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Effects of Task Complexity on the Second Language Collaborative Writing

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Nowadays, collaborative writing has gained much attention of many scholars. And task complexity is a crucial factor that influences second language (L2) writing. However, little research has explored how task complexity affects the quality of L2 collaborative writing. This study investigates the impact of task complexity on syntactic complexity, lexical complexity, and accuracy of the second language collaborative writing. English learners (N = 50) in a Chinese university were required to complete two writing tasks collaboratively: a simple task and a complex task. Through analyzing their compositions, we found that task complexity has a significant impact on syntactic complexity and high complexity writing tasks help increase the syntactic complexity of second language collaborative writing. However, task complexity has little impact on lexical complexity and accuracy. The accuracy of writing tasks is largely influenced by the task requirements. The research results may enhance the understanding of collaborative writing and task complexity and provide valuable guidance for the second language teaching.

Keywords: collaborative writing, task complexity, syntactic complexity, lexical complexity, accuracy

Introduction

In recent years, a novel language teaching approach called collaborative writing has gained prominence in second language (L2) contexts to enhance language proficiency and writing skills. In a collaborative class, students have opportunities to work with their partners on the assigned tasks, sharing their ideas, talking about sentences structures, and selecting appropriate words. The role of collaborative writing has been confirmed by scholars at home and abroad in their empirical studies (Fernández Dobao, 2012; Nassaji & Tian, 2010; Zhu & Xu, 2019). Task complexity is also a critical factor that influences writing outcomes, which affects learners' engagement, interaction, and linguistic output. Scholars have found a significant difference in lexical complexity, syntactic complexity, accuracy, and fluency between the writing tasks of different complexity. However, little research has been done on how task complexity affects the L2 collaborative writing performance. Therefore, this study aims to explore the effect of task complexity on L2 collaborative writing performance. We intend to answer the following questions:

1. Does task complexity affect the syntactical complexity of EFL learners' collaborative writing task performance?

2. Does task complexity affect the lexical complexity of EFL learners' collaborative writing task performance?

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3. Does task complexity affect the accuracy of EFL learners' collaborative writing task performance?

Collaborative Writing and Complexity

In the second language class, collaborative writing tasks require learners to work in pairs or groups to produce written essays or texts. Learners work together during the whole process, discussing vocabulary, grammar, and sentence structure. A considerable number of studies have reported the positive effect of collaborative writing on L2 writing performance. Storch and Wigglesworth (2003) found that L2 collaborative writing helped learners improve their writing skills. Fernández Dobao (2012) examined the effect of collaborative work in pairs or groups on the fluency, complexity, and accuracy of the written texts produced. Results showed that the texts written by the pairs or groups were more accurate than those written individually. In Nassaji and Tian's study (2010), learners were found that completing the tasks collaboratively led to a greater accuracy of task completion than completing them individually, but no significantly greater gains of lexical knowledge than individual tasks.

Chinese scholars have also focused on the role of collaborative writing in language learning contexts. They found that collaborative writing improves students' writing skills, quality of production, and enhance their confidence (Zhang, 2006; Wu & He, 2014). Wu and Gu (2011) revealed in their study among non-English majors that collaborative writing effectively decreased students' anxiety, thus promoting their desire for writing. Zhu and Xu (2019) conducted an empirical study on the collaborative performance of the experimental group and control group among university students. They found that the language accuracy and fluency of all students significantly increased. In terms of complexity, only lexical sophistication improved significantly, while the lexical variety, lexical density, and syntactic complexity did not change significantly.

Complexity has become an important aspect to evaluate learners' second language writing proficiency. Syntactic complexity refers to the changes in language form and the degree of complexity in language production, which can be used to assess the language proficiency. Lexical complexity focuses on the language output in terms of lexical diversity and complexity. Skehan (1998) defined task complexity as the degree of cognitive processing required to complete a task. He found that task complexity had a significant effect on writing performance. Students who worked on complex tasks performed better. Ellis (2003) argued that task complexity affects the way learners approach the writing task. He suggested that learners engage in either top-down or bottom-up processing depending on the complexity of the task. Frear and Bitchener (2015) examined the relationship between increases in cognitive task complexity and the writing of intermediate L2 writers of English. The findings revealed a significant effect of task complexity on decreases in syntactic complexity. Kormos (2011) investigated the differences in the writings of the upper-intermediate foreign language learners and native speakers, and found that their differences are mainly subject to lexical variety and lexical sophistication.

Complexity has also gained much attention of many Chinese scholars. Lei (2017) conducted a comparative study on levels of 10 syntactic complexity indices in the MA theses and Ph.D. dissertations by English learners and native speakers. He found that some of the complexity measures in the writings by Chinese authors are significantly different from those of their native English-speaking counterparts. Zhang and Jiang (2020) investigated the impact of task complexity on the syntactic complexity, lexical complexity, and accuracy of L2 writing. He found that high complexity tasks are better at examining the language proficiency of L2 learners;

high complexity tasks will help increase the syntactic complexity of L2 writing, but has little influence on lexical complexity and accuracy.

While much research has been done on task complexity and L2 collaborative writing, little is known about how these two factors interact. The investigation of the link between task complexity and L2 collaborative writing is of great significance for language pedagogy.

Methods

Participants

The study was conducted in a course of College English in a Chinese university. A total of 50 first-year students aged 18-19 participated in the study. These students majoring in administration, design, communications, industrial engineering, and medical imaging volunteered to enroll in this course. Their proficiency had been measured via the placement test by the university and test results showed that they were at intermediate level of proficiency. All the participants had learned English as a foreign language for at least nine years and none of them had studied in an English-speaking country.

Experimental Design

Two writing tasks, i.e., a simple task and a complex task, were assigned to participants to assess their collaborative writing performance. Two tasks were based on Kuiken and Vedder (2008), but the setting was changed to the Chinese context. Participants had to write a letter to a foreign friend regarding his trip to China. In the first week, participants completed the simple task, introducing China without any additional requirements. Two weeks later, they were assigned to complete the complex task. In the second letter, they had to choose a restaurant, and their choice should take some requirement into accounts, such as restaurant profile and personal preferences. The letter had to comprise a minimum of 150 words. There was a time limit of 40 minutes and the use of dictionaries was allowed.

The task complexity variables manipulated in this study are the number of elements (+/- number of elements) and reasoning requirements (+/- reasoning demands). The simple task does not involve the manipulation of the above variables. The participants only need to complete the task based on their language and cultural knowledge; the complex task considers the cognitive difference when making the best choice from two restaurants according to the established requirements.

Data Collection and Analysis

The syntactic complexity, lexical complexity, and accuracy were analyzed to investigate the impact of task complexity on the L2 collaborative writing performance.

Table 1

Syntactic Complexity Indices

Length of sentential units	Mean length of clauses (MLC)
	Mean length of sentences (MLS)
	Mean length of T-units (MLT)
Dependent clauses	Clause per T-units (C/T)
	Dependent clause ratio (DC/C)
Coordinate phrases	Coordinate phrases per clause (CP/C)
	Coordinate clause ratio (T/S)
Phrasal constructions	Complex nominals per clause (CN/C)

Complexity analysis. The syntactic complexity and lexical complexity were analyzed in this study. Regarding the syntactic complexity measures, the present study examined syntactic complexity as a multi-dimensional construct using the L2 syntactic complexity analyzer (L2SCA) (Lu, 2010; 2011). The syntactic organization was examined at the sentential, clausal, and phrasal levels. Eight indices of syntactic complexity are presented in Table 1.

We also examined the lexical complexity using L2SCA and selected eight indices from all 25 indices as shown in Table 2.

Table 2

Lexical Complexity Indices

Lexical sophistication	Lexical sophistication-II (LS2)
	Verbal sophistication-1 (VS1)
Lexical diversity	Mean segmental type-token ratio 50 (MSTTR-50)
	Verbal variation-II (VV2)
	Noun variety (NV)
	Adjective variety (AdjV)
	Adverb variety (AdvV)
	Modifier variety (ModV)

Accuracy analysis. The accuracy of second language writing output was measured by the proportion of correct T-units in the total T-units (error-free T-units/T-units). To analyze the errors, we divided the errors into two categories: lexical errors and syntactic errors. Lexical errors include the errors in spelling, number of nouns, articles, collocations, and misuse of parts of speech, etc. Syntactic errors refer to missing or redundant elements, wrong tenses, and subject-verb disagreement, etc.

Results and Discussion

This study was conducted to investigate the possible link between the task complexity and the quality of collaborative output. All the participants completed the simple and complex tasks and produced two essays of similar length, 190 words and 181 words respectively, which indicates that the task complexity has no significant impact on the language output of collaborative writing.

Effect of Task Complexity on Syntactical Complexity

Table 3

Comparison of syntactic complexity in two tasks

Syntactic complexity	Indices	Simple task	Complex task
Length of sentential units	Mean length of clauses (MLC)	8.85	8.07
	Mean length of sentences (MLS)	14.38	16.03
	Mean length of T-units (MLT)	13.67	13.68
Dependent clauses	Clause per T-units (C/T)	1.55	1.69
	Dependent clause ratio (DC/C)	0.36	0.37
Coordinate phrases	Coordinate phrases per clause (CP/C)	0.21	0.13
	Coordinate clause ratio (T/S)	1.05	1.17
Phrasal constructions	Complex nominals per clause (CN/C)	1.15	0.78

Table 3 shows the results of eight indices on syntactic complexity of simple and complex tasks. The experimental data indicate that in terms of syntactic complexity, the complex task was generally slightly higher than the simple task. As shown in Table 3, the complex task significantly exceeded the simple task in the mean length of sentences (MLS), the number of clauses per T-units (C/T), and the coordinate clause ratio (T/S), while the mean length of T-units (MLT) and the dependent clause ratio (DC/C) were only slightly higher than those in the simple task. However, the experiment found that the complex task was lower in the mean length of clauses (MLC), coordinate phrases per clause (CP/C), and complex nominals per clause (CN/C) compared to the simple task.

From the above data, we can see that the task complexity has a certain impact on the syntactic complexity of second language writing. The number of clauses and the ratio of coordinate sentences in the complex task are significantly higher than in the non-complex task, which is consistent with the findings of Zhang and Jiang (2020). This suggests that complex tasks encourage English learners to use more complex sentence structures, resulting in longer sentences. The increased use of longer sentences can help English learners enhance their logical thinking and express more complex ideas. However, the results also show that although the number of clauses has increased, the length of the clauses has decreased due to the higher complexity of tasks. A possible explanation for this may be that learners have more freedom to decide their ideas included in the text production of the non-complex task, whereas the requirements of the complex task restrict the inclusion of their ideas.

Effect of Task Complexity on Lexical Complexity

Table 4

Comparison of Lexical Complexity in Two Tasks

Lexical complexity	Indices	Simple task	Complex task
Lexical sophistication	Lexical sophistication-II (LS2)	0.42	0.33
	Verbal sophistication-1 (VS1)	0.08	0.06
Lexical diversity	Mean segmental type-token ratio 50 (MSTTR-50)	13.42	9.34
	Verbal variation-II (VV2)	0.07	0.06
	Noun variety (NV)	0.36	0.24
	Adjective variety (AdjV)	0.8	0.7
	Adverb variety (AdvV)	0.3	0.4
	Modifier variety (ModV)	0.11	0.1

Table 4 shows the eight indices on the lexical complexity of the simple task and the complex task. As can be seen, the lexical sophistication and variety of the complex task were lower in all indices except the adverb variety compared to the simple task. There was a significant difference in the mean segmental type-token ratio (MSTTR) (13.42 versus 9.34), with lower lexical sophistication and noun variety. The results indicate that the task complexity does not have a significant impact on English learners' performance in lexical complexity. No significant difference was found in most indices of complex tasks compared to those of non-complex tasks. The lower mean segmental type-token ratio (MSTTR), lexical sophistication, and noun sophistication suggest that lexical complexity is easily influenced by the writing requirements. The complex task provides the learners with specific requirements for restaurants and personal preferences, which has significantly restricted the content of their writing. To fulfill the task requirements, learners may choose to use relevant vocabulary and some of them may be used repeatedly. In contrast, the non-complex task, which has no specific requirements, allows learners greater freedom to write, thus resulting in higher lexical sophistication and variety.

Effect of Task Complexity on Accuracy

Accuracy analysis shows that the task complexity has a certain impact on accuracy of the second language production. The complex task enjoyed a higher degree of accuracy than the non-complex task. The lexical and syntactic accuracy of the complex task reached 0.82 and 0.85 compared to 0.71 and 0.76 of the non-complex task respectively. This finding may be explained by two reasons. First, restricted by the task requirements, learners seem to have more time to polish their written text instead of spending much time on the ideas included. Second, learners may refer to the given information about restaurants, thus increasing the accuracy of their production. Error analysis also confirms the effect of task requirements on the accuracy of two tasks. Fewer errors were found in spelling and collocation in the complex task, and errors were more focused on the subject-verb agreement. This type of errors may be due to the influence of the native language transfer.

Conclusion

To explore the link between task complexity and collaborative writing, this study was conducted among college students in a Chinese university on the effect of task complexity on syntactic complexity, lexical complexity, and language accuracy of collaborative writing tasks. These students were required to work collaboratively on a simple task and a complex task. The research results showed that the task complexity has a significant impact on syntactic complexity. The second language output of high complexity writing tasks is more complex in terms of syntax, which can better stimulate learners' potential of writing. It was also found that the complexity of writing tasks has a relatively small impact on the lexical complexity and accuracy of second language writing output, and lexical complexity and accuracy are largely influenced by the task requirements.

Since high complexity writing tasks work better at improving learners' writing ability, in the second language class, teachers can assign more complex tasks of different types, such as summary writing tasks and continuation writing tasks, which help learners imitate the vocabulary and ways of expression in the original readings. This study can also help teachers deepen the understanding of collaborative writing and better apply it into their classroom instruction to stimulate learners' potential, thus producing more satisfying outcomes.

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