Diachronic Changes in the Syntactic Complexity of Argumentative Writing by Chinese English Major Students

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Abstract

To investigate the diachronic changes in syntactic complexity in argumentative writing by Chinese English-major students, this study takes the English-major writing subcorpus of the Chinese Learner English Corpus (CLEC) and a self-built contemporary corpus of argumentative writings by English-major students as research objects. Based on the 14 syntactic complexity measures proposed by Lu, a diachronic comparison is conducted on the syntactic complexity features in argumentative writing by junior English-major students two decades ago and at present. The results reveal that no significant differences exist between learners of the two periods in such measures as unit length, sentence complexity and the use of subordinate structures, and the complexity of verb phrases remains relatively stable. In contrast, the complexity of coordinate structures and noun phrase structures is significantly higher in contemporary texts than in texts from 20 years ago. The study indicates that changes in the teaching environment and language input conditions for writing in recent years have to some extent facilitated learners' expansion of syntactic expressions, yet the development of subordinate structures remains relatively slow. The findings can provide references for optimizing the focus of syntactic complexity training in English-major writing instruction.

Keywords

English majors, argumentative writing, syntactic complexity, diachronic change, corpus

1.   Introduction

In the field of second language acquisition (SLA), writing ability is generally regarded as an important dimension for measuring learners' language proficiency. As one of the core measures for evaluating second language writing (L2 writing), syntactic complexity not only reflects learners' mastery of the target language syntactic resources, but also demonstrates their ability to convey complex meanings in the process of discourse construction. Concerning the definition and measurement of syntactic complexity, the research paradigm has gradually shifted from early coarse-grained measures to multi-dimensional fine-grained measures.

Notably, syntactic complexity is not a static feature but is closely associated with the teaching environment, language input conditions and writing training modes [14]. Over the past two decades, English-major education in China has undergone continuous adjustments in curriculum systems, training objectives

and evaluation mechanisms, and the philosophy of writing teaching has gradually shifted from form-oriented to discourse and meaning-oriented. Against the background of more diversified input conditions and reforming teaching models, whether syntactic complexity in argumentative writing by English-major students has changed has become an issue worthy of systematic investigation.

Most existing studies focus on the synchronic dimension, with insufficient attention paid to the developmental trends of syntactic complexity in writing by English-major students over a long time span. In view of this, this study adopts a diachronic perspective, takes the CLEC corpus as a reference, and constructs a self-built contemporary corpus of argumentative writings by English-major students for comparison. It systematically examines the differences in syntactic complexity measures across different periods, aiming to provide empirical evidence for the optimization of L2 writing instruction.

2. Literature Review

Syntactic complexity refers to the complexity, elaboration and diversity of syntactic structures demonstrated by learners in written production. It is an important measure for evaluating the writing quality and language proficiency of undergraduate English-major students. Over the past four decades, research on syntactic complexity in L2 writing has formed three core lines of inquiry, which have provided key empirical evidence for L2 writing teaching and ability assessment.

The first line is research on the construction of measurement indices. Wolfe-Quintero et al. (1998) systematically reviewed more than one hundred complexity-related measures, laying a foundation for the selection of measurement tools. Subsequently, Lu (2010) established a multi-dimensional syntactic complexity index system based on corpus methods and developed the automatic analysis tool L2SCA, improving the objectivity and operability of measurement. On this basis, Biber et al. (2011) criticized the limitation of traditional measures that over-rely on the clausal level, reconstructed a phrasal-level index system suitable for L2 academic writing through academic discourse comparison, and proposed a theoretical model of developmental stages of complexity. Such studies have promoted the conceptualization and measurement of syntactic complexity and provided a foundation for empirical research.

The second line is validity verification of competence correlation, aiming to clarify the internal relationship between syntactic complexity and language development. Lu (2011) systematically verified the discriminant validity for language proficiency of syntactic complexity measures through longitudinal analysis of ESL learner corpus data, identifying core measures such as clause density and length of T-unit. Qin and Bi confirmed the significant predictive power for writing quality of measures including clause length through analyzing compositions by English-major students. Xu et al. (2013) found that the developmental features of syntactic complexity are highly correlated with writing proficiency through comparing corpus data from lower- and upper-grade English majors. By testing the validity of syntactic complexity, these studies have established its status in L2 writing.

The third line is analysis of influencing factors, which has achieved fruitful outcomes from diverse perspectives. Relevant studies show that variables including writing experience, learning environment and task complexity exert significant effects on syntactic complexity. Some studies also point out that syntactic complexity performance varies across different genres and time constraint conditions. This line of research reveals that syntactic complexity is not a single ability measure but the result of the interaction between individual factors and task situational factors of learners.

In summary, existing studies have yielded systematic findings in the construction of measurement indices, validity verification of competence correlation and analysis of influencing factors. Nevertheless, studies examining syntactic complexity from a temporal perspective remain relatively limited, with only a few adopting a diachronic perspective. For instance, Zhu and Wang (2013) detected a non-linear developmental trend in lexical complexity in writing by English-major students through a four-year longitudinal study. Furthermore, under the background of curriculum restructuring and pedagogical transformation in China's foreign language education, whether learners' syntactic complexity has undergone structural evolution still needs to be verified. Accordingly, this study takes argumentative writing by junior Chinese English-major students as the research object, constructs a diachronic comparative corpus, and systematically compares the syntactic complexity of learners in different historical periods. It addresses four research questions:

1) Are there significant differences in unit length and sentence complexity in argumentative writing by Chinese English-major students across different periods?

2) Are there significant differences in the use of subordinate structures?

3) Are there significant differences in the use of coordinate structures?

4) Are there significant differences in the use of specific phrase structures?

3. Research Design

This study takes the advanced English-major writing subcorpus (ST6) of the Chinese Learner English Corpus (CLEC) and the self-built contemporary corpus of argumentative writings by English-major students as research materials. Two subcorpora, namely CSW (CLEC ST6 Writing) and AWJ (Academic Writer Junior), are established respectively to conduct a systematic comparison of syntactic complexity features in argumentative writing by junior English-major students two decades ago and at present. Information on the corpora used in this study is presented in Table 1.

Table 1: Basic Information of the Corpora

Corpus	Number of texts	Number of characters
CLEC ST6 Writing (CSW)	60	74,087
Academic Writer Junior (AWJ)	302	83,478

The CSW corpus consists of 60 valid texts randomly selected from the CLEC ST6 subcorpus, covering the period from the late 1990s to the early 2000s. All texts were argumentative writings completed by junior English-major students under untimed writing conditions. The AWJ corpus was compiled from argumentative writings collected from junior English-major students at a university in central China, based on a unified writing task. After text cleaning and invalid sample elimination, 302 valid texts were finally included. The two corpora are consistent in genre, writing conditions and grade level, thus controlling the interference of task variables and learning stage differences on the results to the greatest extent, and ensuring the validity and comparability of the diachronic comparison.

For data analysis, the corpus was analyzed using the syntactic complexity analyzer L2SCA (Lu, 2010), which extracted raw data for 14 syntactic complexity measures covering four dimensions: sentence length, subordinate structures, coordinate structures, and phrase structure complexity. The raw data were subjected to normality test and homogeneity of variance test via SPSS. On the premise of satisfying parametric test assumptions, independent samples t-test was adopted to compare and analyze the syntactic complexity measures between the two corpora. The significance level was set at $\alpha = 0.05$ to evaluate the practical significance of the differences.

4. Results and Discussion

4.1 Unit Length and Sentence Complexity

The use of unit length and sentence complexity in argumentative writing by junior English-major students over the past two decades is presented in Table 2, and the comparative results are shown in Table 3.

Table 2: Results of Unit Length and Sentence Complexity Analysis for CSW and AWJ

Measure		M±SD	
		CSW	AWJ
Unit Length	MLS	17.66±3.18	17.50±2.83
	MLT	16.42±2.91	16.30±2.60
	MLC	10.43±1.33	10.70±2.14
Sentence Complexity	C/S	1.70±0.24	1.67±0.31

Table 3: Comparative Results of Unit Length and Sentence Complexity Between CSW and AWJ

Measure		t	df	p(2-sided)	CI
Unit Length	MLS	-0.83	360	0.71	[-0.96, 0.65]
	MLT	-0.32	360	0.75	[-0.86, 0.62]

	MLC	0.94	360	0.35	[-0.30, 0.84]
Sentence Complexity	*C/S*	-0.63	360	0.53	[-0.11, 0.06]

As can be seen from the data in Tables 2 and 3, the mean values of all measures of unit length and sentence complexity for junior English-major students 20 years ago and at present are similar, with no significant differences, indicating an overall consistent performance.

This finding is consistent with the conclusions of Wolfe-Quintero et al. (1998) and Jiang and Wang. This phenomenon can be explained by the developmental sequence theory of syntactic complexity proposed by Biber et al. (2011). According to this theory, learners' syntactic development follows a gradual path from simple to advanced. Basic syntactic measures, such as sentence length, the use of basic clauses, and the frequency of simple syntactic structures, gradually reach maturity and stability after learners attain intermediate language proficiency, and do not improve significantly with short-term extension of study or increased learning duration. The theory further states that basic syntactic construction belongs to the early stage of language development. Once intermediate and advanced learners have completed the construction of the basic grammatical system and formed stable output habits, such basic syntactic measures enter a stable phase and no longer fluctuate noticeably with continued learning.

In addition, from the perspective of foreign language teaching, this phenomenon is highly consistent with the long-term practical characteristics of undergraduate English-major education in China. Over the past two decades, although the teaching mode of English majors has been continuously optimized in terms of teaching methods, curriculum design and assessment approaches, the training objectives and core requirements for basic syntactic competence have remained stable without essential changes (Chang & Chang, 2020). Meanwhile, the writing texts selected in this study were all from undergraduate students at the same stage, whose linguistic foundations and curriculum systems were relatively consistent and unaffected by learning stage factors. Therefore, no significant diachronic changes were naturally observed in unit length and sentence complexity measures. Accordingly, the relative stability of unit length and sentence complexity among intermediate and advanced English learners results from the combined effects of the developmental stage of second language syntactic development and the foreign language teaching environment.

4.2   Subordinate Structures

The use of subordinate structures in argumentative writing by junior English-major students over the past two decades is shown in Table 4, and the comparative results are presented in Table 5.

Table 4: Statistical Results of Subordinate Structure Use in CSW and AWJ

Measure		M±SD	
		CSW	AWJ
Subordinate Structure	*CT/T*	0.39±0.10	0.40±0.16
	C/T	1.58±0.19	1.55±0.27
	DC/C	0.33±0.06	0.33±0.11
	DC/T	0.53±0.16	0.53±0.26

Table 5: Comparative Results of Subordinate Structure Use Between CSW and AWJ

Measure		t	df	p(2-sided)	CI
Subordinate Structure	*CT/T*	0.23	360	0.82	[-0.04, 0.05]
	C/T	-0.57	360	0.57	[-0.09, 0.05]
	DC/C	-0.25	360	0.80	[-0.03, 0.02]
	DC/T	0.16	360	0.87	[-0.06, 0.07]

As revealed by the data analysis in Tables 4 and 5, the mean values of the four subordinate structure measures for junior English-major students 20 years ago and at present are similar and show no significant differences, indicating consistent performance in the frequency and complexity of subordinate structure use.

This result suggests that the current cohort of learners is at the same developmental level as the cohort 20 years ago in the use of subordinate structures and syntactic construction competence, with no obvious advantages. The above phenomenon mainly stems from the acquisition difficulty caused by syntactic differences between English and Chinese and long-standing deficiencies in the teaching structure.

English and Chinese differ considerably in syntax. As a typical isolating language, Chinese does not rely on inflection to mark grammatical relations and prefers coordinate structures. Such mother tongue thinking transfer makes it difficult for L2 learners to produce subordinate structures conventionally used by English native speakers when constructing complex clauses. As noted in Lei's (2017) study, this difficulty has persisted throughout the English-major curriculum over the past two decades without systematic resolution, forming a bottleneck restricting the upper limit of syntactic competence. Second, there is a lack of targeted training and pragmatic input on subordinate structures in professional teaching. Despite continuous updates to the curriculum and pedagogical philosophy in English-major writing instruction over the past two decades, a significant teaching gap remains in the pragmatic practice of subordinate structures. Learners generally lack sufficient opportunities to transform theoretical knowledge into natural production, resulting in superficial development of this ability. This dilemma is consistent with the longitudinal findings of Xu et al. (2013), who reported a marked slowdown in the development of subordinate structure use among Chinese undergraduate English-major students.

Notably, the findings regarding subordinate structures are theoretically consistent with the developmental sequence theory of syntactic complexity proposed by Biber et al. (2011). L2 learners face challenges such as negative transfer of mother tongue and insufficient input quality when acquiring subordinate structures as advanced syntactic structures. Therefore, the consistent performance of groups in this study not only confirms the current difficulties in teaching and acquisition but also empirically supports Biber et al.'s (2011) prediction regarding the acquisition difficulty of subordinate structures.

4.3   Coordinate Structures

The use of coordinate structures in argumentative writing by junior English-major students over the past two decades is displayed in Table 6, and the comparative results are shown in Table 7.

Table 6: Statistical Results of Coordinate Structure Use in CSW and AWJ

Measure		M±SD	
		CSW	AWJ
Coordinate Structure	*CP/C*	0.30±0.12	0.37±0.16
	CP/T	0.47±0.18	0.56±0.24
	T/S	1.08±0.07	1.08±0.09

Table 7: Comparative Results of Coordinate Structure Use Between CSW and AWJ

Measure		t	df	p(2-sided)	CI
Coordinate Structure	*CP/C*	2.85	360	0.01*	[0.02, 0.11]
	CP/T	2.67	360	0.01*	[0.02, 0.16]
	T/S	0.02	360	0.09	[-0.02, 0.02]

*Note: * indicates a significant difference (p < 0.05).*

As indicated by the data in Tables 6 and 7, significant differences exist between junior English-major students 20 years ago and at present in the CP/C and CP/T measures of coordinate structures, whereas the T/S measure shows similar mean values with no significant difference.

Over the past two decades, with the continuous enrichment of foreign language teaching resources and the ongoing renewal of teaching philosophy, contemporary English-major education has placed greater emphasis than before on diversity of syntactic expression and the expansion of sentence length, and long sentence construction has become an important training objective in writing instruction. Driven by this teaching orientation, students have gradually attempted to use longer and more varied sentences in writing, thus contributing to a significant increase in the frequency of coordinate structure use. However, constrained by syntactic differences between English and Chinese and deep-rooted mother tongue thinking, Chinese learners struggle to naturally master subordinate structures characterized by prominent hypotaxis in English, and tend to extend sentences by using coordinate structures, which are closer to Chinese parataxis and operationally easier. Consequently, coordinate structures have become learners' primary choice for expanding sentence length and enriching expression.

For this reason, during the two-decade diachronic development, learners' use of coordinate structures has shown a clear upward trend, while the frequency of subordinate structure use has not increased significantly and has remained relatively stable. Meanwhile, the data show no significant change in the T/S measure,

which is mainly due to the objective constraints of timed writing. Under fixed time constraint conditions in examinations and classroom writing, learners struggle to devote sufficient cognitive resources to constructing complex subordinate structures. Therefore, even though teaching encourages long-sentence production, the sentence length in students' English writing has not improved noticeably.

In summary, the significant increases in the CP/C and CP/T measures under the coordinate structure dimension and the stability of multiple measures under the subordinate structure dimension result from the combined effects of teaching orientation, resource conditions and mother tongue thinking, reflecting the characteristics and challenges in the development of syntactic complexity among Chinese English learners.

4.4   Specific Phrase Structures

The use of phrase structures in argumentative writing by junior English-major students over the past two decades is presented in Table 8, and the comparative results are shown in Table 9.

Table 8: Statistical Results of Phrase Structure Use in CSW and AWJ

Measure		M±SD	
		CSW	AWJ
Phrase Structure	*CN/C*	1.23±0.25	1.48±0.42
	CN/T	1.94±0.49	2.25±0.52
	VP/T	2.19±0.31	2.14±0.42

Table 9: Comparative Results of Phrase Structure Use Between CSW and AWJ

Measure		t	df	p(2-sided)	CI
Phrase Structure	*CN/C*	4.52	360	<0.01	[0.14, 0.37]
	CN/T	4.23	360	<0.01	[0.16, 0.45]
	VP/T	-0.84	360	0.40	[-0.16, 0.06]

As can be seen from the data in Tables 8 and 9, the mean values of CN/C and CN/T for contemporary junior English-major students are significantly higher than those for students 20 years ago, with significant differences. However, the VP/T measure shows similar mean values with no significant difference between the two groups.

The significant improvement in contemporary students' ability to use noun phrases fully reflects the positive changes in English-major writing teaching and learning environments in China over the past two decades. With the continuous enrichment of foreign language education resources, students have gained access to more standardized noun phrase structures consistent with academic writing conventions, providing sufficient and authentic language input for accurately understanding and internalizing English usage knowledge. At the same time, English writing teaching in recent years has increasingly emphasized the cultivation of academic language competence and the deep integration of lexical knowledge and syntactic structures. Driven by this teaching orientation, teachers have consciously guided students to learn strategies for expanding noun phrases, helping learners shift from simple expression to more compact and formal expression. This developmental trend aligns with the view of lexical-syntactic interactive development in academic English proposed by Lu and Xu (2016), confirming that high-quality input and goal-oriented teaching promote learners' phraseological competence.

In contrast, no significant diachronic difference was found in verb phrase competence over the two decades. This result does not imply that learners' verb phrase competence has not developed, but is caused by multiple factors. First, the use of verb phrases is strongly constrained by mother tongue grammatical structures. Obvious differences exist between the Chinese and English verb systems in terms of lexical collocation and syntactic function, making it difficult for learners to break through usage habits brought by mother tongue transfer and resulting in relatively slow development of verb phrases (Lian, 2010). Second, verb phrases have long been a core component of grammar and vocabulary teaching for English majors, with stable teaching focuses and core requirements over the two decades. Students from different periods received similar practice, leading to stable overall performance. Taken together, the significant improvement in noun phrase competence and the stability of verb phrase competence demonstrate the positive effects of the transformation in academic writing teaching, while revealing the unbalanced characteristics of phrase structure development among Chinese English learners.

5. Conclusion

Based on the CLEC corpus and a self-built contemporary corpus of argumentative writings by English-major students, this study conducted a diachronic comparative analysis of syntactic complexity features in argumentative writing by Chinese junior English-major students across different periods. The results show no significant differences between learners of the two periods in measures such as unit length, sentence complexity and subordinate structure use, and verb phrase complexity also remained relatively stable, indicating that these basic syntactic competencies have stabilized at this learning stage. In contrast, the complexity of coordinate structures and noun phrase structures was significantly higher in contemporary texts than in texts from 20 years ago, indicating improved mastery of these two types of syntactic resources among current learners.

These findings partly reflect the impact of changes in the teaching environment and language input conditions for English-major writing over the past two decades on learners' syntactic development. On the one hand, the emphasis in teaching on syntactic diversity and compact academic expression may have promoted learners' development in coordinate structure use and noun phrase expansion. On the other hand, the lack of noticeable improvement in subordinate structure use suggests that such structures still pose considerable challenges in the development of learners' writing ability. Therefore, future writing teaching may strengthen systematic training on subordinate structures while continuing to focus on noun phrases and diversified syntactic expression, so as to further promote the balanced development of learners' syntactic complexity.

It should be noted that the contemporary corpus of this study was mainly sourced from students at a single university, which imposes certain limitations on corpus representativeness. Future research may further expand corpus sources by including writing data from learners at different types of universities in different regions and conduct comprehensive analyses with more diachronic data to obtain more robust and generalizable conclusions.

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Conflicts of Interest

The authors declare no conflict of interest.

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