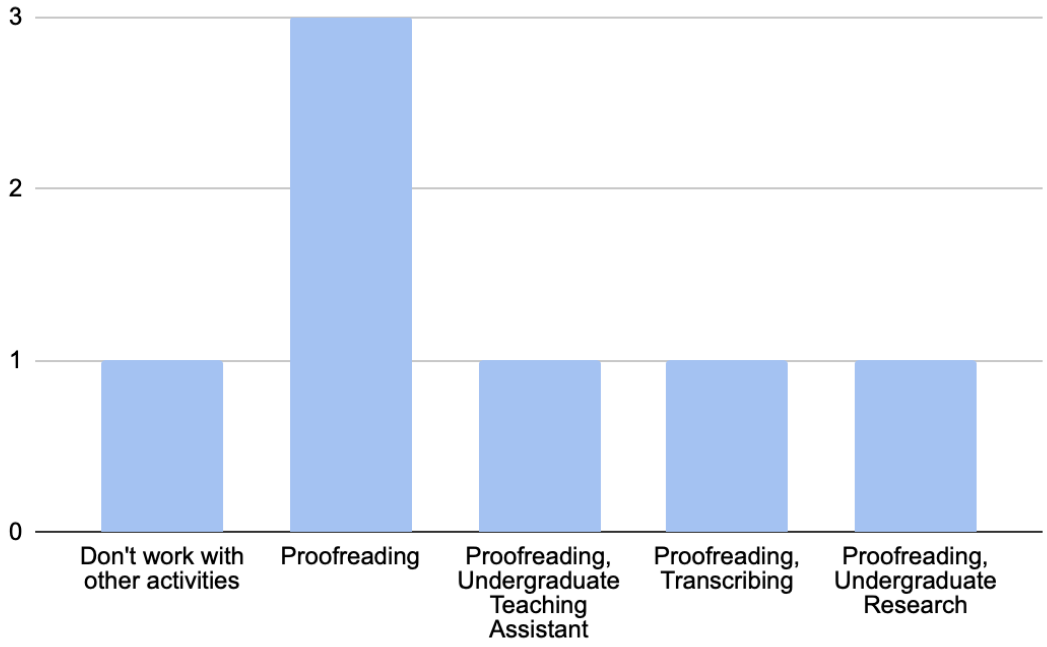


Source: author (2021).

The majority of participants, 57.1%, have never translated as a professional activity, while 14.3% last translated a month ago, 14.3% last translated between six months and a year ago, and 14.3% last translated a few days ago by the time of the data collection. Although some participants stated they have already worked with translation, their experience is not as intense as the group of experienced translators.

As for working with activities other than translation, some students reported to work with some activities within the languages field. Results are shown in Figure 11.

Figure 11 – Other activities



Source: author (2021).

Participants could select multiple activities, but results show that most participants work only with proofreading (42.9%), while some work with proofreading and another activity: 14.3% work with proofreading and as undergraduate teaching assistant, 14.3% work with proofreading and transcribing, and 14.3% work with proofreading and undergraduate research. The remaining 14.3% do not work with any other activities.

As for their preference regarding source and target languages, participants could choose between English-Portuguese (*tradução*) or Portuguese-English (*versão*). Results are shown in Table 7.

Table 7 – Language preference for translation students

ENGLISH-PORTUGUESE (*tradução*)	**PORTUGUESE-ENGLISH (*versão*)**
100.00%	00.00%

Source: author (2021).

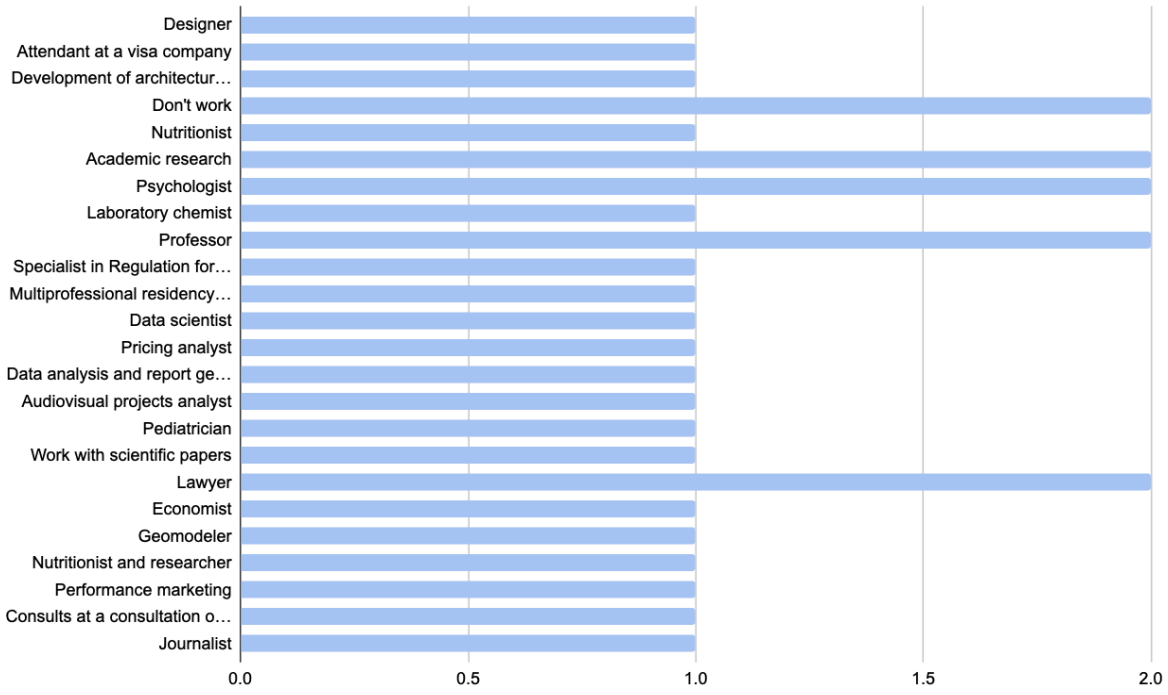
Finally, all translation students (100.00%) reported preferring to translate from English, their L2, to Portuguese, their L1. The majority of experienced translators also said they preferred to translate from English to Portuguese, but some participants did choose the Portuguese-English option, differently from what was found in the case of translation students.

4.1.3 Bilinguals

For the bilinguals group, 29 participants participated in the research. They were required to not work with written languages (Portuguese and English) in their jobs. The information reported in this section was gathered from the answers given in the LHPAQ.

As for professions in which they currently work in, participants reported very diverse professions. Results are presented in Figure 12.

Figure 12 – Current professions



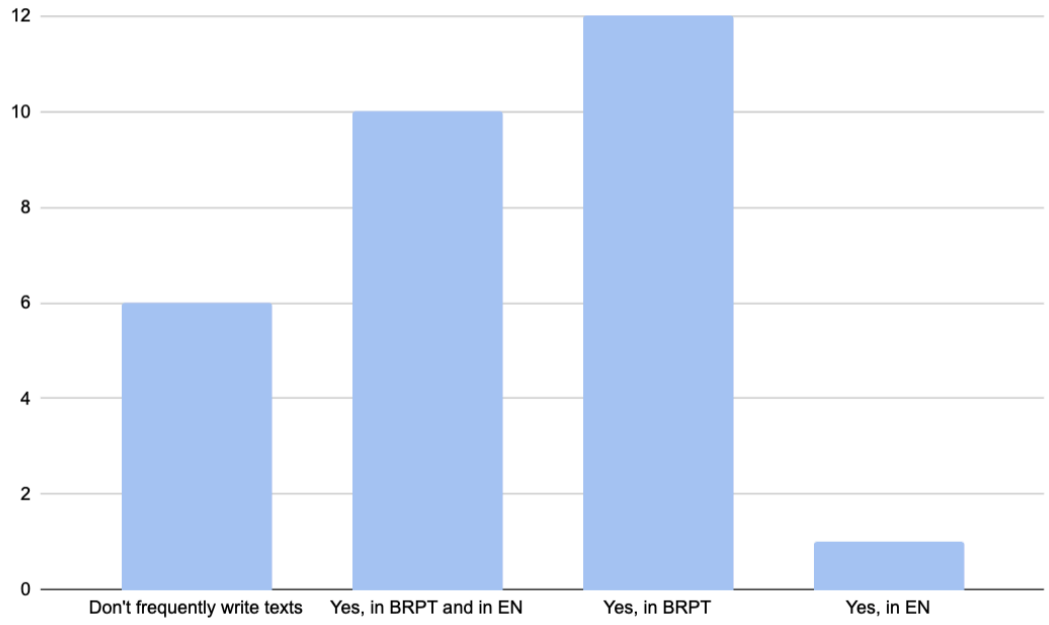
Source: author (2021).

Participants from the bilingual group mainly work with different professions from each other, those being: designer, attendant at a visa company, development of architectural projects, nutritionist, laboratory chemist, specialist in Regulation for cinematographic and audiovisual activities, multiprofessional residency in health care, data scientist, pricing analyst, data analysis and report generation, audiovisual projects analyst, pediatrician, work with scientific papers, economist, geomodeler, nutritionist and researcher, performance marketing, consults at a consultation office and member of an institutional team, and as a journalist. Some participants did report working within the same field, with 2 participants for each profession, those being:

academic research, psychologist, professor, and lawyer. Lastly, 2 participants reported to not be working at the moment of the data collection.

Participants were also asked if they frequently write texts in either Portuguese or in English. According to their responses, 39.3% write in Portuguese, 35.7% write in both Portuguese and in English, 21.4% do not frequently write texts, and 3.6% write in English.

Figure 13 – Writing texts frequently



Source: author (2021).

4.2 INFERENTIAL RESULTS AND DISCUSSION

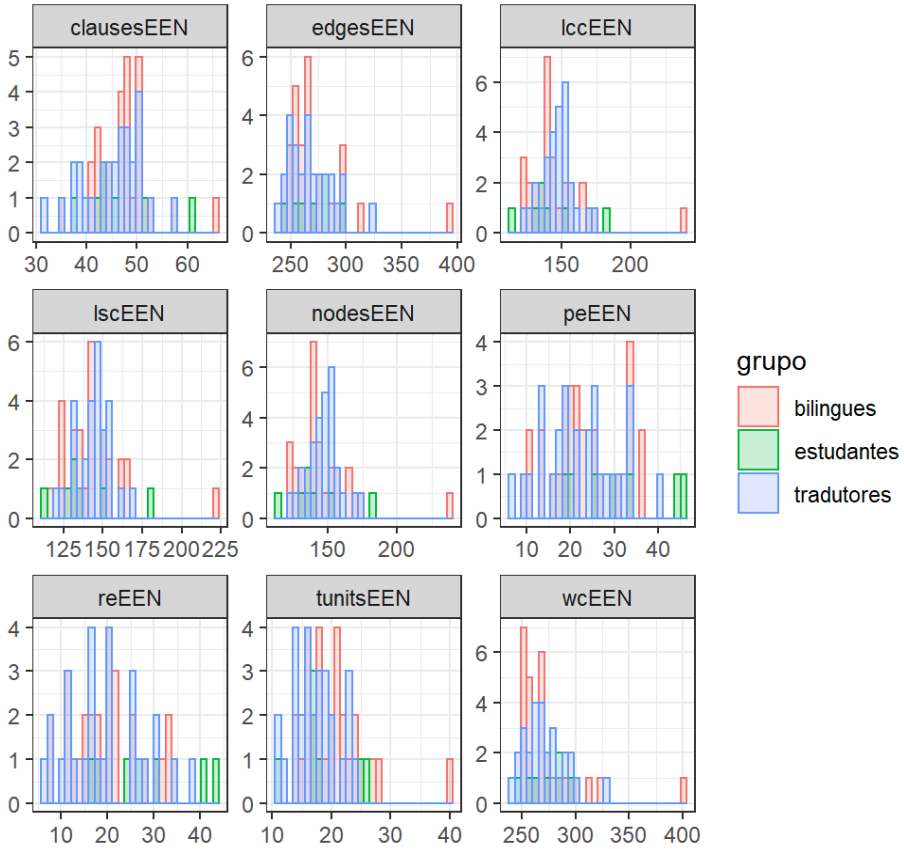
This section will describe statistical results and their discussions. Here, we find it important to emphasize that the main objective of this research was to investigate the extent to which translation experience affects the level of syntactic complexity and thought organization and connectivity in written and oral texts produced by Portuguese-English translators and bilinguals.

To reach this goal, we compared the performance of the three groups of participants: (a) experienced translators, (b) translation students enrolled in an undergraduate course in the area, and (c) non-translators bilinguals with a high level of English proficiency whose professions do not demand a lot of written language use in both English and Portuguese. The linguistic tasks that were used in the study involve different language modalities (Written Production Task and Oral Production Task) and two languages (English and Portuguese). The levels of

syntactic complexity and thought organization in linguistic tasks were measured through the analysis of T-Units (HUNT, 1965) and the Speech Graphs tool (MOTA *et al.*, 2014), respectively. A total of 256 texts were analyzed, being 128 written texts and 128 oral texts.

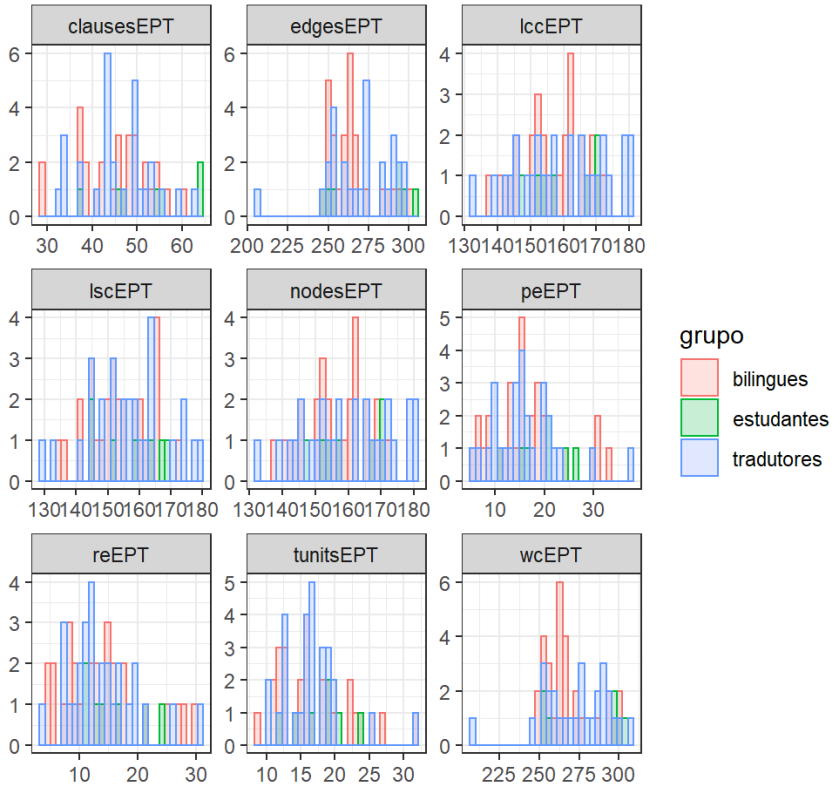
First of all, a Shapiro-Wilk test was conducted to check whether results followed a normal distribution. Syntactic complexity consisted of 2 conditions (clauses and T-Units), and thought organization consisted of 7 conditions (word count, nodes, edges, RE, PE, LCC and LSC). All 9 conditions were tested for all 4 tasks (written English, written Portuguese, oral English, and oral Portuguese). Results revealed all data, in general, did not present a normal distribution. Results are shown in Figures 14, 15, 16 and 17.

Figure 14 – Shapiro-Wilk test results for Written English task



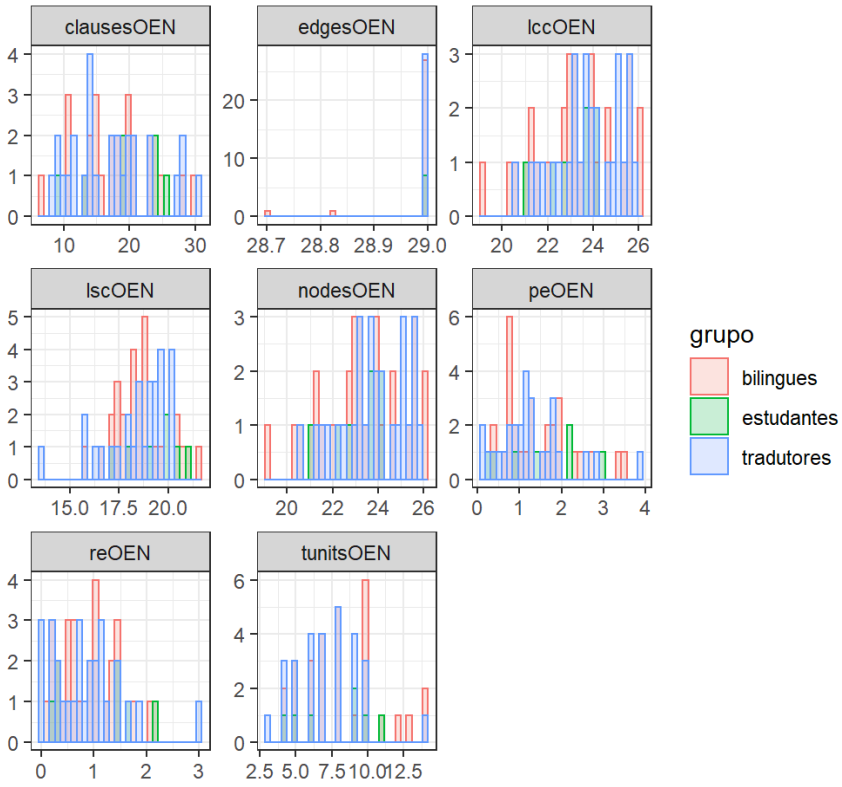
Source: author (2021).

Figure 15 – Shapiro-Wilk test results for Written Portuguese task



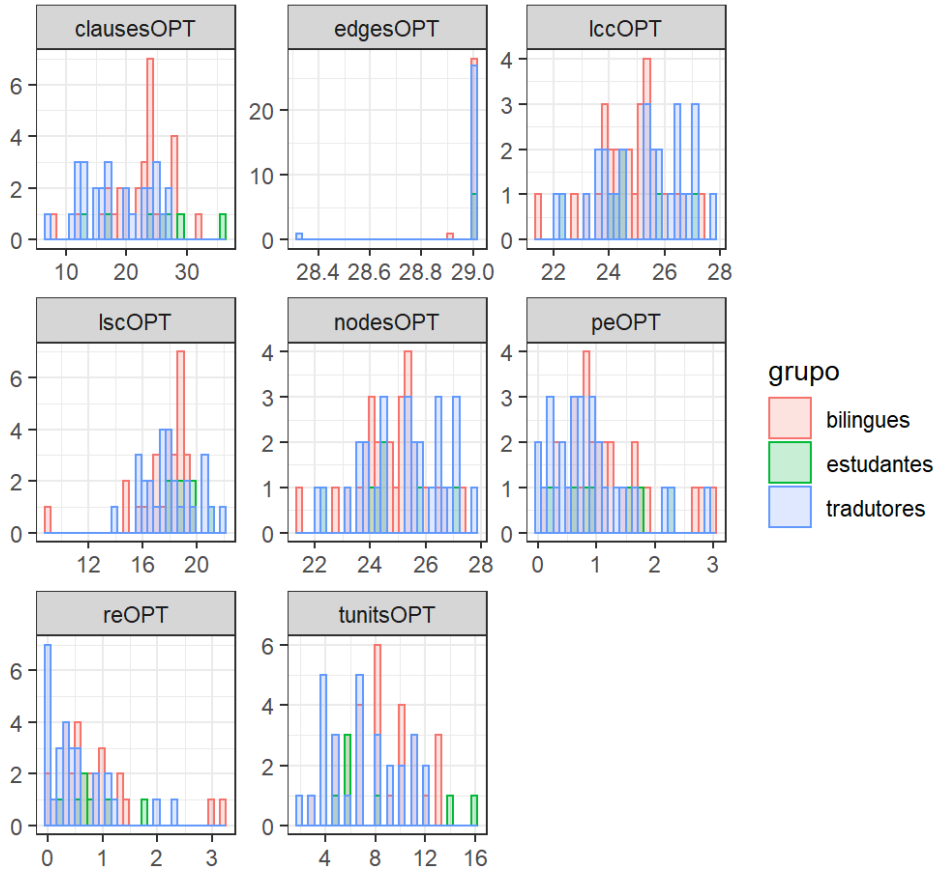
Source: author (2021).

Figure 16 – Shapiro-Wilk test results for Oral English task



Source: author (2021).

Figure 17 – Shapiro-Wilk test results for Oral Portuguese task



Source: author (2021).

Afterwards, a Levene's Test was performed to check for homogeneity of variance. Variance for all 4 tasks and all 9 conditions for each of them were considered to be homogeneous. Since we decided to use moving windows of 30 words with a step of 3 words on both written and oral tasks and for both languages, the number for word count will not be presented, as the values were equal for all participants in all tasks.

Thus, since the sample data does not follow a normal distribution, non-parametric tests were conducted to compare groups and variables. Also, there is a large difference between the number of participants in the translators group (n = 28) and bilinguals group (n = 29) in comparison to the translation students group (n = 7). Thus, tests were first performed between translators and bilinguals (presented in subsection 4.2.1), and then a subgroup analysis between all 3 groups was performed (presented in subsection 4.2.2), selecting 14 participants from the translators groups and 14 participants from the bilinguals groups. Participants were matched with participants from the translation students groups through the age variable.

Results will be presented in the next three sections: first, section 4.2.1 presents results from the comparison between translators and bilinguals, and is divided into four subsections:

written syntactic complexity, oral syntactic complexity, written thought organization, and oral thought organization. Second, section 4.2.2 presents results from the comparison between translators, translation students, and bilinguals, and is divided into four subsections as well: written syntactic complexity, oral syntactic complexity, written thought organization, and oral thought organization. Finally, section 4.2.3 presents results from the correlation between syntactic complexity and thought organization measures in both oral and written texts.

4.2.1 Comparison between translators and bilinguals

For the comparison between translators and bilinguals, a Mann-Whitney test with corrections for multiple comparisons was performed. This comparison occurred for the 2 variables being investigated: syntactic complexity and thought organization, and in all 4 tasks (written English, written Portuguese, oral English, oral Portuguese). Results will be presented in the next four subsections.

4.2.1.1 Written syntactic complexity

Group comparison occurred for written syntactic complexity data in 2 conditions (clauses and T-Units) and in 2 tasks (written English, written Portuguese). This comparison revealed significant results for only one condition – written English T-Units. Our objective was to investigate to what extent translation experience affects the level of syntactic complexity in written texts in Portuguese and English produced by translators and bilinguals, and our hypothesis was that the group of translators were expected to have higher levels of syntactic complexity than bilinguals by producing fewer T-Units in both English and Portuguese written texts.

Results are shown in Table 8 and significant results are highlighted in bold.

Table 8 – Results for syntactic complexity comparison between translators and bilinguals in written texts

	***p*-value**	**significance**
ClausesEEN	0.2328332	ns
TunitsEEN	**0.0205846**	*
ClausesEPT	0.9808684	ns
TunitsEPT	0.9872148	ns

Source: author (2021).
Note: ClausesEEN = clauses written English; TunitsEEN = T-units written English; ClausesEPT = clauses written Portuguese; TunitsEPT = T-units written Portuguese.

Results for the syntactic complexity comparison between translators and bilinguals in written texts showed a significant difference only for the count of T-Units in English written texts ($U = 551$, $p = .020$), with translators producing fewer T-Units ($M = 17.28$, $SD = 3.63$) than bilinguals ($M = 20.37$, $SD = 5.28$), indicating translators produced more complex texts. The analyses for number of clauses in English, number of clauses in Portuguese and number of T-Units in Portuguese did not present statistical significance.

These results from the analysis for written English T-Units confirms our hypothesis that translators would produce fewer T-Units, which characterizes a more syntactically complex text.

We expected that to happen because translators' specific bilingual experience involves them constantly working with writing itself, and we expected that this constant contact with the written language would instigate them to produce more syntactically complex texts. And as a measure of this complexity, T-Units have long been used to investigate writing development and complexity in L2 (KIM, 1998; LARSEN-FREEMAN, 1978; LARSSON; KAATARI, 2020; RAHIMI; ZHANG, 2019), although this method is usually used along with other measures.

Having that proficiency between groups was similar, as exhibited in Tables x and x in section 4.1 which reports results from self-assessed proficiency and VLT measures and showed that average was similar between groups, our findings that translators produced more syntactically complex texts appear to be related to the particularly distinct bilingual and linguistic experiences of each group, since translators work directly with written texts. Taking into consideration these specific results, one could argue that the environments and contexts in which bilinguals use their languages are indeed important and informative. According to Anderson, Hawrylewicz and Bialystok (2018), both linguistic and social contexts can influence bilingual experience. As for social contexts, our sample reported information about aspects such

as education, in which all participants come from a high education context. As for linguistic contexts, groups are inserted in different environments: translators professionally work with both their languages, translation students are still in training to be able to enter the translation job market, and bilinguals use their languages in distinct, particular contexts.

Furthermore, Green and Abutalebi (2013), by presenting the ACH, introduced to the field the hypothesis that three specific contexts of bilinguals would differentiate groups of bilinguals: single-language, in which bilinguals use their languages separately, in distinct contexts; dual-language, in which bilinguals use both their languages separately, but in the same context; and dense code-switching, in which both languages are also present, but bilinguals densely mix their languages in the same utterance. The authors stated that these different bilingual contexts result in different cognitive demands, with the dual-language context presenting a higher cognitive demand and language control than the other contexts.

Although bilinguals in our sample have an advanced level of vocabulary and presented a similar result for clauses, translators have a different experience by working with both their languages in the same context. In section 4.1.1, descriptive results from the translators group were presented based on participants' answers from the LHTAQ, and one of the questions was related to what genres of texts participants translate and what is the pair of languages they use to translate those genres (English-Portuguese or Portuguese-English). Results shown in Table 5 indicated that participants work with several different genres of texts: literary, scientific, advertising, audiovisual, technological, technical, legal, business, and official texts that require a sworn translator. The genre chosen by most participants was scientific texts, and as for which pair of languages they use while translating, 57.14% said they translate from English into Portuguese and also 57.14% said they translate from Portuguese into English. Since we do not know the exact frequency in which participants use each pair of languages, it is possible participants often write in English, possibly explaining the significant difference found for texts written in English.

Moreover, since translators constantly have to switch between reading and writing in both languages while dealing with work deadlines, they have most likely developed skills related to written texts, possibly learning writing strategies to improve their texts, as well as being able to adapt their texts and their writing according to the necessary demands, such as informal or formal texts, and so on. In addition, as Kroll, Dussias and Bajo (2018) emphasize, translators are experts in their languages, meaning they may present linguistic advantages, such as producing more complex texts, in relation to other bilinguals – which may not appear in proficiency tests, but in other measures of analysis, such as T-Units.

Hayes' (2012) cognitive writing model, which is divided into three levels (control level, process level, resource level) could provide an explanation to some of the results found here, but since tasks were not planned considering the factors of these levels, it is difficult to state with certainty. In Hayes and Olinghouse (2015), the authors explain one of the components of the control level, called "writing schemas". And although they were trying to adapt the 2012 model to be suited to children rather than adults, their discussion of the levels are still relevant for adults. They state that "Writers acquire knowledge of genre and other writing schemas through years of instruction and experience in reading and writing. The various genres (narration, exposition, argumentation, etc.) may be acquired at different times and rates, and parts of a genre may be learned piecemeal." (p. 483). Thus, since translators and bilinguals have such distinct language experiences, their "writing schemas" may work differently and that could cause an effect on their text production.

However, although results indicated a significant difference between the two groups regarding number of T-Units in the English task and are in accordance with previous studies and their discussions, no statistical significance between the two groups was found for the written Portuguese task, not confirming our hypothesis. Following the dual-language context discussion presented by Green and Abutalebi (2013), it was expected that the same result would be found for both languages.

Such results could be due to the homogeneity of the two groups in our sample regarding their educational context – all bilinguals were required to have either completed or be enrolled in an undergrad course. In addition, many are also pursuing graduate degrees and/or work within the academic area, meaning all participants have a high education level and are at the very least somewhat familiar with more complex language, whether they had to read or write such complex texts. This familiarity could occur in both languages; however, generally speaking, it is more likely that their writing experience during their undergrad years occurred mostly in Portuguese, thus this group could be very comparable to the translators group.

Moreover, even though our sample consists of all bilinguals with English as their L2, we could make a connection with previous studies that "have repeatedly shown ESL/EFL writers often attained the same level as or even exceeded their English L1 counterpart's level of sophistication in the use of nominal phrases (Bulté and Housen 2014; Crossley and McNamara 2014; Macilla et al. 2015; Lei and Liu 2015)" (DENG; LEI; LIU, 2020, p. 5-6). Results from our data show a significant difference between translators and bilinguals for their L2, but not their L1 – Deng, Lei and Liu's (2020) statement refers to different participants writing in their L1 or L2, whereas our study has the same participants writing in their L1 and

their L2, but these results could be related since written texts in L2 have exhibit higher levels of sophistication, even if for different measures. More specifically to T-Units, Finger, Brentano and Ruschel (2019), while working with children, found that they produced more T-Units in Portuguese, their L1, than in English, their L2, thus producing more syntactically complex texts in their L2 than in their L1, similar to our results. The reason for significant differences appearing in L2 but not in L1 are not clear with the current data we have, but perhaps language interference could be an explanation. As already explained in the literature review section, Schereschewsky, Alves and Kupske (2019) support the concept of language interference which states that it can occur both from L1 to L2 as from L2 to L1.

Another important topic is that this analysis used only one measure of syntactic complexity: T-Unit. Literature usually uses several measures for linguistic complexity, and even for syntactic complexity (LARSEN-FREEMAN, 1978; MYLLÄRI, 2020). This is a limitation of the study, and there is a possibility that further analysis with other complexity measures would provide different and perhaps even more enlightening results. In addition, although T-Units analysis has constantly been employed until nowadays, there have also been those who criticize it. Back in 1992, Bardovi-Harlig stated "Although the T-unit has advantages for certain language samples, in evaluating the syntactic complexity of compositions written by advanced adult second language learners, T-unit analysis does not seem to reflect accurately the knowledge of the learner." (p. 391). This could confirm the need for other measures of syntactic complexity, and analyzing sentences and texts through less minimal units could provide interesting results as well – according to Mellon (1969) *apud* Kim (1998), "saying more with fewer words is a measure of syntactic maturity." (p. 85). This analysis requires looking at a text as a whole, and not its clauses separately.

Nonetheless, a difference of syntactic complexity could have emerged in English but not in Portuguese as translators' experience could be considered even more distinct in their L2 than in their L1, since both groups appear to be highly comparable, at least on their experiences regarding their L1, while translators constantly work it reading and writing in their L2. Green and Abutalebi (2018) focus on aspects of cognitive demand rather than specific linguistic aspects, so that there are a couple of possibilities we can discuss regarding why this difference emerged only in one of their languages:

a) Although the dual-language context itself, which is characterized by bilinguals using both their languages in the same context, is considered as an unique and different bilingual experience, there could also be differences among the two languages of this

context as language use throughout a bilingual's life goes beyond the situations in which the dual-language context occur.

b) Combining linguistic and cognitive measures may help us understand with more details the fine-grained differences the bilingual context causes.

The fact that some groups of bilinguals use their languages in a dual-language context, as translators do, does not mean this is the only context they use their languages. There are many other contexts of bilinguals' lives where they might be required to use both languages, even if separately – daily conversations in the language being used in their countries, language being used at work, reading internet materials, watching movies/TV series, playing video games, and so on. Since our languages are always active (BIALYSTOK, 2017) and we cannot turn on and off our languages as needed or as we wish, it is possible that these other experiences that occur during the rest of bilinguals' days, which are not necessarily part of a dual-language context, can also exert an effect in the dual-language context. This could be an explanation for translators producing more syntactically complex texts in English but not in Portuguese.

Furthermore, many researchers have already emphasized that bilingualism is a complex and multidimensional phenomenon (LAINE; LEHTONEN, 2018), meaning we probably need more refined and detail-oriented measurements – or a combination of several measurements. The bilingualism field has also been filled with inconsistencies and discussions regarding what it means to be bilingual and how and if it actually results in linguistic or cognitive differences (BIALYSTOK, 2021; LEIVADA *et al*., 2021), and research focusing on bilinguals who use their languages in specific contexts are no exception. Cognitive aspects appear to be the focus for research on dual-language context, not investigating in more detail linguistic differences. We believe that a combination of measures on both aspects could provide us with a more detailed understanding of bilingual experience and that it is difficult to discuss and characterize translators' advantages without cognitive tasks as well. Presas (2000) already stated that "The development of translation competence requires the specialization of certain psycholinguistic skills of the bilingual person and the restructuring of certain mechanisms, on the one hand, but also the acquisition of other kinds of knowledge and skills beyond the purely linguistic ones, on the other." (p. 30), suggesting translators' experience comes from both aspects.

Lastly, it is important to discuss the genre used for eliciting participants' written texts. The narrative genre was chosen due to a few reasons: as already mentioned in section 3.4.3, it does not require any previous knowledge or instruction of a specific subject. Sallabaş (2013) states that "[...] narrative text genre has elements, which can be determined in a concrete manner and also people have the same expectations in terms of text structure (Coşkun, 2005)." (p. 362),

making it easy to be used in a task with participants with different backgrounds. In addition, it does not require as much time to be completed in comparison to an argumentative essay, for instance. However, it is important to notice that narrative texts are not commonly written by adults, meaning most participants probably did not have recent experiences in writing a narrative text. Furthermore, it is not a genre known for being more formal or complex – it is usually associated with more simple and straightforward structures. This is also an important limitation of the study to be considered, as these characteristics of possible informality in the narrative genre may go in the opposite direction of what we are trying to measure: complexity.

4.2.1.2 Oral syntactic complexity

Next, results for oral texts will be presented and discussed. Our objective was to investigate to what extent translation experience affects the level of syntactic complexity in oral texts in Portuguese and in English produced by translators and bilinguals, and our hypothesis was that no significant differences were predicted to be found in the comparison between the two groups in the assessment of the levels of syntactic complexity in oral texts in English and Portuguese.

A group comparison for oral syntactic complexity data in 2 conditions (clauses and T-Units) and in 2 tasks (oral English, oral Portuguese) was carried out. This comparison revealed significant results for only one condition – oral Portuguese clauses.

Results for the oral English task and the oral Portuguese confirm our hypothesis that no difference would be found between groups for the count of T-Units, but a statistical significance was found between translators and bilinguals for the number of clauses in the Portuguese task.

Results are shown in Table 9 and significant results are highlighted in bold.

Table 9 – Results for syntactic complexity comparison between translators and bilinguals in oral texts

	***p*-value**	**significance**
clausesOEN	0.423845	ns
TunitsOEN	0.136558	ns
clausesOPT	**0.022934**	*
TunitsOPT	0.096393	ns

Source: author (2021).
Note: clausesOEN = clauses oral English; TunitsOEN = T-units oral English; clausesOPT = clauses Portuguese; TunitsOPT = T-units oral Portuguese.

Results for the syntactic complexity comparison between translators and bilinguals in oral texts showed a significant difference only for the total number of clauses in Portuguese oral texts (U = 548.5, p = .022), with translators producing fewer clauses (M = 18.42, SD = 5.73) than bilinguals (M = 22.13, SD = 5.08). Number of clauses in English, number of T-Units in English, and number of T-Units in Portuguese did not present significant differences.

Results presenting a significant difference between translators and bilinguals for the number of clauses in the oral Portuguese task is interesting – bilinguals produced more clauses than translators, but no significance was found for T-Units. The number of clauses indicates how many main clauses and subordinate clauses there are in total in a text, whereas T-Units combine one main clause + all of its subordinates, indicating a ratio of syntactic complexity.

Kang (2013) investigated several linguistic features in a sample of speaking tests of the Cambridge English exam to check if they could distinguish different proficiency levels, and for syntactic complexity all used measures presented significant results except for total number of T-Units, just as our study did not find a significant difference between groups of translators or bilinguals. These appear to be conflicting results, since T-Units have been found to increase according to proficiency (KIM, 1998; BULTÉ; ROOTHOOFT, 2020), even though the majority of literature uses written texts and not oral texts.

However, according to Bulté and Roothooft (2020), AS-units are more appropriate to measure syntactic complexity in oral texts than T-Units. As already explained in the literature review, according to Street (1971, p. 13) *apud* Larsen-Freeman (1978, p. 441) a T-Unit is "the shortest possible units which are grammatically allowable to be punctuated as sentences.". AS-units, on the other hand, consider all utterances, even those that do not seem to be a complete sentence, such as "Thank you". Calculating T-Units for oral texts was indeed a different and more complicated process than for written texts. Firstly, our sample of oral texts had a limitation regarding the size of each text. During data collection, participants were instructed to tell their narratives in up to 1 minute, and it was requested that they spoke for a minimum of 30 seconds. However, many participants spoke for more than 1 minute and a few others spoke for less than 30 seconds. Calculating T-Units for an oral text of over 3 minutes versus one of 30 seconds would result in very large differences that could directly affect the results. Thus, it was decided to calculate T-Units for up to 1 minute of each oral text, which was the time limit proposed to participants. Although this decision was beneficial so that texts would have similar sizes, it may have impacted text complexity as a whole.

As for the significant result for total number of clauses in oral texts in Portuguese between translators and bilinguals, there is not a clear reason as to why this occurred since we

have not found sufficient information that would explain this result neither in previous literature nor in our data. Kang (2013), despite not finding significant results for total number of T-Units, did find a significant difference between levels of proficiency for total number of clauses, the same measure as in our study – but since the author did not elaborate the discussion for this specific measure, it is difficult to form a connection between the two studies. Furthermore, the author found such significant difference in English, participants' foreign language, whereas we found a significant difference in Portuguese, participants' L1.

Lu (2011), while working with written texts, does mention that the clause could possibly be a more informative measure than the T-Unit, since data from the author's study reveal that results related to clauses followed a linear progression across different proficiency levels. However, once again, this statement is regarding L2, and not L1. As Bulté and Roothooft (2020) also stated that T-Units does not appear to be the best choice for analyzing oral texts, it could be more informative to use other clause-related measures as well. Kim (2000) also discusses the matter of writing x oral, by bringing "Harrell's (1957) observation that after the eighth grade, there is greater syntactic maturity in writing than there is in oral expression." (p. 81). On the other hand, Crossley and McNamara (2014) suggest that subordination could be more common in speech than in writing. Further analysis of our data is necessary to see if different measures and analysis would support any of these discussions.

Another important note is that literature about linguistic complexity focuses its comparison on participants with different proficient levels, or on longitudinal studies following the same participant as their proficiency level increases, whereas here all participants are already advanced learners. Differences between groups occur in their qualitative bilingual experiences, but as seen in VLT results, not exactly in proficiency. Translators, by being considered experts (KROLL; DUSSIAS; BAJO, 2018), supposedly do have an advantage in proficiency, but it is likely that this advantage does not appear in general proficiency tests. Likewise, it is most likely we need to adopt a different perspective while analyzing these context-specific data, or even find more specific and detailed measures – or a combination of them. This discussion has become very popular lately, as the bilingualism field struggles to find consistent results (LAINE; LEHTONEN, 2018; VAN DER LINDEN *et al*, 2018; BIALYSTOK, 2021).

In addition to the total number of clauses in Portuguese presenting a significant difference between translators and bilinguals, it is interesting that this significance emerged only from the task in Portuguese, participants' L1, and not in the English task, since the mentioned literature of previous studies reports results for L2. Although translators work with

written texts, and no significance for T-Units was found in oral texts, there is a possibility that the amount of code-switching that the participants normally employ may have played a part here. Translators have a heavy demand of both languages in a dual-language context while reading in one language and translating into another, which means they work with their languages separately, although in the same context. However, it is possible that this provides translators with a higher or more qualified ability to perform code-switching, since they are more familiar with engaging use of both languages than bilinguals are. Thus, it could be possible that this familiarity with switching between languages in written texts was carried to oral language as well, meaning they may have a little more difficulty in using more words or sentences in Portuguese, as English usually requires shorter sentences than Portuguese. This could possibly mean translators use some of English characteristics in their speech, thus producing fewer clauses.

Another possibility, still in the code-switching aspect, is that bilinguals may have a little more difficulty while planning their narratives in Portuguese since they also had to perform written and oral tasks in English on the same day and thus needed to use more sentences to convey their story. Tasks were counterbalanced to control for possible task effects, but it is possible that bilinguals are not used to this demand and had to use more clauses to be able to tell their stories in a complete way. During data collection, some bilingual participants verbalized they were now thinking in English and it was hard to switch back to Portuguese and we can only assume that translators may probably be able to switch between languages with less cost. Unfortunately, our questionnaire did not ask questions regarding code-switching experience, nor do we have cognitive tasks to compare with these results.

Lastly, we could consider Leandro's (2021) discussion. Although the author refers to lexical data in L2, his reasoning could be applied to number of clauses or even words. The author considers that "It seems plausible to argue that once learners become more experienced L2 users, they no longer worry about testing hypotheses or experimenting with vocabulary and end up resorting to more easily recalled, high-frequency words, knowing this will suffice in conversation or when narrating a story." (p. 32-33). Translators producing fewer clauses in their L1 could be a representation of their different linguistic experience – they have a high knowledge of their language, know how to create strategies and make good use of their text production, even in the oral modality. This could also support Mellon's (1969) *apud* Kim (1998) hypothesis about syntactic maturity, as mentioned previously: translators could be saying more with fewer clauses.

4.2.1.3 Written thought organization

Next, group comparison occurred for thought organization in all 6 conditions (nodes, edges, repeated edges, parallel edges, LCC, LSC) and in 2 tasks (written English, written Portuguese). Our objective was to investigate to what extent translation experience affects thought organization and connectivity in written texts in Portuguese and in English produced by translators and bilinguals, and our hypothesis was that the group of translators would show better scores in both Portuguese and in English than bilinguals regarding graph attributes.

This comparison revealed that no significant difference was found between the two groups, translators and bilinguals, for the written modality. Results for written texts will be presented and discussed first. Results are shown in Table 10.

Table 10 – Results for thought organization comparison between translators and bilinguals in written texts

	***p*-value**	**significance**
nodesEEN	0.3368655	ns
edgesEEN	0.9159308	ns
reEEN	0.9808960	ns
peEEN	0.6722823	ns
lccEEN	0.6320238	ns
lscEEN	0.5105917	ns
nodesEPT	0.6065478	ns
edgesEPT	0.9346998	ns
reEPT	0.8542661	ns
peEPT	0.7677173	ns
lccEPT	0.2130992	ns
lscEPT	0.1723132	ns

Source: author (2021).
Note: nodesEEN = nodes written English; edgesEEN = edges written English; reEEN = repeated edges written English; peEEN = parallel edges written English; lccEEN = LCC written English; lscEEN = LSC written English; nodesEPT = nodes written Portuguese; edgesEPT = edges written Portuguese; reEPT = repeated edges written Portuguese; peEPT = parallel edges written Portuguese; lccEPT = LCC written Portuguese; lscEPT = LSC written Portuguese.

No significant difference was found between the groups of translators and bilinguals in any of the 6 graph attributes (nodes, edges, RE, PE, LCC, LSC) in the written texts, in both English and Portuguese, not confirming our hypothesis.

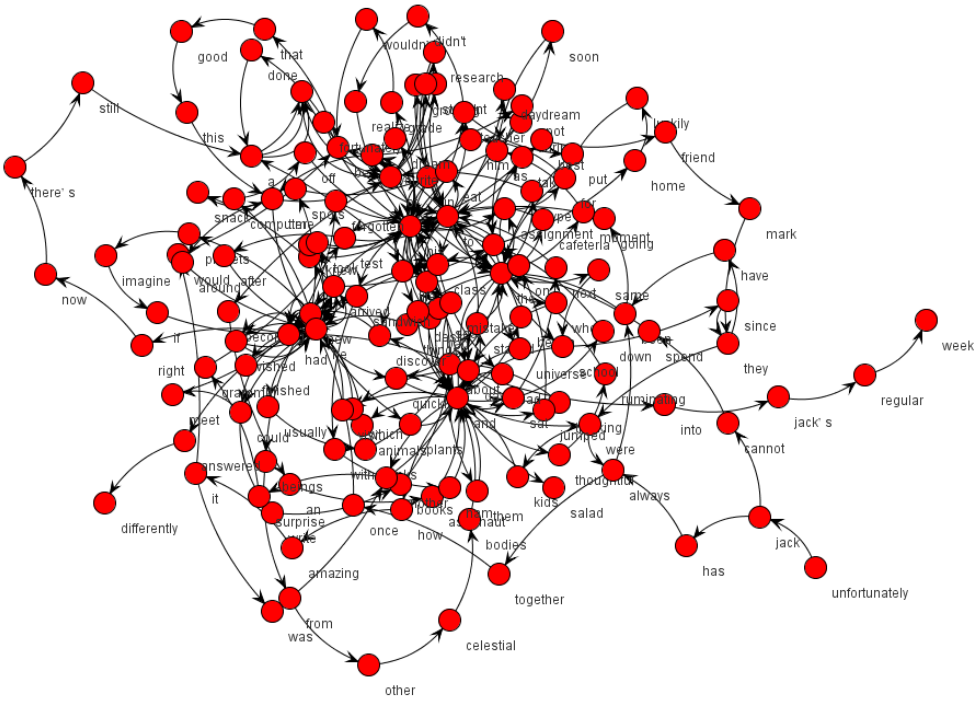
As we already discussed, this could be due to the homogeneity of the entire sample regarding education – all participants had already completed or were enrolled in an undergrad course. Since we are discussing thought organization and connectivity, it is likely all participants are highly skilled in creating cohesive and connected texts. Thus, both groups seem to be too comparable in this matter to exhibit significant differences.

Furthermore, previous literature using SpeechGraphs usually deals with more distinct groups, such as individuals with psychosis (MOTA *et al*., 2012, 2014), schizophrenia (MOTA; COPELLI; RIBEIRO, 2017), Alzheimer's disease (MALCORRA *et al*., 2021) or children, who are still developing their language skills (MOTA *et al.* 2016, 2019). For written texts, we have two previous works: Luz (2018) and Pinheiro *et al*. (2021). Luz (2018), however, worked with three groups of children (good readers, bad readers, and dyslexic), also having more distinct groups. Pinheiro *et al*. (2021) used written texts from the axial age and poetry texts, but they are also different from the present study as they are not an outcome of a planned, lab-environment task, and were compared to oral reports as well. The closest study regarding participants to this one is Leandro (2021), who tested adult English students and teachers – and still, students can present a lot of differences from teachers.

Another important factor when comparing this study to previous ones is that many used other measures and directly compared them to SpeechGraphs attributes – mostly cognitive measures (MOTA *et al*., 2014, 2016, 2019; BERTOLA *et al*., 2014; LEANDRO, 2021). Hence, it is possible these results would provide more complete information when compared to other cognitive measures as well.

To illustrate how similar our sample is regarding their education and how this could have affected thought organization in their written texts, we will use data from the LCC and LSC attributes, which are connectivity attributes and represent how well connected the words in the text are. Figure 18 represents the graph from P64, from the written English task, and it has the lowest LCC value (24.34146341) from all participants in the group of translators.

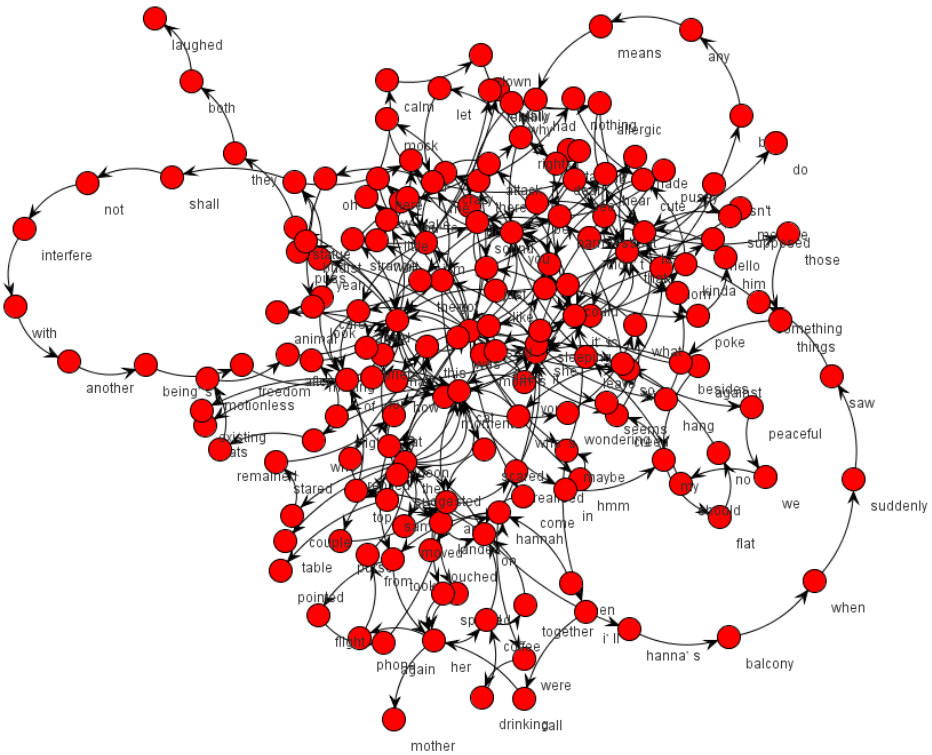
Figure 18 – LCC from P64 written English task



Source: research data (2021).

As for the group of bilinguals, P06 had the lowest value for LCC (23.83673469), and their text is represented in the graph in Figure 19.

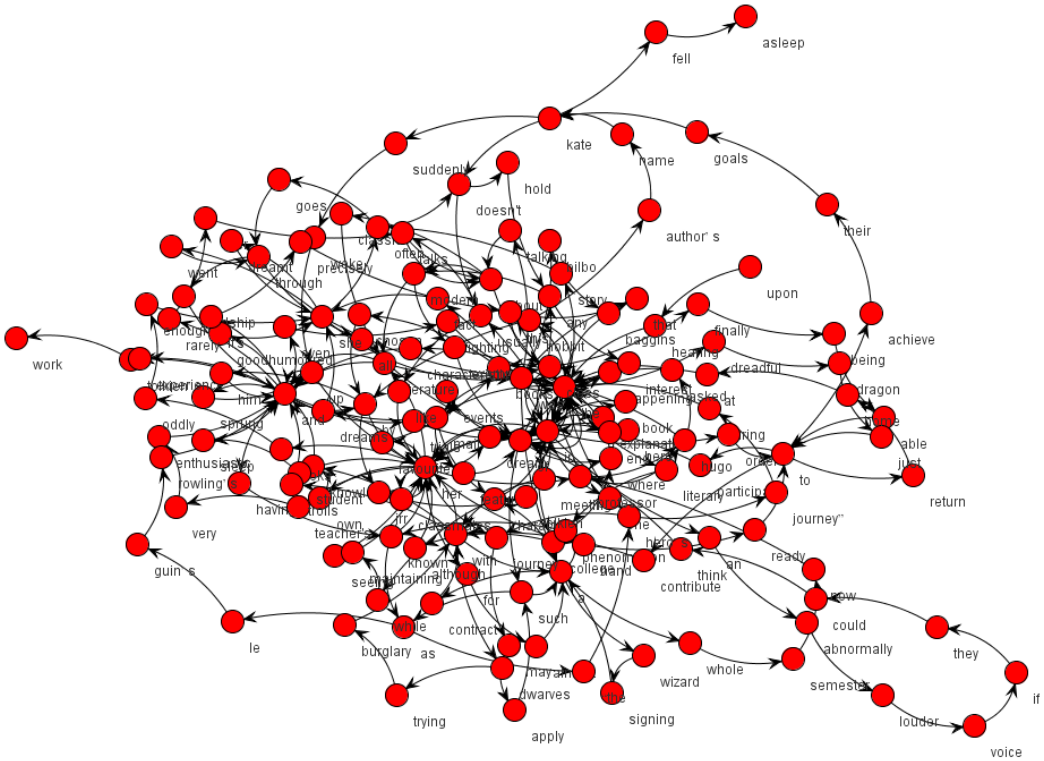
Figure 19 – LCC from P06 written English task



Source: research data (2021).

On the other hand, for LSC value, P11 had the lowest value (14.6923077) for the translation group. Their text is represented in the graph in Figure 20.

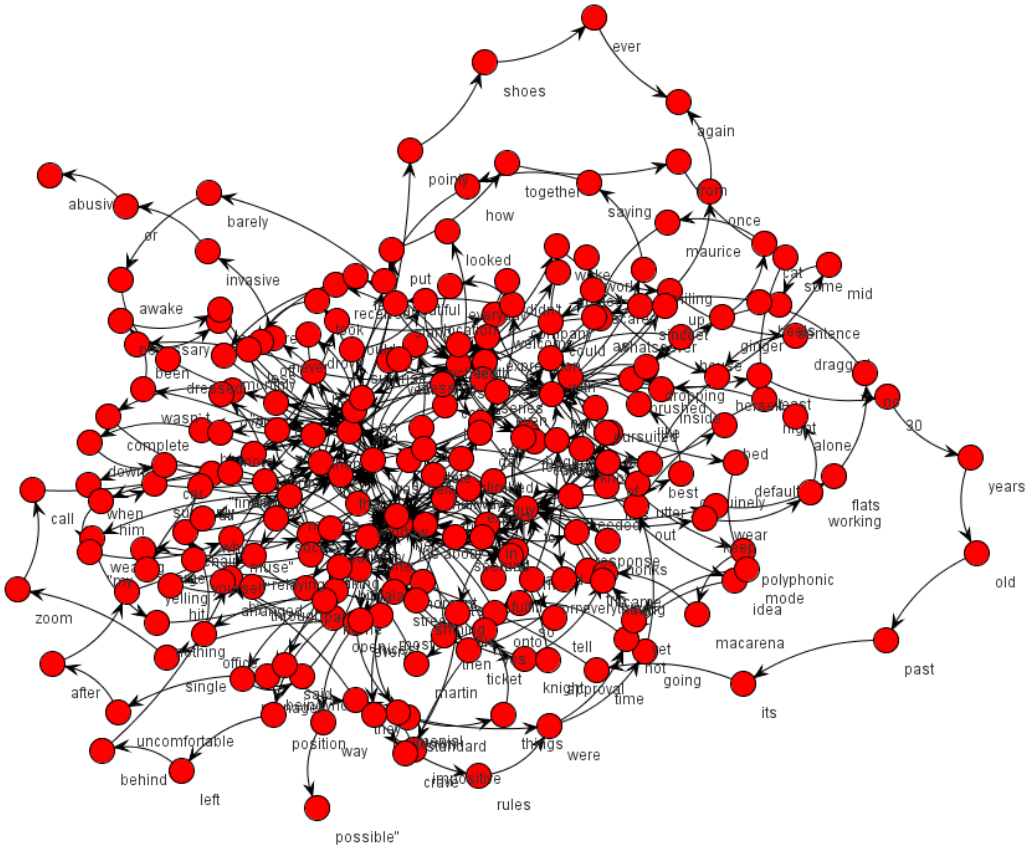
Figure 20 – LSC from P11 written English task



Source: research data (2021).

And for the bilinguals group, P62 had the lowest value for LSC (15.4354839). Their text is represented in the graph in Figure 21.

Figure 21 – LSC from P62 written English task



Source: research data (2021).

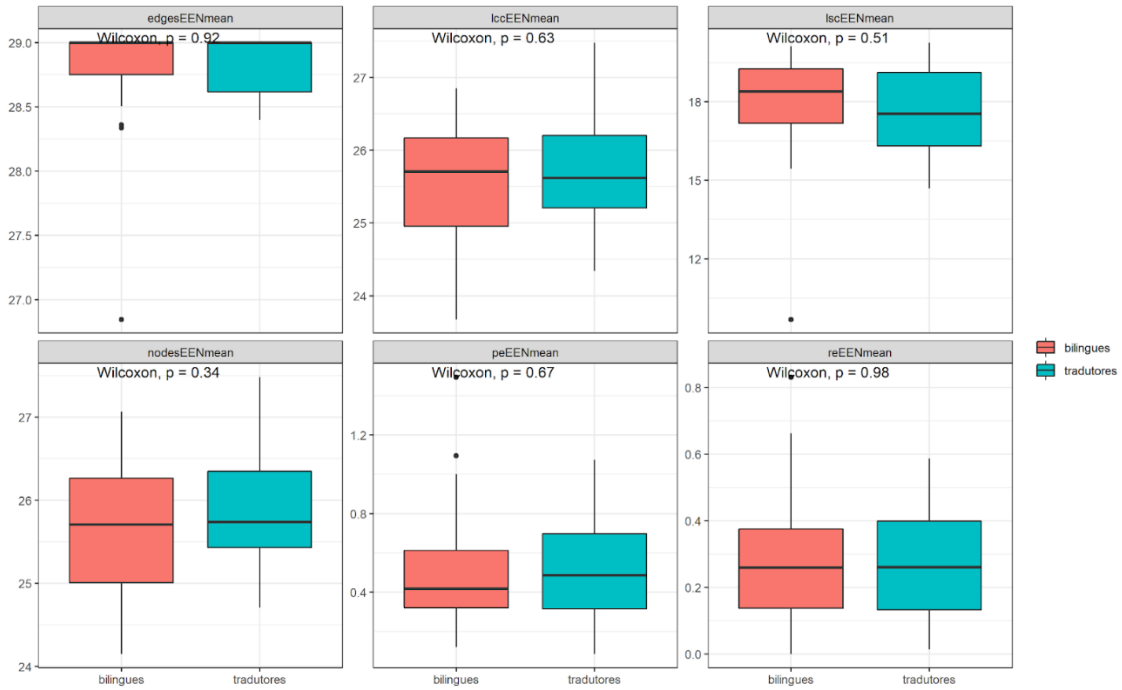
Although there is a very slight difference between the values for groups, it is possible to notice they are very comparable, possibly explaining why we could not find any statistical group differences despite their bilingual experiences being different. In addition, we must also consider that this specific task for the written modality may not be the best choice to investigate these thought organization attributes. Participants had 15 minutes to write between 250-300 words, and they were also allowed to proofread their texts. Individual differences are an important factor when writing a text, but overall, 250 words is not a very small text-size, which could have allowed participants to be able to connect their stories more easily than if they had 100 words, for instance. Being able to proofread their texts after they finished them, in addition to the revision experienced writers automatically conduct while writing (HAYES; OLINGHOUSE, 2015) probably provided participants with more opportunities to fully connect their words and thoughts as well.

Lastly, although no significant difference was found, it is important to notice that this lack of differences occurred for both English and Portuguese. Syntactic analysis had different results for English and Portuguese – the English task presented significant differences, while

the Portuguese task did not, which was unexpected. Thought organization analysis, on the other hand, did not present differences in both languages.

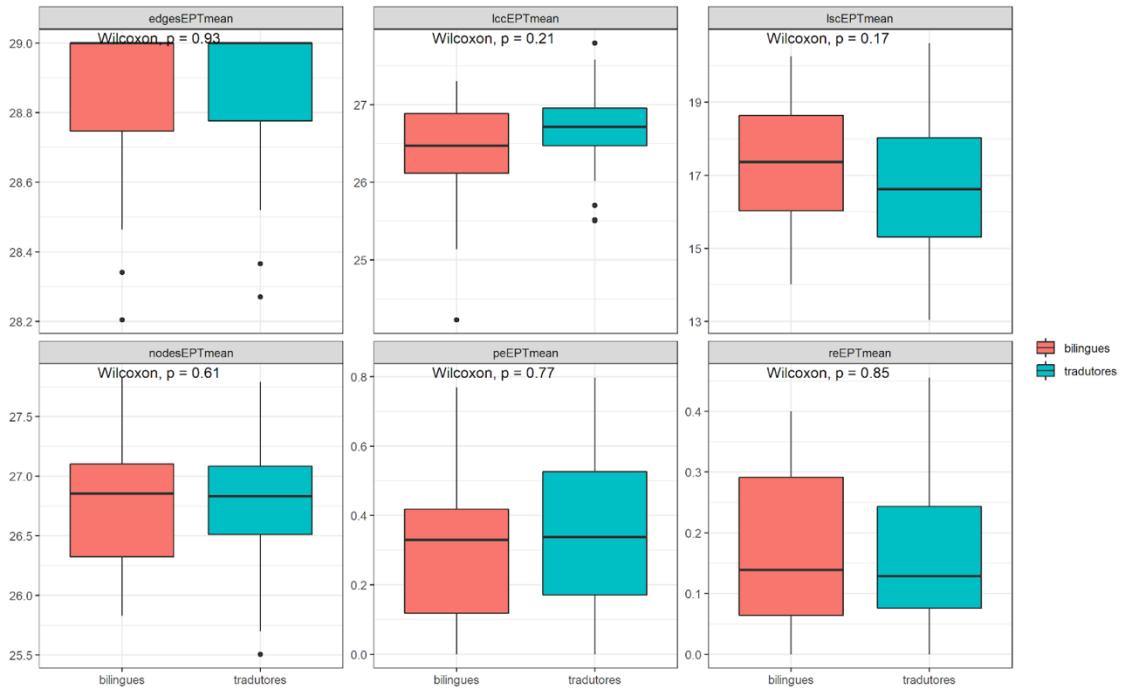
Boxplots for thought organization in the written English task and Portuguese task are presented in Figures 22 and 23.

Figure 22 – Boxplots for thought organization in the written English task



Source: author (2021).
Note: bilingues = bilinguals; tradutores = translators.

Figure 23 – Boxplots for thought organization in the written Portuguese task



Source: author (2021).
Note: bilingues = bilinguals; tradutores = translators.

Overall, it seems that both groups had a larger variability amongst themselves for all attributes in the Portuguese task, participants' L1, while in English both groups appear to be more consistent amongst themselves in most attributes. Another difference is that the translators' group only had outliers for the Portuguese task, and bilinguals had outlier for both English and Portuguese tasks. Still, both groups appear to be very similar to each other, which could, once again, explain the lack of significant results in the comparison between groups.

These results could also imply that future studies seeking to use SpeechGraphs with written texts and with healthy and proficient speakers need to revise the task being used. The cartoon strip and the word-limit for texts should be further analyzed and other options for participants to create their texts could provide different results.

4.2.1.4 Oral thought organization

Next, group comparison occurred for thought organization in all 6 conditions (nodes, edges, repeated edges, parallel edges, LCC, LSC) and in 2 tasks (oral English, oral Portuguese). Our objective was to investigate to what extent translation experience affects thought organization and connectivity in oral texts in Portuguese and in English produced by translators

and bilinguals, and our hypothesis was that no significant differences were expected to be found between translators and bilinguals in oral texts in English and Portuguese regarding graph attributes.

This comparison revealed a significant difference for the number of repeated edges (RE) and parallel edges (PE). Results are shown in Table 11 and significant results are highlighted in bold. The number of edges for oral results was almost equal for both groups after performing the moving window analysis of 30 words per text, which is why results for this attribute were not included here.

Table 11 – Results for thought organization comparison between translators and bilinguals in oral texts

	***p*-value**	**significance**
nodesOEN	0.2439076	ns
reOEN	0.6433697	ns
peOEN	0.4201539	ns
lccOEN	0.2439076	ns
lscOEN	0.6150879	ns
nodesOPT	0.1463339	ns
reOPT	**0.0227990**	*
peOPT	**0.0387153**	*
lccOPT	0.1649079	ns
lscOPT	0.7677574	ns

Source: author (2021).
Note: nodesOEN = nodes oral English; reOEN = repeated edges oral English; peOEN = parallel edges oral English; lccOEN = LCC oral English; lscOEN = LSC oral English; nodesOPT = nodes oral Portuguese; reOPT = repeated edges oral Portuguese; peOPT = parallel edges oral Portuguese; lccOPT = LCC oral Portuguese; lscOPT = LSC oral Portuguese.

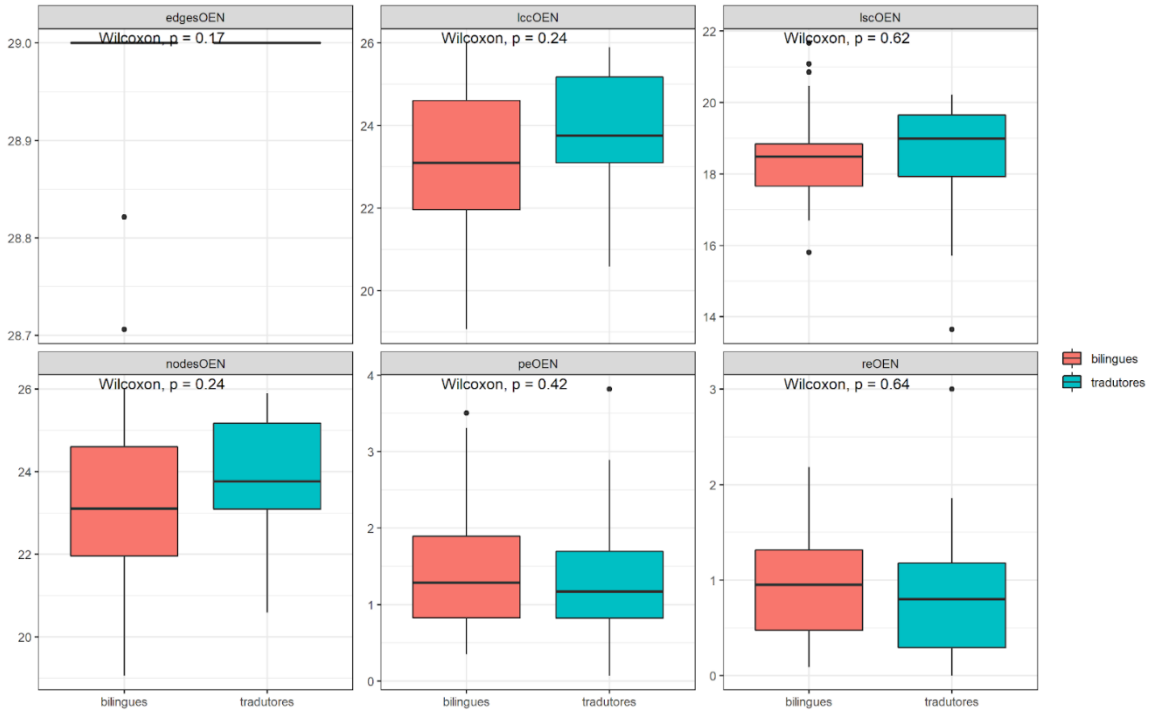
Results revealed a significant difference only for attributes of RE (U = 549, p = .022) and PE (U = 536, p = .038) in the oral Portuguese task with bilinguals producing more RE (M = .82, SD = .73) and PE (M = 1.18, SD = .71) than translators (RE: M = .50, SD = .57), (PE: M = .85, SD = .71). However, this significance did not survive a following correction for multiple comparisons. No significant differences were found for any of the 5 attributes in the oral English task (nodes, RE, PE, LCC, LSC) nor for the remaining 3 attributes in the oral Portuguese task (nodes, LCC, LSC).

Once again, as in the syntactic complexity analysis for clauses, it is surprising that a significance appeared only for the Portuguese language, and not for English, or for both.

However, this appears to confirm that participants' different bilingual experiences did play an important part during the Portuguese task, possibly being a matter of code-switching and even of cognitive flexibility.

Figure 24 shows the boxplots for the written English task.

Figure 24 – Boxplots for thought organization comparison between translators and bilinguals in the oral English task

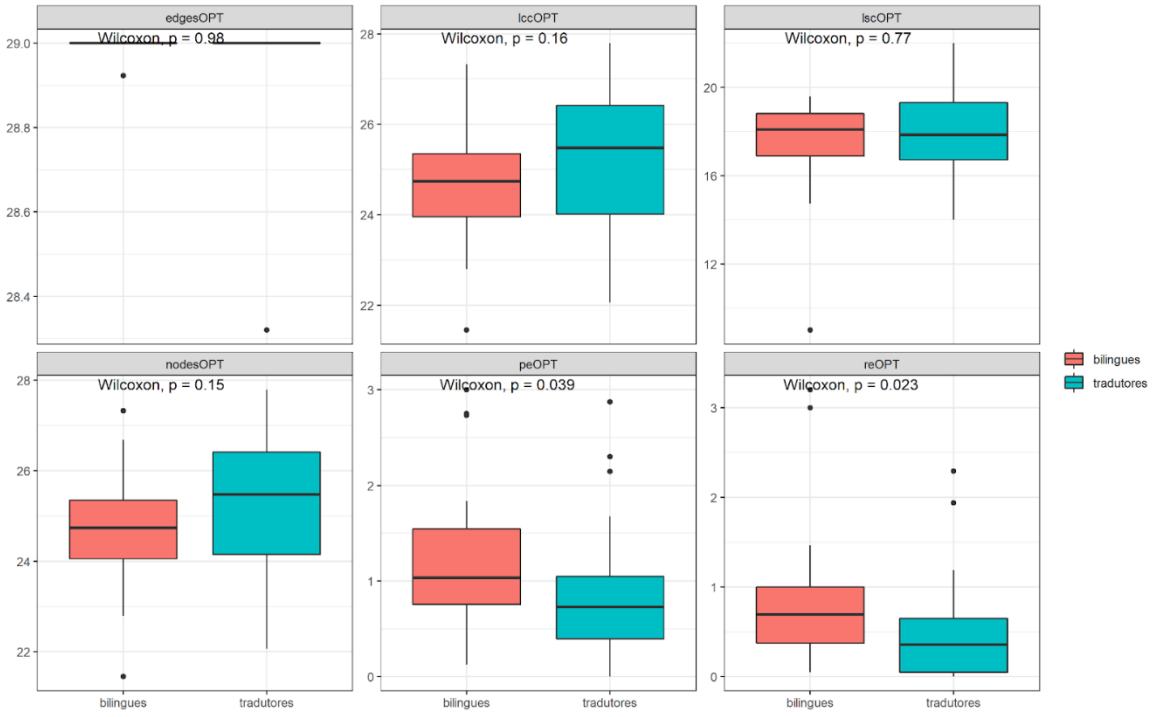


Source: author (2021).
Note: bilingues = bilinguals; tradutores = translators.

Overall, both groups performed very similarly in all thought organization conditions. Bilinguals did present outliers for four conditions, meaning translators had a little more consistency between themselves during the task. Boxplots for LCC, a connectivity attribute, and nodes, a general attribute, show translators also had a little more consistency among themselves, although it did not result in a significance. Nevertheless, this similarity between groups could indicate that translators' bilingual experience with written texts is not related to attributes of thought organization in the oral modality, at least not in both languages.

Significant results for the oral Portuguese task occurred in the recurrence attributes of RE and PE: bilinguals produced more repeated edges and parallel edges than translators. However, this significance did not survive the following correction for multiple comparisons (0.05 / 5 attributes = 0.01). Boxplots for this task are presented in Figure 25.

Figure 25 – Boxplots for thought organization comparison between translators and bilinguals in the oral Portuguese task



Source: author (2021).
Note: bilingues = bilinguals; tradutores = translators.

As in the English task, bilinguals had more outliers than translators. It is interesting to notice that for LCC translators varied more amongst themselves in the Portuguese task, while in the English task they were more consistent in their variability. The number of edges, due to the use of moving window analysis, is almost the same for both groups, which can be seen clearly in the boxplots, where data was represented through horizontal lines.

As for the RE and PE attributes, although their results did not survive post-correction analysis, it is important to discuss what these findings mean, since the differences do exist. In the previous literature regarding recurrence attributes, a few unexpected results were found. Luz (2018) compared groups of children divided into good readers, bad readers and dyslexics, and found significant results for good readers producing more PE. Leandro (2021) compared groups of advanced bilinguals and learners, and found that the advanced group "made more repetitions, as indicated by the number of repeated edges [...], parallel edges [...] and loops of three nodes [...]" (p. 139). And finally, differently from the other two, Mota *et al*. (2016) found a negative relationship between PE and cognitive performance: children presenting fewer repetitions in declarative memory reports "performed better on IQ and ToM tests." (p. 7).

According to the results found by Luz (2018) and Leandro (2021), more advanced groups made more repetitions – we would generally assume that the more proficient participants are, the less repetitions they would make. This could be related to Leandro's (2021) statement, mentioned previously, that the more proficient and experienced individuals are in a language, the more they seem to lean towards using more known and easily-accessed vocabulary, not minding about repetitions or lack of variety in their stories; they may see it as if they are able to successfully tell their narratives with that vocabulary, then there is no need to look for different words or structures.

Lastly, as Mota *et al*. (2016) compared and found a relationship between recurrence attributes and measures of cognitive performance, which did not occur in the present study, future studies could combine linguistic and cognitive measures, possibly providing more complete results about groups of individuals and their data.

4.2.2 Comparison between translators, translation students and bilinguals

After the comparison between translators and bilinguals, a subgroup analysis was performed to compare all three groups: translators, translation students and bilinguals. Since the translation students had a very small number of participants (n = 7), we decided to use a 2:1 ratio to select participants from the other two groups. Hence, 14 participants were selected from the translators groups and 14 participants from the bilinguals group. They were selected based on the age variable, although the mean age for each group was quite different, with translation students being younger.

A Kruskal-Wallis test was conducted for this comparison. It occurred for the 2 variables being investigated: syntactic complexity and thought organization, and in all 4 tasks (written English, written Portuguese, oral English, oral Portuguese). Results will be presented in the next four sections.

4.2.2.1 Written syntactic complexity

Group comparison occurred for written syntactic complexity data in 2 conditions (clauses and T-Units) and in 2 tasks (written English, written Portuguese). This comparison revealed significant results for only one condition – written English T-Units. Our objective was to investigate to what extent translation experience affects the level of syntactic complexity in written texts in Portuguese and in English produced by translators, translation students and

bilinguals, and our hypothesis was that the group of translators were expected to have higher levels of syntactic complexity than translation students and bilinguals, and translation students were expected to obtain levels of syntactic complexity than bilinguals by producing less T-Units.

Results are shown in Table 12 and significant results are highlighted in bold.

Table 12 – Results for syntactic complexity comparison between translators, translation students and bilinguals in written texts

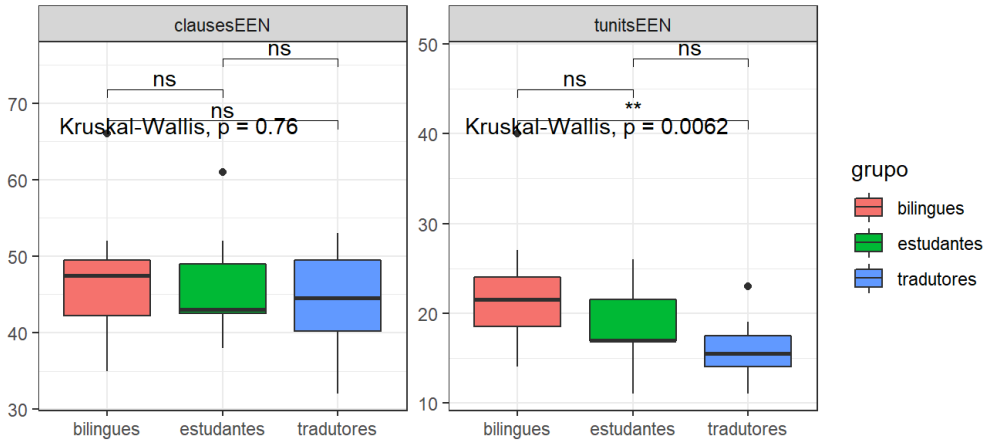
	***p*-value**	**significance**
clausesEEN	0.7602227	ns
tunitsEEN	**0.0062303**	*
clausesEPT	0.1193512	ns
tunitsEPT	0.6787147	ns

Source: author (2021).
Note: clausesEEN = clauses written English; tunitsEEN = t-units written English; clausesEPT = clauses written Portuguese; tunitsEPT = t-units written Portuguese.

A significance was found for T-Units in the written English task ($H = 10.15$, $p = .006$). A post-hoc analysis was conducted and the Dunn test revealed the difference occurred for bilinguals and translators, as already presented previously. Translation students did not present a significant difference with the other groups.

Figure 26 shows the boxplots for all three groups in the written English task.

Figure 26 – Boxplot for syntactic complexity in written English task



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

As for clauses, it appears translation students had less variability regarding number of clauses, being more similar to bilinguals, while translators had a larger variability. On the other hand, translation students' median is lower than bilinguals', but students appear to have less variability when we look at whiskers in quartiles 1 and 4. Bilinguals and translators appear to have a large variability in quartile 1. Bilinguals and students also had an outlier participant.

As for T-Units, bilinguals and translators had an outlier participant, but bilinguals and translation students are still more similar to each other than to translators regarding T-Units range. Students' median is still the lowest of all groups.

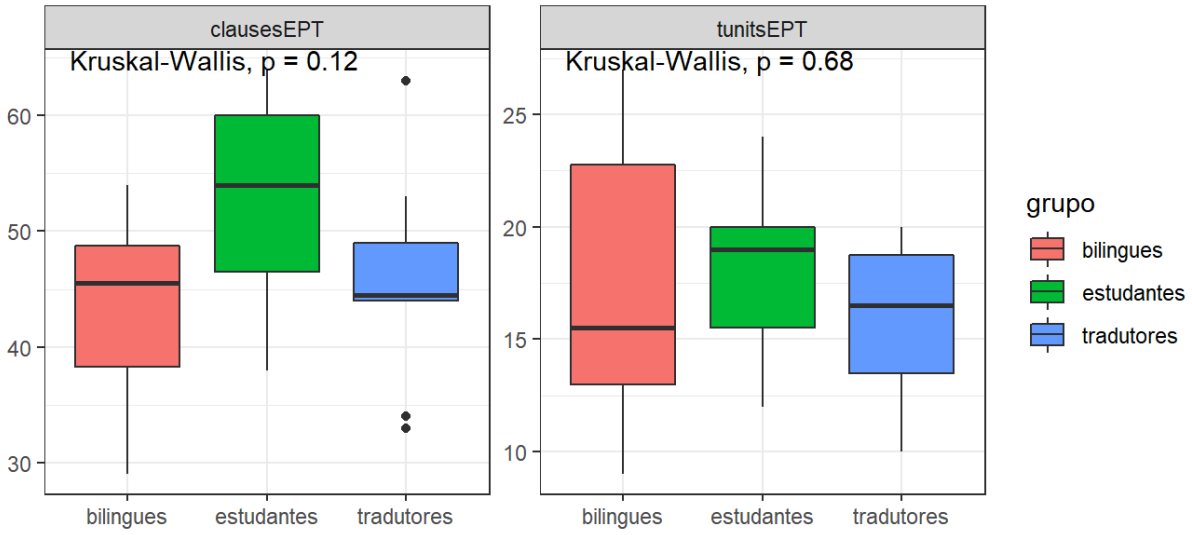
Since this subgroup analysis has such a small number of participants, it is difficult to confirm any results and even discuss them. However, looking at their results for syntactic complexity, one thing which does seem clear is that this group is consistent overall. Translators and bilinguals have a higher variability among each other, while students' range remains constant.

Previous literature comparing novice translators and experienced translators (ALVES, 2005; BRAGA; SILVA, 2006) have found that experienced translators usually perform better on tasks or exhibit better abilities to strategize or manage their translation time (SCHAMLTZ *et al*, 2019), for instance. However, since these studies usually use translation tasks, it could be a matter of "practice makes perfect" and not exactly an advantage coming from a different bilingual experience.

Nevertheless, it is interesting that translation students appear to be more similar to bilinguals than translators in the written English task variability. To participate in the research, it was required that students did not have more than 6 months of experience working with translations, but since all of them have already taken at least one translation course at university, along with many theoretical courses, we expected them to present higher syntactic complexity than bilinguals and to be more comparable to translators. This result could lean towards the discussion that translation experience does, in fact, have an overall effect on linguistic abilities, even if it is a small effect that still needs to be discussed further and more fine-grained, detailed measures need to be discovered in order to identify and confirm such an effect.

As for the written Portuguese task, no significance was found for either number of clauses or T-units. Figure 27 shows the boxplot for all three groups.

Figure 27 – Boxplot for syntactic complexity in written Portuguese task



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

Compared to the English task, the variability of all groups is much larger. For the number of clauses, translation students and bilinguals had a very wide range between participants, once again showing these two groups appear to be more comparable between each other than with the group of translators. However, translators do have three outliers, while the other two groups do not. As for the number of T-Units, considering all four quartiles, translators were the most consistent group, followed by translation students and then bilinguals, with a large variability.

Even though no statistical significance was found, the variability between groups presents a few important aspects for discussion. Once again, it is interesting that the Portuguese task had a larger variability than the English one. Tiryakioglu, Peters e Verschaffel (2010) state that writing in our L2 is an even more complex and difficult process than in our L1, but results from the final product (completed text) of our participants show that English texts had more consistency than Portuguese texts. A few participants did mention an interesting aspect during data collection that could have influenced this results: independently of them having a high proficiency level in their L2, they will always have a higher and better knowledge and control of their L1 – Portuguese; however, they also expressed that having more knowledge meant that they had too many possibilities for vocabulary and structures, both in writing and speaking, while in their L2 their possibilities were narrower, hence they did not have to spend much time deciding on what choices to make.

This could indicate that when writing in English most participants in the bilingual group chose more frequent and easily-recalled vocabulary and structures, but while writing in Portuguese, they may have tried to experiment more with their knowledge of the language. Translators, on the other hand, did not have as much variability among themselves as the other groups, which could also be an indicator that their dual-language experience has an effect on their texts, even if a small and difficult to identify effect. For T-Units, translation students were closer to translators than bilinguals. Since they still have very little or none professional experience, it is possible that they may have not had much experience translating into English, explaining why for the English task they were closer to bilinguals but for the Portuguese task they were closer to translators.

4.2.2.2 Oral syntactic complexity

Group comparison occurred for oral syntactic complexity data in 2 conditions (clauses and T-Units) and in 2 tasks (oral English, oral Portuguese). Our objective was to investigate to what extent translation experience affects the level of syntactic complexity in oral texts in Portuguese and in English produced by translators, translation students and bilinguals, and our hypothesis was that no significant differences were predicted to be found in the comparison of the three groups of participants in the assessment of the levels of syntactic complexity in both English and Portuguese.

As in the direct comparison between translators and bilinguals, our hypothesis that no difference was found between the three groups regarding the count of T-Units was found. Results are shown in Table 13.

Table 13 – Results for syntactic complexity comparison between translators, translation students and bilinguals in oral texts

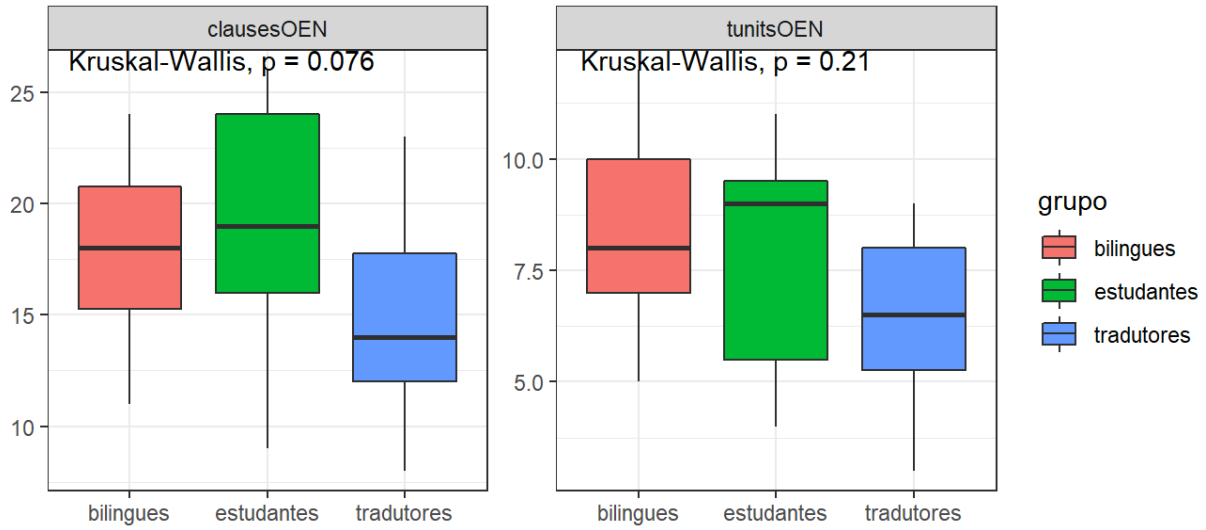
	***p*-value**	**significance**
clausesOEN	0.0760096	ns
tunitsOEN	0.2132468	ns
clausesOPT	**0.0017789**	*****
tunitsOPT	0.0627574	ns

Source: author (2021).
Note: clausesOEN = clauses oral English; tunitsOEN = t-units oral English; clausesOPT = clauses oral Portuguese; tunitsOPT = t-units oral Portuguese.

However, a significance was found for the number of clauses in the oral Portuguese task (H = 12.66, p = .001). A post-hoc analysis was conducted and the Dunn test revealed the difference occurred between bilinguals and translators, with bilinguals producing more clauses than translators, as already described previously, and also between translation students and translators, with translation students producing more clauses than translators as well.

Figure 28 shows the boxplot for all three groups in the oral English task.

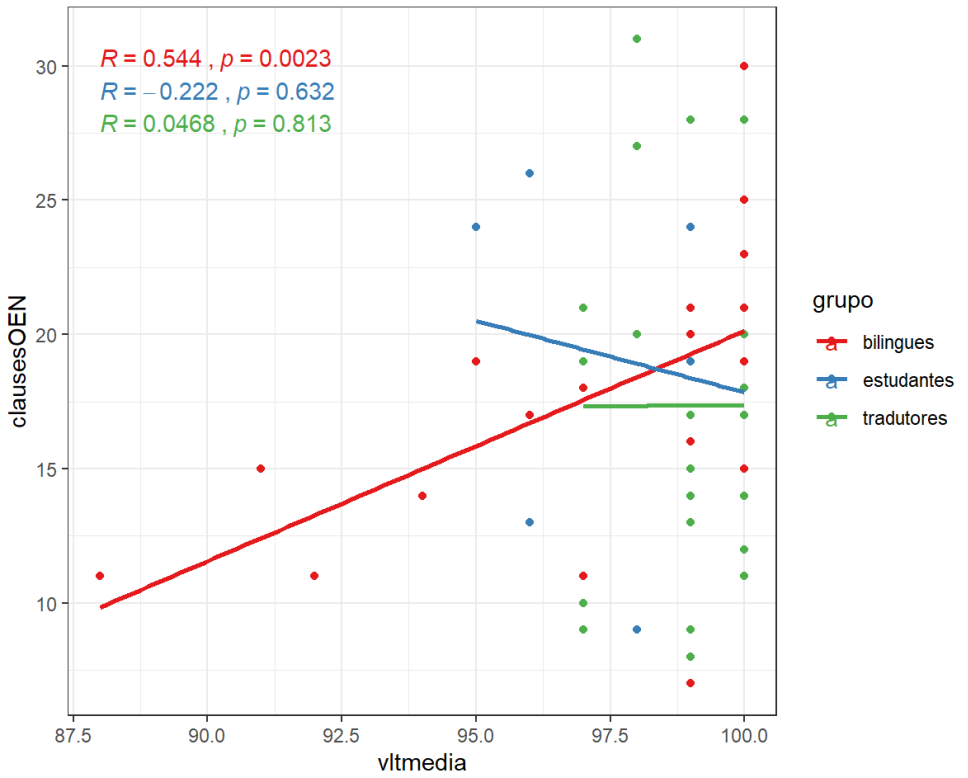
Figure 28 – Boxplot for syntactic complexity in oral English task



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

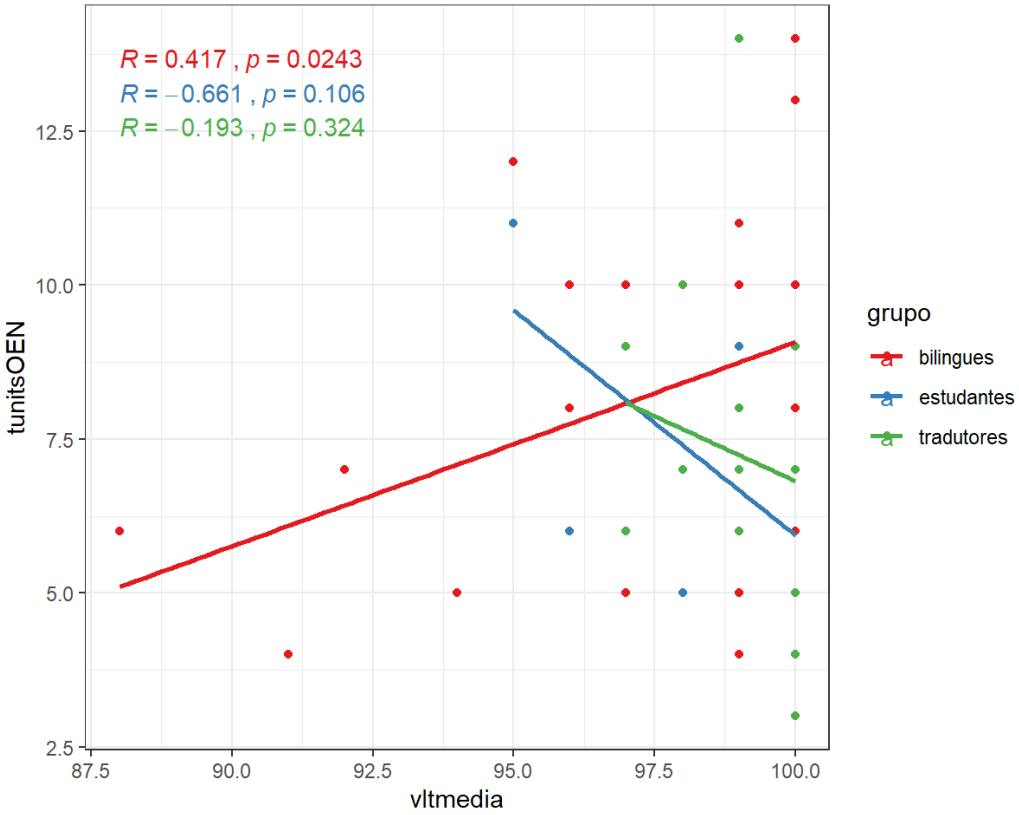
Boxplots reveal texts in the oral modality had a larger variability than the written texts, with all groups varying quite a lot. Interestingly, it was found that as bilinguals' VLT mean scores (proficiency) increased, the number of clauses (Rho = .54, p = 0.002) and T-Units (Rho = .42, p = 0.024) increased as well. Figures 29 and 30 represent this correlation.

Figure 29 – Number of clausesOEN x VLT (mean)



Source: author (2021).

Figure 30 – Number of tunitsOEN x VLT (mean)



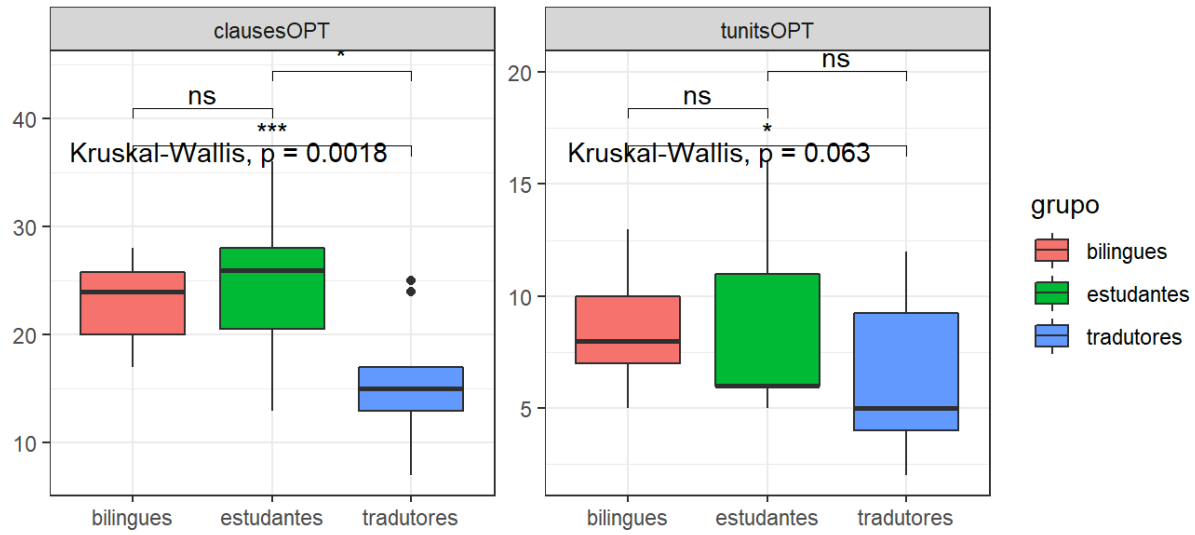
Source: author (2021).

Literature suggests that as proficiency increases the number of T-Units decreases, representing a higher level of syntactic complexity (KIM, 1998). Figures 29 and 30 show there are quite a few outliers, especially for bilinguals, which could be due to their bilingual experiences not being as homogeneous as in the group of translators. Furthermore, since the VLT is a vocabulary proficiency measure, and this correlation appeared in the oral modality, it is possible that bilinguals have a higher proficiency in writing than in speaking – although translators do not necessarily need to have a very high oral proficiency or even use the oral modality either. Since bilinguals exhibited a very different trajectory than translators and translation students, it is possible that the written experience of these two groups is influencing the oral modality as well.

Another important discussion is that translation students appear to be more similar to both the translators' groups and the bilinguals' groups, varying according to each task. This could be an indicator that training is indeed a long and varying process but with an important outcome, and until translation students acquire experience, they will not present consistency across their languages and modalities.

For results of the oral Portuguese task, translators outperformed both translation students and bilinguals, with the last two groups producing more clauses than translators. Figure 31 shows the boxplot for all three groups.

Figure 31 – Boxplot for syntactic complexity in oral Portuguese task



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

As already discussed in the direct comparison between translators and bilinguals, these results appearing only in the oral Portuguese modality is quite unexpected. Nonetheless, translators presenting less clauses than both other groups, despite the sample size for the subgroup analysis being small, does show that there is a characteristic specific to the translators group resulting in these differences. Unfortunately, our tasks and current data analysis do not seem sufficient to explain these results, and as stated by Ortega (2003), "[...] 'more complex' may mean 'more developed' in many different ways, and the nature of L2 development cannot be sufficiently investigated by means of these global measures alone." (p. 494). Hence, these measures need to be combined with other kinds of assessment to produce more accurate results and discussions.

The code-switching discussion related to the dual-language experience does still seem plausible, especially now that results show translators outperform translation students as well. In addition, as already mentioned, the T-Unit analysis for oral texts may not be the best choice. Other measures for syntactic complexity should be used, such as the AS-unit (BULTÉ; ROOTHOOFT, 2020), so we can confirm if these results between groups repeat themselves or if they are simply a consequence of a methodological choice.

Furthermore, in this subgroup analysis, results for the comparison of translators and bilinguals for T-Units in the oral Portuguese presented a *p* value within significance margin, but still not significant. Since the Mann-Whitney test with the entire sample of both groups did not present any significant results, this subgroup analysis result cannot be considered as fully reliable.

4.2.2.3 Written thought organization

Next, comparison between all three groups occurred for thought organization in all 6 conditions (nodes, edges, repeated edges, parallel edges, LCC, LSC) and in 2 tasks (written English, written Portuguese). Our objective was to investigate to what extent translation experience affects thought organization and connectivity in written texts in Portuguese and in English produced by translators, translation students and bilinguals, and our hypothesis was that the group of translators would show better scores in both English and in Portuguese than translation students and bilinguals, and that translation students would show better scores than bilinguals as well.

As in the direct comparison between translators and bilinguals, a moving window of 30 words with a step of 3 words was used for participants' texts. This comparison did not reveal any significant difference between groups. Results are shown in Table 14.

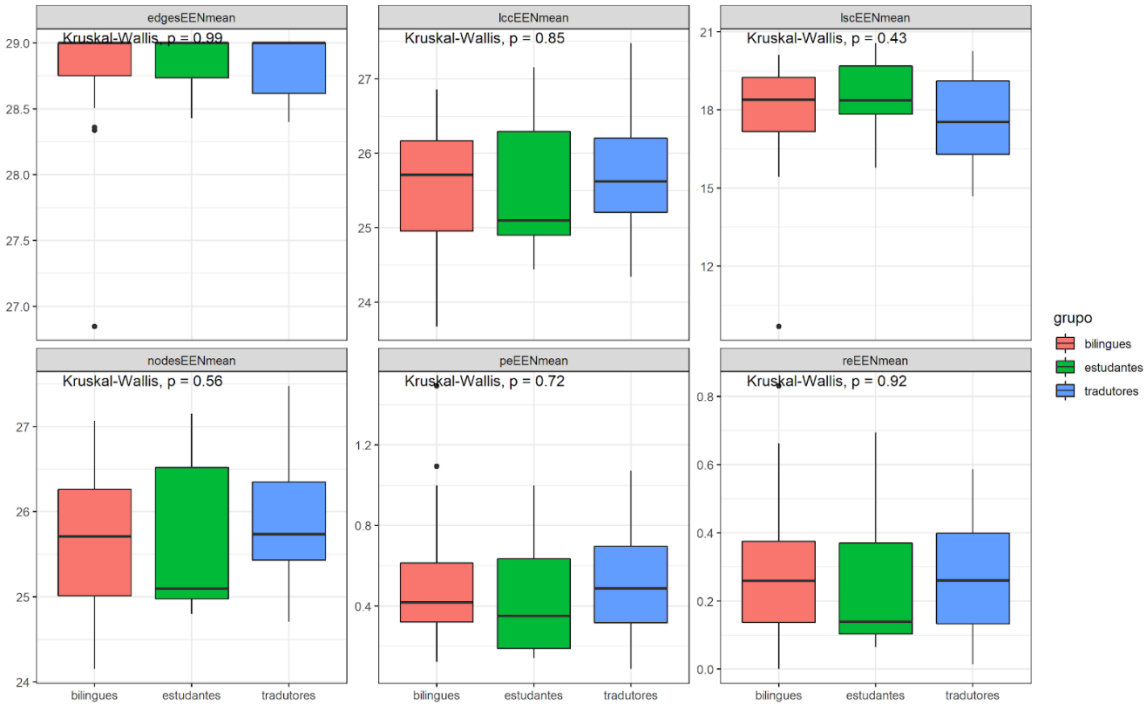
Table 14 – Results for thought organization comparison between translators, translation students and bilinguals in written texts

	***p*-value**	**Significance**
nodesEEN	0.1762742	ns
edgesEEN	0.4138408	ns
reEEN	0.4628529	ns
peEEN	0.3547100	ns
lccEEN	0.1425647	ns
lscEEN	0.8043771	ns
nodesEPT	0.5443498	ns
edgesEPT	0.9751718	ns
reEPT	0.9987249	ns
peEPT	0.9157402	ns
lccEPT	0.6024186	ns
lscEPT	0.6572042	ns

Source: author (2021).
Note: nodesEEN = nodes written English; edgesEEN = edges written English; reEEN = repeated edges written English; peEEN = parallel edges written English; lccEEN = LCC written English; lscEEN = LSC written English; nodesEPT = nodes written Portuguese; edgesEPT = edges written Portuguese; reEPT = repeated edges written Portuguese; peEPT = parallel edges written Portuguese; lccEPT = LCC written Portuguese; lscEPT = LSC written Portuguese.

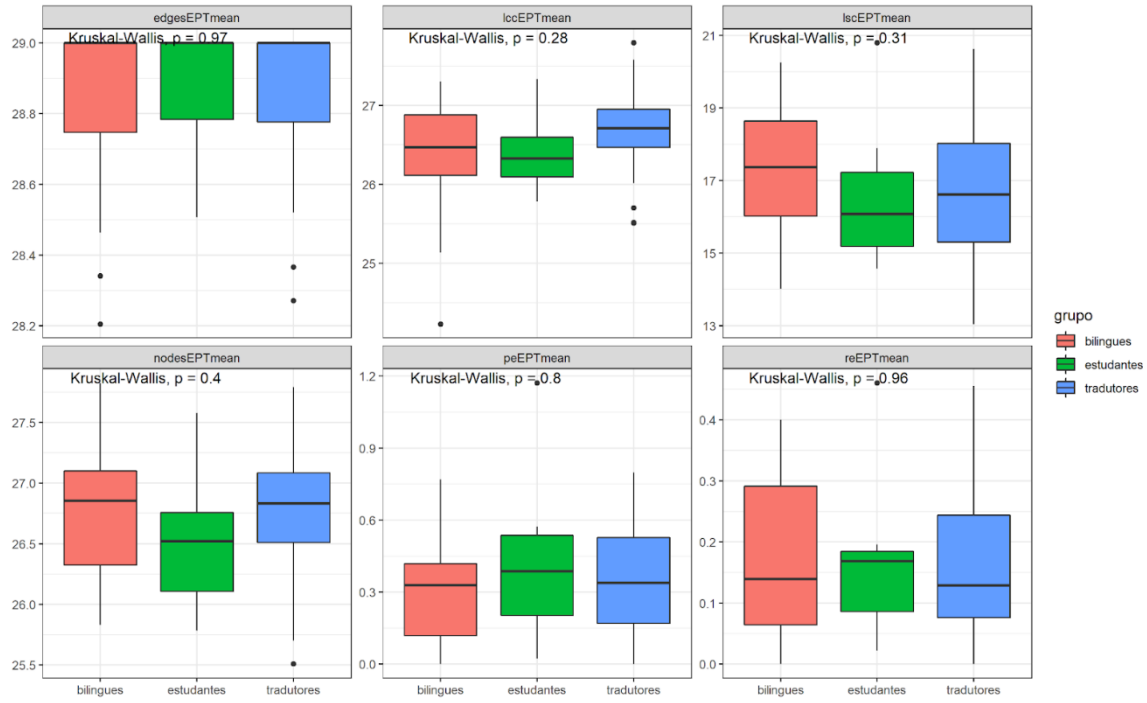
Comparison for the three groups did not present any significant difference for the 6 thought organization attributes (nodes, edges, RE, PE, LCC, LSC) in both languages (English and Portuguese). As already discussed, it is possible all groups were too similar for any significant differences to be found. Figure 32 shows the boxplots for all three groups in the written English task.

Figure 32 – Boxplot for thought organization of all three groups in written English task



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

Figure 33 – Boxplot for thought organization of all three groups in written Portuguese task



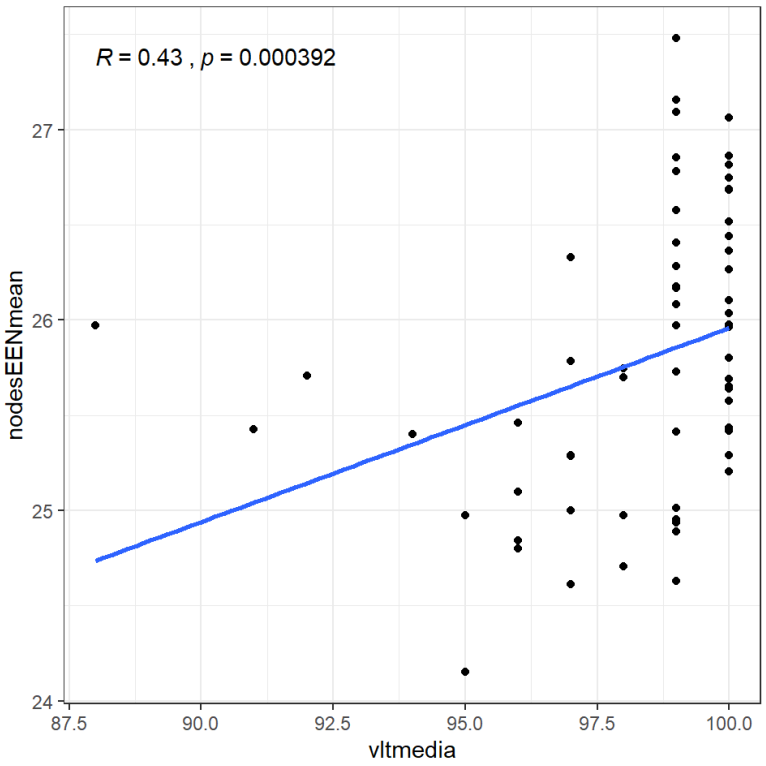
Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

For most attributes, all participants had a large variability amongst themselves. For the English task, the group of bilinguals was the only one which presented outliers, in 4 out of the 6 conditions. The translation students group, despite still being in the process of learning strategies for their texts on their undergrad course, did not have any outliers, which could be an initial indicator that training does have an effect in written texts. For the Portuguese task, on the other hand, both bilinguals and translators presented outliers, and variability for all groups was different from the English task.

This difference in the presentation of the data of each group between the two languages could add to the dual-language context discussion, as results and participants' performance has been showing that even for translators there are differences depending on whether they are using English or Portuguese. As most research focuses on cognitive aspects (HENRARD; VAN DAELE, 2017; VAN DER LINDEN, 2017; FERREIRA; SCHWIETER; FESTMAN, 2020), linguistic aspects have not been discussed thoroughly, although there are studies comparing the translation process between experts and novices or students (ALVES, 2005; BRAGA; SILVA, 2006). Unfortunately, our analysis does not cover a wide range of linguistic aspects besides T-Units, and the result for thought organization does not seem to explain much other than the groups appear to be very comparable.

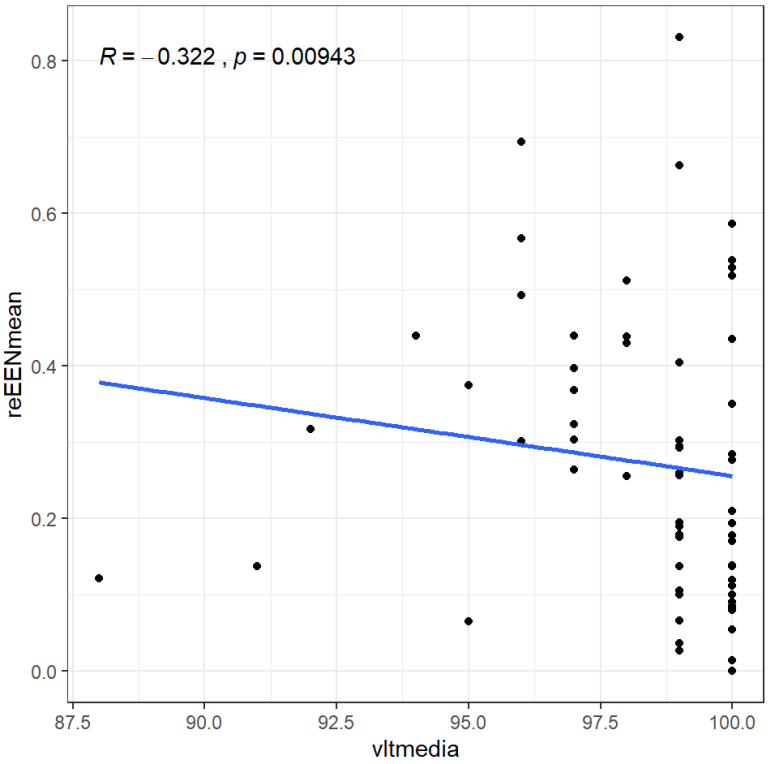
Nevertheless, while comparing data from the average of VLT results with thought organization data for all participants through a Spearman correlation test, a significant correlation was found for proficiency and number of nodes, number of RE and LCC in the English written task, as can be seen in Figures 34, 35 and 36. The written Portuguese task did not present any significant correlations.

Figure 34 – Correlation between VLT and nodes in the written English task



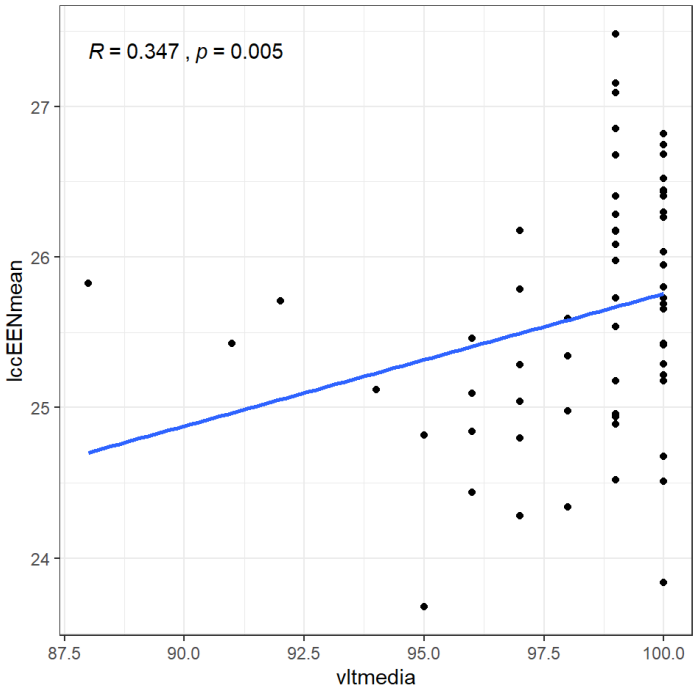
Source: author (2021).

Figure 35 – Correlation between VLT and RE in the written English task



Source: author (2021).

Figure 36 – Correlation between VLT and LCC in the written English task



Source: author (2021).

While nodes and LCC had a positive correlation with VLT, RE had a negative correlation: the higher their proficiency, less RE were produced. Naturally, we would expect that with higher proficiency participants would be able to produced more lexically diverse texts, but as already discussed, Luz (2018) and Leandro (2021) found that groups of good readers and advanced bilinguals made more repetitions than other groups, who were less proficient in reading or in English in general. Our results seem to correlate better with Mota *et al.*'s (2016) findings, which found a negative correlation between repetition and cognitive measures, despite our study not using other cognitive measures. As for nodes and LCC, it seems logical for them to have a positive correlation with proficiency, since more proficient individuals supposedly have a wider vocabulary range and thus can produce texts with more diversity of words and have a better control of the connectivity of their text as a whole.

As for the lack of other results, as already discussed as well, the fact that all participants have either completed or are enrolled in a higher education course could have contributed to the lack of significant results, since all participants have some kind of experience with reading and/or writing during undergrad. Other two factors that could have affected results are sample size, which for the subgroup analysis was very small, since the translation students' group only has 7 participants, and the narrative task that was used, which had not been used with SpeechGraphs research yet. Previous studies focus mainly on oral production, and used one-image tasks (LEANDRO, 2021), an affective photo (MOTA *et al.*, 2019), a sequence of images

of a story with beginning, middle and end (LUZ, 2018), or requested participants to tell a report of a dream (MOTA *et al*., 2014). Thus, it is possible that the task used here – the cartoon strips with a blank frame – is not the most appropriate method to produce texts to use with SpeechGraphs attributes analysis, at least with a written task for advanced bilinguals.

4.2.2.4 Oral thought organization

Next, comparison between all three groups occurred for thought organization in oral texts, in all 6 conditions (nodes, edges, repeated edges, parallel edges, LCC, LSC) and in 2 tasks (oral English, oral Portuguese). Our objective was to investigate to what extent translation experience affects thought organization and connectivity in oral texts in Portuguese and in English produced by translators, translation students and bilinguals, and our hypothesis was that no significant differences were expected to be found among the three groups in their oral texts in English and in Portuguese.

A moving window of 30 words with a step of 3 words was used as in the written texts analysis. Results are shown in Table 15, and as in the comparison between translators and bilinguals, the number of edges for all groups was too similar, thus their results were not presented here.

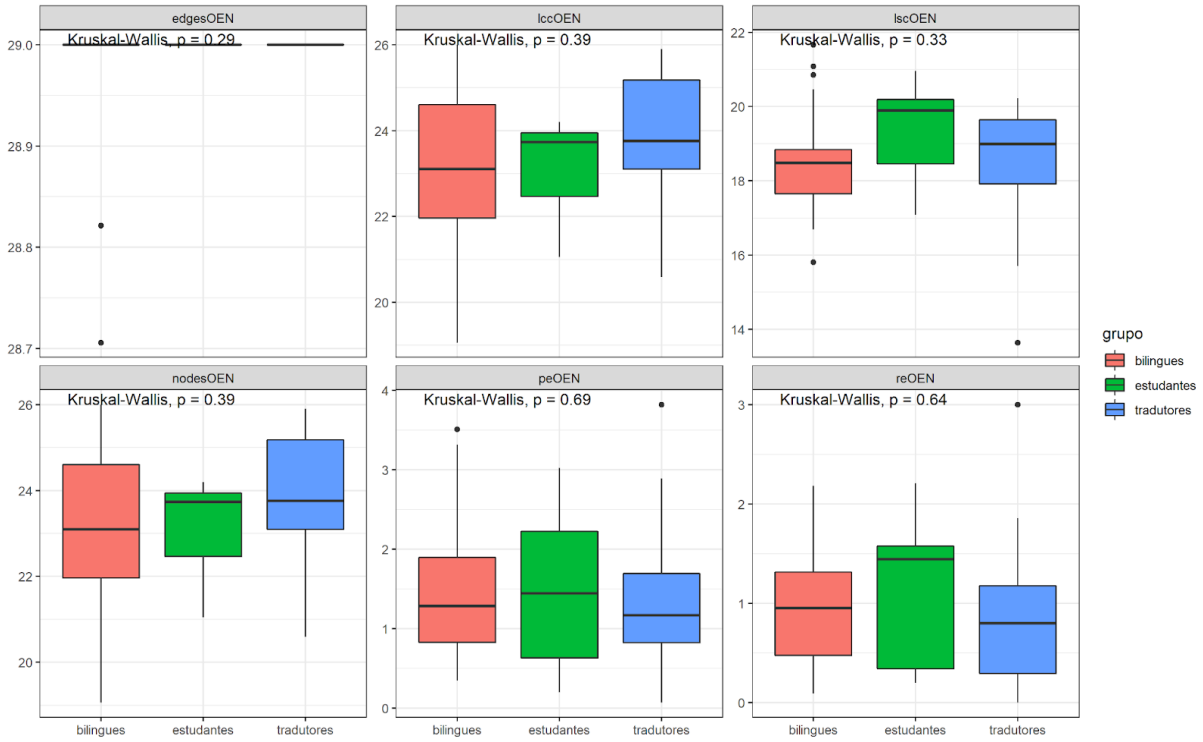
Table 15 – Results for thought organization comparison between translators, translation students and bilinguals in oral texts

	***p*-value**	**significance**
nodesOEN	0.7197067	ns
reOEN	0.7737942	ns
peOEN	0.9818762	ns
lccOEN	0.7197067	ns
lscOEN	0.1259691	ns
nodesOPT	0.8313587	ns
reOPT	0.3352059	ns
peOPT	0.7667470	ns
lccOPT	0.9447804	ns
lscOPT	0.3827633	ns

Source: author (2021).
Note: nodesOEN = nodes oral English; reOEN = repeated edges oral English; peOEN = parallel edges oral English; lccOEN = LCC oral English; lscOEN = LSC oral English; nodesOPT = nodes oral Portuguese; reOPT = repeated edges oral Portuguese; peOPT = parallel edges oral Portuguese; lccOPT = LCC oral Portuguese; lscOPT = LSC oral Portuguese.

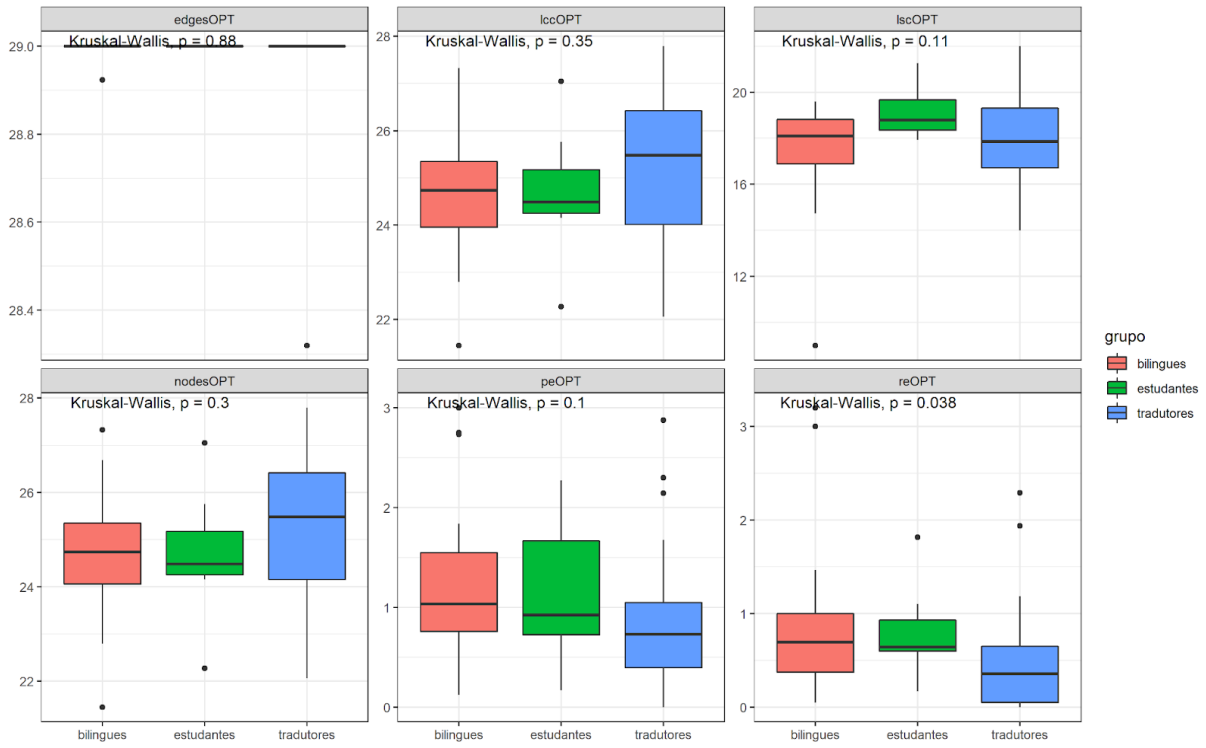
For oral texts, results did not indicate any significant difference between groups for all 5 attributes (nodes, RE, PE, LCC, LSC) in both languages (English and Portuguese), as our hypothesis predicted, but it appears that a similar situation occurred as in the written texts. Figures 37 and 38 show the boxplots for English and Portuguese tasks.

Figure 37 – Boxplot for thought organization of all three groups in oral English task



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

Figure 38 – Boxplot for thought organization of all three groups in oral Portuguese task



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

For the Portuguese tasks, all groups presented outliers in some of the conditions, and all participants presented outliers for the repeated edges (RE) attributes. As we have already discussed and seen in our data, repetition attributes appear to have mixed results in previous and in our study – this could possibly be an indicator that repetition is related to bilingual experience, and not only proficiency. Our sample focuses on individuals with writing experience, and not oral production, which may explain why all groups presented outliers.

The lack of positive results, as we predicted, could mean that the written experience of translators does not influence oral experience. However, results for the subanalysis were a little different than for the direct comparison between translators and bilinguals, and the lack of more informative results may be related to the factors already mentioned – homogeneity between groups, small sample size for the comparison of three groups, and the linguistic task of cartoon strips being used. Future studies could replicate our task and compare results, or continue to use the methods from previous studies with oral production with more proficient bilinguals as well to discover if more informative results are found.

4.2.3 Correlation between syntactic complexity and thought organization

Finally, a Spearman correlation was performed to verify the relationship between measures of syntactic complexity and thought organization. This comparison was conducted for written texts (in English and in Portuguese) and for oral texts (in English and in Portuguese) and the Bonferroni correction for multiple comparisons was used. Our objective was to investigate to what extent aspects of syntactic complexity and attributes of thought organization and connectivity are correlated to each other in written and oral texts in Portuguese and in English produced by translators, translation students and bilinguals, and our hypothesis was that it was expected that measures of syntactic complexity (number of clauses, number of T-Units) would correlate with attributes of thought organization regarding general attributes (nodes, edges) and connectedness attributes (LCC, LSC), and would not correlate with attributes of recurrence (repeated edges, parallel edges) in both written and oral modalities and in both Portuguese and English.

Results indicated a few significant results for written English, written Portuguese and oral English tasks. Results for the written English task are described in Table 16 and significant results are highlighted in bold.

Table 16 – Spearman correlation between syntactic complexity and thought organization in the written English task

	rho	*p* value	significance
clausesEEN x nodesEEN	-0.1656093	0.1909362	ns
clausesEEN x edgesEEN	-0.1465849	0.2477533	ns
clausesEEN x reEEN	0.0559262	0.6607079	ns
clausesEEN x peEEN	0.1070965	0.3996132	ns
clausesEEN x lccEEN	-0.1669312	0.1873690	ns
clausesEEN x lscEEN	0.0893243	0.4827315	ns
tunitsEEN x nodesEEN	-0.2524487	**0.0441661**	*
tunitsEEN x edgesEEN	-0.3080902	**0.0132598**	*
tunitsEEN x reEEN	0.2216287	0.0784001	ns
tunitsEEN x peEEN	0.2359363	0.0605343	ns
tunitsEEN x lccEEN	-0.3272312	**0.0083065**	*
tunitsEEN x lscEEN	-0.1704896	0.1780060	ns

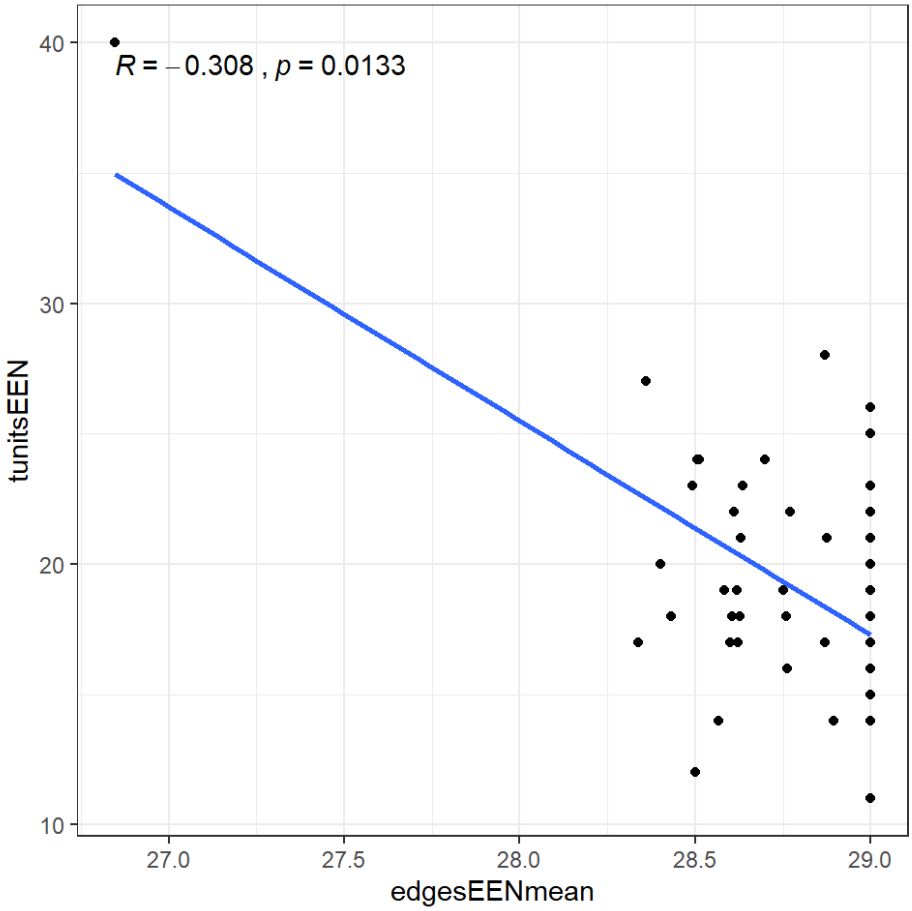
Source: author (2021).
Note: clausesEEN = clauses written English; tunitsEEN = t-units written English; nodesEEN = nodes written English; edgesEEN = edges written English; reEEN = repeated edges written English; peEEN = parallel edges written English; lccEEN = LCC written English; lscEEN = LSC written English.

In the written English task, significant results were found for T-Units x nodes (r = .044, p = .0441661), T-Units x edges (r = .013, p = .0132598), and T-Units x LCC (r = .008, p = .0083065), all presenting a negative correlation.

For the correlation between T-Units and nodes in English written texts, a negative correlation was found, which was to be expected, as the number of nodes expresses the number of distinct lexical items in the texts, and the number of T-Units expresses the combination of the main clauses + its subordinates of a text, thus generating what can be considered a small number when compared to an entire text.

Figure 39 shows the correlation results in the comparison between T-Units and edges.

Figure 39 – Comparison between T-Units and edges in the written English task

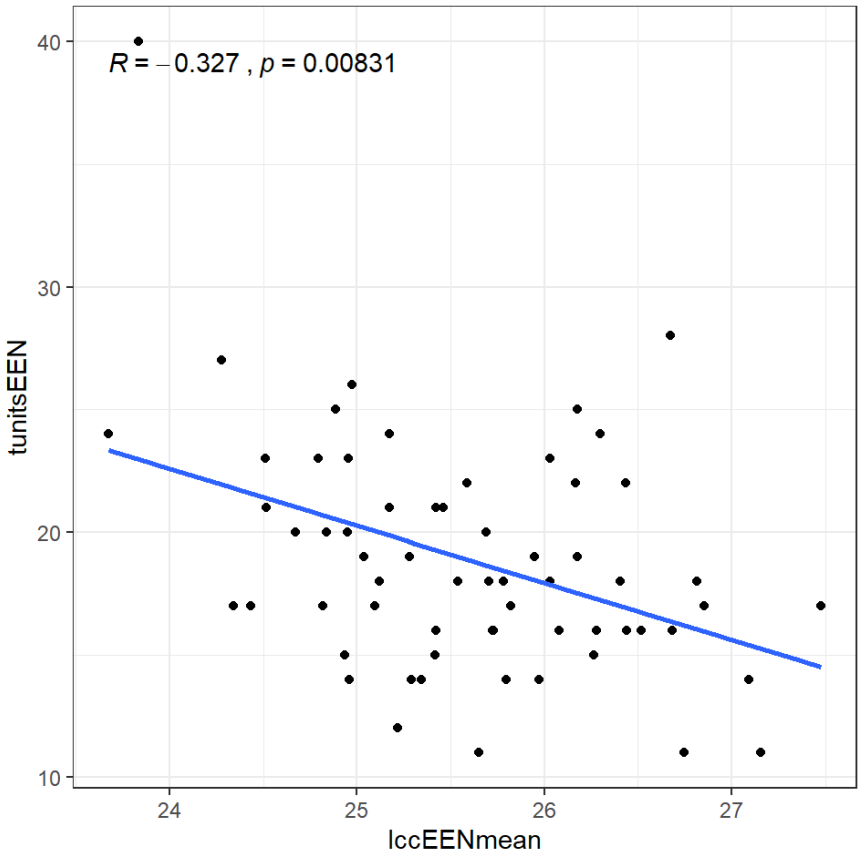


Source: author (2021).

The number of T-Units represents the syntactic complexity of a text, while the number of edges represents the number of links between lexical items in a text, and our data shows that the more T-Units a text has, the less edges it contains. As in the correlation between T-Units and nodes, since the T-Unit analysis gathers main clauses + all of its subordinates, meaning the more T-Units, less complex a text is, it seems logical to expect a negative correlation with edges: less complex text, less connection between lexical items.

Figure 40 shows the relation between T-Units and LCC.

Figure 40 – Comparison between T-Units and LCC in the written English task



Source: author (2021).

Once again, a negative correlation was found. LCC is the largest connected component, measuring how well-connected words in a text are. Again, since T-Units can join several sentences together, it seems logical to expect that the number for LCC decreases as T-Units increase. Less T-Units means a more complex text, and a higher number of LCC means a better-connected text.

Next, results for the comparison of syntactic complexity and thought organization in the written Portuguese text will be presented in Table 17.

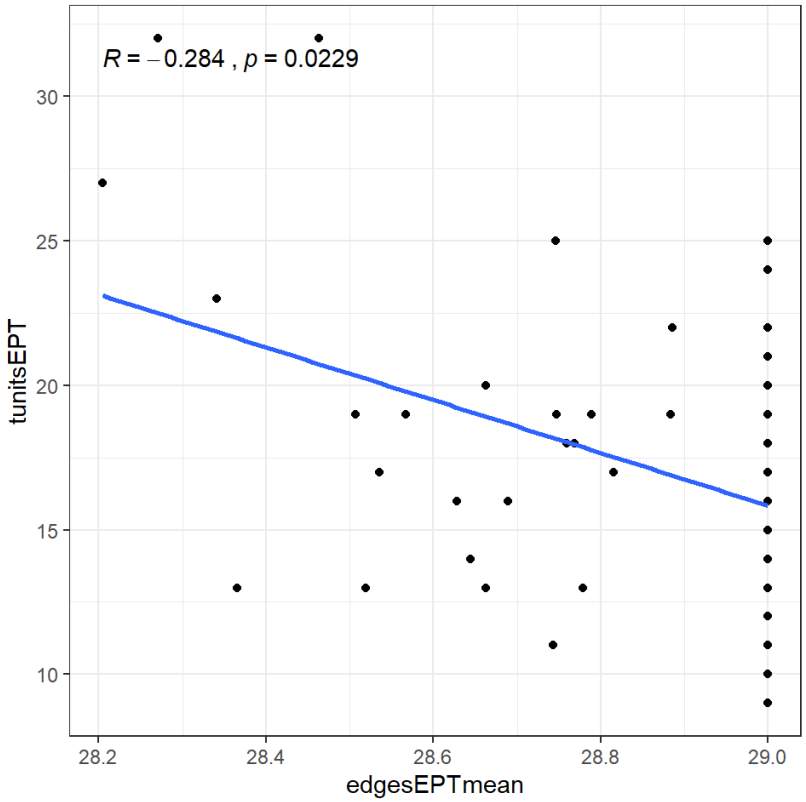
Table 17 – Spearman correlation between syntactic complexity and thought organization in the written Portuguese task

	rho	*p* value	significance
clausesEPT x nodesEPT	-0.1342321	0.2902892	ns
clausesEPT x edgesEPT	-0.2409932	0.0550697	ns
clausesEPT x reEPT	-0.0305164	0.8108144	ns
clausesEPT x peEPT	0.1796181	0.1555483	ns
clausesEPT x lccEPT	-0.1974530	0.1178334	ns
clausesEPT x lscEPT	-0.0950880	0.4548175	ns
tunitsEPT x nodesEPT	0.0773813	0.5433454	ns
tunitsEPT x edgesEPT	**-0.2841623**	**0.0228683**	*
tunitsEPT x reEPT	-0.0827935	0.5154258	ns
tunitsEPT x peEPT	0.0025391	0.9841127	ns
tunitsEPT x lccEPT	-0.1290545	0.3094646	ns
tunitsEPT x lscEPT	-0.2115282	0.0933628	ns

Source: author (2021).
Note: clausesEPT = clauses written Portuguese; tunitsEPT = t-units written Portuguese; nodesEPT = nodes written Portuguese; edgesEPT = edges written Portuguese; reEPT = repeated edges written Portuguese; peEPT = parallel edges written Portuguese; lccEPT = LCC written Portuguese; lscEPT = LSC written Portuguese.

In the written Portuguese task, significant results were found only for T-Units x edges (r = .022, p = .0228683). All other correlations did not present significant results. Just as in the English task, a negative correlation between the number of T-Units and the number of edges was identified. Since this relation appeared in both languages of the written task, the two variables appear to be highly connected to each other. This correlation is represented in Figure 41.

Figure 41 – Comparison between T-Units and edges in the Portuguese task



Source: author (2021).

Next, results for the comparisons of oral tasks will be presented. Significant correlations were found only for the oral English task.

Table 18 – Spearman correlation between syntactic complexity and thought organization in the oral English task

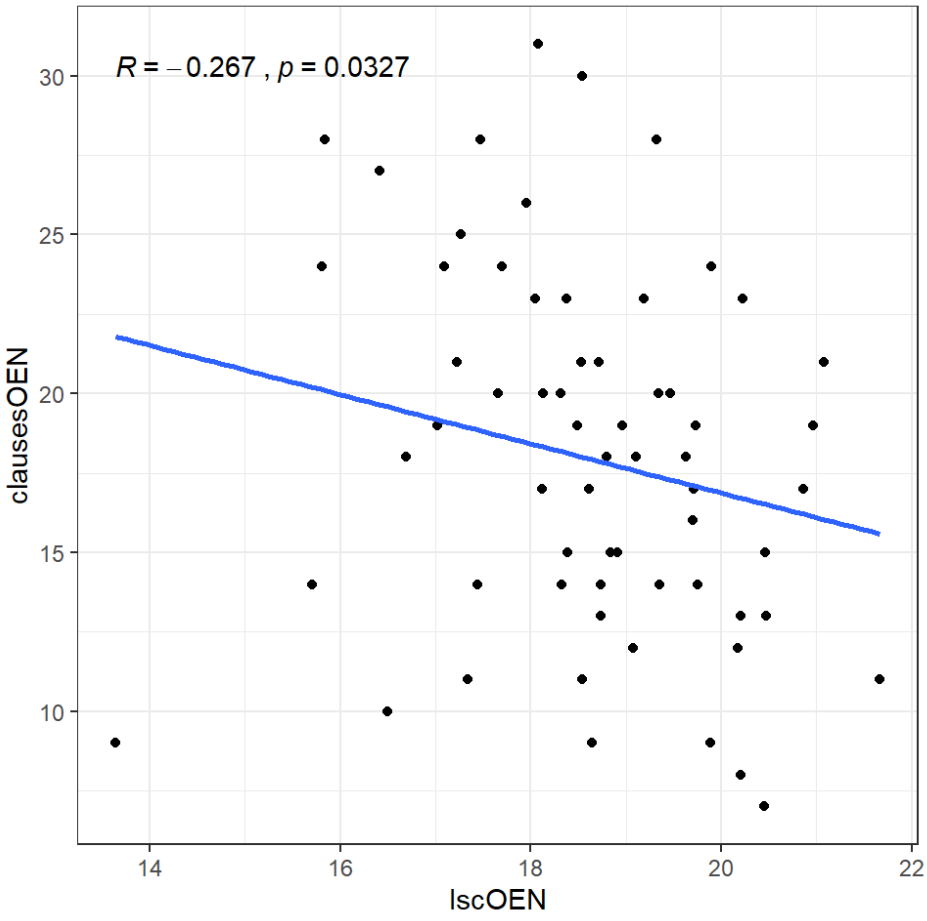
	rho	***p* value**	**significance**
clausesOEN x nodesOEN	-0.0194264	0.8789009	ns
clausesOEN x reOEN	-0.0802272	0.5285735	ns
clausesOEN x peOEN	-0.0375586	0.7682601	ns
clausesOEN x lccOEN	-0.0194264	0.8789009	ns
clausesOEN x lscOEN	**-0.2673138**	**0.0327292**	*
tunitsOEN x nodesOEN	-0.0336422	0.7918509	ns
tunitsOEN x reOEN	0.0104042	0.9349684	ns
tunitsOEN x peOEN	0.0170929	0.8933567	ns
tunitsOEN x lccOEN	-0.0336422	0.7918509	ns
tunitsOEN x lscOEN	**-0.3197450**	**0.0100082**	*

Source: author (2021).
Note: clausesOEN = clauses oral English; tunitsOEN = t-units oral English; nodesOEN = nodes oral English; reOEN = repeated edges oral English; peOEN = parallel edges oral English; lccOEN = LCC oral English; lscOEN = LSC oral English.

In the oral English task, significant results were found for number of clauses x LSC (r = .026, p = .0327292) and for number of T-Units x LSC (r = .031, p = .0100082). All other correlations did not present significant results.

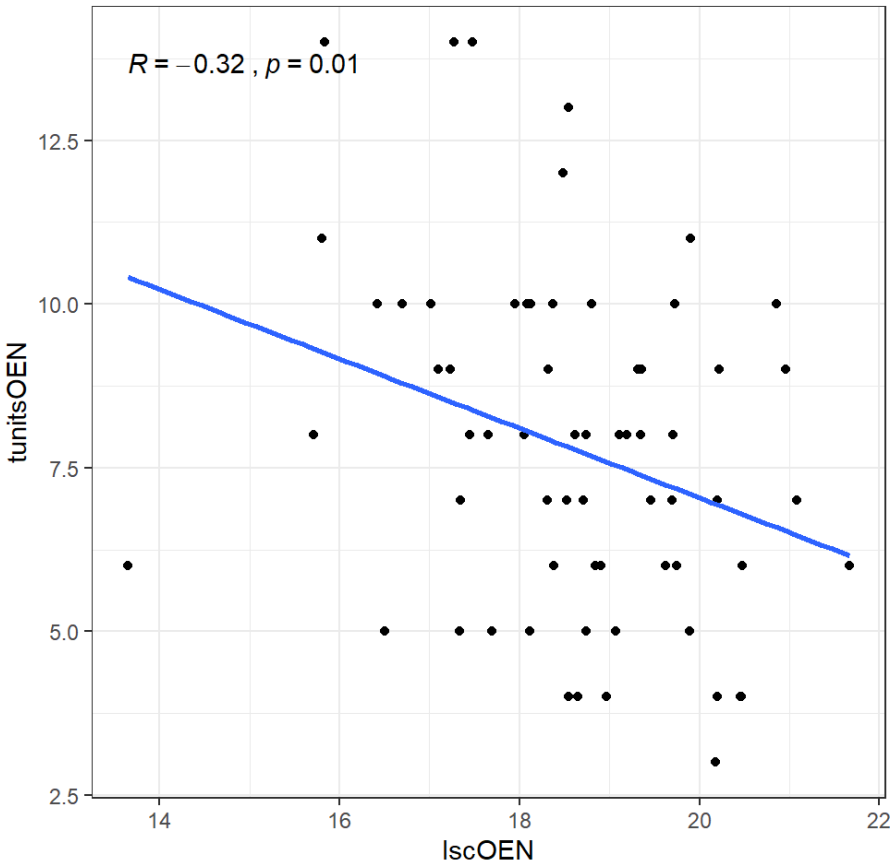
Figures 42 and 43 show the representation of the correlation between clauses and LSC and T-Units and LSC.

Figure 42 – Comparison between clauses and LSC in the oral English task



Source: author (2021).

Figure 43 – Comparison between T-Units and edges in the oral English task



Source: author (2021).

LSC was found to have a negative correlation with the two conditions of syntactic complexity: clauses and T-Units. LSC measures how well connected the words of the text are, just like the LCC, the difference being that for LSC the nodes must be mutually linked.

However, opposite of the T-Units number, it is not very clear why there is a negative correlation between the number of clauses and the number of LSC. The number of clauses represents the total number of separate clauses – both main clauses and subordinate clauses, unlike the T-Units count that emerges from the combination of both types of clauses. Still, since LSC measures the number of single nodes, its number tends to be a lot higher than the number of clauses, probably explaining the negative correlation that was found.

Lastly, results for the oral Portuguese task are presented in Table 19.

Table 19 – Spearman correlation between syntactic complexity and thought organization in the oral Portuguese task

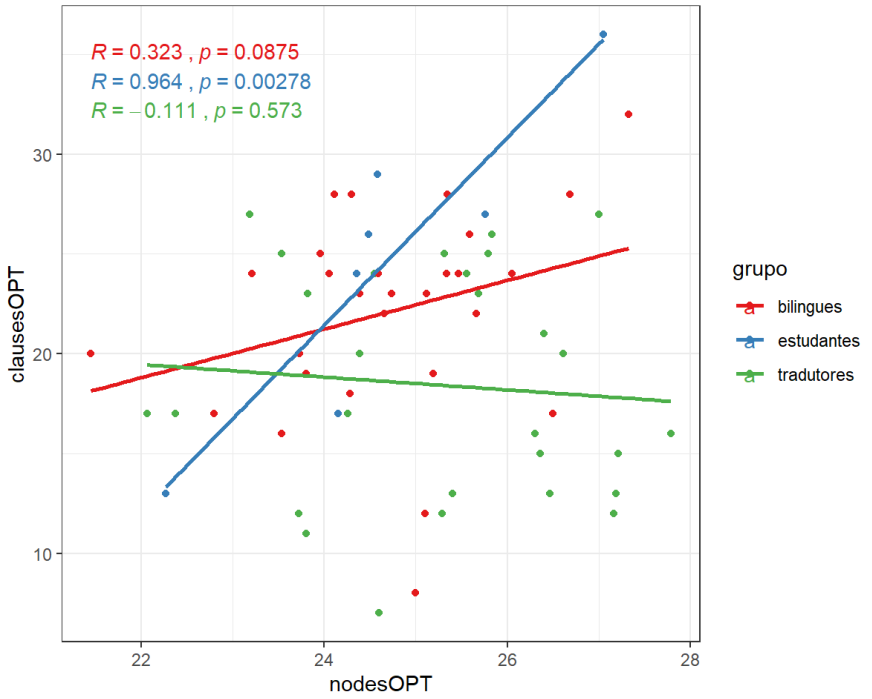
	rho	*p* value	significance
clausesOPT x nodesOPT	0.0875466	0.4915206	ns
clausesOPT x reOPT	0.0979133	0.4414655	ns
clausesOPT x peOPT	-0.0294470	0.8173276	ns
clausesOPT x lccOPT	0.1053936	0.4071929	ns
clausesOPT x lscOPT	-0.1669852	0.1872243	ns
tunitsOPT x nodesOPT	-0.0971015	0.4452797	ns
tunitsOPT x reOPT	0.2016247	0.1101181	ns
tunitsOPT x peOPT	0.0863617	0.4974252	ns
tunitsOPT x lccOPT	-0.0798779	0.5303758	ns
tunitsOPT x lscOPT	-0.0888811	0.4849151	ns

Source: author (2021).
Notes: clausesOPT = clauses oral Portuguese; tunitsOPT = t-units oral Portuguese; nodesOPT = nodes oral Portuguese; reOPT = repeated edges oral Portuguese; peOPT = parallel edges oral Portuguese; lccOPT = LCC oral Portuguese; lscOPT = LSC oral Portuguese.

Differently from the results found in the written tasks, the analysis of the oral tasks did not present significant results for both languages. The oral Portuguese task showed significant results during both the syntactic complexity and the thought organization analysis, so it is interesting to notice that no significance was found when comparing both variables. These results could indicate that, independently of how proficient individuals are in their L1 and their L2, they still present noticeable differences between their languages.

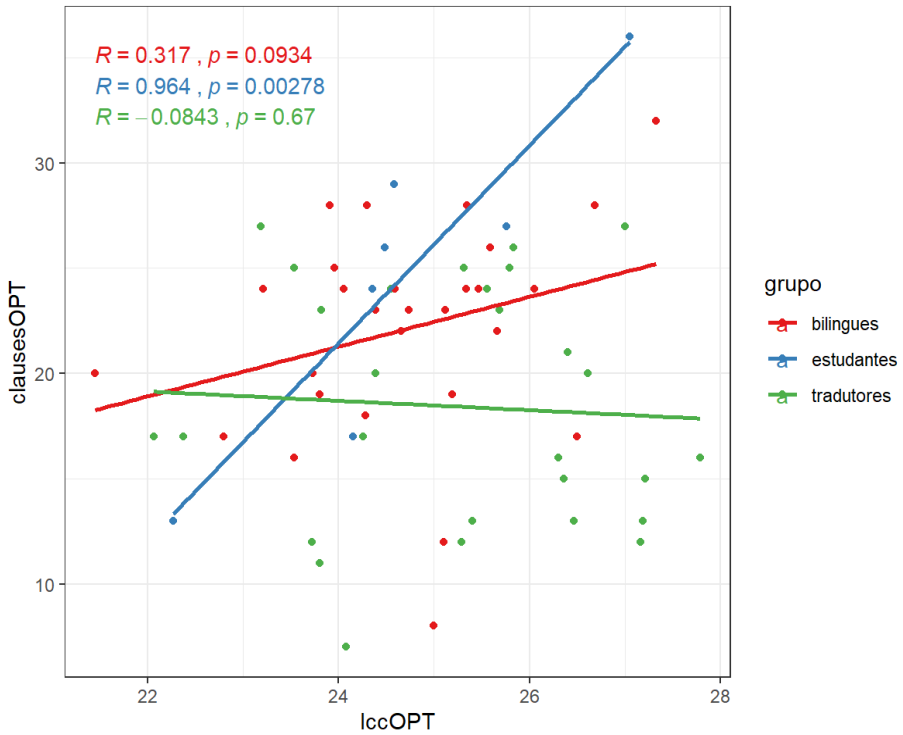
However, after the Spearman comparison between measures of syntactic complexity and thought organization, another Spearman comparison was also conducted, with the same two measures, but now investigating the difference between the three groups: translators, translation students and bilinguals. This comparison now found significant differences in the oral Portuguese task for the three groups for two comparisons: number of clauses x nodes, and number of clauses x LCC. The relation between the three groups is shown in Figures 44 and 45.

Figure 44 – Clauses x nodes for three groups



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

Figure 45 - Clauses x LCC for three groups



Source: author (2021).
Note: bilingues = bilinguals; estudantes = translation students; tradutores = translators.

In both cases, the comparison between clauses x nodes and clauses x LCC for the translators group exhibited a negative correlation, while the same comparison for the groups of bilinguals and translation students had a positive correlation. Although no significance between their results for thought organization and only a few significant results for syntactic complexity were found, we can see that groups do behave differently from each other, especially the translators in comparison to translation students and bilinguals.

This comparison between groups and seeing how their data presents themselves could be an indicator that translation experience does indeed affect both variables – but it is still a subtle difference that cannot be easily identified with the measurements we currently have. Studies should continue to combine different measurements and test new correlations while seeking to find what represents and differentiates bilingual experience (LAINE; LEHTONEN, 2018; BIALYSTOK, 2021), and specific contexts of bilinguals, such as the dual-language context (GREEN; ABUTALEBI, 2013) should be further explored and described in as much details as possible.

5 FINAL CONSIDERATIONS AND CONCLUSION

The present study attempted to contribute to the bilingual experience and the dual-language context discussions by investigating to what extent translation experience affects the level of syntactic complexity and thought organization and connectivity in written and oral texts produced by Portuguese-English translators and bilinguals. Two linguistic tasks were conducted: a Written Production Task, in Portuguese and English, and an Oral Production Task, in Portuguese and English. The levels of syntactic complexity and thought organization were measured through the analysis of T-Units (HUNT, 1965) and the Speech Graphs tool (MOTA *et al*., 2014), respectively.

In the last decade or so, studies and discussions have been focusing on discovering and explaining why previous research on bilingualism has had so many inconsistent and controversial results (LAINE; LEHTONEN, 2018; BIALYSTOK, 2021) and whether the existence of a bilingual advantage can be found and confirmed. In the midst of this turmoil in the field, discussions about bilingual experience began to gain attention and context of use of the languages of a bilingual became a promising subject for research, especially regarding cognitive investigation.

With such discussions and studies focusing on it increasing, it appears that there has been a general realization that to test such a complex and multidimensional phenomenon such as bilingualism, we must invest in characterizing with more details who the bilinguals in our studies are and how their languages are being used in their daily lives. Cognition has been found to be shaped by our experience, and bilingual experience is variable between individuals and can be a very intense one, with constant switching between a bilingual's languages – and that is the reason our studies need to focus more on specific characterizations. Even in studies investigating cognitive aspects, it seems that we cannot ignore the need for more details about language use (BEATTY-MARTÍNEZ *et al*., 2020).

While searching for more information and results on characterizing the bilingual experience and language use and its effects on cognition, Green and Abutalebi's model (2013) remain a relevant beginning point. Their Adaptive Control Hypothesis has led many into researching context-specific bilinguals, creating a fast-growing amount of research on dual-language context bilinguals, such as interpreters (HENRARD; VAN DAELE, 2017; VAN DER LINDEN, 2017; FERREIRA; SCHWIETER; FESTMAN, 2020). And as this topic becomes more relevant, our study saw the need to also investigate translators and how their specific use of language is perceived in their texts.

We then decided to investigate written texts and also compare them to oral texts produced by the same participants, to further explore if and how translators' bilingual experience presents itself in their texts and if we would be able to measure it through known analyses methods. Translators were then compared to translation students and non-translators bilinguals, and both their written and oral texts were analyzed through a T-Unit count to measure syntactic complexity (HUNT, 1965) and through graphs attributes to measure thought organization and connectivity (MOTA *et al*., 2012, 2014).

Syntactic complexity analysis revealed that:

a) Translators produced more syntactically complex written texts than bilinguals in English by producing less T-Units, while in Portuguese translators produced fewer clauses.
b) Translators, translation students and bilinguals produced comparable oral texts in English, while in Portuguese translators produced fewer clauses than both bilinguals and translation students.

Furthermore, thought organization analysis revealed that:

a) Translators, translation students and bilinguals presented comparable graph attributes of thought organization in written texts in both English and Portuguese.
b) Translators, translation students and bilinguals presented comparable graph attributes of thought organization in oral texts as well, although bilinguals produced more repetition attributes of repeated edges and parallel edges than translators in Portuguese.

Syntactic complexity analyses did reveal that the translators seem to have a specific bilingual experience of working with both languages in the same context as a likely explanation for the results found, confirming that different contexts of use of language can differentiate bilinguals among themselves and that linguistic aspects need to be investigated as well.

The thought organization analyses, on the other hand, did not reveal differences between groups. The only significance found was for oral Portuguese texts between translators and bilinguals for RE and PE attributes, and even this difference did not survive further statistical analysis. Since strictly linguistic differences were not found, it appears all three groups were too similar regarding their background and general experiences for differences to be found.

It is important to observe, however, that this study had several limitations regarding sample size and tasks. The first limitation is related to the sample size of each group: translators (n = 28), bilinguals (n = 29), and translation students (n = 7). Although there has been recent support towards smaller sample sizes (NAVARRO-TORRES *et al*., 2021), the general belief is still that we need larger sample sizes in order to find more reliable results, such as n > 30.

Furthermore, the translation students group had a significantly smaller size than the other two groups, and although a subgroup analysis was conducted to compare all three groups and try to minimize the effects of sample size, results may not be as informative or reliable as they could be if we had a larger sample size for this group.

Regarding population, our results and discussions support findings for a specific group: Brazilians who have English as their L2 and live in Brazil. Since we are discussing specific bilingual experiences, it seems natural that our results cannot be generalized to different populations and cultures, since they are likely to differ in important aspects, such as context of language use, which is essential for the discussion of results.

Furthermore, there are limitations regarding the tasks which were used – Written Production Task and Oral Production Task. First of all, the genre chosen for both production tasks was the narrative genre, due to it being a convenient genre to use with several participants with different backgrounds, as it does not require any previous specific knowledge or instruction (ALLEN, SNOW, MCNAMARA, 2016). However, this genre may not be the most appropriate while working with textual complexity: it usually requires simple vocabulary and structures, clashing with our aim for the linguistic analysis. And for thought organization analysis, it is possible that the narrative genre, especially in the written form, generates texts that are too centered on planning and on structure for differences to be found between groups. Since participants were required to write texts that could be considered to be on the larger size, it is possible this provided an advantage by allowing them to better connect their texts, thus not resulting in a clear difference between groups. Other studies could try to either replicate our task and compare results, try to use other genres or at least review our protocol and improve instructions.

For the oral task, our hypotheses were that no differences would be found between groups since translators' bilingual experience differentiates itself from other groups of bilinguals in the written modality, and our results mostly confirm such hypothesis. However, since tasks and analyses were equal for written and oral tasks, limitations can apply to both. Previous literature working with thought organization analysis through SpeechGraphs uses mainly oral reports (MOTA *et al*., 2012, 2014, 2016; LEANDRO, 2021), but our task was the first to use a cartoon strip with a blank frame to help generate narrative texts, which could have impacted participants' productions and resulted in texts that are not in the best format to be analyzed by SpeechGraphs attributes. Furthermore, our participants had more time to plan their narratives than in previous studies (LEANDRO, 2021) and more time to tell their narratives (MOTA *et al*. 2016, 2019). Both planning time and speaking time could have also helped

participants to better manipulate their narratives in order to produce them in a more organized and connected manner. For the syntactic complexity analysis, the count of T-Units proved to be more challenging than with written texts, as oral production is usually not linear and has more repetitions than the written form. Thus, using T-Units is possibly a limitation for analysis oral production (BULTÉ; ROOTHOOFT, 2020). As in written texts, further research could try to either replicate our task and compare results, try to use other genres, review our protocol – focusing on planning and speaking time, in addition to debating on what is the best method of analysis for linguistic aspects of oral texts.

Another important limitation is that SpeechGraphs attributes have usually been associated with other measures, such as cognitive ones (MOTA *et al*., 2016, 2019, LEANDRO, 2021), and our study did have such a comparison. A brief analysis for the correlation between T-Units and thought organization attributes were performed, but both our literature review and our discussion did not present sufficient information to understand how this comparison affects each variable and how it is related to the different bilingual experiences of our sample. Further analysis and future research could explore this aspect in more detail.

Despite its limitations, our study can contribute to a better understanding of different bilingual experiences and, more specifically, of translators' experience. As they are a group of bilinguals that differs from most, investigating translators can provide important and relevant results towards our understanding on how specific contexts can shape bilingual experience and how their linguistic aspects are affected as well – or if they are affected at all.

While trying to understand this experience, our study also tried to contribute to the discussion of written versus oral texts by investigating if the same group of participants show similar results in both modalities. In addition to contributing to a theoretical approach, our study could also have pedagogical implications, as discovering more about proficient bilinguals can help with teaching strategies for general L2 teaching and with specific training for translators.

In conclusion, this study tried to characterize and understand how translation experience presents itself in linguistic aspects and if this specific bilingual experience can be identified in their self-produced texts when compared to other groups of bilinguals. Hopefully, it was able to help with this understanding and helps further research to continue this investigation.

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ANNEX

ANNEX A – CARTOON STRIPS

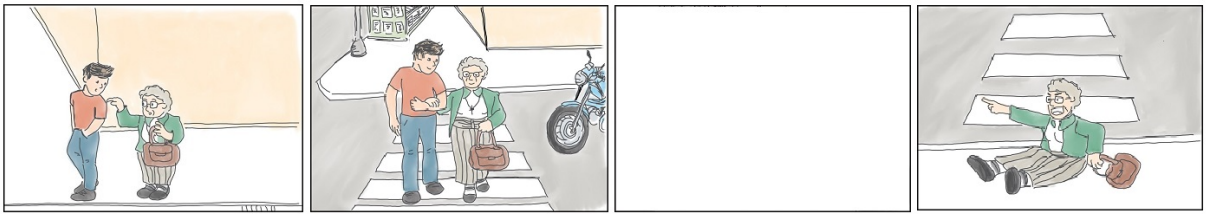

Figure 1 – Cartoon strip 1

Figure 2 – Cartoon strip 2

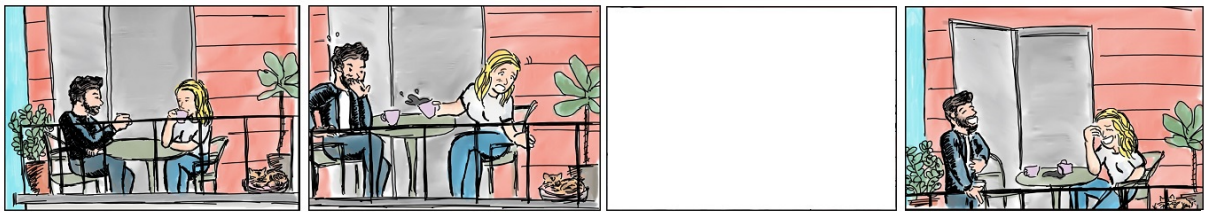

Figure 3 – Cartoon strip 3

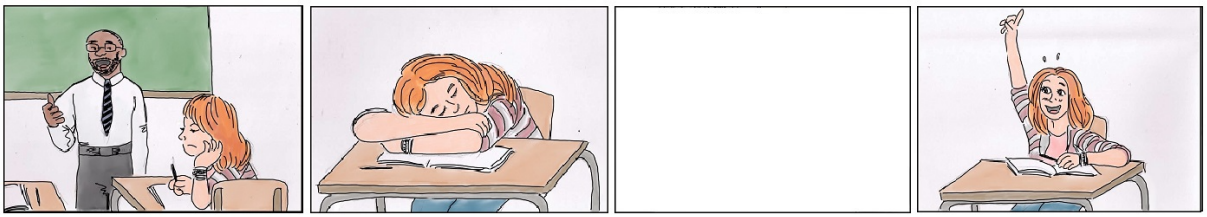

Figure 4 – Cartoon strip 4

ANNEX B – WRITTEN AND ORAL TEXTS BY PARTICIPANTS

Written English texts:

https://drive.google.com/drive/folders/10AoHtz8pXz_vOU3J3AfpQaIY0-eSJ5ZB

Written Portuguese texts:

https://drive.google.com/drive/folders/1-yhuA6Oln2SBX1nC_2r8WoE-swEVtuPu

Oral English texts:

https://drive.google.com/drive/folders/1X6A5U2VcS0bXhhtniMgHlEetMcraNdt5

Oral Portuguese texts:

https://drive.google.com/drive/folders/1QOIoH9gsZpRHEyV6TAobVI4XGh4gXgQM

ANNEX C – SEQUENCE OF LOGICAL IMAGES PILOT STUDY

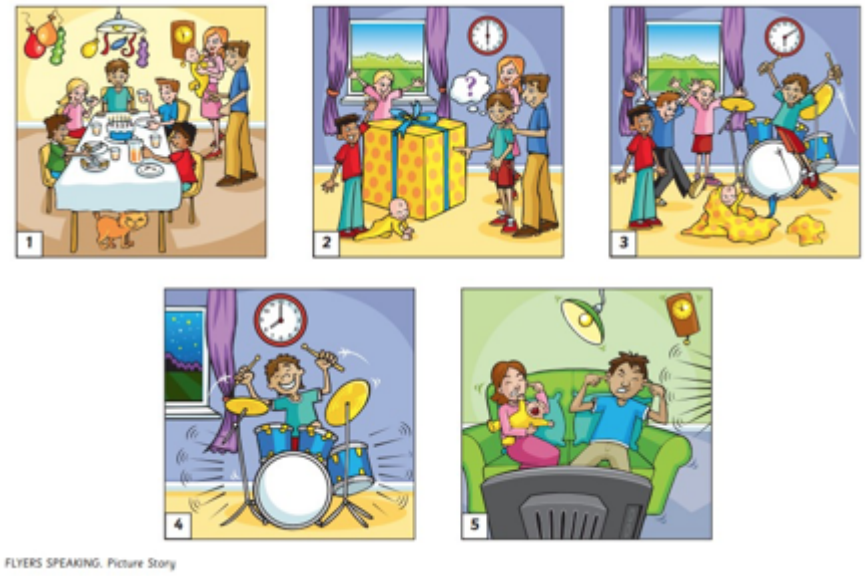

Figure 1 – Written Portuguese task

Figure 2 – Oral Portuguese task

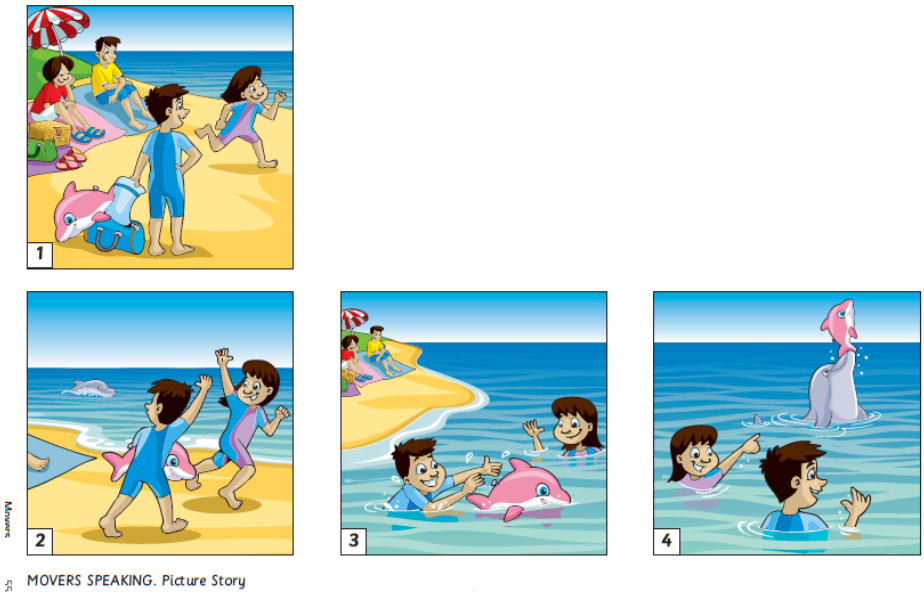

Figure 3 – Oral English task

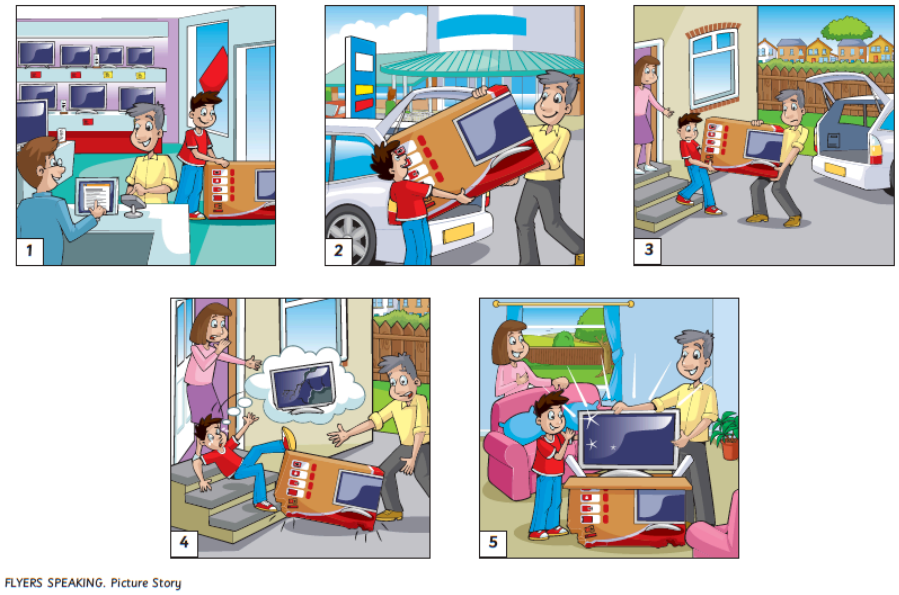

Figure 4 – Written English task

Source: CAMBRIDGE ENGLISH LANGUAGE ASSESSMENT. *Cambridge English First*: Young Learners English Tests.

APPENDIX

APPENDIX A – INFORMED CONSENT FORM

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
PROGRAMA DE PÓS-GRADUAÇÃO EM LETRAS
PESQUISADORA: Hannah dos Santos Kahn
PESQUISADORA RESPONSÁVEL: Profa. Dra. Ingrid Finger

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

O projeto de pesquisa **O papel da experiência tradutória na complexidade sintática e na organização do pensamento na produção escrita de tradutores português-inglês** insere-se nos estudos de Psicolinguística e tem como objetivo verificar a relação entre experiência tradutória e complexidade sintática e na organização de pensamento em textos escritos. Para tanto, analisará os dados de tradutores profissionais, estudantes de tradução do curso de Bacharelado em Letras da UFRGS com habilitação inglês-português e bilíngues português-inglês que não façam uso da língua escrita como parte da sua profissão e/ou trabalho.

Ao aceitar participar da pesquisa, você responderá um questionário online sobre sua experiência linguística e sua atividade acadêmica e profissional, e realizará duas breves tarefas de produção oral e duas breves tarefas de produção escrita. A realização dessas tarefas deve levar aproximadamente 40 minutos.

A identidade dos participantes será mantida em sigilo, conforme Resolução CNS 510/2016. Os resultados obtidos serão armazenados em um banco de dados para posterior análise e discussão. A previsão do armazenamento dos dados é de, no mínimo, 5 anos. Você poderá se beneficiar indiretamente da pesquisa ao responder ao questionário, momento que poderá proporcionar melhor autoconhecimento para você quanto às suas habilidades metalinguísticas. Você também poderá se beneficiar indiretamente da pesquisa como um todo, pois acreditamos que sua participação no estudo possa ajudar a ampliar nossa compreensão da realidade cognitiva específica do bilinguismo no contexto da tradução, o que será útil para as pesquisas nas áreas da Psicolinguística e dos Estudos da Tradução e para a pesquisa brasileira como um todo. Quanto aos riscos, a participação na pesquisa não deve ocasionar nenhum dano moral aos participantes; no entanto, pode ocasionar cansaço mental ao realizar as tarefas ou ao responder o questionário. Esses riscos, caso se concretizem, são de caráter passageiro, e não

permanente. Para minimizar os riscos, será indicado que os participantes informem a pesquisadora e façam uma pequena pausa, e, se necessário, poderão interromper a coleta de dados a qualquer momento, sem qualquer prejuízo. Também há um risco de quebra de sigilo do e-mail e das respostas fornecidas no questionário, visto que a pesquisa conta com o uso do Google Forms, uma plataforma online. Para minimizar esse risco, após o fim do preenchimento e realização das tarefas pelos participantes, a pesquisadora irá baixar todos os dados coletados para o seu computador, protegido por senha e de acesso exclusivo, e apagar os arquivos das plataformas do Google.

O projeto foi avaliado pelo CEP-UFRGS, órgão colegiado, de caráter consultivo, deliberativo e educativo, cuja finalidade é avaliar – emitir parecer e acompanhar os projetos de pesquisa envolvendo seres humanos, em seus aspectos éticos e metodológicos, realizados no âmbito da instituição.

A pesquisadora responsável por este projeto de pesquisa é a professora Dra. Ingrid Finger (ingrid.finger@ufrgs.br, telefone institucional: 51-3308.6704; endereço institucional: gabinete nº 220 do Prédio Administrativo do Instituto de Letras do Campus do Vale da UFRGS). Quaisquer dúvidas podem ser sanadas junto à mestranda Hannah dos Santos Kahn (hannah.kahn95@gmail.com, fone: 51-99114.6933) ou junto ao Comitê de Ética em Pesquisa da UFRGS (CEP/UFRGS: 51-3308.3738, horário de atendimento: segunda a sexta, das 08h30 às 12h30 e das 13h30 às 17h30).

Ao concordar com o presente Termo de Consentimento Livre e Esclarecido, você declara que autoriza sua participação nesta pesquisa, e que foi informado(a), de forma clara e detalhada, livre de qualquer forma de constrangimento e coerção, dos objetivos e justificativa desta pesquisa, dos procedimentos a que será submetido(a), dos riscos, desconfortos e benefícios e de informações sobre as tarefas que realizará, e que pode retirar seu consentimento, a qualquer momento, e deixar de participar do estudo, sem justificativa, sem que isso traga prejuízo, todos acima listados.

E-mail:

_____

Você aceita participar da pesquisa?

- Aceito participar
- Não aceito participar

APPENDIX B – INVITATION FOR TRANSLATORS

CONVITE PARA PARTICIPAÇÃO EM PESQUISA

Você está sendo convidado(a) a participar da pesquisa **O papel da experiência tradutória na complexidade sintática e na organização do pensamento na produção escrita de tradutores português-inglês**. Esta investigação insere-se nos estudos de Psicolinguística e tem como **objetivo** verificar a relação entre experiência tradutória e complexidade sintática e organização de pensamento em textos escritos.

Para participar, **você deve ser tradutor** freelance (com carga horária mensal de tradução de pelo menos 120h) ou CLT no **par inglês-português**, ter mais de 18 anos E ter o português brasileiro como língua materna. Você será convidado(a) a responder a um questionário em formato online sobre sua experiência linguística e tradutória, a realizar uma breve tarefa de produção oral e uma breve tarefa de produção escrita. A coleta é individual e ocorrerá toda de forma online, com o questionário sendo respondido através de Google Forms e as tarefas sendo realizadas em uma chamada de vídeo junto à pesquisadora na plataforma Zoom, que será agendada conforme sua disponibilidade.

Para participar desta pesquisa, você deverá **autorizar e assinar um Termo de Consentimento Livre e Esclarecido**. O consentimento pode ser retirado a qualquer momento. A sua participação é **voluntária**, por isso você não terá nenhum custo, nem receberá qualquer vantagem financeira.

A participação na pesquisa não ocasionará nenhum dano físico ou moral, sendo a duração das atividades, aproximadamente de 40 minutos, uma possível inconveniência. Também há um risco de quebra de sigilo do e-mail e das respostas dos participantes, visto que a pesquisa conta com o uso do Google Forms, uma plataforma online. Para minimizar esse risco, após o fim do preenchimento e realização das tarefas pelos participantes, a pesquisadora irá baixar todos os dados coletados para o seu computador, protegido por senha e de acesso exclusivo, e apagar os arquivos das plataformas do Google. Você pode não se beneficiar diretamente desta pesquisa; no entanto, acreditamos que sua participação no estudo possa ajudar a ampliar nossa compreensão da realidade cognitiva específica do bilinguismo no contexto de tradução, o que pode ser útil na formação de tradutores no futuro.

A sua identidade será mantida em sigilo, conforme a Resolução CNS 510/2016. Os resultados obtidos serão armazenados em um banco de dados para posterior análise e discussão. A pesquisadora responsável por este projeto de pesquisa é a professora Dra. Ingrid Finger

(ingrid.finger@ufrgs.br, telefone institucional: 51-3308.6704; endereço institucional: gabinete nº 220 do Prédio Administrativo do Instituto de Letras do Campus do Vale da UFRGS). Quaisquer dúvidas podem ser sanadas junto à mestranda Hannah dos Santos Kahn (hannah.kahn95@gmail.com, fone: 51-99114.6933) ou junto ao Comitê de Ética em Pesquisa da UFRGS (CEP/UFRGS: 51-3308.3738, horário de atendimento: segunda a sexta, das 08h30 às 12h30 e das 13h30 às 17h30).

Agradeço imensamente por sua atenção.

Hannah dos Santos Kahn

APPENDIX C – INVITATION FOR TRANSLATION STUDENTS

CONVITE PARA PARTICIPAÇÃO EM PESQUISA

Você está sendo convidado(a) a participar da pesquisa **O papel da experiência tradutória na complexidade sintática e na organização do pensamento na produção escrita de tradutores português-inglês**. Esta investigação insere-se nos estudos de Psicolinguística e tem como **objetivo** verificar a relação entre experiência tradutória e complexidade sintática e organização de pensamento em textos escritos.

Para participar, **você deve ser aluno(a) do Bacharelado em Letras com Habilitação Tradutor Inglês-Português** e estar pelo menos no **quarto semestre**, possuir **nível avançado** de proficiência em inglês, ter mais de 18 anos E ter o português brasileiro como língua materna. Você será convidado(a) a responder a um questionário em formato online sobre sua experiência linguística e tradutória, a realizar uma breve tarefa de produção oral e uma breve tarefa de produção escrita. A coleta é individual e ocorrerá toda de forma online, com o questionário sendo respondido através de Google Forms e as tarefas sendo realizadas em uma chamada de vídeo junto à pesquisadora na plataforma Zoom, que será agendada conforme sua disponibilidade.

Para participar desta pesquisa, você deverá **autorizar e assinar um Termo de Consentimento Livre e Esclarecido**. O consentimento pode ser retirado a qualquer momento. A sua participação é **voluntária**, por isso você não terá nenhum custo, nem receberá qualquer vantagem financeira.

A participação na pesquisa não ocasionará nenhum dano físico ou moral, sendo a duração das atividades, aproximadamente de 40 minutos, uma possível inconveniência. Também há um risco de quebra de sigilo do e-mail e das respostas dos participantes, visto que a pesquisa conta com o uso do Google Forms, uma plataforma online. Para minimizar esse risco, após o fim do preenchimento e realização das tarefas pelos participantes, a pesquisadora irá baixar todos os dados coletados para o seu computador, protegido por senha e de acesso exclusivo, e apagar os arquivos das plataformas do Google. Você pode não se beneficiar diretamente desta pesquisa; no entanto, acreditamos que sua participação no estudo possa ajudar a ampliar nossa compreensão da realidade cognitiva específica do bilinguismo no contexto de tradução, o que pode ser útil na formação de tradutores no futuro.

A sua identidade será mantida em sigilo, conforme a Resolução CNS 510/2016. Os resultados obtidos serão armazenados em um banco de dados para posterior análise e discussão.

A pesquisadora responsável por este projeto de pesquisa é a professora Dra. Ingrid Finger (ingrid.finger@ufrgs.br, telefone institucional: 51-3308.6704; endereço institucional: gabinete nº 220 do Prédio Administrativo do Instituto de Letras do Campus do Vale da UFRGS). Quaisquer dúvidas podem ser sanadas junto à mestranda Hannah dos Santos Kahn (hannah.kahn95@gmail.com, fone: 51-99114.6933) ou junto ao Comitê de Ética em Pesquisa da UFRGS (CEP/UFRGS: 51-3308.3738, horário de atendimento: segunda a sexta, das 08h30 às 12h30 e das 13h30 às 17h30).

Agradeço imensamente por sua atenção.

Hannah dos Santos Kahn

APPENDIX D – INVITATION FOR BILINGUALS

CONVITE PARA PARTICIPAÇÃO EM PESQUISA

Você está sendo convidado(a) a participar da pesquisa **O papel da experiência tradutória na complexidade sintática e na organização do pensamento na produção escrita de tradutores português-inglês**. Esta investigação insere-se nos estudos de Psicolinguística e tem como **objetivo** verificar a relação entre experiência tradutória e complexidade sintática e organização de pensamento em textos escritos.

Para participar, **você deve ser bilíngue** no **par português-inglês** e possuir **nível avançado** de proficiência em inglês, ter cursado ou estar cursando ensino superior, **não fazer uso direto da língua escrita em seu trabalho e/ou profissão**, ter mais de 18 anos E ter o português brasileiro como língua materna. Você será convidado(a) a responder a um questionário em formato online sobre sua experiência linguística e tradutória, a realizar uma breve tarefa de produção oral e uma breve tarefa de produção escrita. A coleta é individual e ocorrerá toda de forma online, com o questionário sendo respondido através de Google Forms e as tarefas sendo realizadas em uma chamada de vídeo junto à pesquisadora na plataforma Zoom, que será agendada conforme sua disponibilidade.

Para participar desta pesquisa, você deverá **autorizar e assinar um Termo de Consentimento Livre e Esclarecido**. O consentimento pode ser retirado a qualquer momento. A sua participação é **voluntária**, por isso você não terá nenhum custo, nem receberá qualquer vantagem financeira.

A participação na pesquisa não ocasionará nenhum dano físico ou moral, sendo a duração das atividades, aproximadamente de 40 minutos, uma possível inconveniência. Também há um risco de quebra de sigilo do e-mail e das respostas dos participantes, visto que a pesquisa conta com o uso do Google Forms, uma plataforma online. Para minimizar esse risco, após o fim do preenchimento e realização das tarefas pelos participantes, a pesquisadora irá baixar todos os dados coletados para o seu computador, protegido por senha e de acesso exclusivo, e apagar os arquivos das plataformas do Google. Você pode não se beneficiar diretamente desta pesquisa; no entanto, acreditamos que sua participação no estudo possa ajudar a ampliar nossa compreensão da realidade cognitiva específica do bilinguismo no contexto de tradução, o que pode ser útil na formação de tradutores no futuro.

A sua identidade será mantida em sigilo, conforme a Resolução CNS 510/2016. Os resultados obtidos serão armazenados em um banco de dados para posterior análise e discussão.

A pesquisadora responsável por este projeto de pesquisa é a professora Dra. Ingrid Finger (ingrid.finger@ufrgs.br, telefone institucional: 51-3308.6704; endereço institucional: gabinete nº 220 do Prédio Administrativo do Instituto de Letras do Campus do Vale da UFRGS). Quaisquer dúvidas podem ser sanadas junto à mestranda Hannah dos Santos Kahn (hannah.kahn95@gmail.com, fone: 51-99114.6933) ou junto ao Comitê de Ética em Pesquisa da UFRGS (CEP/UFRGS: 51-3308.3738, horário de atendimento: segunda a sexta, das 08h30 às 12h30 e das 13h30 às 17h30).

Agradeço imensamente por sua atenção.

Hannah dos Santos Kahn

APPENDIX E – INVITATION FOR FACEBOOK GROUPS MODERATORS

APÊNDICE E – Texto de convite à participação de tradutores profissionais

Texto a ser enviado por mensagem pessoal aos moderadores dos grupos do Facebook, conforme o item 5.2 do projeto de pesquisa:

Olá, meu nome é Hannah Kahn, sou tradutora formada pela Universidade Federal do Rio Grande do Sul (UFRGS) e estou fazendo mestrado em Psicolinguística, também pela UFRGS.

Tenho acompanhado as publicações do grupo e valorizo as contribuições que trazem para a nossa formação e aprendizado contínuos como tradutores. Assim, gostaria de publicar um convite no grupo para que os outros integrantes possam fazer parte da minha pesquisa como participantes.

Veja em anexo o convite oficial aos moderadores do grupo.

Agradeço muito pela atenção!

Convite oficial anexado à mensagem no Facebook, conforme o item 5.2 do projeto de pesquisa:

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
PROGRAMA DE PÓS-GRADUAÇÃO EM LETRAS
PESQUISADORA: Hannah dos Santos Kahn
PESQUISADORA RESPONSÁVEL: Profa. Dra. Ingrid Finger

CONVITE AOS MODERADORES DE GRUPOS DE TRADUTORES NO FACEBOOK

Você, enquanto moderador do grupo [COLOCAR NOME DO GRUPO NO FACEBOOK, CONFORME O ITEM 5.2 DO PROJETO DE PESQUISA] está sendo convidado(a) a avaliar a publicação de um convite de participação na pesquisa **O papel da experiência tradutória na complexidade sintática e na organização do pensamento na produção escrita de tradutores português-inglês**. Esta investigação insere-se nos estudos de

psicolinguística e tem como **objetivo** verificar a relação entre experiência tradutória e complexidade sintática e na organização de pensamento em textos escritos.

As pesquisadoras do estudo gostariam de publicar o convite no grupo supramencionado porque os membros do grupo se encaixam no perfil de participantes visado, quais sejam: **tradutores** freelance ou CLT no **par inglês-português** E com o português brasileiro como língua materna.

Para que você, enquanto moderador do grupo, possa dar sua resposta de maneira segura, esclarecemos abaixo informações importantes da pesquisa, que constarão na publicação de convite, caso ela seja autorizada por você.

Os participantes serão convidados a responder a um questionário sobre sua experiência linguística e tradutória e a realizar uma tarefa de produção oral e uma tarefa de produção escrita.

A coleta será individual e ocorrerá toda de forma online, através de Google Forms e de uma chamada de vídeo junto à pesquisadora, a ser marcada conforme disponibilidade dos participantes.

Para participar desta pesquisa, o participante deverá **autorizar e assinar um Termo de Consentimento Livre e Esclarecido**. O consentimento poderá ser retirado a qualquer momento, sem nenhum prejuízo.

A participação é **voluntária**, por isso o participante não terá nenhum custo, nem receberá qualquer vantagem financeira.

A identidade dos participantes será mantida em sigilo, conforme Resolução CNS 510/2016. Os resultados obtidos serão armazenados em um banco de dados para posterior análise e discussão. A previsão do armazenamento dos dados é de, no mínimo, 5 anos.

Os participantes poderão se beneficiar indiretamente da pesquisa ao responderem ao questionário, momento que poderá proporcionar melhor autoconhecimento para você quanto às suas habilidades metalinguísticas, e ao realizar as tarefas de funções executivas, momento em que você poderá se tornar mais consciente de suas habilidades nessas funções. Os participantes também poderão se beneficiar indiretamente da pesquisa como um todo, pois acreditamos que a participação no estudo possa ajudar a ampliar nossa compreensão da realidade cognitiva específica do bilinguismo no contexto da tradução, o que será útil para as pesquisas nas áreas da Psicolinguística e dos Estudos da Tradução e para a pesquisa brasileira como um todo. Quanto aos riscos, a participação na pesquisa não deve ocasionar nenhum dano moral aos participantes, no entanto, pode ocasionar cansaço mental ao realizar as tarefas ou ao responder o questionário. Esses riscos, caso se concretizem, são de caráter passageiro, e não permanente. Para minimizar os riscos, será indicado que os participantes informem a pesquisadora e façam

uma pequena pausa, e, se necessário, poderão interromper a coleta de dados a qualquer momento, sem qualquer prejuízo. Também há um risco de quebra de sigilo do e-mail e das respostas fornecidas no questionário, visto que a pesquisa conta com o uso do Google Forms, uma plataforma online. Para minimizar esse risco, após o fim do preenchimento e realização das tarefas pelos participantes, a pesquisadora irá baixar todos os dados coletados para o seu computador, protegido por senha e de acesso exclusivo, e apagar os arquivos das plataformas do Google.

A pesquisadora responsável por este projeto de pesquisa é a professora Dra. Ingrid Finger (ingrid.finger@ufrgs.br, telefone institucional: 51-3308.6704; endereço institucional: gabinete nº 220 do Prédio Administrativo do Instituto de Letras do Campus do Vale da UFRGS). Quaisquer dúvidas podem ser sanadas junto à mestranda Hannah dos Santos Kahn (hannah.kahn95@gmail.com, fone: 51-99114.6933) ou junto ao Comitê de Ética em Pesquisa da UFRGS (CEP/UFRGS: 51-3308.3738, horário de atendimento: segunda a sexta, das 08h30 às 12h30 e das 13h30 às 17h30).

Agradeço imensamente por sua atenção.
Hannah dos Santos Kahn

APPENDIX F – LANGUAGE HISTORY AND TRANSLATION ACTIVITY QUESTIONNAIRE

Questionnaire link: https://forms.gle/bET6CtwTXu1CdLAf9

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
PROGRAMA DE PÓS-GRADUAÇÃO EM LETRAS
PESQUISADORA: Hannah dos Santos Kahn
PESQUISADORA RESPONSÁVEL: Profa. Dra. Ingrid Finger

Participante n° _____

Questionário de Histórico de Linguagem e Atividade Tradutória

Parte 1 – Histórico da Linguagem

Sexo: ☐ Feminino ☐ Masculino ☐ Prefiro não me identificar ☐ Outro: _____

Idade: __ anos e __ meses

Cidade e estado de nascimento:

☐ Porto Alegre – RS ☐ Viamão – RS ☐ Canoas – RS ☐ São Leopoldo – RS ☐ Gravataí – RS

☐ Novo Hamburgo – RS ☐ Cachoeirinha – RS ☐ Outro: _____

Cidade em que reside:

☐ Porto Alegre – RS ☐ Viamão – RS ☐ Canoas – RS ☐ São Leopoldo – RS ☐ Gravataí – RS

☐ Novo Hamburgo – RS ☐ Cachoeirinha – RS ☐ Outro: _____

E-mail: _____

1. Liste todas as línguas que você conhece na ordem em que foram adquiridas:

Língua 1 (língua materna):

Língua 2:

Língua 3:

Língua 4:

2. Informe a idade em que você:

Começou a aprender inglês:

Começou a utilizar inglês ativamente:

Tornou-se fluente em inglês:

3. Indique onde você aprendeu inglês (marque tantas opções quantas forem necessárias):

Inglês

☐ Casa
☐ Escola
☐ Curso de línguas
☐ Sozinho – ouvindo música
☐ Sozinho – jogando videogame
☐ Sozinho – usando a internet em geral
☐ Sozinho – lendo leituras gerais
☐ Sozinho – assistindo TV, séries e/ou filmes
☐ Sozinho – estudando com livros didáticos
☐ Sozinho – Interagindo com alguém que falava a língua
☐ Outro _____

4. Indique o quanto estes fatores contribuem para o desenvolvimento da sua proficiência em <u>inglês</u>:

	Não contribuiu	**Contribui pouco**	**Contribui em boa medida**	**É essencial**
Interagir com a família	☐	☐	☐	☐
Interagir com os amigos	☐	☐	☐	☐
Ler textos acadêmicos	☐	☐	☐	☐
Ler leituras em geral	☐	☐	☐	☐
Assistir TV, filmes, séries, Youtube e outros vídeos	☐	☐	☐	☐
Ouvir rádio, música ou podcasts	☐	☐	☐	☐
Usar a internet (sites, aplicativos)	☐	☐	☐	☐

Curso de línguas	☐	☐	☐	☐
Jogar videogame	☐	☐	☐	☐
Outro _____	☐	☐	☐	☐

5. Você já morou em outro país que não fosse o Brasil?

☐ Sim Em qual(is) país(íses) e por quanto tempo (anos/meses)?

☐ Não

6. Marque com um X em que língua você realiza estas atividades <u>atualmente</u> e circule o número correspondente à frequência com que elas acontecem:

1 = algumas vezes por ano **2** = uma vez por mês **3 =** uma vez a cada duas semanas

4 = uma vez por semana **5** = mais de uma vez por semana **6 =** diariamente

	Português	**Frequência**	**Inglês**	**Frequência**
Falar com sua família		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Falar com amigos		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Falar no trabalho/faculdade		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Ler/escrever no trabalho/faculdade		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Ler (livros, revistas, jornais...)		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Ler (textos acadêmicos)		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Escrever em geral (e-mails, mensagens, chats, diário, agenda...)		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Assistir TV, filmes, séries, Youtube e outros vídeos		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Ouvir música, podcasts e outros áudios		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Jogar videogames e usar aplicativos		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Falar (conversas, apresentações...)		**1 2 3 4 5 6**		**1 2 3 4 5 6**

7. Marque com um X seu nível de proficiência em cada habilidade em <u>inglês</u>:

	Muito baixo	**Baixo**	**Razoável**	**Bom**	**Muito bom**	**Fluente**	**Proficiente**
Leitura	☐	☐	☐	☐	☐	☐	☐
Escrita	☐	☐	☐	☐	☐	☐	☐
Produção oral	☐	☐	☐	☐	☐	☐	☐
Compreensão oral	☐	☐	☐	☐	☐	☐	☐

8. Caso você já tenha realizado algum teste de proficiência em <u>inglês</u>, indique:

Teste	**Ano**	**Conceito/pontuação aproximada**

Parte 2 – Atividade tradutória

9. Você recebeu formação acadêmica? Marque quantas opções forem necessárias.

☐ Graduação em Letras – Bacharelado

☐ Graduação em Letras – Outra

☐ Graduação em Letras – Bacharelado em andamento

☐ Graduação em outro curso – concluída

☐ Graduação em outro curso – em andamento

☐ Especialização em Tradução

☐ Curso Livre em tradução

☐ Ensino Técnico

10. Indique <u>qual</u> a graduação, especialização, curso ou ensino técnico que você fez, de acordo com a resposta à pergunta anterior, e qual o <u>ano de conclusão/semestre</u> ou ano/semestre esperado de conclusão:

_____

11. Se você ainda está cursando Bacharelado, quais cadeiras de tradução e versão você já cursou?

☐ Tradução I

☐ Tradução II

☐ Tradução III

☐ Versão I

☐ Versão II

☐ Versão III

☐ Nenhuma

☐ Não estou cursando Bacharelado no momento

12. Há quanto tempo você traduz como atividade profissional?

__ anos e __ meses

☐ Não traduzo como atividade profissional

13. Marque com um X o que indica suas formas de trabalho e o tempo, podendo marcar quantas forem necessárias:

		Tempo (anos e meses)
Já trabalhou em empresas de tradução		
Trabalha em empresa de tradução		
Trabalha como freelancer		
Nunca trabalhei com tradução		

14. Se você trabalha como freelancer, quantas horas semanais, em média, você trabalha traduzindo? __ horas

15. Qual foi a última vez que você traduziu como atividade profissional?

☐ Há alguns dias

☐ Na última semana

☐ Há algumas semanas

☐ Há um mês

☐ Entre um mês e meio e seis meses

☐ Entre seis meses e um ano

☐ Mais de um ano

☐ Nunca traduzi como atividade profissional

16. Há quanto tempo você trabalha/trabalhou em uma empresa de tradução?

☐ Trabalho atualmente

☐ Deixei de trabalhar entre um e seis meses atrás

☐ Deixei de trabalhar entre sete meses e um ano atrás

☐ Deixei de trabalhar há mais de um ano

☐ Nunca trabalhei em empresa de tradução

17. Você trabalha com frequência com outras atividades? Indique há quanto tempo.

☐ Revisão

☐ Interpretação

☐ Professor(a) de idiomas

☐ Professor(a) de redação

☐ Correção de redações

☐ Outro: _____

18. Ferramentas habituais de trabalho (marque todas que você utiliza diariamente para traduzir)**:**

☐ PC/notebook

☐ Internet (glossários e dicionários bilíngues)

☐ Internet (*corpora*)

☐ Internet (mecanismos de pesquisa)

☐ Obras de referência (dicionários monolíngues, dicionários de regência, gramáticas etc.)

☐ Ferramentas de auxílio à tradução (SDL Trados Studio, Wordfast, XTM, Smartling etc.)

☐ Não traduzo como atividade ainda

19. Você sente necessidade de revisar e atualizar seus conhecimentos sobre as regras gramáticas, sintáticas e de regência do português e do inglês com frequência?

☐ Sim, do português e do inglês

☐ Sim, apenas do português

☐ Sim, apenas do inglês

☐ Não, não sinto que faça diferença no meu trabalho ou na minha formação

20. Que tipo de texto você mais traduz? Escolha até **duas** opções para **cada** direção.

	Inglês para português	**Português para inglês**
Literário (romances, contos, ensaios etc.)	☐	☐
Científico (médico, químico, acadêmico etc.)	☐	☐
Publicidade (panfletos, anúncios etc.)	☐	☐
Audiovisual (dublagem, legendagem etc.)	☐	☐
Econômico (relatórios, orçamentos etc.)	☐	☐
Técnico (TI, engenharia etc.)	☐	☐
Jurídico (documentos legais etc.)	☐	☐
Negócios (cartas, termos etc.)	☐	☐
Juramentado (diversos documentos)	☐	☐

21. Você prefere traduzir:

☐ inglês – português (tradução)

☐ português – inglês (versão)

22. Explique, brevemente, o motivo da sua preferência em traduzir inglês – português ou português – inglês:

_____

23. O que você considera <u>fundamental</u> para conseguir escrever textos com alta qualidade sintática, lexical, e de organização, tanto em português quanto em inglês? Marque quantas opções julgar necessárias.

☐ Vocabulário rico

☐ Conhecimento de regras ortográficas

☐ Conhecimento de regras sintáticas

☐ Conhecimento de regras de pontuação

☐ Fluência na língua

☐ Escrever com frequência

☐ Ler com frequência

☐ Conhecimento sobre o tema do texto a ser escrito

☐ Outro: _____

APPENDIX G – LANGUAGE HISTORY AND PROFESSIONAL ACTIVITY QUESTIONNAIRE

Questionnaire link: https://forms.gle/C37nvXRjrqrMJTLNA

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
PROGRAMA DE PÓS-GRADUAÇÃO EM LETRAS
PESQUISADORA: Hannah dos Santos Kahn
PESQUISADORA RESPONSÁVEL: Profa. Dra. Ingrid Finger

Participante n° _____

Questionário de Histórico de Linguagem e Atividade Profissional

Parte 1 – Histórico da Linguagem

Sexo: ☐ Feminino ☐ Masculino ☐ Prefiro não me identificar ☐ Outro: _____

Idade: __ anos e __ meses

Cidade e estado de nascimento:

☐ Porto Alegre – RS ☐ Viamão – RS ☐ Canoas – RS ☐ São Leopoldo – RS ☐ Gravataí – RS

☐ Novo Hamburgo – RS ☐ Cachoeirinha – RS ☐ Outro: _____

Cidade em que reside:

☐ Porto Alegre – RS ☐ Viamão – RS ☐ Canoas – RS ☐ São Leopoldo – RS ☐ Gravataí – RS

☐ Novo Hamburgo – RS ☐ Cachoeirinha – RS ☐ Outro: _____

E-mail: _____

1. Liste todas as línguas que você conhece na ordem em que foram adquiridas:

Língua 1 (língua materna):

Língua 2:

Língua 3:

Língua 4:

2. Informe a idade em que você:

Começou a aprender inglês:

Começou a utilizar inglês ativamente:

Tornou-se fluente em inglês:

3. Indique onde você aprendeu inglês (marque tantas opções quantas forem necessárias):

Inglês

☐ Casa
☐ Escola
☐ Curso de línguas
☐ Sozinho – ouvindo música
☐ Sozinho – jogando videogame
☐ Sozinho – usando a internet em geral
☐ Sozinho – lendo leituras gerais
☐ Sozinho – assistindo TV, séries e/ou filmes
☐ Sozinho – estudando com livros didáticos
☐ Sozinho – Interagindo com alguém que falava a língua
☐ Outro _____

4. Indique o quanto estes fatores contribuem para o desenvolvimento da sua proficiência em <u>inglês</u>:

	Não contribuiu	**Contribui pouco**	**Contribui em boa medida**	**É essencial**
Interagir com a família	☐	☐	☐	☐
Interagir com os amigos	☐	☐	☐	☐
Ler textos acadêmicos	☐	☐	☐	☐
Ler leituras em geral	☐	☐	☐	☐
Assistir TV, filmes, séries, Youtube e outros vídeos	☐	☐	☐	☐
Ouvir rádio, música ou podcasts	☐	☐	☐	☐
Usar a internet (sites, aplicativos)	☐	☐	☐	☐
Curso de línguas	☐	☐	☐	☐

Jogar videogame	☐	☐	☐	☐
Outro _____	☐	☐	☐	☐

5. Você já morou em outro país que não fosse o Brasil?

☐ Sim Em qual(is) país(íses) e por quanto tempo (anos/meses)?

☐ Não

6. Marque com um X em que língua você realiza estas atividades <u>atualmente</u> e circule o número correspondente à frequência com que elas acontecem:

1 = algumas vezes por ano **2** = uma vez por mês **3 =** uma vez a cada duas semanas

4 = uma vez por semana **5** = mais de uma vez por semana **6 =** diariamente

	Português	**Frequência**	**Inglês**	**Frequência**
Falar com sua família		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Falar com amigos		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Falar no trabalho/faculdade		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Ler/escrever no trabalho/faculdade		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Ler (livros, revistas, jornais...)		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Ler (textos acadêmicos)		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Escrever em geral (e-mails, mensagens, chats, diário, agenda...)		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Assistir TV, filmes, séries, Youtube e outros vídeos		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Ouvir música, podcasts e outros áudios		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Jogar videogames e usar aplicativos		**1 2 3 4 5 6**		**1 2 3 4 5 6**
Falar (conversas, apresentações...)		**1 2 3 4 5 6**		**1 2 3 4 5 6**

7. Marque com um X seu nível de proficiência em cada habilidade em <u>inglês</u>:

	Muito baixo	Baixo	Razoável	Bom	Muito bom	Fluente	Proficiente
Leitura	☐	☐	☐	☐	☐	☐	☐
Escrita	☐	☐	☐	☐	☐	☐	☐
Produção oral	☐	☐	☐	☐	☐	☐	☐
Compreensão oral	☐	☐	☐	☐	☐	☐	☐

9. Caso você já tenha realizado algum teste de proficiência em inglês, indique:

Teste	Ano	Conceito/pontuação aproximada

Parte 2 – Atividade profissional

10. Qual seu curso de formação? Indique se o curso foi finalizado ou se está em andamento e o ano/semestre em que o finalizou ou em que espera terminar. Ex.: Graduação em Arquitetura - Finalizada em 2017/02. / Graduação em Arquitetura - Em andamento, término previsto para 2021/02.

_____

11. Qual a sua principal atividade de trabalho? _____

12. Descreva brevemente que tipo de atividades você realiza em seu trabalho:

_____

_____

_____

_____

13. Você já trabalhou com alguma atividade que envolva idiomas?

☐ Tradução

☐ Revisão

☐ Interpretação

☐ Professor(a) de línguas ou redação

☐ Corretor de redação

☐ Não, nunca trabalhei com nada relacionado a idiomas

☐ Outro _____

14. Se você marcou que já trabalho com alguma atividade que envolva idiomas, por quanto tempo?

☐ Menos de um mês

☐ Entre um mês e seis meses

☐ Entre seis meses e um ano

☐ Mais de um ano

☐ Ainda trabalho com essa atividade

☐ Nunca trabalhei com nada relacionado a idiomas

15. Descreva em que medida você desempenha atividades que envolvam a prática da forma escrita da língua atualmente na sua atividade, seja ela acadêmica ou profissional.

_____

16. Você costuma escrever textos (com mínimo de meia página) com frequência?

☐ Sim, em português e inglês

☐ Sim, em português

☐ Sim, em inglês

☐ Não costumo escrever textos

17. Você costuma ler com frequência?

☐ Sim, livros em geral

☐ Sim, artigos ou outros textos científicos

☐ Sim, sites e/ou matérias de jornal

☐ Não costumo ler

18. Você considera que tem um bom conhecimento sobre as regras do português e do inglês?

☐ Sim, do português e inglês

☐ Sim, do português

☐ Sim, do inglês

☐ Não considero que tenho um bom conhecimento

19. O que você considera <u>fundamental</u> para conseguir escrever textos com alta qualidade sintática, lexical, e de organização, tanto em português quanto em inglês? Marque quantas opções julgar necessárias.

☐ Vocabulário rico

☐ Conhecimento de regras ortográficas

☐ Conhecimento de regras sintáticas

☐ Conhecimento de regras de pontuação

☐ Fluência na língua

☐ Escrever com frequência

☐ Ler com frequência

☐ Conhecimento sobre o tema do texto a ser escrito

☐ Outro: _____

APPENDIX H – INVITATION PILOT STUDY

CONVITE PARA PARTICIPAÇÃO EM PESQUISA

Boa tarde, tudo bem?

Me chamo Hannah Kahn e sou mestranda da Universidade Federal do Rio Grande do Sul na linha de pesquisa Psicolinguística. Atualmente, estou realizando um estudo chamado "**O papel da experiência tradutória na complexidade sintática e na organização do pensamento na produção escrita de tradutores português-inglês**", que tem como objetivo verificar a relação entre experiência tradutória e complexidade sintática e organização de pensamento em textos escritos, e estou buscando tradutores profissionais, tradutores em formação e bilíngues para realizar este estudo.

Dessa forma, venho, através deste e-mail, convidá-lo(a) a participar do meu estudo. Para participar, você deverá realizar duas tarefas de produção oral e duas tarefas de produção escrita, além de responder um questionário sobre histórico da linguagem e atividade tradutória ou profissional. A participação ocorrerá toda de forma online: você responderá o questionário através de um Google Forms e as tarefas de produção oral e escrita serão realizadas junto comigo, através de um encontro marcado pelo Zoom. Antes de iniciar as tarefas, você deverá ler e aceitar o Termo de Consentimento Livre e Esclarecido, que explica com todos os detalhes o objetivo da pesquisa, as etapas e outros tópicos importantes, e que será apresentado como a primeira etapa do questionário que você deverá preencher. Além disso, você pode se retirar da pesquisa a qualquer momento, sem que ocorra qualquer prejuízo.

Caso tenha interesse em participar do meu estudo, peço que responda este e-mail para que possamos tirar possíveis dúvidas e combinar uma data para realizar as tarefas. Sua contribuição será muito importante!

Atenciosamente,
Hannah Kahn

APPENDIX I – INFORMED CONSENT FORM PILOT STUDY

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
PROGRAMA DE PÓS-GRADUAÇÃO EM LETRAS
PESQUISADORA: Hannah dos Santos Kahn
PESQUISADORA RESPONSÁVEL: Profa. Dra. Ingrid Finger

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

O projeto de pesquisa **O papel da experiência tradutória na complexidade sintática e na organização do pensamento na produção escrita de tradutores português-inglês** insere-se nos estudos de Psicolinguística e tem como objetivo verificar a relação entre experiência tradutória e complexidade sintática e na organização de pensamento em textos escritos. Para tanto, analisará os dados de tradutores profissionais, estudantes de tradução do curso de Bacharelado em Letras da UFRGS com habilitação inglês-português e bilíngues português-inglês que não façam uso da língua escrita como parte da sua profissão e/ou trabalho.

Ao aceitar participar da pesquisa, você responderá um questionário online sobre sua experiência linguística e sua atividade acadêmica e profissional, e realizará duas breves tarefas de produção oral e duas breves tarefas de produção escrita. A realização dessas tarefas deve levar aproximadamente 40 minutos.

A identidade dos participantes será mantida em sigilo, conforme Resolução CNS 510/2016. Os resultados obtidos serão armazenados em um banco de dados para posterior análise e discussão. A previsão do armazenamento dos dados é de, no mínimo, 5 anos. Você poderá se beneficiar indiretamente da pesquisa ao responder ao questionário, momento que poderá proporcionar melhor autoconhecimento para você quanto às suas habilidades metalinguísticas. Você também poderá se beneficiar indiretamente da pesquisa como um todo, pois acreditamos que sua participação no estudo possa ajudar a ampliar nossa compreensão da realidade cognitiva específica do bilinguismo no contexto da tradução, o que será útil para as pesquisas nas áreas da Psicolinguística e dos Estudos da Tradução e para a pesquisa brasileira como um todo. Quanto aos riscos, a participação na pesquisa não deve ocasionar nenhum dano moral aos participantes; no entanto, pode ocasionar cansaço mental ao realizar as tarefas ou ao responder o questionário. Esses riscos, caso se concretizem, são de caráter passageiro, e não permanente. Para minimizar os riscos, será indicado que os participantes informem a

pesquisadora e façam uma pequena pausa, e, se necessário, poderão interromper a coleta de dados a qualquer momento, sem qualquer prejuízo. Também há um risco de quebra de sigilo do e-mail e das respostas fornecidas no questionário, visto que a pesquisa conta com o uso do Google Forms, uma plataforma online. Para minimizar esse risco, após o fim do preenchimento e realização das tarefas pelos participantes, a pesquisadora irá baixar todos os dados coletados para o seu computador, protegido por senha e de acesso exclusivo, e apagar os arquivos das plataformas do Google.

O projeto foi avaliado pelo CEP-UFRGS, órgão colegiado, de caráter consultivo, deliberativo e educativo, cuja finalidade é avaliar – emitir parecer e acompanhar os projetos de pesquisa envolvendo seres humanos, em seus aspectos éticos e metodológicos, realizados no âmbito da instituição.

A pesquisadora responsável por este projeto de pesquisa é a professora Dra. Ingrid Finger (ingrid.finger@ufrgs.br, telefone institucional: 51-3308.6704; endereço institucional: gabinete nº 220 do Prédio Administrativo do Instituto de Letras do Campus do Vale da UFRGS). Quaisquer dúvidas podem ser sanadas junto à mestranda Hannah dos Santos Kahn (hannah.kahn95@gmail.com, fone: 51-99114.6933) ou junto ao Comitê de Ética em Pesquisa da UFRGS (CEP/UFRGS: 51-3308.3738, horário de atendimento: segunda a sexta, das 08h30 às 12h30 e das 13h30 às 17h30).

Ao concordar com o presente Termo de Consentimento Livre e Esclarecido, você declara que autoriza sua participação nesta pesquisa, e que foi informado(a), de forma clara e detalhada, livre de qualquer forma de constrangimento e coerção, dos objetivos e justificativa desta pesquisa, dos procedimentos a que será submetido(a), dos riscos, desconfortos e benefícios e de informações sobre as tarefas que realizará, e que pode retirar seu consentimento, a qualquer momento, e deixar de participar do estudo, sem justificativa, sem que isso traga prejuízo, todos acima listados.

E-mail:

_____

Você aceita participar da pesquisa?

- Aceito participar
- Não aceito participar