



The Effects of Increasing Task Complexity on EFL Learners' Writing Performance

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Abstract

This study examined the effects of task complexity on Chinese EFL learners' argumentative writing performance in terms of complexity, accuracy and fluency. Thirty-one non-English majors in a university are included as participants. They are required to write about two argumentative titles with different complexity. The results reveal that the fluency, accuracy and syntactic complexity reduced as the task complexity increased, while the lexical variety enhanced. Based on the findings, some pedagogical implications for task design and task-based instruction are drawn.

Key words: Task-based language teaching; Task complexity; Complexity; Accuracy; Fluency

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INTRODUCTION

Task-based approaches are motivated by ideas espoused by communicative language teaching, which calls for language teaching to make use of real-life situations that necessitate language use. Under TBLT, learners perform tasks that focus on meaning exchange and use language for real-world, non-linguistic purposes. It has been hypothesized that the intentional manipulation of task variables in the context of meaningful language use will likely result in learners' focusing on form. According to Skehan (1998) and Robinson (2001a), tasks can

be designed in such a way that learners allocate more attention to language form while still primarily focusing on task completion. This is done through what Skehan and Robinson refer to as the manipulation of task complexity, which can be matched both to learners' linguistic development and to the purpose of the lesson.

To date, a variety of predictions about the effects of task complexity in Robinson's (2001b) framework have been tested, focusing mainly on L2 linguistic performance (i.e., complexity, accuracy, and fluency) during either oral or written tasks (Gilabert, 2007; Kuiken & Vedder, 2007; Michel, Kuiken, & Vedder, 2007; Robinson, 2001a). However, the findings of these studies have not been conclusive; they suggest that more complex tasks positively impact linguistic performance in general, yet more specific findings related to both accuracy and syntactic complexity only partially supported the cognition hypothesis (e.g., promoting either complexity or accuracy).

1. LITERATURE REVIEW

1.1 Task Complexity and Two Predictions

Within the context of task-based language teaching, the use of any pedagogical tasks raises the issue of how to justify the cognitive demands of tasks (i.e., task complexity). The construct of task complexity is an important task-sequencing criterion, such that tasks are ordered from less complexity to greater complexity (Long, 1985; Robinson, 2001a; Skehan, 1996, 1998).

Skehan (1996) put out a three-way dimension framework for the analysis of task difficulty. The first is code complexity, which concerns about traditional areas of syntactic and lexical difficulty as well as range. Skehan distinguished it between the areas of familiarity and processing. Familiarity involves the extent to which the task draws on ready-made or pre-packaged solutions. It

is implicated when all that is required is the accessing of relevant, ready-organized material and even solutions to complete tasks. In contrast, processing is about the amount of on-line computation during task completion, and highlights learners' actively thinking through task content. The last part of the theory is communicative stress, which has an impact on the pressure of communication. Each factor will affect learners' output of the task. In Skehan's (1998) view, due to limitations in attentional resources, learners cannot attend to all aspects of language production at the same time (e.g., complexity, fluency, accuracy). Thus, tasks can promote either increased complexity or accuracy, but not both.

As suggested by Robinson (2001a), the terms complexity and difficulty are not interchangeable, in that the scope of potential influences on them is various and wide, including cognitive, affective, linguistic, interactional, experiential and many other factors. Therefore, Robinson has distinguished task complexity, task difficulty, and task conditions, which finally formed the Triadic Framework. The framework is composed of three parts: task complexity, task conditions, and task difficulty. Task complexity, as argued by Robinson himself, is the result of various factors, including attentional, memory, reasoning, and other information processing demands imposed by the structure of the task on the language learners. Robinson classifies task complexity into two dimensions: resource-directing and resource-dispersing demands. According to Robinson, resource-directing variables of task complexity make greater demands on attention and working memory in a way that redirects them to linguistic resources during task performance. Therefore, increasing task complexity along resource directing dimensions can direct learners' attention to specific, task-relevant linguistic features. On the contrary, making tasks more complex along resource-dispersing dimensions leads learners to disperse attention over many non-linguistic areas during task performance.

1.2 Previous Studies About the Effects of Task Complexity on Learners' Writing

Whereas the effect of task complexity on oral language production has caught many researchers' attention in the past twenty years, there is considerably less research on how different complexity levels of task influence written output of FL learners.

Ishikawa (2006) examined the effect of task complexity and language proficiency for task-based writing performance. Task complexity was manipulated along here-and-now/there-and-then dimension. The results showed that increasing task complexity for high-proficient learners had positive effects on accuracy, structural complexity and fluency, though; it had negative effects on lexical complexity. The results of increasing task complexity for low-proficient learners, however, showed the positive effects on accuracy, fluency, lexical

and structural complexity.

Kuiken, Mos and Vedder (2005) manipulated task complexity by varying the number of elements to be considered in a writing task. Five destination choices were given and the participants were required to choose only one based on a varying number of criteria. They examined three categories of L2 production measures: syntactic complexity; lexical variation; accuracy. Their results showed that there were no task complexity effects on lexical and syntactic complexity. In contrast, analyses on accuracy data yielded significant interactions between task complexity and proficiency; namely, greater written accuracy was observed when task complexity and proficiency were both high. The low proficiency group was generally unaffected by varying the degree of task complexity.

Similarly, Kuiken & Vedder (2007) conducted a study on L2 proficiency in writing among 84 Dutch university students of Italian and 75 students of French. In their study, task complexity was manipulated along two variables of Robinson's Triadic Componential Framework, the number of elements which have to be taken into account and the reasoning demands posed by the task. The results showed that both students of Italian and French produced fewer lexical errors in the complex task. However, students of French made significantly more appropriateness and other errors in complex tasks than in simple tasks. In addition, students of Italian used more highly frequent words in complex task whereas the students of French used more infrequent words in complex task.

Rahimpour and Hosseini (2010) also examined the effect of increasing task complexity along +/-Here-and-Now dimension on 52 Iranian learners' narrative writing elicited by means of picture story. Learners' written performance was also measured in terms of accuracy, fluency, and complexity. The findings of the study demonstrated that there was statistically significant effect of task complexity on fluency of L2 learners' written narratives and no significant effects on accuracy and complexity.

Ong and Zhang (2010) explored the effects of task complexity on fluency and lexical complexity of 108 EFL students argumentative writing. Task complexity was manipulated using three factors of planning time, provision of ideas and macro-structure, and the availability of drafts. The results of the study showed that: (a) Increasing task complexity with respect to planning time continuum produced significantly greater fluency. (b) Increasing task complexity through the provision of ideas and macro-structure produced significantly greater lexical complexity but no effects on fluency. (c) Increasing task complexity through the availability of draft produced no significant differences in fluency, and lexical complexity.

To summarize, previous studies examining task complexity variables along resource-directing dimensions

have mainly focused on the impact of task complexity on L2 production. More studies supported the hypothesis with accuracy measures, indicating complex tasks led to more accurate language use, whereas the results with respect to the complexity measures have not yet provided any conclusive support for the cognition hypothesis. Despite this growing body of research, other predictions of the hypothesis regarding task complexity and interaction have not yet been widely explored. The inconsistency may be attributed to analyze different aspects of task complexity and use different measures to evaluate the linguistic production in the previous research. Moreover, the studies on the effects of task complexity are limited in number in China. This calls for further study of the effects of task complexity.

2. RESEARCH METHODOLOGY

2.1 Research Questions

Because of the two contrasting predictions on the effects of task complexity on L2 production, the present study aims at investigating the effects of task complexity on Chinese college EFL learners' argumentative writing. Thus, the questions to be addressed in the present paper are:

- a) What's the effect of increasing task complexity on the complexity of Chinese college EFL learners' argumentative writing performance?
- b) What's the effect of increasing task complexity on the accuracy of Chinese college EFL learners' argumentative writing performance?
- c) What's the effect of increasing task complexity on the fluency of Chinese college EFL learners' argumentative writing performance?

2.2 Subjects

The subjects in the experiment are from an intact class in a university in China. They are non-English major in their second year of college study. For them, English is an obligatory course which involves listening, speaking, reading and writing. In order to make sure there is no difference among the subjects, we consult their English scores in the last examination. At last, we choose thirty-one students whose English scores are between seventy-two and eighty, since this range includes the largest number of students. At the time of doing research, the students have been learning English as a foreign language for at least 7 years.

2.3 Writing Tasks

The writing tasks used in the present study are two argumentative tasks. We choose the argumentation as the writing task for the following reasons: (a) The argumentative are among the frequently taught written text types and the typical academic assignment that students have to perform in ordinary English classes. (b)

Argumentation is a demanding text type, so it "requires the participants to be aware of formal register and have the ability to manipulate abstract concepts and be familiar with the rhetorical conventions of presenting arguments" (de Larios, Marin & Murphy, 2001). (c) A large number of language proficiency tests also employ argumentative tasks to assess foreign language learners' competence in China, such as TEM4 & 8, CET4 & 6. In addition, we want to compare our study with those of previous ones in which narrative writing task was mostly examined to see whether different genres of writing elicit different results.

All the students in the class are required to write two argumentative writing in order not to make pressure on the chosen subjects. The first writing task entitled "School or Major?", which is closely related to students' life experience as they all have gone through the difficult choice after the College Entrance Examination. So it is thought that the students are familiar with the topic and all of the students have something to say. This writing is the same complexity of CET-4. The second argumentative writing entitled "Will the development of economy overshadow the culture?" requires the students to write about the relationship between economics and culture which are both abstract concepts, which not only requires the students to make his own judgment, but also requires the students' general knowledge of both economics and culture, the influence of the development of economy on the society, on people's views and on the whole culture (Luo & Skehan, 2008).

In Robinson's Triadic Componential Framework, +reasoning demands were considered less complex compared with -reasoning demands. Actually the task that does not require reasoning demands was impossible for the argumentative writing. Being aware of this, Robinson also explains that plus or minus a feature can also be regarded as a continuum. From this point, we can say that the two tasks have different task complexity based on the different reasoning demands. And the second one is a little more complex than the first one. To make a clear distinction, in the following chapter, the first task "School or Major?" will be termed as the simple task and the second task "Will the development of economy overshadow the culture?" as the complex task.

2.4 Measures of Complexity, Accuracy and Fluency

Following the previous research, in the present one, fluency was measured by words per T-unit. The calculation formula is the total number of words of the text divided by the total number of T-units in the text. The bigger the result is, the more fluent of the production. The T-unit is defined as "a main clause plus whatever subordinate clauses happen to be attached or embedded with it" (Hunt, 1965, p.735).

Accuracy was measured by error-free clauses, that is, the percentage of clauses that did not contain any error.

The calculation formula of error-free clauses is the error-free clauses of the text divided by the total clauses in the text. The bigger the result is, the more accurate of the text. In analyzing the learners' essays, clause was defined as any expression that contains a subject (or coordinate subjects) and a finite verb (or coordinate verbs). All errors relating to syntax, lexical are counted.

Complexity was measured from two aspects: lexical variation and syntactic complexity. The commonly used method to measure lexical variation is type-token ratio (TTR), that is, the total number of types divided by the total number of tokens in a text. However, Malvern and Richards (2002) argues that TTR may have problem because it is affected by sample size and they put forward another measure Mean Segmental Type-Token Ratio (MSTTR). In this study, we used both TTR and MSTTR to assess the lexical variation. We follow the research of Ellis and Yuan (2004) in which they divided the students' compositions into segments of forty words. And then the type token ratio of each segment was calculated as in counting type-token ratio. Syntactic complexity was measured by clauses per T-unit, which means the ratio of the total number of clauses to the total number of T-units in the text.

2.5 Data Collection and Data Analysis

All of the students were required to hand in their two compositions within two weeks without knowing the real purposes of the tasks. As the students are busy preparing for the coming CET4, they all consider the tasks as an exercise and they are willing to cooperate. After two weeks, the students' compositions were collected. Then we only coded the chosen thirty-one students' essays using the measures abovementioned. Students' letters were coded in terms of accuracy, syntactic complexity, and lexical variation, following the considerations and recommendations of Wolfe-Quintero, Inagaki, and Kim (1998). After getting the statistics of EFC, W/T, C/T, TTR and MSTTR in each text, we typed the raw data into computer and used SPSS 21.0 to analyze the raw data. As this study is a within-subjects design, multiple times of Paired-samples T-test were employed to detect the difference between the two tasks of different task complexity.

3. RESULTS AND DISCUSSION

3.1 Effects of Task Complexity on the Complexity of Learners' Writing Performance

The third question is about whether Chinese college EFL learners produce more complex written production in the task complexity increased task. With regard to complexity, two measures were used to evaluate it, that is, lexical variation and syntactic complexity. And lexical variation is measured by type token ratio (TTR) and Mean

Segmental Type-Token Ratio (MSTTR) which is used to remove the problem of variation in sample size; syntactic complexity is measured by clauses per T-unit (C/T).

We employed Paired-samples T-test to determine whether the difference is statistically significant. The results of paired sample T-test on the three measures of complexity can be found in table 1. Measured by type-token ratio, the mean of lexical variation in the less complex task is .56 and .61 in the complex task. The mean of task 1 minus task 2 equals -.04710 which means that the complex task elicits vocabulary of more variety. The results turn out that (see Table 3-6) there is a real significant distinction between the two tasks of different task complexity as $df=30, p=.001 < .05$. So we can safely draw the conclusion that students generate more complex writing production in term of lexical density as the task complexity increases.

In order to get rid of the influence of sample size because the total words of students' writings vary a lot, the measure of Mean Segmental Type-Token Ratio (MSTTR) was used to complement the measure of type token ratio. There is also another measure to assess the complexity of students' written production, that is, clauses per T-unit (C/T). From the Table 1, it is obvious that the syntactic complexity measured by clauses per T-unit differs a lot in the two tasks ($M=1.9952$) in the simple task, $M=1.6303$ in the complex task. That is to say, students use more clauses or more embedded sentences in the cognitively simple task. As task complexity increases, students employ simple sentences to express their opinion. The conducted Paired-samples T-test testified our idea in that the difference between that two tasks concerning syntactic complexity of different task complexity reached a significant level ($df=30, p=.000$).

Table 1
Paired Sample T-Test on Lexical Variation and Syntactic Complexity

	Mean difference	t	df	Sig.(2-tailed)
TTR1-TTR2	-.04710	-3.857	30	.001**
MSTTR1-MSTTR2	-.03355	-3.317	30	.002**
C/T1-C/T2	.36484	5.652	30	.000**

To summarize, different results were obtained as to the lexical variation and syntactic complexity. Firstly, with respect to lexical variation, measured by type token ratio and mean segmental type-token ratio, students produce vocabulary of more variety as the task complexity increases, that is, complex task leads to the production of more complex language in terms of lexical variation. Secondly, as to syntactic complexity, the result is opposite. The more complex the task is, the lower the syntactic complexity. This phenomenon has been argued by Van Pattern (1990) that "limited attentional resources are directed first at those elements that convey message meaning, which is the most important in most second language acquisition contexts, primarily lexicon,

and only later, when the cost comes down, towards communicatively redundant formal features of language” (cited from Robinson, 2007). For the subjects in the present study whose English proficiency are limited, it is likely that they tries to access more lexicon to express their idea clearly which leads to the increased lexical variation and decreased syntactic complexity in the cognitively more complex task. This finding is in line with the research done by Ong and Zhang (2010), who also investigated the effects of manipulating task complexity on students’ argumentative writing.

3.2 Effects of Task Complexity on the Accuracy of Learners’ Writing Performance

Our second question is about whether Chinese college EFL learners produce more accurate written production in the complex task. The accuracy of the learners’ written production is measured by error-free clauses (EFC). Results show that the mean of error-free clauses is 0.83 in the simple task and 0.79 in the complex task. The Paired-samples T-test is also conducted to see whether the difference concerning accuracy between the two tasks of different task complexity is significant or not. Table 2 shows the result of the T-test.

Table 2
Paired Sample T-Test on Accuracy in Learners’ Writings

	Mean difference	SD	T	df	Sig. (2-tailed)
Task 1- task 2	.04419	.06433	3.825	30	.001

From the Table 2 we can discover that $df=30, p=.001 < .05$. The results demonstrate the significant difference between the two tasks with regard to the accuracy. Based on the above analysis, the answer to our second question whether Chinese college EFL learners produce more accurate written production as task complexity increases are clear. Students produce less accurate written production of the complex task.

This production of less accurate written production can be attributed to the fact that (Van Pattern, 1990) human beings’ attentional resources are limited, so learners cannot pay attention to form and meaning at the same time. When they are free to allocate attention, meaning is primary. As a result, in order to express their opinion clearly, learners prioritize concern for the content over concern for the form. In the cognitively simple task “School or major?”, students are familiar with the topic because they all have experienced the hard choice before they enter into the university. Therefore, compared with the complex task, the simple task can relieve processing load and free up attention space to be devoted to accuracy. This leads to the result that the simple task is of higher accuracy. When task complexity increases, the cognitive demand imposes extra burden of information processing and attentional resources on the learners’ mental capacity,

which leads to less attention can be paid to the language form.

3.3 Effects of Task Complexity on the Fluency of Learners’ Writing Performance

The last question concerns whether Chinese college EFL learners produce less fluent written production in the complex task. The fluency of the learners’ written production is measured by words per T-unit (W/T). Results show that the mean of the W/T is 15.40 words in the simple task and 13.87 words in the complex task. It’s obvious that the task complexity has impacts on the fluency of learners’ written production as the mean decreases when the task complexity increases. In order to see whether the difference concerning fluency between the two tasks is significant or not, paired-samples T-test was carried out. Table 3 shows the results.

Table 3
Paired Sample T-Test on Fluency In Learners’ Writings

	Mean difference	SD	T	df	Sig. (2-tailed)
Task 1- task 2	1.53323	2.61704	3.262	30	.003

From the Table 3, we can see that the mean of Task 1 minus Task 2 is 1.53323, which means that students perform better in the low task complexity task. And the difference concerning fluency between the two tasks of different task complexity is significant as the statistics reveal that $df=30, p=.003 < .05$. That is to say, the fluency of students’ written production decreases in the complex task. This finding is not in line with Rahimpour and Hosseini (2010) and Ishikawa (2006) who found there is a statistically significant effect of task complexity on the fluency of written production, that is, the more complex the task is, the more fluent of the written production.

There are at least the following possible reasons to explain this inconsistency. Firstly, it can be attributed to the different task type. Skehan and Foster (1999) argue that the task type is one of the crucial factors affecting task production. In their research, personal, narrative and decision-making tasks were used to measure the fluency, accuracy and complexity of learners’ oral production. The results turned out that the narrative elicited the most fluent production. Thirdly, as we have discussed in chapter one, writing is a complex, multidimensional task that demands a large amount of mental effort and engagement. According to Kellogg’s writing model, six sub-processes—planning, translating, programming, executing, reading and editing are involved while writing. In the simple task “School or major?” students are familiar with the topic. Thus, they need not spend too much time in planning before they can translate the idea onto the paper. Besides, the vocabulary and expression required for the cognitively simple task is frequently used. It is no wonder that their written productions are more fluent.

CONCLUSION

The present study aims to examine the effects of increasing task complexity on Chinese college EFL learners' argumentative writing performance. The major findings of the present study are that task complexity significantly affects learners' written production but not in the way Robinson has argued. To be more specific, except lexical variation, as task complexity increases, learners produce less fluent, less accurate and less syntactic complex written production. It seems that our results are more compatible with Skehan's Limited Attentional Capacity Model, which predicts that fluency, accuracy and complexity are in competition for limited attentional resources and increasing task demand degrades fluency, accuracy and complexity. Surely, this does not mean that Robinson's Triadic Componential Framework should be rejected. Instead, more empirical research should be done to detect whether the framework is feasible.

As can be drawn from the study, task complexity significantly affects learners' language production. Cognitively demanding tasks are likely to direct attentional resources to language content rather than language form. Therefore, an appropriation of task complexity should be guaranteed in designing tasks and the task should be sequenced from simple to complex based on different task complexity. Tasks should not be so simple that learners do not extend their ability for use, which leads to no gains in the aspects of complexity. Nor should tasks be so complex that learners attend to complexity at the expense of accuracy and complexity.

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