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Unraveling cognitive constraints in constrained languages: a comparative study of syntactic complexity in translated, EFL, and native varieties☆

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A B S T R A C T

This study examines syntactic complexity in Translated English (TE) and English as a Foreign Language (EFL), drawing comparisons with Native English (NE). The objective is to explore the unique syntactic features of these constrained languages, which we hypothesize are influenced by inherent cognitive and social constraints. We operationalize syntactic complexity using five constructs, namely length of production units, sentence complexity, subordination, coordination, and specific structures. The data reveals differential syntactic patterns across the language varieties studied. In our analysis, we observed that TE and EFL display a tendency for extended sentence structures, as indicated by higher mean lengths of clauses (MLC) and T-units (MLT) compared to NE. We propose that this inclination might stem from first-language interference in the writing and translation. The study also underscores a decrease in sentence complexity and subordination in constrained languages, a pattern which potentially mirrors the simplification phenomenon often reported in second language acquisition and translation research. Conversely, coordination measures exhibit an increase in TE and EFL, suggesting a syntax preference possibly informed by the linguistic structures of the speaker's or translator's first language. Our findings resonate with the idea of "constrained communication", illuminating shared syntactic tendencies between second languages (L2s) and translated languages, which may be attributable to similar processing constraints. This investigation contributes to the ongoing dialogue on complexity and simplification in constrained languages, and encourages a merger of the traditionally separate fields of second language acquisition and translation studies.

1. Introduction

Investigations into the differences and similarities between constrained and non-constrained languages have gained increasing attention in the fields of second language acquisition, contact linguistics, and translation studies (Filppula et al., 2008; Granger, 2015; Kortmann and Szmrecsanyi, 2009; Kruger and Van Rooy, 2012; Liu et al., 2022a, 2022b). Constrained languages, exemplified by translated language and second language varieties, are influenced or 'constrained' by the cognitive

☆ Corpus data concerning the study are publicly available on Open Science Framework (https://osf.io/udc2p/).

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and sociolinguistic parameters of a speaker's or translator's first language (Lanstyák and Heltai, 2012). In contrast, non-constrained languages, such as Native English (NE), are typically unaffected by such influences. This growing field of inquiry aims to understand the diverse linguistic nuances that shape these different language varieties, with a broader goal of uncovering their unique characteristics and exploring similarities between constrained languages (Kotze, 2022).

However, despite the increasing interest, research to date has mainly been conducted in isolation, separately examining the constrained language varieties of translation and English as a Second Language (ESL), without a comparative lens that encompasses all three language varieties (c.f., Kruger and Van Rooy, 2016a). This represents a significant gap in our understanding, especially considering the potential insights that can be gained from a direct comparison between constrained and non-constrained language forms. Furthermore, limited attention has been given to analyzing syntactic features and complexity patterns within these constrained languages. However, syntax, as a fundamental aspect of language, offers rich potential for investigating the distinctive characteristics of these language varieties (Liu and Afzaal, 2021). Therefore, examining TE, EFL, and NE from a syntactic perspective promises to provide a comprehensive and novel understanding of the underlying influences and constraints in these forms of English.

Addressing these research gaps, our study aims to highlight the unique syntactic features of TE and EFL compared to NE within the theoretical framework of constrained languages (Lanstyák and Heltai, 2012). By establishing a comparative paradigm involving TE and EFL with a focus on syntactic complexity, our research seeks to contribute to the broader discourse on the influence of L1 on second language acquisition and translation.

The structure of this article is as follows. Section 2 provides a literature review on EFL writing, offering an overview of the constrained communication framework and relevant empirical studies focusing on syntactic features. Section 3 outlines the methodology and data used for the analysis. The results are presented in Section 4, followed by a detailed discussion in Section 5. Finally, Section 6 concludes the article.

2. Constrained communication framework

The concept of constrained language, introduced decades ago by scholars like House and Blum-Kulka (1986), Chesterman (2004), and Ulrych and Murphy (2008), has only recently received sustained attention both theoretically and empirically. This concept aimed to unify fields such as translation studies, contact linguistics, SLA studies, and bilingualism studies. Lanstyák and Heltai (2012) explicitly utilized constrained communication universals to encapsulate the common features in translation and bilingualism-influenced communication, arguing that these communicative settings impose similar cognitive and social constraints.

Constrained language, as defined by Kruger and Van Rooy (2016a: 27), is "the language produced in communicative contexts characterized by particularly conspicuous constraints". Kotze (2022) further categorized these constraints into five dimensions: language activation, modality and register, text production, proficiency, and task expertise. This classification has facilitated empirical investigations into linguistic features at various levels, including lexical patterns, syntactic structures, and discourse cohesion across constrained language varieties (Kajzer-Wietrzny, 2021; Kajzer-Wietrzny and Ivaska, 2020; Kruger and De Sutter, 2018; Kruger and Van Rooy, 2016a, 2016b).

This framework's underlying rationale is that bilingualism-influenced language varieties undergo similar cognitive and cultural constraints, which intertwine and interact to shape language use (Kotze, 2022; Lanstyák and Heltai, 2012). Consequently, translation is contrasted with various non-native or mediated language varieties, such as learner language, non-native language, and edited language (Bisiada, 2017; Kruger, 2012; Kruger and De Sutter, 2018; Liu et al., 2023). This body of research provides partial confirmation that constrained language varieties exhibit a lower level of lexical diversity and display similar patterns, such as a higher frequency of the optional complementizer 'that' (Kajzer-Wietrzny and Ivaska, 2020; Kruger and De Sutter, 2018; Rabinovich et al., 2016).

However, the existing literature has some limitations. One crucial issue is that existing literature comparing translations with other non-native English varieties often overlooks the distinction between English as a Foreign Language (EFL) and English as a Second Language (ESL). Such distinctions are vital in the fields of World Englishes (WE) and Second Language Acquisition (SLA) (Edwards and Laporte, 2015; Götz and Schilk, 2011). English as a Native Language (ENL), ESL, and EFL are traditionally categorized into the Inner, Outer, and Expanding Circles of English in Kachru's Three-Circle model (Kachru, 1992). ESL is used in various domestic communication settings where English serves as a second or co-official language, while EFL is primarily used in classrooms or international communication. Previous research on constrained English varieties often neglects this distinction, with a few exceptions such as Kruger and Van Rooy (2018), who identified varying degrees of language contact in their analysis of non-native English. Our study specifically investigates the English produced by Chinese speakers, an EFL variant, which may exhibit linguistic features distinct from those found in high-contact English varieties (Mesthrie and Bhatt, 2008; Mukherjee and Hundt, 2011).

Another limitation is the predominant use of European and African languages as the first/source languages in prior studies. Given the role language pairs play in shaping constrained language production (Kotze, 2022), a broader range of data, including typologically and culturally distant languages like Chinese and English which may pose additional challenges to translators and L2 writers (Ma, 2021), should be included in future research.

3. Constrained language: syntactic measures

Much of the existing research on constrained language has primarily focused on lexical measures, leaving syntactic measures, a crucial dimension of grammatical variation and sophistication in language production, relatively unexplored within the constrained communication framework. Notable exceptions include studies by Ivaska and Bernardini (2020) and Ivaska et al. (2022). By using Part-of-Speech (POS) dependency bi-grams to operationalize syntactic properties, these researchers identified distinctive features, such as the preference for post-nominal phrasal modification in constrained language use. They emphasized that these constraining effects vary depending on register and language pairs and called for further research to incorporate a wider range of these factors.

A frequently studied aspect in constrained language research pertains to the concepts of simplification and explicitation, two prevalent tendencies or "translation universals" in translation studies. However, previous studies primarily conducted investigations at the lexical level (Bernardini et al., 2016; Laviosa, 2002). Explicitation research often hinges on a small set of lexical items, such as the optional complementizer 'that' or the frequency of specific conjuncts and cohesive devices (Hansen-Schirra et al., 2007; Kruger, 2019). Although some studies have explored specific syntactic structures in translated Chinese (Xiao and Hu, 2015), the predominant focus on individual or small groups of lexical items can lead to conflicting results due to varied linguistic feature selections (Liu et al., 2022a).

In translation studies, researchers investigating translation universals have primarily used mean sentence length to test the simplification hypothesis (e.g., Laviosa, 2002). However, this metric has seldom been explored in depth. In contrast, research in L2 writing underscores that syntactic complexity is a multidimensional phenomenon, involving phrasal, clausal, and sentence components. Recognizing this comprehensive nature, recent scholars, such as Liu and Afzaal (2021) and Xu and Li (2021), have applied this framework to their comparative studies of translated and non-translated language. This shift away from reliance on length-based metrics signifies a considerable advancement in the methodologies employed in translation studies. Both studies used the L2 Syntactic Complexity Analyzer (L2SCA) to compare translated English with native English, concluding that non-translations exhibit higher syntactic complexity. Although these studies yielded insightful results about the distinctiveness of translated language, they did not strictly adhere to a constrained language framework since they only compared translated and non-translated languages.

In this context, we undertake an empirical study using a corpus-based approach to analyze the syntactic complexity of two constrained English varieties (Translated English and EFL writing), using Native English writing as a benchmark. The main objective is to discern the syntactic patterns typical of constrained language use and those unique to each constrained variety.

More precisely, we aim to answer the following three research questions:

RQ1: How are syntactic features distributed across the three varieties: translated English, EFL writing, and non-constrained native English writing?
RQ2: Do the two constrained varieties exhibit shared syntactic patterns distinguishing them from non-constrained native writing? If so, what could be the possible explanations?
RQ3: Do the two constrained varieties demonstrate unique syntactic patterns compared to each other? If so, what could be the potential explanations?

4. Methods and procedures

4.1. Corpora

This study employs a corpus-based approach to juxtapose translated English and EFL writing, using native English writing as a baseline. The corpus representing native English writing is the Press sub-corpus of CLOB, a balanced contemporary written English corpus developed by the Beijing Foreign Studies University (Xu and Liang, 2013). The EFL and TE corpora, compiled to represent EFL writing and translation respectively, are derived from online English media archives in China: translations from *Global Times* and *Sixth Tone*, and EFL writings from *China Daily*. Table 1 provides further details on the data used.

EFL writing samples are selected from *China Daily*, the first national English-language daily newspaper in China. The 2009 archive was chosen to align with the period covered by CLOB. We randomly selected texts from each topic classified by Factiva, with the number of texts reflecting the proportion of each category. Only reports specifying reporters with Chinese names were chosen, presuming these English reports are written by native Chinese speakers.

Table 1
Descriptive statistics of the NE, TE and EFL corpora.

Sub-corpora	Text count	Overall size	Mean size	Std. deviation
NE	82	179,383	2188	380
TE	78	180,663	2316	142
EFL	80	182,588	2282	262

The translation corpus includes data from *Global Times* and *Sixth Tone*, contributing to about half of the corpus size each. *Global Times*, a renowned state-run news tabloid, launched its English edition in 2009. The English translations can be traced back to their Chinese source in the original edition (Liu and Li, 2022). *Sixth Tone*, an online magazine established in 2016 by Shanghai United Media Group, offers a section dedicated to translations from respected Chinese and international media outlets. As prominent English press outlets in China, *Global Times* and *Sixth Tone* provide a broad discussion of current issues and personal viewpoints. The three corpora are comparable in size (around 180,000 words each), mode of production (written), register (press), and source/first language (Chinese) for the two constrained varieties. These three factors are acknowledged to impact language use.

4.2. Measuring syntactic complexity

This study aims to explore syntactic complexity within the constrained language framework by comparing three language varieties: native English, translated English, and English as a Foreign Language (EFL). We use the L2 Syntactic Complexity Analyzer (L2SCA) for this purpose, an automatic tool that offers 14 measures spanning five dimensions: the length of production units, the amount of subordination, the amount of coordination, particular syntactic structures, and overall sentence complexity (Lu, 2010). Widely applied in L2 writing studies due to its comprehensive syntactic dimensions, automatic analysis capabilities, and high reliability (Larsson and Kaatari, 2020), L2SCA is suitable for this study. In language studies, some scholars advocate for more fine-grained metrics that offer a detailed analysis of language complexity by focusing on specific structural constructions and syntactic features. These metrics, which provide an in-depth linguistic description, may afford a nuanced and precise examination of linguistic characteristics (e.g., Biber et al., 2020; Bulté and Housen, 2012). However, these metrics can have limitations due to overlap, as they often analyze similar or interconnected linguistic features. The application of such detailed metrics may also lead to over-specification, where an intense focus on fine details may overlook broader patterns or fail to capture the holistic aspects of language use. In contrast, broad-based metrics combine multiple structural and syntactic features into a single quantitative variable. While this approach might seem oversimplified, it has substantial predictive power, making it a valuable tool in language research where the goal is to classify different varieties of language output (e.g., Liu and Afzaal, 2021; Liu et al., 2023). In the context of our study, which aims to reveal complexity differences among three language varieties, the L2SCA with its 14 measures falling into five constructs is highly beneficial. This tool allows us to analyze complexity features in three varieties of English, providing a comprehensive understanding of the overall pattern and complexity of the data under investigation.

Therefore, in our pursuit to identify potential syntactic patterns distinguishing constrained from non-constrained language use, L2SCA presents an apt choice for measuring syntactic complexity. These metrics encompass the primary constructs of syntactic complexity at clause (e.g., quantity of subordination per T-unit), phrase (e.g., quantity of complex nominals and coordinated phrases per T-unit), and overall complexity levels (e.g., average sentence length). Detailed definitions and operationalizations of these metrics are documented in Lu (2010). For instance, a T-unit is defined as “one main clause plus any subordinate clause or nonclausal structure that is attached to or embedded in it” (Hunt, 1970: 4). As per Lu (2010: 482), a T-unit is recognized by the presence of an independent clause that stands alone as the top-level sentence structure, a coordinate independent clause that functions in conjunction with another clause, or any sentence fragment that the writer demarcates with punctuation. Table 2 delineates these 14 parameters, including their codes and definitions. For all these measures, a higher score suggests a greater degree of syntactic complexity.

Table 2
Syntactic complexity metrics based on Lu (2010: 479).

Measure	Code	Definitions
Type 1: Length of production unit		
Mean length of clause	MLC	# of words / # of clauses
Mean length of sentence	MLS	# of words / # of sentences
Mean length of T-unit	MLT	# of words / # of T-units
Type 2: Sentence complexity		
Sentence complexity ratio	C/S	# of clauses / # of sentences
Type 3: Subordination		
T-unit complexity ratio	C/T	# of clauses / # of T-units
Complex T-unit ratio	CT/T	# of complex T-units / # of T-units
Dependent clause ratio	DC/C	# of dependent clauses / # of clauses
Dependent clause per T-unit	DC/T	# of dependent clauses / # of T-units
Type 4: Coordination		
Coordinate phrases per clause	CP/C	# of coordinate phrases / # of clauses
Coordinate phrases per T-unit	CP/T	# of coordinate phrases / # of T-units
Sentence coordination ratio	T/S	# of T-units / # of sentences
Type 5: Particular structures		
Complex nominals per clause	CN/C	# of complex nominals / # of clauses
Complex nominals per T-unit	CN/T	# of complex nominals / # of T-units
Verb phrases per T-unit	VP/T	# of verb phrases / # of T-units

5. Results

Table 3 provides the mean values and standard deviations for all 14 syntactic complexity measures across the three subcorpora. Prior to performing statistical comparisons, we initially conducted the Shapiro–Wilk test for normality and Levene's test for equality of variances to assess data distribution. The results indicated a lack of normal distribution, with the exception of DC/C, CT/T, and CN/T measures. As a result, we performed one-way ANOVA tests for normally distributed measures, while Kruskal–Wallis H tests were utilized for those not normally distributed. As shown in Table 4, the results demonstrate a significant corpus effect across all fourteen measures. For pair-wise comparisons, we ran Bonferroni post-hoc tests for ANOVA tests and Dunn-Bonferroni post-hoc tests for Kruskal–Wallis H tests. The results are shown in Table 5.

Table 3
Mean values for 14 metrics of syntactic complexity.

Measure	Code	NE Mean (SD)		TE Mean (SD)		EFL Mean (SD)	
Type 1: Length of production unit							
Mean length of clause	MLC	11.764	(3.750)	12.048	(1.160)	12.913	(1.953)
Mean length of sentence	MLS	24.182	(7.268)	20.441	(2.625)	22.931	(3.247)
Mean length of T-unit	MLT	20.619	(6.201)	18.160	(2.273)	20.847	(3.079)
Type 2: Sentence complexity							
Sentence complexity ratio	C/S	2.068	(0.265)	1.703	(0.208)	1.797	(0.240)
Type 3: Subordination							
T-unit complexity ratio	C/T	1.759	(0.181)	1.512	(0.168)	1.628	(0.201)
Complex T-unit ratio	CT/T	0.498	(0.083)	0.389	(0.098)	0.412	(0.094)
Dependent clause ratio	DC/C	0.399	(0.050)	0.315	(0.062)	0.318	(0.060)
Dependent clause per T-unit	DC/T	0.710	(0.157)	0.486	(0.147)	0.524	(0.141)
Type 4: Coordination							
Coordinate phrases per clause	CP/C	0.203	(0.059)	0.285	(0.067)	0.294	(0.074)
Coordinate phrases per T-unit	CP/T	0.353	(0.100)	0.427	(0.095)	0.472	(0.106)
Sentence coordination ratio	T/S	1.174	(0.078)	1.126	(0.042)	1.102	(0.096)
Type 5: Particular structures							
Complex nominals per clause	CN/C	1.292	(0.201)	1.460	(0.226)	1.616	(0.321)
Complex nominals per T-unit	CN/T	2.275	(0.434)	2.194	(0.355)	2.608	(0.497)
Verb phrases per T-unit	VP/T	2.336	(0.266)	2.084	(0.260)	2.207	(0.279)

Table 4
Results of Kruskal–Wallis tests and ANOVA tests.

Measure	Kruskal–Wallis H (F statistic for ANOVA)	df	Asymp. Sig.
MLC	40.352*	2	<0.01
MLS	32.781*	2	<0.01
MLT	36.730*	2	<0.01
C/S	73.185*	2	<0.01
C/T	61.850*	2	<0.01
CT/T	33.902*	2	<0.01
DC/C	61.289*	2	<0.01
DC/T	77.379*	2	<0.01
CP/C	71.482*	2	<0.01
CP/T	51.163*	2	<0.01
T/S	50.649*	2	<0.01
CN/C	47.912*	2	<0.01
CN/T	20.795*	2	<0.01
VP/T	35.092*	2	<0.01

Note: * indicates statistical significant differences ($p < 0.05$).

5.1. Overall complexity patterns

As shown in Table 5, in 11 out of the 14 measures, the two constrained varieties diverge from the non-constrained variety, supporting the hypothesis that the constrained varieties do share similar patterns dinstinguishing them from the non-constrained one. But the shared tendencies do not consistently follow the same direction, meaning the two constrained varieties are less complex than NE in some metrics while more complex in others. Meanwhile, in 8 out of the 14 measures, the two constrained varieties show different patterns from each other, which may result from their distincive constraints. In the following section, we present the comparison across the varieties in the 14 measures by categorizing them into five sub-constructs: the length of the production unit, the amount of subordination, the amount of coordination, the degree of phrasal sophistication, and overall sentence complexity.

Table 5
Differences in Mean Ranks between sub-corpora.

		NE< >TE	NE< >EFL	TE< >EFL
Length of production unit	MLC0	* <	* <	–
	MLS0	* >	–	* <
	MLT0	* >	* <	* <
Sentence complexity	C/S0	* >	* >	* <
Subordination	C/T0	* >	* >	* <
	CT/T0	* >	* >	–
	DC/C0	* >	* >	–
	DC/T0	* >	* >	–
Coordination	CP/C0	* <	* <	–
	CP/T0	* <	* <	* <
	T/S0	* >	* >	* >
Particular structures	CN/C0	* <	* <	–
	CN/T0	–	* <	* <
	VP/T0	* >	* >	* <

Notes:
*> indicates the former is statistically higher than the latter (adjusted $p < 0.05$).
*< indicates the former is statistically lower than the latter (adjusted $p < 0.05$).
– indicates no statistically significant difference.

5.2. Length of production unit

Fig. 1 illustrates the three metrics of production unit length across the three varieties. As shown in Fig. 1, NE exhibits a lower mean MLC than the two constrained varieties, and the post-hoc test results in Table 5 indicate that the difference is statistically significant. This suggests that the constrained varieties may be more complex at the sub-clausal level. Regarding MLS and MLT, EFL has higher mean values than the other two varieties, although the difference in MLS between EFL and NE is not statistically significant. Overall, EFL demonstrates the highest complexity in terms of the three production unit lengths.

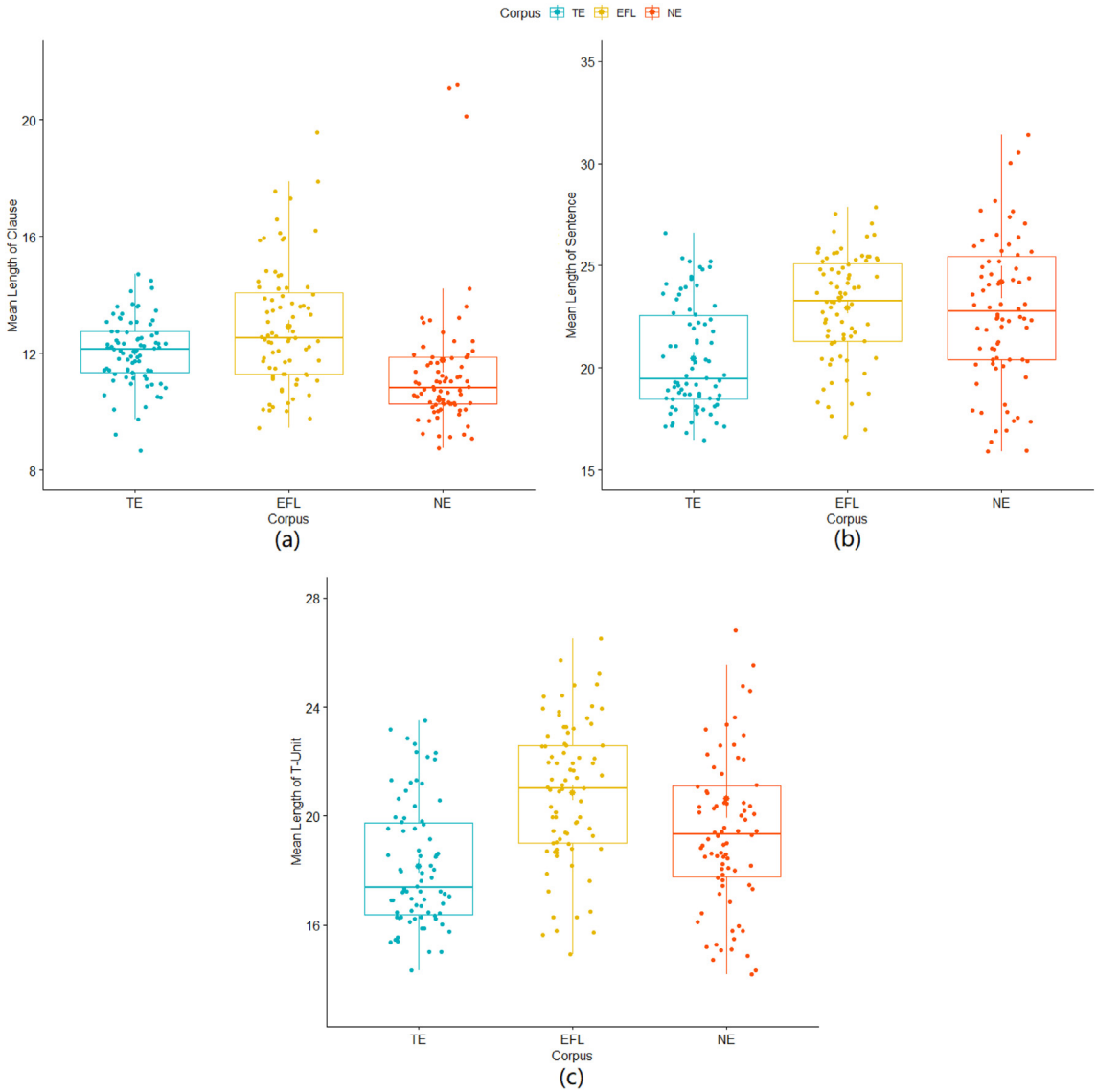

Fig. 1. Syntactic complexity in the length of production unit: (a) Mean length of clauses; (b) mean length of sentences; (c) mean length of T-units.

5.3. *Amount of subordination*

As depicted by the boxplot in Fig. 2, it is evident that NE exhibits significantly higher means in all four subordination measures compared to the two constrained varieties (Table 5). This highlights the higher level of subordination complexity present in NE. The differences observed are statistically significant, emphasizing the distinct subordination patterns across the three varieties. Further analysis focusing on a comparison between the two constrained varieties reveals that TE consistently exhibits lower values than EFL across the four categories, although the difference reaches statistical significance only in the C/T measure. This suggests that TE generally demonstrates a lower degree of subordination complexity compared to EFL.

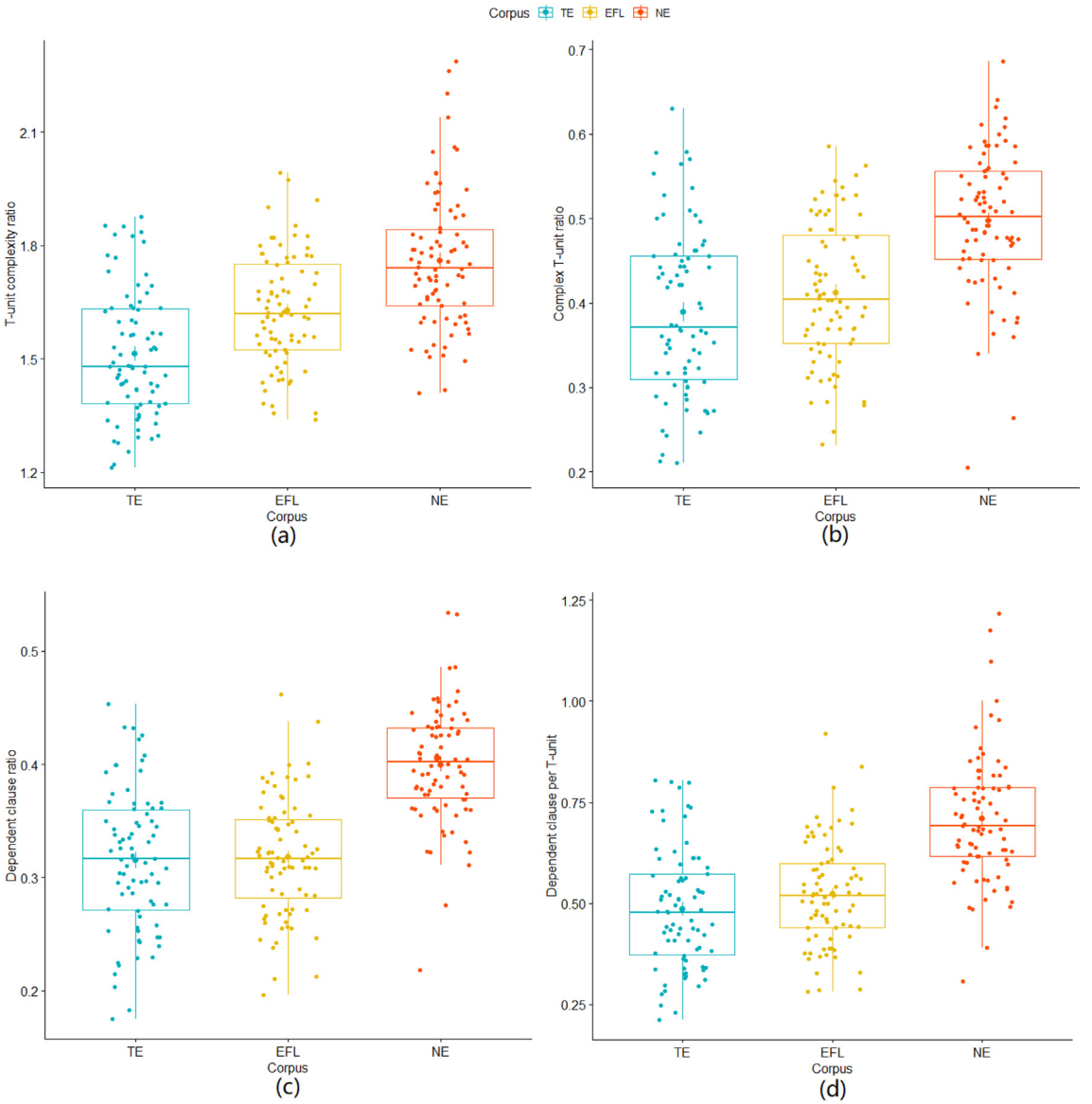

Fig. 2. Syntactic complexity in the amount of subordination: (a) The T-unit complexity ratio; (b) the complex T-unit ratio; (c) the dependent clause ratio; (d) dependent clauses per T-unit.

5.4. Amount of coordination

In terms of coordination metrics, the analysis reveals interesting patterns among the three varieties. The two constrained varieties exhibit higher complexity than NE in phrasal coordination, as evidenced by their higher mean values in CP/C and CP/T (Fig. 3). The statistically significant differences (see Table 5) further support this finding. On the other hand, the constrained varieties demonstrate lower complexity in sentence coordination, as indicated by their lower means compared to NE in the T/S measure. When comparing TE and EFL, it is observed that TE has a lower mean value than EFL in CP/T, indicating lower complexity in phrasal coordination. However, TE shows a higher mean value than EFL in T/S, suggesting higher complexity in sentence coordination. The absence of a statistically significant difference in CP/C between TE and EFL implies that they exhibit similar levels of complexity in this particular measure.

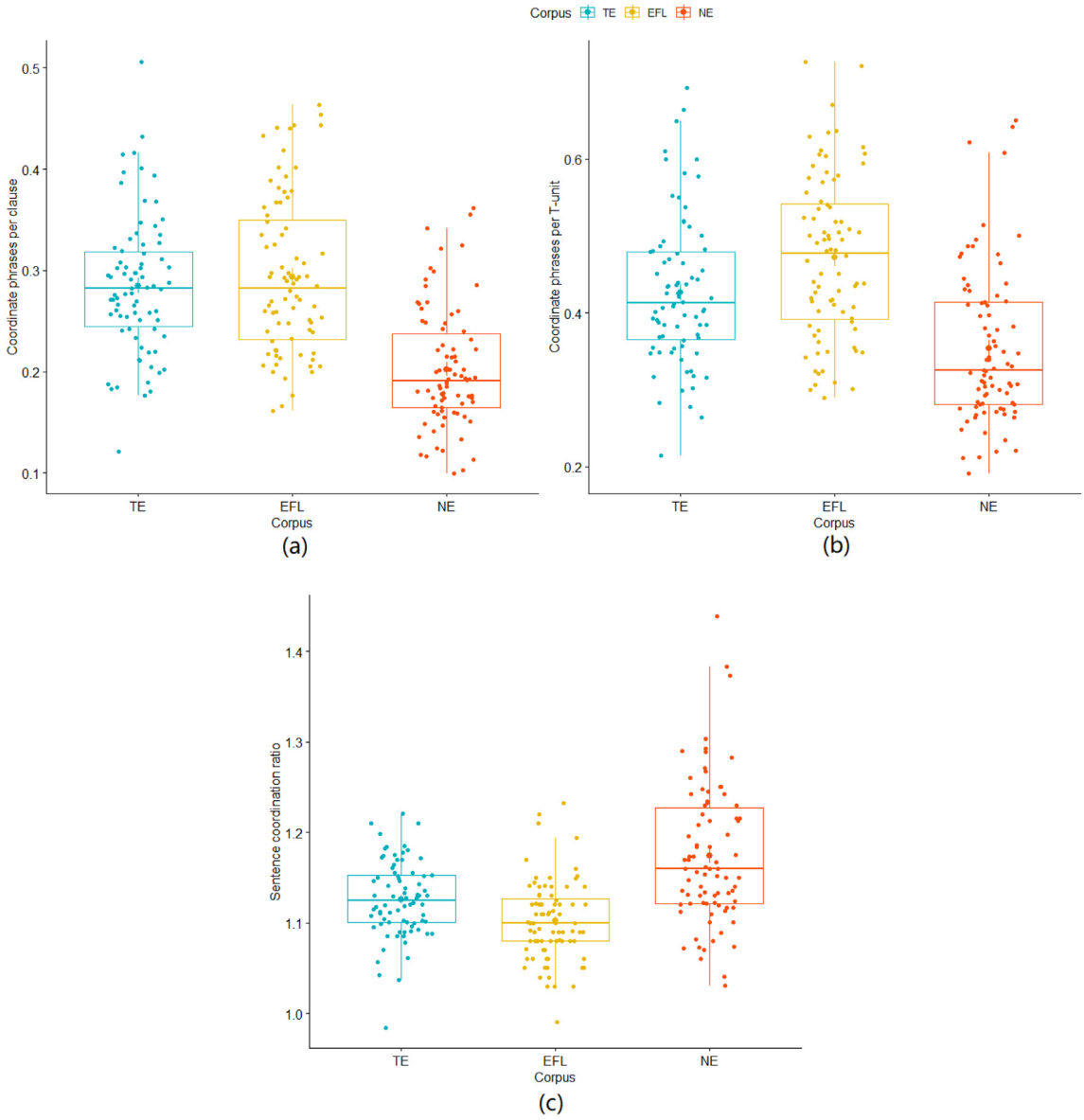

Fig. 3. Syntactic complexity in the amount of coordination: (a) Coordinate phrases per clause; (b) coordinate phrases per T-unit; (c) the sentence coordination ratio.

5.5. *Phrasal and overall sentence complexity*

Fig. 4 illustrates the variation in overall sentence and phrasal-level complexity across the three varieties. At the overall sentence level, NE exhibits higher complexity compared to the two constrained varieties, as indicated by its higher T/S mean value. This difference reaches a statistically significant level. In addition, NE demonstrates greater complexity in the use of verbal phrases per T-unit. In both metrics, EFL has higher means than TE. In contrast, the two constrained varieties demonstrate higher complexity than NE in the use of complex nominals per clause. However, there is no statistically significant difference between TE and EFL in this regard (see Table 5). When considering complex nominals per T-unit, EFL has a higher mean value than NE, while TE shows a slightly lower mean value than NE, although this difference is not statistically significant.

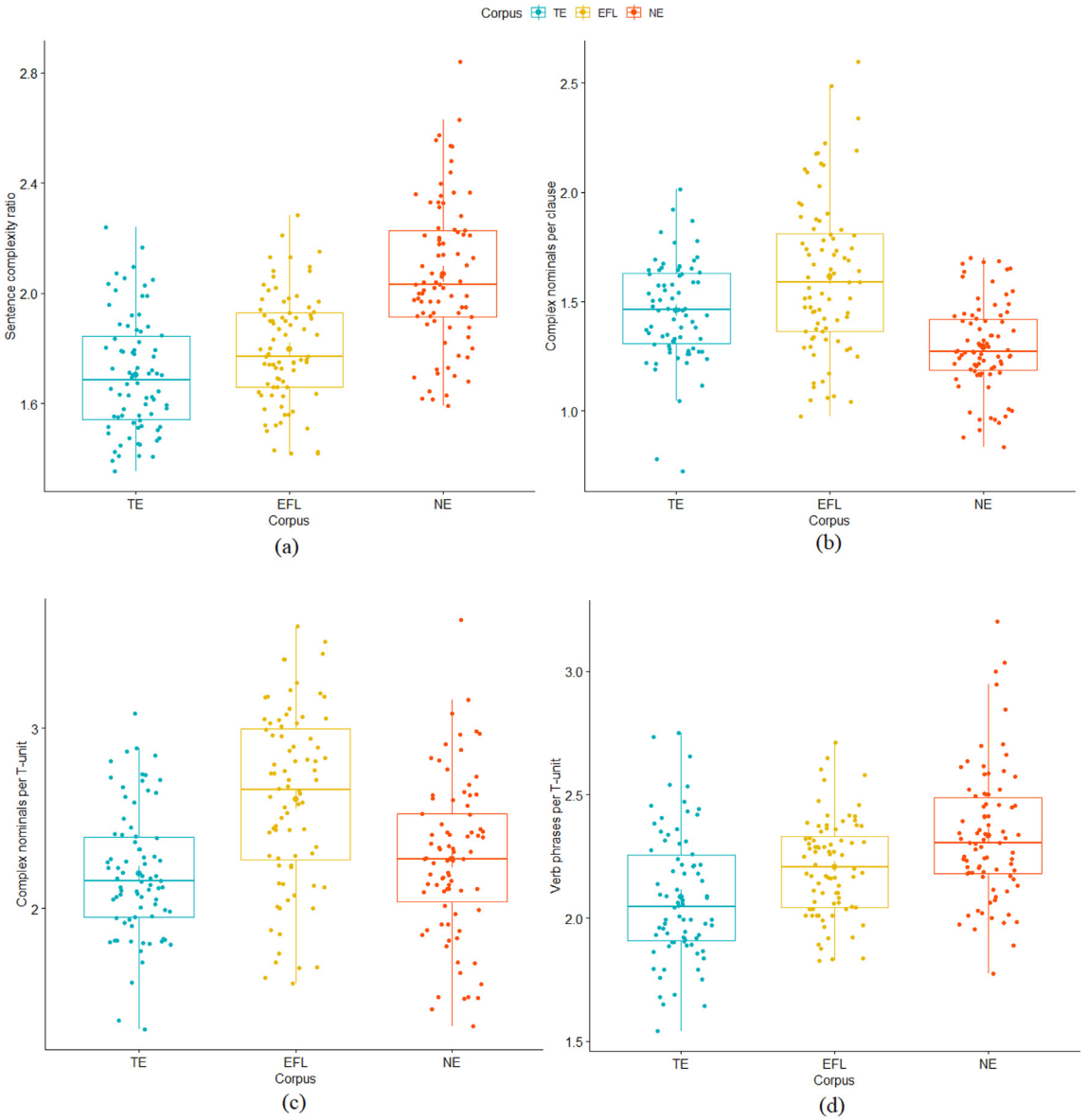

Fig. 4. Syntactic complexity in phrasal and overall sentence complexity: (a) The sentence complexity ratio; (b) complex nominals per clause; (c) complex nominals per T-unit; (d) verb phrases per T-unit.

6. Discussion

6.1. Similarities of constrained languages

This study examines the syntactic complexity of two constrained English varieties (TE and EFL) in comparison to non-mediated, native English (NE). The L2SCA tool is employed to analyze syntactic complexity using five subconstructs. The comparison between the constrained and non-constrained varieties unveils an intriguing trend: TE and EFL, the two constrained varieties, diverge from NE in the same direction in 11 out of the 14 metrics. Of the five subconstructs, NE consistently displays higher complexity than TE and EFL in two subconstructs, namely, overall sentence complexity and subordination. However, for the remaining constructs, the results differ across specific measures within the constructs (refer to Table 5).

Compared to NE, the constrained varieties exhibit a reduced level of subordination and overall sentence complexity. Both translators and EFL writers employ fewer subordinating structures and produce shorter sentences. However, the observed similar patterns in the constrained varieties indicate a shared preference for phrasal structures over clausal structures. This preference reflects a tendency to prioritize the use of phrasal constructions, such as coordinating phrases and complex

nominal structures, which contribute to the overall syntactic complexity of these varieties. This phenomenon highlights an important aspect of the syntactic preferences and strategies employed by translators and EFL writers in their language production. In Excerpt (1), which is translated from Chinese, the presence of four coordinating phrases highlights the influence of the source language, Chinese, on the translation. These coordinating phrases, including "thrilling and exotic," "covert and difficult," "films and drama," and "daily life, study, and work," contribute to the higher coordination complexity observed in Translated English (TE). This heightened coordination complexity can be attributed to the structural preferences and patterns found in the Chinese language, where coordination is often favored (Plaks, 1988; Liu et al., 2023). Whereas in Excerpt (2) of EFL writing, there are various complex nominal structures that provide specific details about Pi Qiansheng's position, reputation, and background. These structures include "an official of vice-ministerial rank in Tianjin," "a front-ranking soldier of reform and opening up," "the 58-year-old former boss of Binhai New Area, a development zone and economic powerhouse," and "serious violation of discipline and law." These complex nominal structures contribute to a comprehensive understanding of Pi's role and the circumstances surrounding his expulsion from the CPC. From a grammatical standpoint, these structures significantly enhance the overall syntactic phrasal complexity of the passage. The two constrained varieties exhibit patterns that diverge from those of the non-constrained variety, as observed in the study. Considering that syntactic complexity is a multidimensional phenomenon encompassing various subconstructs, the findings suggest that these two constrained varieties show higher complexity in the subconstruct of "particular structures", which primarily measures phrasal complexity. This observation underscores the robustness of the framework used in the study.

> Excerpt (1): The (espionage) activities, in reality, are not as *thrilling and exotic* as they are in *films and drama*, but they are more *covert and difficult to detect* as they quietly penetrate our daily *life, study, and work*. (TE 006)
>
> Excerpt (2): Pi Qiansheng, *an official of vice-ministerial rank in Tianjin*, was seen as a *front-ranking soldier of reform and opening up*. But a week ago the *58-year-old former boss of Binhai New Area, a development zone and economic powerhouse*, was expelled from the CPC for *serious violation of discipline and law*. (EFL 0013)

The finding corroborates the work of Kruger and Van Rooy (2016a), who identified phrasal coordination as a prominent feature in two constrained varieties of English, specifically English translated from Afrikaans and East African English. It also aligns with the findings of Ivaska and Bernadini (2020), who distinguished between constrained and non-constrained Finnish based on dimensions such as verbal versus clausal complexity and noun phrase complexity. However, it contradicts the findings of Ivaska et al. (2022), who discovered a higher degree of clausal elaboration/verbality compared to phrasal elaboration/nominality in non-native production. We suspect that this contradiction may arise from the influence of the source language in the constrained languages, which can impact the syntactic patterns and preferences observed. Nevertheless, this discrepancy underscores the importance of considering multiple factors that influence language use when examining the effects of constraints.

6.2. Effect of shared constraints in TE and EFL: overlapping effects of cross-linguistic influence and stylistic standardization

Previous studies have revealed that users of constrained languages tend to simplify linguistic structures and messages, either consciously or unconsciously, in order to cope with higher cognitive load and mitigate communicative risks in cross-linguistic and cross-cultural settings (Kruger and Van Rooy, 2016a; Lanstyák and Heltai, 2012; Liu et al., 2023). Similarly, this study found evidence of simplification tendencies in both TE and EFL, reflected in shorter sentences and reduced use of subordination structures. On the other hand, a seemingly contrasting tendency against simplification has also been identified in constrained varieties, specifically in terms of phrasal sophistication at the sub-clausal level. Both constrained varieties exhibit higher usage of phrasal coordination and complex nominals. We propose that this phenomenon arises from the overlapping effects of cross-linguistic influence (CLI) and stylistic standardization.

6.2.1. Effects of CLI

Psycholinguistic studies have demonstrated that in bilingualism-influenced communication, such as translation and EFL writing, both languages of bilingual individuals are simultaneously activated (Kroll et al., 2014). Even in monolingual production contexts, knowledge of one language can have an interference effect, potentially leading to different distributional patterns of certain forms or structures compared to native production in the same language. This phenomenon has been widely investigated in SLA studies as cross-linguistic influence (Jarvis and Pavlenko, 2008; Odlin, 2008). Similarly, translators, who are bilinguals, are subject to cognitive constraints similar to those experienced in L2 production. In translation studies, the concept of "shining-through effect" is often used to discuss traces of the source language in the translation output (Teich, 2003). Specific lexical-grammatical features have been found to be overrepresented in translations compared to native production in the target language, resulting from source language transfer (Cappelle and Loock, 2013, 2017; Dai and Xiao, 2011).

Our findings corroborate previous studies on the effect of cross-linguistic influence in L2 production and translation. In this study, Mandarin Chinese plays an important role either as the source language or the L1 language for the two constrained varieties examined. Coordinating structures are common in Mandarin Chinese, and as a result, the language features of the two constrained varieties are likely to be influenced by Chinese in this language environment. Chinese speakers frequently employ coordination to conjoin items that are parallel in meaning, function, and form (Xu, 2010). Xu (2010) identified the

parallel use of multiple conjoins within a sentence as one of the prominent features of China English. Another characteristic of Chinese is the use of left-branching structures for noun modification (Liu et al., 2017). This preference for premodification and phrasal modification in Chinese may transfer to EFL writing and translation. For example, Liu et al.'s (2017) study on nominalization in China and British Media corpora revealed that post-modification for nouns, particularly clausal elaboration, was less frequently selected, while premodification was overused in Chinese English Media.

6.2.2. Effects of stylistic standardization

From a socio-cognitive perspective, bilingualism-influenced settings entail higher communicative risks (Lanstyák and Heltai, 2012), and to mitigate such risks, constrained language users often opt for safer solutions by conforming to perceived written standards (Kruger and Van Rooy, 2016a). In translation studies, this phenomenon has been formulated as the law of increasing standardization (Toury, 2012) or conventionalization (Chesterman, 2004). A similar pattern has been observed in L2 writing, where L2 speakers tend to prefer more conservative and standard options, employing formal styles even in less formal situations (Van Rooy et al., 2010). This study investigates syntactic variation based on data from the press and news genres, as English news traditionally requires a formal writing style characterized by compact expressions and informational density (Hackert and Wengler, 2022). According to Biber and Grey (2010), phrasal structures are often associated with structural compression, which is typical of formal written texts. Such structures are also linked to increased formality and information density. In contrast, clausal expansion is more common in informal and spoken registers. By employing more complex phrasal structures, constrained language users may attempt to adhere to the writing standards of news discourse in the target culture. However, it has been suggested that native English media has undergone a process of colloquialization (Liu et al., 2017), and the higher level of formality observed in EFL and translated English news could be a consequence of their adherence to conventional norms, even when those norms may be considered obsolete. In summary, while constrained language users tend to simplify certain syntactic structures due to cognitive constraints, the specific data examined in this study suggests that this inclination may be counterbalanced and even overridden by the combined effects of first/source language transfer and stylistic standardization. Consequently, a higher level of phrasal sophistication is observed in the constrained varieties.

6.3. Unique patterns of constrained languages

Despite TE and EFL consistently diverging from NE in 11 out of the 14 measures, pairwise comparisons underscore that TE and EFL exhibit statistically significant differences when comparing to each other. The most notable difference is observed in the lower frequency of clauses in translation, as evidenced by the results of overall sentence complexity (C/S), length of production units (MLS and MLT), and clausal subordination (C/T). Clauses measured by L2SCA include independent clauses, adjective clauses, adverbial clauses, and nominal clauses (Lu, 2010). Although information on the underrepresented types of clauses in translation could not be obtained, the results tentatively suggest that translators use fewer or less diverse syntactic structures at the clausal level, not only compared to native writers but also EFL writers. One plausible explanation is that translators face additional constraints compared to EFL writers. As "translation operates at the extreme end of the bilingual activation mode" (Kruger and Van Rooy, 2016a: 29), an increased level of cognitive load is expected during translation due to constraining factors such as the rapid shifting between the two languages and the presence of the source texts (Kotze, 2020). Another notable difference is the lower occurrence of sentence-level coordination in EFL, as indicated by the lower T/S measure. Interestingly, previous research comparing translation and ESL writing has shown no statistical differences between ESL production and translation (Wang et al., 2023) or interpreting (Liu et al., 2023) in this regard. Research on EFL writing development found that the level of sentence coordination measured by T/S increased as language proficiency improved (Jiang et al., 2019). The underrepresentation of sentence-level coordination in EFL may suggest that, in this aspect, EFL writers, unlike ESL writers, are more inclined towards using fewer coordinated structures compared to translators.

7. Conclusion

This study compares two constrained varieties of English (translated English and EFL) with native English in terms of syntactic complexity, aiming to identify distinctive syntactic features that characterize constrained varieties. The results confirm the hypothesis that constrained varieties exhibit shared syntactic patterns that differentiate them from the non-constrained variety. Notable similarities include phrasal sophistication (coordinating phrases and complex nominals) and a reduced level of complexity in sentence length and subordination. These patterns can be attributed to various constraining factors, such as increased cognitive load, cross-linguistic influence, and stylistic standardization. Furthermore, translation and EFL display distinct features, suggesting different levels of constraints at play.

The analysis sheds empirical light on the concept of constrained communication by revealing significant syntactic similarities between second language production and translation. Exploring potential explanations highlights the intricate interplay of various constraining factors that shape the use of constrained language. By adopting a unified framework of constrained communication, this investigation contributes to the ongoing discussion on complexity and simplification in second language production and translation, promoting convergence between these traditionally separate fields for a deeper understanding of the complex dynamics of constrained language use.

It is important to consider several limitations when interpreting the findings. Firstly, the data used in this study is limited to published news articles, which means the observed patterns may reflect the specific writing standards and editing processes employed by news agencies (Bisiada, 2018; Kruger and Rooy, 2018). Caution should be exercised when generalizing the findings to other registers. In addition, the study focuses solely on the English/Chinese language pair, which may result in language-dependent conclusions. Further investigations encompassing a broader range of registers and language pairs would benefit the study of constrained language use. Future studies employing a parallel corpus design can help validate the proposed explanations put forth in this research. Another limitation pertains to the scarce metadata regarding translators and EFL writers. While Lanstyák and Heltai (2012) primarily discussed the influence of a second language (L2) on a first language (L1) in their concept of "constrained communication," this study concentrates on the reverse effect. Specifically, we analyze how the first language (L1) of Chinese writers impacts their second language (L2) output in EFL writing. In the Chinese context, L1-L2 translation is more prevalent. However, determining the linguistic backgrounds of translators proved challenging. For example, the names of translators from Sixth Tone suggest they are likely non-native Chinese speakers, indicating a translation direction from L2 to L1. Conversely, translator data from Global Times was unavailable, obscuring the directionality of the language. This potential variability highlights the need for additional research to examine the influences of translation direction and translators' linguistic backgrounds on language production. This study utilizes a comparable corpus approach to investigate syntactic complexity across three English varieties. To enhance the methodology, future research could adopt a parallel corpus-based approach for the TE dataset. This approach involves the collection of aligned source texts and their corresponding translations, facilitating the validation of hypotheses about the transfer of syntactic features from source to target languages. Such a methodological enhancement could provide more robust evidence for cross-linguistic influence in translated language production, thereby further substantiating claims regarding translational output.

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Data availability

Data concerning the study are publicly available on Open Science Framework (https://osf.io/udc2p/).

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