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Multidimensional Analysis of Continuation Writings by Chinese Learners of English Across Different Proficiency Levels

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Abstract: This study used multidimensional analysis to investigate whether English learners' writing features vary significantly across their proficiency levels in the continuation writing task. Writings were collected from 30 Chinese high-school English learners, who were divided into three proficiency groups based on their writing scores. Their writing texts were analyzed by using Multidimensional Analysis Tagger (MAT 1.3). The results showed that three groups varied significantly in the dimensions of formality and abstractness of their writings. These two dimensions are related to the proportion of nouns and conjunctions in writings. Writings by higher proficiency students were more formal and abstract because of higher proportions of nouns and conjunctions than those by intermediate and low proficiency students. The results indicate that teachers can improve students' writing performance by introducing some formal words and conjunctions to students.

Keywords: multidimensional analysis, continuation writing, Chinese learners of English, high-school English learners

1. Introduction

Continuation writing is a popular writing task in the subject (test) of English in National College Entrance Examination (NCEE) in China. This kind of writing task was first used in 2016 in the English test in Zhejiang Province. In 2022 NCEE, the number of provinces which adopted continuation writing as the writing task in the English subject rose to 11, which accounted for 46.8% provinces in China. In the past studies, many researchers investigated the continuation writing task from the perspectives of vocabulary [1], grammar [2], and some teaching methods [3]. Few of them analyzed students' texts from the perspective of discourse. Multidimensional (MD) analysis can provide a useful tool to explore discourse features of continuation writing by students.

The use of multidimensional analysis is not uncommon in L2 writing research. Many researchers have focused on analyzing discourse features in a variety of writing tasks, such as argumentation [4], and academic writings [5]. Few of them chose narration, the genre of continuation writing, as the research material. This study attempts to find the relationship between students' proficiency levels and their scores in six dimensions by MD analysis. The results indicated that Chinese learners of

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English at different proficiency levels varied significantly on Dimension 1 and 5, which are concerned with formality and abstractness, respectively.

2. Literature Review

2.1. Multidimensional Analysis

This study used multidimensional analysis to explore the relationship between students' writing performances and their proficiency levels. This method was initially proposed by Biber [6], arguing that different registers have different clusters of linguistic co-occurrences and that these registers can be described by scores on different dimensions.

Previous studies have focused on various aspects of texts, for example, using multidimensional analysis to analyze the differences of texts across several disciplines [7], educational levels [8], and genres [9]. In addition, some researchers used multidimensional analysis to compare the writings between English learners. For instance, one research used MD analysis to explore the different writing features between native English speakers and English learners [10]. In a longitudinal study, Crosthwaite used MD analysis to examine the effectiveness of EAP training taken by Chinese first-year undergraduates in a university in Hong Kong by analyzing students' writings across three time points, indicating that EAP course has a positive impact on student's writing performances [11].

Furthermore, there was a link between student's proficiency levels and the results of each dimensions' scores. Yan and Staples found a significant correlation between students' holistic scores in Executive and Continuing Professional Education (ECPE) and scores on three out of five dimensions (e.g., dimensions related to the contrast between literate and oral discourse, between prompt dependence and lexical variety, and between stance and referential discourse) [4]. Moreover, Nesi found that students at different proficiency levels performed differently in three out of five dimensions [5].

However, the writing materials that previous research used mainly focused on academic writings and argumentation, and few of them chose narration as the research material. Therefore, in this study focuses on students' different performances across proficiency levels at the task of continuation writing, which requires English language learners to produce the genre of narration in writing.

2.2. Continuation Writing

Continuation writing is a popular writing task in China. In this task, students are required to read a short incomplete passage with about 300 words and then write the other half of the story with more than 150 words in two paragraphs on their own. Through this task, students can not only exercise their imagination, but also develop their writing skills, like language accuracy and reading skills [12].

Continuation writing has many advantages. First of all, continuation writing can facilitate students' writing skills in terms of language accuracy and complexity, which has better effect than propositional writing [13]. The researchers divided 107 students in a high school in Guangdong Province into two groups. In the first group, the researchers asked students to complete a propositional writing task, and in the second group, the students were asked to take continuation writing practice. The researchers administered pre-test, intervention, post-test 1 and post-test 2 and analyzed students' writings from the perspectives of both lexical complexity and language accuracy. The result showed that continuation writing plays a positive role in improving students' language accuracy and complexity.

Moreover, as a popular writing method nowadays, it can promote students' reading ability in addition to their writing skills. Continuation needs rereading, and rereading promotes the interaction between output and understanding, and the interaction produces synergistic effect [14]. When teachers train students' ability of continuation writing, students not only improve their language

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complexity and fluency in writing texts, but also improve their ability to find and understand text information.

In general, continuation writing can test students' comprehensive language ability, including the following four aspects: grasping the key information and the features of language ability, the accuracy of language use and richness, the ability to grasp the discourse structure, and the opportunity to develop creative thinking ability [15]. Therefore, continuation writing is a reliable source for teachers and researchers to observe students' writing proficiency.

However, continuation writing is a relevant new type of writing task. Many researchers tended to analyze writing texts through the lexical aspect, and few of them tried to analyze them at the discourse level.

3. Methods

3.1. Participants

The writing materials used in this study were those of Chinese high school English learner's writings. The participants (N = 30), 14 males and 16 females ranging in age from 17 to 18, were from Wenzhou, Zhejiang Province. All students were in Grade 12. All students began to learn English since primary school. They were divided into three groups based on their writing proficiency levels, which were assessed by one English teacher, who had abundant experiences in teaching and scoring writing. There were 6 students in the low proficiency group, whose writing scores were below 16 points[1]. There were 14 students in the intermediate proficiency group, whose writing scores were between 16 to 19. There were 10 students in the high proficiency group, whose writing scores were beyond 20 points.

3.2. Materials

The topic of the continuation writing task was chosen from the 2021 Summer English subject of the National College Entrance Examination in Zhejiang[2]. There were two types of writing tasks in the subject. The first type of the task is practical writing, which takes up 15 points in the subject. The form of the second type writing is summary or continuation writing. The material that this research chose was continuation writing. In the continuation writing task, students need to read a portion of a passage with 336 words and write the rest of the story in two paragraphs based on two given short sentences at the beginning of each paragraph. Student are required to write over 150 words.

The reading text in this writing task talked about a boy and his father. His father was poor-educated and tried his best to earn a living for his family. The boy believed that he surpassed his father in many perspectives. During the summer before his eighth grade, the boy worked in a farming field and earned some money. But his father wanted to get the boy's salary for family expenses. Therefore, the boy decided to persuade his father to leave the money for him. After reading the text, students were required to continue writing the remaining part of the story.

3.3. Text Analysis

Multidimensional Analysis Tagger 1.3 (MAT1.3) was used to analyze the discourse features and text types of students' continuation writing. This tool utilized Biber's 8 register categories [6][16], 67

[1] According to the scoring rubric, those writings which are considered as high-quality will get the scores over 20, and those writings which are considered as low-quality will get the scores less than 16.

[2] As in Zhejiang Province, two English College Entrance Examinations are administered each year. The first exam takes place in January, and the second one takes place in June, which is called Summer English College Entrance examination in this paper. The text those participants used is from the second one.

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linguistic features and 6 functional dimensions and tagged part-of-speech by embedding Stanford POS Tagger [17]. This research investigated the differences between students at different proficiency levels with regard to the 6 dimensions. In recent studies, the number and naming of dimensions can be varied by different researchers. But due to the limited number of writing materials, this study uses the dimensions from Biber's original one.

On the basis of the original texts, misspellings and grammatical mistakes were corrected and saved into two different versions. In the first version, only misspelled words and misused punctuation were corrected, as MAT could not analyze the text with wrong-spelled words. In the second version, those grammar mistakes in each writing were corrected. To find whether grammatical mistakes would influence the results of MAT analysis, those two versions of writing were tested by paired samples t-test in table 1, to find whether the six dimension scores in the two versions have significant differences.

Table 1: Comparison between two corrected versions on six dimension scores.

	D1	D2	D3	D4	D5	D6
t				-5.509		
p	.949	.939	.963	< .001	.513	.990

The results indicated that there were no significant differences between two versions in five out of six dimensions, except for Dimension 4. Therefore, the second version could be taken to analyze.

4. Results

To investigate the differences in dimension scores across three proficiency levels, one-way ANOVA was conducted to explore whether there are any statistically significant differences in dimension scores across high-, intermediate-, and low-proficiency groups.

A one-way ANOVA was conducted to determine if the scores on Dimension 1 were different for students at different proficiency levels. Participants were classified into three groups: high proficiency (n = 10), intermediate proficiency (n = 14) and low proficiency (n = 6). The residuals were normally distributed, as assessed by Shapiro-Wilk test (W = 0.939, p = .083); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variance (W2,27 = 1.309, p = .287). The scores on Dimension 1 were statistically significantly different between students at different proficiency levels, F(2, 27) = 6.331, p = .006, η2 = 0.319. The scores on Dimension 1 decreased from low level (M = 14.673, SD = 8.571) to intermediate level (M = 5.852, SD = 6.967) and high level (M = 3.142, SD = 3.440) students, in that order. Post hoc tests (using the Holm correction to adjust p) indicated that low level students performed significantly differently on Dimension 1 than both high level (p = .005) and intermediate level students (p = .018). We found no evidence against the null hypothesis between high and intermediate level students (p = .315).

Table 2: Descriptive statistics of six dimension scores across three proficiency levels.

	H (*n* = 10)		I (*n* = 14)		L (*n* = 6)	
	M	SD	M	SD	M	SD
D1	3.142	3.440	5.852	6.967	14.673	8.571
D2	5.091	5.322	7.306	4.198	3.440	4.085
D3	-1.224	2.967	-0.758	5.037	1.757	1.734
D4	0.795	3.939	0.149	3.804	0.002	3.215
D5	2.385	3.820	-1.693	2.575	1.728	5.400
D6	0.853	3.179	-0.984	1.927	-0.100	1.640

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A one-way ANOVA was conducted to determine if the scores on Dimension 2 were different for students at different proficiency levels. The residuals were normally distributed, as assessed by Shapiro-Wilk test (W = 0.975, p = .687); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variance (W2,27 = 0.292, p = .749). The scores on Dimension 2 were not statistically significantly different among students at different proficiency levels, F (2, 27) = 1.671, p = .207, η2 = 0.110.

A Kruskal-Wallis rank sum test was conducted to determine if the scores on Dimension 1 were different for students at different proficiency levels, as the residuals were not normally distributed, as assessed by Shapiro-Wilk test (W = 0.909, p = .014). The scores on Dimension 3 were not statistically significantly different between different level's of students, $\chi 2(2) = 4.979$, p = .083.

A one-way ANOVA was conducted to determine if the scores on Dimension 4 were different for students at different proficiency levels. The residuals were normally distributed, as assessed by Shapiro-Wilk test (W = 0.973, p = .624); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variance (W2,27 = 0.344, p = .712). The scores on Dimension 4 were not statistically significantly different among students at different proficiency levels, F (2, 27) = 0.116, p = .891, η2 = 0.009.

A one-way ANOVA was conducted to determine if the scores on Dimension 5 were different for students at different proficiency levels. The residuals were normally distributed, as assessed by Shapiro-Wilk test (W = 0.93859, p = .083); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variance (W2,27 = 0.957, p = .254). The scores on Dimension 5 were statistically significantly different between students at different proficiency levels, F(2, 27) = 4.133, p = .027, η2 = 0.234. The scores on Dimension 5 decreased from low level (M = 1.728, SD = 5.400) to intermediate level (M = -1.693, SD = 2.575) and then increased to high level (M = 2.385, SD = 3.820) students, in that order. Post hoc tests (using the Holm correction to adjust p) indicated that high level students performed significantly differently on Dimension 5 than intermediate level (p = .037). We found no evidence against the null hypothesis between both high and low level students (p = .732) and intermediate and low level students (p = .133).

A one-way ANOVA was conducted to determine if the scores on Dimension 6 were different for students at different proficiency levels. The residuals were normally distributed, as assessed by Shapiro-Wilk test (W = 0.957, p = .254); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variance (W2,27 = 1.237, p = .306). The scores on Dimension 6 were not statistically significantly different among students at different proficiency levels, F(2, 27) = 1.746, p = .194, η2 = 0.114.

5. Discussion

Dimension 1

In this study, the dimension scores across three different proficiency levels varied significantly on Dimension 1, and students at higher proficiency level gained lower scores. The lower score according to Biber means the text is formal and serious, like a published paper, which tends to use more adjectives, long words and nouns than verbs and pronouns, while the higher score indicates more informal text, like a conversation [6]. To better analyze this finding, the researcher collected some sentences from the original texts written by students.

The following part of writing is from high proficiency group, which got -0.6 points in Dimension 1.

[Excerpt 1] Student No. 26: high proficiency group

However, I nervously tried to avert his gaze, in the case of reminding him of my money. "Not, not bad." I stumbled over my words.

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It can be noticed that this student used four nouns like gaze and case, to describe the actions instead of simply using verbs. The proportion of nouns is 16%. Also, the proportion of verbs is 16% and the student chose various verbs to describe properly. In this way, the writing can be more specific and detailed, and thus get higher score in the text.

For some writings in low proficiency group, there are many verbs, for example,

[Excerpt 2] Student No. 4: low proficiency group

As centuries go by, he talked in a low voice. “We are family. And it’s fair.” I really knew it, but I couldn’t argue.

This writing is from the low proficiency group, and it got 11.27 points in Dimension 1. Compared to the sentences in Excerpt 1, there are more verbs, like *go, talked, are, is, knew* and *argue* in 23 words, and the proportion is 26%, while the proportion of nouns is 13%. What’s more, this writing contains only one adjective. This number is much less than the writing in high proficiency group.

The average score of Dimension 1 in the intermediate group is between the low and high proficiency group. For example,

[Excerpt 3] Student No. 13: intermediate proficiency group

Eyebrows raised, I asked with astonishment, “Why wouldn’t you ask me for contributing my money?”

This excerpt got 4.34 points on Dimension 1. The proportion of verb is 26%. However, this excerpt contains more nouns than that in low proficiency group. The proportion is 26%.

These results indicate that in continuation writing task, formality is important in getting higher score in the test. According the scoring rubric of continuation writing [18], students obtaining higher score use more diverse and appropriate vocabulary and grammatical structures. Moreover, better writing needs to be more coherent than other writings. These standards for evaluation encourage students to write more formally. Nesi [5] also suggested that higher level students’ writing sin the university got lower score in Dimension 1. As higher level’s students tend to have better writing skills, Nesi’s finding can strengthen the result of this research.

Dimension 5

In addition to Dimension 1, there were significant differences between three different proficiency levels in scores on Dimension 5. The results showed that writings at intermediate proficiency levels got the lowest score, and writings in high proficiency level got the highest score. Biber defined Dimension 5 as the opposition between abstract and non-abstract writing [6]. The higher score indicates the writing is more abstract, which contains more passive clauses and conjuncts, while lower score indicates that the writing is more concrete.

The part of writing is from high proficiency group, which got 3.91 points in Dimension 5.

[Excerpt 4] Student No. 27: high proficiency group

At that time, I first realized the burden and the responsibility my father shouldered and I knew this time, I truly became a man in my family.

This excerpt contains two conjunctions which connect two simple sentences to become a compound sentence. In this way, the content of the writing can be richer and this writing can be more cohesive and logical. The proportion of conjunction is 7% in this excerpt.

Interestingly, the writings in low proficiency group are more abstract than the writings in intermediate proficiency group. For example,

[Excerpt 5] Student No. 4: low proficiency group

“We are family. And it’s fair.” I really knew it, but I couldn’t argue. So I handed in my pay check.

The excerpt got -1.76 points in Dimension 5. These two sentences from the low proficiency group contained three conjunctions. But contrary to the excerpt in high proficiency group, the student in low proficiency group chose to keep some simple sentences. This action made the excerpt not so cohesive. The teacher who scored those writings mentioned that it was because many students in the

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low proficiency group could not use those conjunctions skillfully than those students in high proficiency group. Thus, it is hard for them to use conjunctions to make their writing more cohesive and logical.

For the writings by intermediate proficiency group, the writings obtained the lowest scores in Dimension 5. For example,

[Excerpt 6] Student No. 15: intermediate proficiency group

The words was just like a lighting bolt, which made me realize how seIfish I was. A sense of guilt stirred in the bottom of my heart.

This excerpt got -3.92 points in Dimension 5. These two sentences had no conjunctions. “These two sentences are very vivid, but this student wrote too much descriptions and pay less attention to the storytelling,” said the teacher who scored these writings.

Despite some interesting findings regarding the differences across three proficiency levels on writing dimensions, using Multidimensional Analysis to examine continuation writing, this research has some limitations. First, due to the limited condition, the researcher could not come to class to observe how teachers teach and how students react in the continuation writing class. Therefore, the researcher can only analyze the results from the text and interview with the teacher who was responsible for scoring. In the further study, researchers can explore students’ learning by taking part in the class, observing students’ reactions of each writing tasks in class and asking students about what they have learned face to face after class. Second, the definition of six dimensions may not correspond to the standard for evaluation as the number of writings is small. In the further study, researchers can collect more materials and build a new version about each dimension. Third, the study did not observe students’ longitudinal writing development. In the further study, researchers can check students’ writing development from 10th to 12th grade. Although there are some limitations, this study still revealed some interesting results and have implications for classroom-based writing teaching to help students better develop their continuation writing abilities.

6. Conclusion

The results of this study showed that the formality and abstractness varies significantly among three different English proficiency groups. Higher proficiency level’s writings tend to be more formal (through higher proportion of noun use) than lower proficiency level writings. Besides, those writings in intermediate group are not so abstract. Based on the findings, the researcher argue that teacher can improve students’ writing proficiency levels in several ways. First, teachers can design more writing tasks to make students’ writings more formal, for example, sharing some phrases which are formal. Second, teachers can design different tasks for students in different proficiency groups. For example, for the students in low proficiency level, teachers can focus on the explanation of new words to ensure these students can use them properly. For the students in intermediate proficiency level, teachers can spend more time in teaching students how to apply new words into their writings. For the students in high proficiency level, teachers can find more native English expression to help students learn and apply by themselves, this way, teachers can develop those students’ ability of self-learning.

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