

# **Education, Sustainability & Society (ESS)**

DOI: http://doi.org/10.26480/ess.02.2021.77.80



ISSN: 2617-9415 (Online) CODEN: ESSDAX

RESEARCH ARTICLE

## EFFECTS OF TASK COMPLEXITY ON CHINESE EFL WRITING

#### Hui Liu\*

Qingdao Foreign Language Department, Qingdao University, Qingdao 266000, China. \*Corresponding Author E-mail: 6265988@qq.com

This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

#### ARTICLE DETAILS

#### Article History:

Received 14 September 2021 Accepted 18 October 2021 Available online 21 October 2021

#### ABSTRACT

The current study explores the effects of task complexity on senior high school students' writing performance. The participants were 60 Chinese senior high school EFL students. The variable of task complexity is based on the combination of reasoning demands and prior knowledge aspects and the writing performance is measured by syntactic complexity. The results show that the participants produced more complex syntactic structures in task with higher complexity. Meanwhile, the participants' perception of task complexity can influence the production of writing.

#### **KEYWORDS**

Task Complexity, EFL Writing, Syntactic Complexity.

### 1. Introduction

Recently, the effects of task complexity on language complexity are a hot issue in the field of second language acquisition. Empirical studies concerning the relationship between task complexity and L2 written performance usually carried out from Skehan and Foster's (2001) Limited Attentional Capacity model and Robinson's (2001; 2005; 2011) Cognition hypotheses, both of which primarily explores the effects of task complexity on oral production, and are gradually used to exam the impact of written performance. As for the writing performance, complexity, accuracy and fluency (CAF) is an important measure.

### 1.1 The cognition hypothesis v. limited attentional capacity model

The Limited Attentional Capacity Model posits that humans have limited information processing capacity so that the more complex tasks require them to pay more attention. It means that facing with a complex task, the learner will rely on the use of acquired knowledge to meet the processing demands for learners. Thus, more complex task means more fluency but less complexity and accuracy. In Cognition Hypothesis, the Triadic framework supplies a way for description of task design with the respect of three axes, i.e., task complexity, task difficulty and task condition (see in Figure 1) (Robinson, 2003; 2011). Task difficulty is different from task complexity: task complexity is controlled by task designer while task difficulty is the learner's perception of cognitive task demands. But all of them are significant factors that affect learner's performance. In terms of task complexity, there are two dimensions (resource-directing and resource-dispersing) and six features (see in Table 1).

Task designers can change the cognitive needs of learners during task execution along these two dimensions, i.e., increasing the task complexity along resource-directing can improve accuracy and complexity but weaken fluency; in contrast, an increase in task complexity along resource-dispersing aspect will lead to the weakening of CAF.

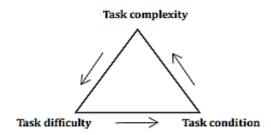


Figure 1: Triadic componential framework (Robinson, 2001b).

Table 1: Features of task complexity (Robinson, 2007)				
Resource-directing features	Resource-dispersing features			
± Here-and-now	± Planning time			
± Few elements	± Prior knowledge			
± Spatial reasoning	± Single task			
± Causal reasoning	± Task structure			
± Intentional reasoning	± Few steps			
± Perspective taking	± Interdependency of steps			

### 1.2 CAF

Since the middle of the 20th century, the study of syntactic complexity has attracted extensive attention in the linguistic field. Its definition was first proposed by as an overall measure of language development that includes complexity, accuracy and fluency (CAF) (Wolfe-Quintero et al., 1998). CAF are originally used as indexes to verify oral performance. However, there has been growing interest for researchers to explore writing performance.

Complexity generally includes lexical and syntactic complexity. Lexical complexity is usually associated with lexical diversity and sophistication

Quick Response Code	Access this article online			
□ 1/3/10 7/2/2/2/2 □ 20/2/2	<b>Website:</b> www.educationsustability.com	<b>DOI:</b> 10.26480/ess.02.2021.77.80		

and it has a positive relationship to writing performance (Arthur, 1979; Crossley and McNamara, 2012; Yu, 2010). In L2 writing field, syntactic complexity can be constructed generally as the variety and degree of sophistication of syntactic structures deployed in written production (Bulté and Housen, 2014; Lu, 2011; 2017; Ortega, 2003). That is the definition adopted in this research.

Some researchers defines fluency as "more words and structures are accessed in a limited time" (Wolfe-Quintero et al., 1998). And for accuracy, Skehan and Foster defines it as "freedom from error" (Skehan and Foster, 1996). The existing accuracy indicators are mainly divided into two dimensions: (1) Proportion of correct sentences in the full text; (2) Proportion of error sentences in the full text (Ellis and Yuan, 2004; Ishikawa, 2007; Kuiken and Vedder, 2008).

#### 1.3 Empirical studies on task complexity

In one hand, in terms of the relationship between task complexity and language performance, quite a few task designs are based on resource-directing aspect of the Cognition Hypothesis. Kuiken and Vedder examine the effects of reasoning demands and number of elements on CAF (Kuiken and Vedder, 2007; 2008; 2012). Partial replication of the study of chooses the same factors but different measures to exam the performance of learners (Kuiken and Vedder, 2007; 2008; 2012; Frear and Bitchener, 2015). The conclusion shows that learners produce more complex lexis and syntax in the process of more complex task, especially in the performance of adverbial dependent clause per T-unit.

Zalbidea chooses the number of elements and reasoning demands dimensions as independent variables and investigates the interactive effects of task complexity and task modality (Zalbidea, 2017). The conclusion is that task modality plays more robust role than task complexity. According to Zalbidea, task modality may best be viewed as an element of task complexity (Zalbidea, 2017). A group researchers' exam the learner's perception of different complex tasks in terms of number of elements and reasoning demands so as to verify the validity of task complexity (Jin et al., 2020). Findings show that the learner's perception of task difficulty differ from task complexity and the more complex task followed by the more accurate sentences. In previous studies, different results are remained because of different subjects, measures, and task designs.

In terms of reasoning demands and number of elements, in one hand, some researches hold the idea that increasing task complexity can improve language performance, such as; another group believes that task complexity either affect performance or has a negative impact on performance, such as (Frear and Bitchener, 2015; Kuiken and Vedder, 2012; Kuiken and Vedder, 2007; 2008; Jin et al., 2020; Zalbidea, 2017). Based on the divergence of conclusions about resource-directing aspect, this research chosen reasoning demands as one factor of task design.

On the other hand, as for the resource-dispersing dimension, the factors explored in previous studies are generally focused on planning time, prior knowledge and task familiarity. Task or topic familiarity is one of the presentations of prior knowledge in some research (Yang, 2014; Ruiz-Funes, 2015). With the respect of prior knowledge, Yang examines how the task and topic familiarity affect learner's L2 production (Yang, 2014). Factors in his research are six tasks according to the combination of personal, impersonal and context higher familiar, familiar and less familiar. One finding is that task familiarity is significantly related to syntactic complexity of global measures, i.e., articles on less familiar topics are significantly higher than articles on two more familiar topics.

Ruiz- Funes investigates topic familiarity in different genres (Ruiz- Funes, 2015). They view the genre as a factor of resource-dispersing aspect, namely task familiarity. The results show that the syntactic complexity increases as the task complexity increases. As for the study of task and topic familiarity, all hold the suggestion that more complex task means better language performance, that is, when learner meet unfamiliar topic or task demands, they will pay more attention to their content to avoid lexical or syntactic errors (Yang, 2014; Ruiz- Funes, 2015).

Recently, some researchers combine the resource-directing and resource-dispersing dimensions to explore the interactive effects on CAF. A group researcher verifies the effects of "number of elements and prior knowledge" on L2 writing (Wang et al., 2020). The result shows that, in one hand, increasing the number of elements lead to the decrease of verb phrase, lexical density and diversity; in another more prior knowledge of learner can produce more non-redundant word. Based on this finding, they believe that the Cognition Hypothesis and Trade-off Hypothesis still need to be verified. Zhang and Jiang distinguish task complexity from resource-

directing and dispersing dimensions, which includes seven factors in all (Zhang and Jiang, 2020). They find that the most complex task (continuation writing) is the best way to improve learner's writing. Another finding is that there is no relationship between task complexity and lexical complexity and accuracy, but it has a significant impact on syntactic complexity.

### 1.4 The present study

Under the Cognition hypothesis, whether the task design is based on the resource-directing or resource-dispersing dimension, the findings still remain inconsistent. Apart from this, the "prior knowledge" of resource-dispersing can be understood in various ways, but there is no researcher to define it as different types of tasks. In addition, few studies combine the reasoning demands and task familiarity as factors affecting EFL writing. So, the present study tries to investigate the effects of task complexity on EFL learner's writing performance by comparing two task types (applied writing v. continuation) in terms of syntactic complexity.

#### 1.5 Research questions

Does task complexity affect syntactic complexity of EFL writing?

Does the learner's perception of task difficulty affect the learner's writing performance?

#### 2. MATERIALS AND METHODS

#### 2.1 Tasks and questionnaires

According to the Cognition Hypothesis, two tasks of different complexity are designed in terms of resource-directing and resource-dispersing aspects respectively (Robinson, 2007). Reasoning demand and prior knowledge are selected as the independent variables of task design. The first task is traditional writing type named practical writing and the other is comparatively new type called continuation. In first task, participants were asked to recall an experience about picking activity. In the second task, participants need to continue writing according to the given story fragments to make it a complete. The detailed design features see in Table 2.

Table 2: The design of task complexity							
Task	Resource- directing Reasoning demand	Resource- dispersing	Task complexity				
		Prior knowledge					
Practical writing	-	+	Low				
Continuation writing	+	-	High				

There are three parts in the questionnaire, and each part includes 5 questions. The specific information sees in:

 $Question naire\ 1\ and\ Question naire\ 2$ 

1, I thought task 1/ task 2 was \_\_\_\_\_:

Not hard (2) somewhat hard (3) hard (4) very hard

2, I felt \_\_\_\_\_ doing task 1/ task 2:

(1) not relaxed (2) somewhat relaxed (3) relaxed (4) very relaxed

3, I did \_\_\_\_ on task 1/ task 2:

(1) not well (2) somewhat well (3) well (4) very well

4, Task 1/ task 2 was \_\_\_\_:

not interesting (2) somewhat interesting (3) interesting (4) very interesting

#### Questionnaire 3

- 1, (a) I thought task1 was hard / (b) I thought the task2 was hard;
- 2, (a) I felt relaxed doing task1 / (b)I felt relaxed doing task2;
- 3, (a) I didn't do well on task1 / (b) I didn't do well on task2;
- 4, (a) Task1 was interesting / (b) Task2 was interesting;
- 5, (a) I prefer doing task1 / (b) task2 in further study.

#### 2.2 Independent and dependent variables

The independent variables are two tasks of different complexity and learner's perception of tasks. The assumption of these two tasks is that increasing the task complexity along the resource-directing aspect, learner's syntactic complexity should be enhanced; while increasing the complexity along the resource-dispersing aspect, learner's syntactic complexity should be depressed. Due to these, the present study tries to combine the two aspects as an independent variable. The dependent variable is learner's syntactic complexity of their writing. The present study assume that learner can produce more complex syntax in task 2 than in task 1. The reason is that the core meaning of continuation is alignment, so their complex sentences were imitated when learners encountered the difficult of expression. Based on the assumption, the present study tries to explore the effects of increasing the task complexity on learner's written performance.

#### 2.3 Participants

Participants came from a second-year liberal arts class in a high school in Inner Mongolia. According to the average scores of the four English tests, the 30 participants in the experiment have comparatively similar English proficiency. Their ages ranged from 17 to 19 (mean age is 18) and there was an almost equal percentage of males (47%) and females (53%). The instructor is the same person among them.

#### 2.4 Procedures

The teacher gave out task 1 and task 2 in two sequencing English classes respectively. After the students completing task 1, they were asked to answer questionnaire 1. The steps of task 2 were the same as those of task 1. After completing the two writing tasks, students answered the third questionnaire. The teacher transcribed the handwritten writing into a word version, and used L2 Syntactic Complexity Analyzer to analyze the collected essays and draw conclusions (Lu, 2010).

#### 2.5 Measurements

The measurement of syntactic complexity is L2 Syntactic Complexity Analyzer (L2SCA), which was designed to automate syntactic complexity analysis of L2 English texts including five types and 14measures. The present study selected four measures (Mean length of clause, Number of clauses per T-unit, Number of coordinate phrases per T-unit, Number of clauses per sentence) to exam the performance of learner's syntactic complexity.

### 3. RESULTS

Table 3 displays the descriptive statistics for syntactic complexity on two tasks respectively. It can be seen that task complexity and syntactic complexity is positively correlated on the whole, i.e., the task with higher complexity means the higher syntactic complexity in terms of W, MLT, C/S and C/T. However, the syntactic complexity of task 2 (high task complexity) is lower than task 1 (low task complexity) in terms of CP/C, i.e., the task with higher complexity means the smaller ratio of CP/C.

Table 3: Syntactic complexity comparisons between tasks							
Measure	Task 1 (n=60)		Task 2 (n=60)		n		
	M	SD	M	SD	P		
W	123.705	16.841	145.441	31.149	0.002		
MLT	9.907	2.188	11.169	1.619	0.007		
C/S	1.467	0.212	1.736	0.457	0.031		
CP/C	0.267	0.119	0.172	0.115	0.006		

### 4. Discussion

### 4.1 Mean length of T-unit (MLT)

The above table shows that mean length of T-unit in complex task (M=11.169) is higher than in simple task (M=9.907) and it is close to the value of number in reading part of continuation (M=12.842), which indicates that the participants can produce more complex T-units in complex tasks. Affected by the reading part of continuation, the participants are more inclined to use more complex sentences to make sentences more complicated.

# 4.2 Number of clauses per sentence (C/S)

There is a significant difference between two tasks (P=0.031). The mean

score of C/S is 1.467 (SD=0.212) in simple task while it is 1.736 (SD=0.457) in complex task and the value number of complex tasks is close to the reading part in continuation (M=1.847). The reason could be the high school students have a certain limit in their grasp of complex sentences, so the number of clauses per sentence in task 1 is less than task 2. However, affected by the previous reading part of the continuation, the participants are more inclined to creatively imitate the structure of the original text, and produce sentences that are similar in structure but have different meanings. That is the "alignment effect" proposed (Wang, 2010). Alignment effect refers to the process of converging the output language and the understood language, the process of corresponding the language output with the language input, and the process of narrowing the gap from low to high level. Hence, during the process of doing task 2, the participants are prone to imitate the structures of original text when they encounter the difficulties in expression. Therefore, with the help of the previous article in continuation task, the participants can performance better than relying on his own known language.

#### 4.3 Number of coordinate phrase per clause (CP/C)

There is a negatively correlation between task complexity and syntactic complexity in view of CP/C. The proportion in continuation task (M=0.172) is lower than that in practical task group (M=0.267) may be because the participants are required to describe the environment of the farm and the process of picking activity when completing the task 1, so they use a lot of coordinate phrases, such as "picking apples, putting them into baskets and tasting them" and "the sweet air, the clear river and the blue sky" and so on. Considering the continuation task, the ratio of CP/C of participants' writing (M=0.172) is lower than reading part (M=0.347). It means that there is no alignment effect appeared in terms of the CP/C. This result in line with the conclusion of Wang and Li (2020) that the alignment process is a selective process, i.e., syntactic structures that are not fully mastered are more likely to have alignment effects.

According to the questionnaire, 87% participants think that continuation writing is more difficult than practical writing, but 80% participants think that continuation writing is more interesting, and they are more willing to learn it in their future writing studies. It can be seen that the participants can write the sentences they want to express even if they encounter difficulties in expression. Therefore, the continuation writing is unanimously favored by the students.

#### 5. CONCLUSION

In this study, the task designed by the elements of reasoning demand and prior knowledge. It analyzes the impact of tasks complexity on students' writing performance. The results found that high-complexity task is more conducive to students' syntactic complexity learning and output, and students have a higher writing motivation in high-complexity writing task, Therefore, the task with high complexity could improve the students' writing skills and competence. There are limitations in this study, such as the less participants and the single measurement of writing performance.

#### REFERENCES

Ai, H.Y., Lu, X.F., 2013. A corpus-based comparison of syntactic complexity in NNS and NS university students' writing. John Benjamins Publishing Company.

Arthur, B., 1979. Short-term changes in EFL composition skills. In C. A. Yorio, K. Perkins, J. Schachter (Eds.), On TESOL '79: the learner in focus, Pp. 330–342.

Biber, D, 2015. Grammatical complexity in academic English. Cambridge: Cambridge University Press.

Bulté, B., Housen, A., 2014. Conceptualizing and measuring short-term changes in L2 writing complexity. Journal of Second Language Writing, 26, Pp. 42–65.

Crossley, S.A., McNamara, D.S., 2012. Predicting second language writing proficiency: The roles of cohesion and linguistic sophistication. Journal of Research in Reading, 3, Pp. 115–135.

Ellis, R., Yuan, F.Y., 2004. The effects of planning on fluency, complexity and accuracy in second language narrative writing. Studies in Second Language Acquisition, (1), Pp. 59-84.

- Ellis, R., 2003. Task-based language learning and teaching. Oxford: Oxford University Press.
- Ellis, R., 2009. Task-based language teaching: sorting out the misunderstandings. International Journal of Applied Linguistics, 19(3), Pp. 221-246.
- Frear, M.W., Bitchener, J., 2015. The effects of cognitive task complexity on writing complexity. Journal of Second Language Writing, 30, Pp. 45-57.
- Han, Y.W., Liu, S., 2019. The effects of task and working memory capacity on Chinese EFL learners' written production. Shandong Foreign Language Teaching, 40 (2), Pp. 66-75.
- Ishikawa, T., 2007. The effect of manipulating task complexity along the (here-and-now) dimension on L2 written narrative discourse. Clevedon: Multilingual Matters.
- Jin, H.Y., Wang, T.S., Yu, C.H., 2020. Validating L2 writing task complexity. Modern Foreign Language.
- Benjamins, J., 2011. Second language task complexity: Researching the cognition hypothesis of language learning and performance. Amsterdam: John Benjamins.
- Kellogg, R.T., 1988. Attentional overload and writing performance: Effects of rough draft and outline strategies. Journal of Experimental Psychology: Learning, Memory, and Cognition, 14, Pp. 355-365.
- Kellogg, R.T., 1990. Effectiveness of prewriting strategies as a function of task demands. The American Journal of Psychology, 103, Pp. 327–342.
- Kuiken, F., Vedder, I., 2007. Task complexity and measures of linguistic performance in L2 writing. International Review of Applied Linguistics in Language Teaching, 45, Pp. 261–284.
- Kuiken, F., Vedder, I., 2008. Cognitive task complexity and written output in Italian and French as a foreign language. Journal of Second Language Writing, 17, Pp. 48–60.
- Kuiken, F., Vedder, I., 2012. Syntactic complexity, lexical variation and accuracy as a function of task complexity and proficiency level in L2 writing and speaking. Dimensions of L2 performance and proficiency: Complexity, accuracy and fluency in SLA, 143–170. Amsterdam: John Benjamins.
- Kuiken F., Vedder. I., 2008. Cognitive task complexity and written output in Italian and French as a foreign language. Journal of Second language writing, (1), Pp. 48-60.
- Liu, B., Wei, X., 2019. Effects of participatory structures on students' task planning and production in online EFL writing. Chinese Foreign Language, (6).
- Lu, X., 2010. Automatic analysis of syntactic complexity in second language writing. International Journal of Corpus Linguistic, 15, Pp. 474-496.
- Lu, X., 2011. A corpus-based evaluation of syntactic complexity measures as indices of college level ESL writers' language development. TESOL Quarterly, 45 (1), Pp. 36–62.
- Lu, X., 2017. Automated measurement of syntactic complexity in corpusbased 12 writing research and implications for writing assessment. Language Testing, 34 (4), Pp. 493-511.
- Lu, X.F., Ai, H.Y., 2015. Syntactic complexity in college-level English writing: Differences among writers with diverse L1 backgrounds. Journal of Second Language Writing, 29, Pp. 16-27.
- Ojima, M., 2006. Concept mapping as pre-task planning: A case study of three Japanese ESL writers. System, 34, Pp. 566-585.
- Ong, J., Zhang, L.J., 2010. Effects of task complexity on the fluency and lexical complexity in EFL students' argumentative writing. Journal of Second Language Writing, (4), Pp. 218-233.

- Ortega, L., 2003. Syntactic complexity measures and their relationship to 12 proficiency: a research synthesis of college-level L2 writing. Applied Linguistics, 24, Pp. 492-518.
- Robinson, P., 2001. Task complexity, cognitive resources, and syllabus design: A triadic framework for examining task influences on SLA. Cognition and Second Language Instruction, Pp. 287–318.
- Robinson, P., 2001b. Task complexity, task difficulty, and task production: exploring interaction in a componential framework. Applied Linguistics, (1), Pp. 27-57.
- Robinson, P., 1996. Task complexity and second language syllabus design: data-based studies and speculations. University of Queensland Working Papers in Applied Linguistics.
- Robinson, P., 2003b. The cognition hypothesis of adult, task-based language learning. Second Language Studies, 21, Pp. 45–107.
- Robinson, P., 2007a. Criteria for grading and sequencing pedagogic tasks. In Investigating Tasks in Formal Language Learning, Maria del Pilar Garcia Mayo (ed.).
- Robinson, P., 2005a. Cognitive complexity and task sequencing: A review of studies in a Componential Framework for second language task design. International Review of Applied Linguistics in Language Teaching, 43 (1), Pp. 1–33.
- Ruiz-Funes, M., 2015. Exploring the potential of second/foreign language writing for language learning: The effects of task factors and learner variables. Journal of Second Language Writing, 28, Pp. 1–19.
- Skehan, P., 1998. A cognitive approach to language learning. Oxford: Oxford University Press.
- Skehan, P., Foster, P., 2001. Cognition and tasks. Cognition and second language instruction (183–205). New York, Cambridge University Press.
- Wolfe-Quintero, K., Inagaki, S., Kim, H.Y., 1998. Second language development in writing: measures of fluency, accuracy, complexity. Second Language Teaching, Curriculum Center, University of Hawai'i at Mānoa; Distributed by University of Hawai'i Press.
- Wang, C.M., 2010. Alignment and foreign language teaching. Foreign Language Teaching and Research, (4), Pp. 297-299.
- Wang, M., Wang, C.M., 2014. The alignment effects of continuation. Modern Foreign Languages, (4), Pp. 501-512.
- Wang, J.P., 2013. The influence of task complexity of resource-directing on the language performance of second language writing. Foreign Language Teaching, 34 (4), Pp. 65-68.
- Wang, L.P., Wu, H.Y., Zhang J., 2020. Effects of task complexity on linguistic complexity in EFL writing. Modern Foreign Languages, (4).
- Xin, S., Li, L.X., 2020. The alignment effect of text complexity of continuation writing tasks and its impact on accuracy. Journal of PLA University of Foreign Languages, 43 (1), Pp. 33-41.
- Yang, W.W., 2014. Mapping the relationships among the cognitive complexity of independent writing tasks, L2 writing quality, and complexity, accuracy and fluency of L2 writing. Applied Linguistics and English as A Second Language Dissertations.
- Yan, J., Xu, X.Y., 2017. The relationship between syntactic complexity and writing quality of Chinese EFL learners. 3rd Annual International Conference on Social Science and Contemporary Humanity Development (SSCHD 2017).
- Zalbidea, J., 2017. 'One Task Fits All'? The roles of task complexity, modality, and working memory capacity in l2 performance. The Modern Language Journal, 101 (2), Pp. 335-352.

