

Original Paper

Order in Chaos: An Analysis of Senior Three Students' English
Continuation Writing Texts Based on Complex Dynamic
Systems Theory

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Abstract

This study investigates the dynamic features of language production in senior three students' English continuation writing. Traditional writing instruction and assessment, which rely on static and linear models, fail to explain the complex fluctuations students exhibit in lexicon, syntax, and discourse construction. To address this issue, the study adopts Complex Dynamic Systems Theory (CDST) as a new analytical framework. Using textual analysis combined with case analysis, the study examines 14 continuation writing texts completed by senior three students from a natural class in a key high school in Taiyuan during a mock exam in the first semester of the 2025 academic year. The analysis focuses on three dimensions: lexicon, syntax, and discourse cohesion. The results show that students' continuation texts are not simple accumulations of linguistic elements but complex systems characterized by fluctuation and self-organization. Specifically, vocabulary use exhibits obvious nonlinear waxing and waning; syntactic structures show dynamic competition between complex and simple forms; and discourse cohesion emerges as overall coherence from the interaction of micro-level elements. The findings indicate that CDST offers an ecological perspective for understanding students' writing production. Students should rationally view the nonlinear fluctuations in their writing process, adjust their task-response strategies appropriately, and actively identify and utilize their own linguistic resources, thereby enhancing their English writing competence more effectively.

Keywords

Complex Dynamic Systems Theory, continuation writing, nonlinear fluctuation, textual analysis, discourse cohesion

1. Introduction

In the field of second language acquisition (SLA), written production serves as a critical window into learners' linguistic competence and cognitive development, and has long been a core focus of pedagogical reform and theoretical research. Since the implementation of the new college entrance examination (often referred to as "Gaokao") reform launched in 2016, continuation task, as a new test form that integrates creative language output with interactive reading comprehension, has been widely incorporated into the ability test system of college entrance examination English (Wang, 2012). This question type not only requires the examinee to have strong language imitation ability and context perception, but also puts forward higher standards for the diversity of vocabulary use, the complex level of sentence structure and the cohesion and coherence at the discourse level. However, from the actual situation of English writing teaching in senior three, there are still prominent practical difficulties in the cultivation of continuation writing ability. First, the existing teaching model tends to stick to the static and linear evaluation ideas. Teachers tend to equate the improvement of writing level with the simple superposition of "advanced vocabulary reserve" and "sentence pattern mechanical training," and fail to pay full attention to the dynamic linkage mechanism between the elements in the process of language generation. Secondly, in the time-limited continuation task, senior three students generally face greater cognitive pressure, which is mainly due to their insufficient vocabulary stock, limited sentence pattern changes, and scattered discourse organization logic. In the actual writing process, students' language output often shows nonlinear fluctuations, and even appears as a seemingly chaotic state. This "high effort, low reward" teaching dilemma urgently requires a scientific and dynamic theoretical perspective to deeply analyze the real cognitive construction process and the development and change trajectory of students' language ability in the continuation task.

Under the above realistic dilemma, Complex Dynamic Systems Theory (CDST) opens up a new path with ecological significance for interpreting the generation mechanism of continuation task. According to the core concept of CDST, the language system is not a static entity formed by simple superposition of isolated elements, but a dynamic and complex organism shaped by nonlinear interaction, self-organizing evolution and emergent growth among subsystems such as lexicon, syntactic structure and discourse organization (Larsen-Freeman, 1997; De Bot, Lowie, & Verspoor, 2007). Taking the continuation works of senior three students as the "instantaneous cross-section" of the language system at a specific time and space node, it is helpful to break through the linear and goal-preset thinking pattern in the traditional evaluation model. However, looking at the existing research on second language writing texts under the CDST framework, most of the work focuses on the vertical development trajectory at the macro level. Few scholars have started from the micro level and adopted cross-sectional design in specific task situations to explore in depth how lexical selection, syntactic configuration and discourse cohesion achieve dynamic synergy and interaction between each other in the process of instant writing production. This study attempts to describe the dynamic characteristics and temporal evolution of the language output process by means of a systematic analysis of the

continuation texts of senior three students, in order to provide a new cognitive reference for the effective promotion of second language writing teaching and learning.

Based on the theoretical framework of CDST, this study combines text analysis and case analysis to systematically investigate the language output characteristics of senior three students in the continuation task. Specifically, from the three dimensions of lexical, syntactic and discourse cohesion, the study explores the nonlinear fluctuations, self-organization phenomena and emergence characteristics. At the same time, it tries to transform the conclusions of text analysis into writing teaching suggestions, so as to provide a systematic reference for students to adjust their learning strategies and carry out self-diagnosis and improvement.

At the theoretical level, this study breaks through the traditional linear analysis paradigm that regards language as discrete and static in second language writing research, and expands the application of CDST from macro longitudinal tracking to cross-sectional qualitative analysis of specific discourse at the micro level. By focusing on the nonlinear interaction among the three subsystems of lexicon, syntax and discourse cohesion, this study explores its self-organization mode in the continuation task. This study not only enriches the empirical accumulation of CDST in the field of English writing teaching in senior high schools in China, but also provides a new micro-theoretical entry point for understanding the “dynamic fluctuation” and “attractor state” in the learner’s language system. At the practical level, it is helpful to grasp the dynamic complexity of students’ continuation writing, which is helpful to form a constructive and operable self-regulation guidance strategy. By revealing the objective law of “chaos and order coexistence” in students’ writing, it helps students to rationally view the nonlinear regression phenomenon in the writing process and get rid of the unrealistic expectation of instant and linear progress.

2. Literature Review

2.1 *Research on CDST in Second Language Acquisition*

Complex Dynamic Systems Theory (CDST), a landmark emergentist framework bridging cognitivism and the sociocultural turn, has gradually undermined the dominance of traditional reductionism and causal determinism since its introduction to SLA in the late 1990s. Larsen-Freeman, the foundational scholar of CDST in SLA, first systematically expounded its applicability, arguing that second language learning is not a linear, step-by-step static process, but a highly complex, unpredictable dynamic system with self-organizing properties. Since then, de Bot *et al.*, in their landmark study, have made it clear that language should be considered as a set of constantly changing and interrelated variables. They pointed out that language development not only exhibits nonlinear characteristics - including intra-individual variability, stagnation (i.e., attractor state), and even abrasion - but also is highly sensitive to initial conditions (i.e., the butterfly effect). Crucially, the CDST perspective defines variability as an important representation of language development and evolution, rather than a “distractor” that can be ignored in experimental measurements.

In Chinese academic circles, scholars have carried out in-depth theoretical reflection and localization exploration around CDST. Through case analysis, Wang further clarifies that language is essentially an open and complex system with ecological attributes, and advocates that relevant research should focus on the perspective of “process and diachronic”, and pay attention to the system evolution driven by cross-level and cross-period interaction (Wang, 2011). From the perspective of CDST, Xu and Wu conducted a reflective review of SLA research, pointing out that SLA is essentially a self-organizing process characterized by free variability, and the subsystems continue to interact with each other as the environment changes (Xu & Wu, 2015). They advocate breaking through the traditional SLA research orientation of pursuing homogeneity and static laws and promoting fundamental paradigm shift. In general, there is a basic consensus on the theoretical discussion of CDST at home and abroad, that is, the language system is always in the process of evolution and reconstruction. This consensus provides a solid theoretical support for examining the multidimensional nonlinear characteristics of L2 writing output.

2.2 Research on Senior High School Students' English Continuation Writing

A large number of empirical studies have shown that continuation task can effectively improve the quality of second language writing, especially in vocabulary acquisition and the three dimensions of complexity, accuracy and fluency (CAF). In a quantitative study, Jiang and Tu used pseudo-words as test materials, and found that continuation task was more conducive to the mastery of word form, meaning and usage than summary writing, highlighting its advantages in strengthening vocabulary memory through active use (Jiang & Tu, 2016). At the level of overall language output, Jiang and Chen found through experiments that continuation task can achieve a balance between input attention and output efficiency, and significantly improve the accuracy, complexity and fluency of writing, thus promoting the internalization of language knowledge (Jiang & Chen, 2015). In addition, through a 12-week teaching experiment combining Coh-Metrix analysis and writing journals, Zhang found that a model-imitation based continuation mode not only improves lexical, syntactic, and discourse quality, but also alleviates learners' writing anxiety (Zhang, 2016).

At present, the academic circle mainly relies on the two paths of interactive synergy model and sociocultural theory to explain the internal mechanism of continuation task to promote learning. From the perspective of interactive synergy, Wang, M. and Wang, C. conducted an empirical study on the synergistic effects in written tasks by means of corpus analysis. The study found that learners tend to repeatedly extract vocabulary, chunks and syntactic structures from the original text, and this “read-to-write” model significantly reduces the frequency of errors in tense, subject-predicate agreement and non-predicate verbs (Wang, M., & Wang, C. M., 2014). Recently, Wang, Gan and Boland compared single-round and multi-round continuation tasks, and introduced latent semantic similarity (LSS) to measure lexical alignment, further confirming that the greater the interaction intensity, the stronger the predictive effect of lexical alignment on writing quality (Wang, Gan, & Boland, 2022). Under the framework of sociocultural theory, some scholars explore continuation task

based on Vygotsky's Zone of Proximal Development (ZPD). Liu investigated the influence of dynamic assessment on the performance of senior high school students' continuation task, and found that peer support in dynamic assessment can not only effectively improve the quality of article structure, but also stimulate more positive learning emotions (Liu, 2022). At the practical level, Song and Wang explored the scaffolding instruction based on topic vocabulary, discourse organization and cohesive devices based on text interpretation, aiming to reduce the writing difficulty of senior high school students (Song, & Wang, 2015).

At the discourse level, researchers pay attention to the use of cohesive devices in continuation tasks and their contribution to textual coherence. Based on Halliday and Hasan 's cohesion theory, Alharbi and Elyas focused on the effect of lexical cohesion on the quality of second language writing (Khalil, Abu-Ayyash, & Salhieh, 2023). Through quantitative and qualitative analysis of personal narratives written by grade 12 English learners, it is found that there is a significant positive correlation between the number of lexical cohesive devices and the quality of writing, and different types of cohesive devices (such as synonyms, hyponyms, collocations, etc.) have different predictive effects on the quality of writing. The study also points out that it is still difficult for learners to use lexical cohesion effectively, and cohesion is still an obvious weak link in their writing. This finding further confirms the practical application value of cohesion theory in the teaching of second language writing in middle school.

2.3 CDST Research on Senior High School English Writing

The application of CDST to writing text analysis is the frontier direction of second language writing research. In her seminal study, Larsen-Freeman conducted a six-month follow-up survey of five Chinese English learners. By analyzing her oral and written output, she questions the traditional metaphor of "development ladder." (Larsen-Freeman, 2006) It is found that under the condition of limited cognitive resources, there is a competitive and trade-off relationship among accuracy, fluency and complexity (CAF). Individual development trajectories show their own unique fluctuation characteristics, and this change often indicates that the system is about to undergo "phase shift".

Empirical research has gradually extended to the field of higher education and secondary education. Through a two-year longitudinal tracking, Ren applied the entropy method to the multidimensional data of non-English majors, confirming that second language writing is a highly self-organized complex process, and there is a significant non-linear correlation between the subsystems (Ren, 2022). Based on the large-scale intensive tracking data, Zhang used the latent variable modeling method to describe the complex development path of CAF in L2 writing, and further verified its response to the sensitivity of initial conditions and the interaction between nonlinear dimensions (Zhang, 2022). At the level of secondary education, Dong investigated the influence of task complexity on junior high school students' English writing performance (Dong, 2025). According to the CAF analysis framework, she uses TTR to measure lexical complexity, C / T ratio to measure syntactic complexity, and W / T ratio to evaluate fluency. The results show that the task complexity of dynamic alternation (simple and complex

alternation) is more effective in stimulating learners' language adaptability than static fixed task setting.

2.4 Research Gaps and This Study's Focus

Although significant progress has been made in this field, there are still three major deficiencies in the current CDST-based continuation task research. First, there is a lack of effective docking between the theoretical framework and the analytical dimension. Based on cognitive psychological approaches (such as synergistic effect), most of the studies on continuation task tend to measure each dimension of CAF in a static and isolated way, focus on short-term effects, and regard language output as a discrete and linear observation index, but fail to regard lexical, syntactic and textual cohesion as an interrelated whole system. Second, the distribution of research objects is uneven, and the research design is also limited. The existing empirical research on second language writing under the framework of CDST mostly selects college students as subjects, but pays little attention to the third-year high school students who are in the high-pressure period of preparing for the exam and are at the critical stage of cognitive development. Furthermore, most of the studies use long-term, large-sample quantitative tracking design, which is difficult to be directly applied to daily teaching practice by front-line teachers. More importantly, few studies have provided students with truly learner-centered self-regulation strategies in the writing process. Third, the dynamic investigation of discourse cohesion at the micro level is still weak. Most of the existing studies on cohesion focus on the static quantitative processing of lexical cohesive devices. Few scholars, based on the complex system concepts such as "variability", "self-organization" and "emergence", explain how lexical changes and syntactic fluctuations affect the construction of overall discourse coherence from bottom to top in the process of limited-time impromptu continuation.

In order to make up for the above shortcomings, this study takes CDST as the overall theoretical framework and selects senior three students' texts as the research object. Referring to the core meaning of CDST proposed by Larsen-Freeman and applicable to the characteristics of continuation corpus, this study builds an analytical framework around the five dimensions of nonlinearity, emergence, self-organization, the butterfly effect and variability. In terms of research methods, a cross-sectional micro-research design combining text analysis and case analysis is adopted. The three subsystems of lexicon, syntax and discourse cohesion are unified into a complex dynamic perspective, and the practice of simply judging the text as "right / wrong" or "advanced / basic" in the traditional linear evaluation is abandoned, and the fluctuation state, competition relationship and order generation mechanism within the continuation text language system are analyzed. The term "chaos" in this study does not refer to pure randomness in strict CDST terminology. Rather, it describes the state of highly nonlinear fluctuations, frequent variability, and seemingly disordered local performance constrained by global order—in short, the "edge of chaos". This exploration not only complements micro synchronic textual analysis in CDST research, but also provides senior three students with an operable, self-diagnostic approach to nonlinear continuation writing learning and self-assessment.

3. Research Design

3.1 Research Subjects

The corpus consists of 14 English continuation writing essays by senior three students, collected from a natural class at a key high school in Taiyuan. All the texts are taken from the school-level simulation test in the first semester of the 2025 academic year. The examination is organized and implemented by the school. It follows the examination process, time limit requirements and scoring rules of the formal college entrance examination, and has high authority and standardization. The original text is a narrative about the successful rescue of a cave explorer after being trapped. The story is complete, the characters are vivid, and there is a reasonable space for continuation. The writing task is limited to 30 minutes, and the students are required to complete the continuation of about 150 words according to the first sentence of the two paragraphs given without consulting the data and discussing with others. After the examination, the answer cards were collected uniformly, and 14 valid texts were finally obtained after eliminating the invalid samples with incomplete writing or obvious bias. All texts are anonymized, and original spelling, grammar, and punctuation errors are preserved.

The selection of 14 text samples is mainly based on three considerations. First, there is good comparability. All texts are completed under the same task instructions, time constraints and examination environment, and the external confounding variables are effectively controlled. Therefore, the differences between texts are mainly due to the internal differences of individual language systems, which provides a comparable basis for examining the characteristics of dynamic systems. Second, it covers multi-level proficiency. There are obvious differences in lexical richness, syntactic complexity and discourse coherence among the texts. Some of them only have deviations in one aspect, while others have deficiencies in multiple aspects. This gradient distribution is conducive to the comparative case analysis of CDST features for different language levels. Third, it is suitable to carry out in-depth qualitative analysis. The length of each text is 150 to 200 words, and the total number of words is about 2500 to 3000 words. This sample size achieves a good balance between representativeness and analytical fineness, which can not only support sentence-by-sentence close reading, but also not damage the depth of analysis or promotion value.

On the whole, the 14 continuations have completed the basic narrative requirements according to the given opening sentences, and the plot structure is relatively complete, which is consistent with the logic of the original text. However, at the level of language expression, there are significant individual differences between texts. Some of the texts are fluent and cohesive, while others show varying degrees of deficiencies at the lexical, syntactic or textual levels. This difference provides sufficient data support for examining nonlinear fluctuations, emergence, self-organization, the butterfly effect and variability from the perspective of CDST.

3.2 Theoretical Framework

This study adopts CDST as its core theoretical framework, supplemented by Halliday and Hasan's discourse cohesion theory, to construct a three-dimensional analytical framework covering lexicon,

syntax, and discourse cohesion.

CDST believes that language is a complex dynamic system composed of interrelated subsystems such as lexicon, syntax and discourse. Each subsystem interacts nonlinearly and has the characteristics of self-organization and emergence. Language learning is not a process of nonlinear accumulation, but a dynamic evolution of fluctuation, variability and creative adaptation. This study selects five CDST core features suitable for cross-sectional text analysis as the theoretical point. Nonlinearity means that language development is not advancing at a constant speed, but there are fluctuations, stagnations and temporary regressions. Emergence means that in the absence of explicit external instructions, new linguistic forms are spontaneously generated through the interaction between components and show characteristics beyond input complexity. Self-organization means that the system spontaneously forms an orderly structure in the absence of external intervention. The butterfly effect refers to how the subtle initial information in the source text is noticed and amplified by learners, and then leads to different narrative directions. Variability means that the fluctuation and difference of language form itself carry development information, and the same language project may show non-target language variability in actual output. Discourse cohesion theory provides a concrete analysis tool for discourse dimension. The five cohesive devices proposed by Halliday and Hasan include reference, substitution, ellipsis, conjunction and lexical cohesion. This study focuses on students' use of connectives, lexical reiteration and anaphora to construct discourse coherence.

Building on the theories outlined above, this study develops an analytical framework grounded in CDST, as illustrated in Figure 1. Informed by the five core features of CDST as its theoretical lens, the framework operationalizes three specific analytical dimensions, namely lexicon, syntax, and discourse cohesion, to uncover the dynamic system characteristics embedded in senior three students' continuation writing texts.

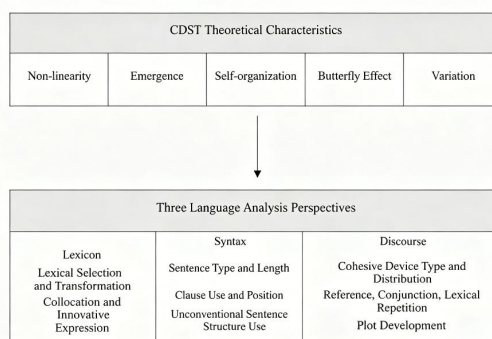


Figure 1. CDST Theoretical Analytical Framework

The analysis of the lexical dimension covers two interrelated aspects, as shown in Figure 1. The first is lexical selection and transformation, which is used to observe the diversity and change characteristics of students' vocabulary use in continuation task. The second is collocation and innovative expression, focusing on whether students use unconventional word combinations or self-generated language forms

in writing.

The syntactic dimension is analyzed from three interrelated aspects. First, examine the changes in sentence type and length, pay attention to whether students switch flexibly between simple sentences, coordinative sentences and compound sentences, and whether the sentence length is adjusted with the progression of the plot. Secondly, it investigates the frequency and location of clauses, focusing on the occurrence of adverbial clauses and attributive clauses and their distribution characteristics in key plots. Thirdly, it discusses the use of unconventional sentence patterns, including the configuration of complex sentence patterns such as inverted structure, emphatic sentence pattern and subjunctive mood. Based on Halliday and Hasan 's cohesion theory, the analysis of the dimension of discourse cohesion focuses on the distribution of various cohesive devices shown in the figure, focusing on reference, connectives and lexical reiteration. In addition to language cohesion, this study also focuses on the organization of plot structure and evaluates whether students can construct a complete narrative arc based on the two given opening sentences in the continuation task. As one of the important features of CDST, the butterfly effect is also examined in this dimension to observe whether students can capture the subtle information in the source text and enlarge it, and develop it into a key clue to promote the development of the plot.

3.3 Research Questions and Methods

On the basis of literature review and research objectives, this study, from the perspective of CDST, focuses on the three dimensions of lexicon, syntax and discourse cohesion, and analyzes the continuation texts of senior three students. In view of the current lack of micro-level CDST cross-sectional studies on senior three students, this study proposes the following three research questions:

- (1) Does the continuation task of senior three students show nonlinearity, emergence, self-organization, the butterfly effect and variability in lexicon, syntax and discourse cohesion? How do these characteristics manifest?
- (2) What are the implications of these features for understanding the dynamics of students' language system in the process of second language writing?
- (3) What pedagogical guidance does these features offer for senior three students' continuation writing practice?

This study employs four complementary research methods in its analytical procedure.

Textual analysis involves non-numerical, interpretive close reading of the writing texts to unpack implicit meanings, structural patterns and linguistic features. Sentence-by-sentence annotation covering lexical choices, syntactic structures and discourse features is performed on all 14 texts to establish a fundamental reference for error identification and theoretical interpretation.

Error analysis focuses on identifying and classifying deviations from target language norms, with reference to the scoring rubric of Gaokao. Errors can be grouped into three broad categories. Lexical errors consist of improper word choice, collocation errors, spelling errors and Chinglish expressions.

Syntactic errors include tense confusion, subject-verb disagreement, clause structure errors, non-finite verb errors, sentence fragments and run-on sentences. Discourse errors comprise unclear reference, misuse or absence of conjunctions, logical leaps and overall incoherence. All identified errors are recorded with corresponding textual examples to support subsequent theoretical analysis.

The case analysis method can analyze the selected representative texts in depth. According to the annotation results, four cases with the highest degree of error concentration are selected. In the screening process, texts with obvious deficiencies in multiple dimensions such as lexicon, syntax and discourse are preferentially selected, and finally a typical sample is determined for each dimension. A sentence-by-sentence analysis of each selected case is conducted to describe its wrong form and explain it in combination with the five core features of CDST.

Comparative analysis conducts cross-case tests on four focus cases to identify the similarities and differences of error patterns and external manifestations under CDST features. At the same time, these four focus cases are compared with the remaining ten texts to examine the systematic differences between error-prone texts and relatively skilled texts. This comparative analysis is helpful to summarize the common rules, capture individual differences, and lay an empirical foundation for proposing targeted writing improvement strategies.

3.4 Research Procedure

As mentioned above, this study is based on the five core characteristics of CDST, including nonlinearity, emergence, self-organization, the butterfly effect and variability. From the three dimensions of lexicon, syntax and discourse cohesion, this study makes a systematic analysis of the English continuation texts of senior three students. Combined with the scoring criteria of college entrance examination English writing, text analysis, error analysis, case analysis and comparative analysis are used to identify and interpret the language deviation in the text sentence by sentence. Focusing on the above research questions and analysis paths, this study is carried out in three consecutive steps, each stage with clear work objectives and corresponding outputs.

The first stage covers first reading and error labeling. Two rounds of reading are implemented for all 14 texts. The first round assesses the narrative integrity of each writing sample and its logical consistency with the original source passage.

The second round systematically marked errors in the three dimensions of lexicon, syntax and discourse with the help of Word annotation function according to the scoring criteria. This stage aims to grasp the language quality of the sample as a whole and provide a basis for subsequent case screening and focuses on the selection of typical cases. According to the annotation results, four texts with the most concentrated errors were selected according to the multi-dimensional criteria, which were used as the core analysis samples, and the remaining 10 were used as the reference group for comparative analysis.

The third stage is in-depth case analysis and cross-case comparison. For each selected case, a sentence-by-sentence error list is compiled one by one, and attribution analysis is carried out according

to the CDST framework. At the same time, a case analysis report covering typical error classification, CDST feature interpretation and teaching enlightenment is specially written. On this basis, the four focus cases are compared internally, and the common features and individual differences are refined with reference to the remaining ten texts, which constitute the main content of Chapter 4 to respond to the research questions.

4. Case Analysis

4.1 Error Analysis

Referring to the scoring criteria of the continuation task in the college entrance examination, this study analyzes 14 students' texts from three dimensions: language (lexical accuracy and grammatical complexity), content (content relevance and plot integrity) and structure (cohesion and coherence), and selects four representative cases for detailed discussion. Among them, the errors at the lexical level are marked in blue, the errors at the syntactic level are marked in red, and the errors at the discourse cohesion level are not marked specially. The source text depicts a cave exploration rescue scenario, with two given opening sentences: "I'd been trapped for three hours, but I wasn't prepared to give up." "The cave was full of cheerful voices." Students completed approximately 150 words of continuation within 30 minutes. All 14 texts fulfill the basic narrative task but exhibit varying degrees of lexical, syntactic, and discourse deficiencies.

Note: Each case is analyzed across three dimensions below.

4.1.1 Case 1 (14 points)

I'd been trapped for three hours, but I wasn't prepared to give up. With the sound of footsteps approaching, I heard my father's cry, "Son, I am coming", my father was trying to get close to me. My fingers unconsciously turned to the direction of him. He took out two bottles of lubricating oil from a black and dirty bag, "Relax, son, I will save you out, relax", he gasped strenuously, but I shed tears of excitement and hope, saying "How can you come?" "Emma contacted me, he said you were in danger, and I came as fast as I could." Together, my father, firemen chipped away at the rock nearby my hand. They grabbed my hand and spread the grease on the rock around me, pulling me out slowly.⁶¹

The cave was full of cheerful voices. Finally, I was successfully rescued. Immediately, I tightly held my father. Only touch my head, he did not say anything. The people around us had a warm applause, and the cave was full of applause voice again.⁶²

Figure 2. Writing Script of Student A

At the lexical level, as shown in Figure 2, two types of problems appear in this sample. Collocation errors include "save you out", a non-standard expression that should be replaced by "get sb out" or "pull sb out", and "nearby my hand", where "nearby" cannot directly precede a noun phrase and should be revised as "near my hand". Chinglish coinage is seen in "applause voice", a redundant phrase since "applause" already carries the meaning of clapping sound.

At the syntactic level, errors involve comma splices, non-finite verb misuse and tense inconsistency. The opening sentence contains a comma splice where two independent clauses are joined only by a comma without a conjunction. The phrase "Only touch my head" misuses the base verb form as an adverbial, and the present participle "touching" should be used to indicate concomitant action. The

direct speech “How can you come” uses the present modal “can”, which conflicts with the overall past-tense narrative frame.

At the discourse cohesion level, the text suffers from missing conjunctions, unclear reference and logical leaps. Plot progression from hearing footsteps to final applause lacks transitional conjunctions such as “then” or “next”, making transitions between events abrupt. The first appearance of “firemen” without the definite article weakens the referential chain of the subsequent pronoun “they”. The unaccounted-for presence of lubricating oil on the father also creates a logical gap in plot development.

4.1.2 Case 2 (5 points)

I'd been trapped for three hours, but I wasn't prepared to give up...I knew now I must do something. What if I do nothing now, after that I will die. In my mind I encouraged myself one by one. And I think when I was a child, my father and I is come to here? After a long time I finally remembered. When I was a child, I did come here (emphatic sentence). I remembered first I go a long way than I found this crack. It made of two stones. One of stones seem can moved. I'm very excited. Than I tell with my friends. They are excited too. After that rescue worker user this way successful find my in two big stones middle. They open two stones then I was haye help with them. ^{c1}

The cave was full of cheerful voices...We are all very happy and we are all saved. And this thing is tell me, when we have difficult we must not give up. After that we are all not go to dangerous places. ^{c2}

Figure 3. Writing Script of Student B

At the lexical level, as shown in Figure 3, errors cover improper word choice, spelling mistakes, Chinglish and faulty collocations. Misused or misspelt items include “user” for the past tense “used”, the adjective “successful” for the adverb “successfully”, the misspelt “haye” with unclear meaning, and the objective pronoun error of “my” for “me”. The phrase “in two big stones middle” is a typical Chinglish calque, and “tell with my friends” uses an incorrect preposition collocation.

At the syntactic level, dense errors include tense confusion, subject-verb disagreement and defective clause structures. Tense shifts erratically between past, present and ungrammatical forms such as “is come”, showing no stable tense attractor. In “One of stones seem can moved”, the singular subject mismatches the plural verb form, and the modal verb is incorrectly followed by a past participle. Sentences such as the memory-recalling line and “It made of two stones” lack proper conjunctions and passive auxiliary verbs respectively.

At the discourse cohesion level, the text is marked by absent conjunctions, vague reference and severe logical leaps. Almost no transitional conjunctions are used, leaving sentences loosely connected in simple sequence. The phrase “this way” has no clear antecedent in the preceding context. The narrative jumps directly from childhood memory to stone discovery and then to rescue without transitional information, breaking the causal coherence of the story.

4.1.3 Case 3 (13 points)

4.1.4

I have been trapped for three hours, but I wasn't prepared to give up. As the matter of fact, what did not **make me from** being saved **is** just a firm rock which trapped my legs. If I **can** **seize up** an opportunity for myself to cut open this stone, I **would** be able to have my normal life. It's a matter of life and death. Either I patiently waited for an **impatiant** rescue, or I **tried** **squeeze** the stone with my best. "Please give me a chisel and I will have a try to save myself." I said weakly but firmly, making my own choice.⁶³

The cave was full of cheerful voices. With all my effort, I attempted to move my body freely to **pave** path of life. Little by little, **the rock had been loosen** and **seem** that I **would be safe**. Unfortunately, when **the job** **would be close to being completed**, the firefighters said alarmingly, "Quick! The rainstorm is coming." **With the hands scratched by blood**, I made it. Everyone breathed a sigh of relief when I got out of the crack. I **returned** my daily life. **When you meeting or will meeting** any adversities hold you back, don't be nervous, just take **action**. After all, action is worry's worst enemy and that's why I was here, telling **you** my story.⁶⁴

Figure 4. Writing Script of Student C

At the lexical level, as shown in Figure 4, errors mainly take the form of improper word choice and collocation errors. Semantically inappropriate choices include "impatiant" in "impatiant rescue" where "patient" is intended, and "squeeze" for describing the action of pushing away rock, where "push" is more accurate. Collocation errors include the non-existent "make me from being saved" which should be "prevent me from being saved", the misused phrasal verb "seize up" in "seize up an opportunity", and the missing preposition "to" in "returned my daily life".

At the syntactic level, errors involve tense confusion, non-finite verb mistakes, clause structure defects and sentence fragments. The conditional sentence mismatches present modal "can" in the if-clause with past modal "would" in the main clause, violating past unreal conditional rules. The rock description sentence has incorrect past perfect tense and verb form, and the main verb "seem" appears in present tense against the past narrative. Non-finite errors include the missing infinitive marker "to" after "tried" and the missing article after "pave". The compound sentence joined by "and" has an imbalanced structure with the second clause lacking a subject, and the closing sentence about adversities is structurally garbled as a fragment.

At the discourse cohesion level, the text shows a sudden narrative perspective shift and logical leaps. The ending abruptly switches from first-person narrative to second-person address, breaking rhetorical consistency. The transition from successful self-rescue to the moral statement about action and worry lacks a smooth link. The noun phrase "the job" serves as a vague reference, and some conjunctions such as the "when" clause fail to build precise logical relations between clauses.

4.1.5 Case 4 (19 points)

I have been trapped for three hours, but I wasn't prepared to give up. Fresh oxygen they sent me made me think clearly. I comforted myself, "I have come here several times. I will leave here, right?" I'm tall and a large man which made me unbelievable to move. The most emergent thing was I needed water that can drink. "Hey, give me some water. Just sprinkle it to my body! I'm dehydrated." I shouted to those anxious firefighters. Water stricken me. I felt I was pushed down. There was a thought across my brain—if I could blanket myself with oil, I could reduce the friction between me and the rock. Fortunately, one of the cavers who packaged a bowl of salad oil which is used for cooking. They began to pour oil into the crack while my fingers grasped the rope that they throw to me. "Pull!" They shouted outside, and I felt I was moving upside.⁴²

The cave was full of cheerful voices. They spent long time pulling me out. After the doctor checked my body simply, I followed firefighters' footsteps to go outside. I hugged to Emma and expressed my appreciation to the cravers. It's lucky to see the sky again for me.⁴³

Figure 5. Writing Script of Student D

At the lexical level, as shown in Figure 5, errors are mainly Chinglish, improper word choice and collocation faults. The sentence "There was a thought across my brain" is a literal Chinglish translation, for which "A thought crossed my mind" is the idiomatic equivalent. Self-generated or semantically inappropriate expressions include "Water stricken me", the denominal verb usage "blanket myself with oil", the misused adjective "emergent" for an urgent need, and the incorrect "unbelievable" to describe physical impossibility of movement. Collocation errors include the redundant preposition "to" after "hugged" and the wrong use of the noun "upside" where the adverb "upwards" is required.

At the syntactic level, errors include missing main predicates, defective clause structures and tense inconsistency. The sentence about cavers and salad oil contains two embedded attributive clauses but no main predicate verb, forming a typical sentence fragment. The relative pronoun "which" in the body size sentence has a vague antecedent, and the attributive clause modifying water has an incorrect agent-patient relation where water cannot act as the subject of "drink". The verb "throw" in the rope clause appears in present tense, inconsistent with the past-tense narrative.

At the discourse cohesion level, the text exhibits paragraph imbalance and logical leaps. The first paragraph devotes most space to psychological activities and self-rescue plans while the second paragraph is extremely brief, creating a top-heavy structure. The causal links between water splashing, the feeling of being pushed down and the emergence of the idea are not clearly articulated, making transitions blunt. Reference is generally clear, but "cavers" is misspelt as "cravers" in one place and the group is not sufficiently foreshadowed earlier.

4.2 Error Attribution

4.2.1 Case 1

At the lexical level, the emergence of "save you out" and "applause voice" corresponds to the CDST features of variability and emergence. Variability is reflected in the coexistence of multiple synonymous expressions for "rescue" in the student's lexical system. Under the cognitive pressure of timed writing, the system fails to select the canonical collocation, resulting in non-standard output. Emergence is embodied in "applause voice", a creative phrase spontaneously formed by recombining existing lexical resources without external input, which reflects the adaptive generativity of the

linguistic system.

At the syntactic level, phenomena such as comma splices, non-finite verb misuse and tense inconsistency correspond to nonlinearity and emergence. Nonlinearity manifests as unbalanced syntactic development. The student can produce complex adverbial structures but repeatedly fails at basic rules such as clause boundaries. This coexistence of advanced structures and elementary errors is a typical signal of the system operating at the edge of chaos. Emergence is seen in the student's tentative use of participial structures to enrich sentence patterns. Although formally incorrect, the spontaneous appearance of new structures indicates the syntactic system is actively constructing more complex expressive devices.

At the discourse cohesion level, the text's problems correspond to the butterfly effect and self-organization. The butterfly effect is most prominent: the minor detail of exploring caves with the father in the source text is amplified into the core plot of the father rescuing the protagonist in person with lubricating oil, diverting the narrative from the original theme of professional rescue. This reflects the system's sensitive dependence on initial conditions. Self-organization is demonstrated in the complete narrative structure centered on the father-rescue theme despite cohesive gaps, indicating the discourse system can spontaneously integrate information, though the self-organizing process remains unstable.

4.2.2 Case 2

At the lexical level, the errors mainly reflect variability and nonlinearity. Expressions of the same concept are highly unstable with frequent spelling mistakes, suggesting stable form-meaning attractors for target words have not yet formed. The student can use complex structures such as emphatic sentences but cannot spell basic words, presenting a nonlinear trajectory where advanced forms coexist with elementary errors.

At the syntactic level, the dense errors correspond to nonlinearity, variability and low self-organization. Tense shifts erratically among past, present and ungrammatical forms without a stable attractor, which is a precursor to phase shift and system reorganization according to CDST. Correct and erroneous forms alternate for the same grammatical point, reflecting competitive variability between rule overgeneralization and target-like forms. The overall syntactic structure is highly fragmented with insufficient connections between information points, showing inadequate self-organizing capacity of the system.

At the discourse cohesion level, the fragmentation and logical leaps indicate a low state of self-organization. Information points lack clear causal and temporal links, and sentences function as isolated nodes instead of forming a coherent narrative network, meaning no effective self-organizing mechanism has been established in the discourse system. The student captures the detail of childhood exploration but fails to embed it into the main plot, with the clue dissipating halfway. This shows insufficient self-organization constrains the effective manifestation of the butterfly effect.

4.2.3 Case 3

At the lexical level, the problems mainly correspond to variability and emergence. The confusion between “impatient” and “patient”, and the semantic deviation between “squeeze” and “push”, reflect unresolved competition among near-synonyms in the lexical network. The tentative use of participial structures, though logically flawed, represents the student’s active exploration of complex lexical combinations and bears the property of emergence.

At the syntactic level, the errors highlight the interaction between emergence and nonlinearity. Emergence is the most salient feature: the student intensively attempts multiple complex sentence patterns in limited space. Though most are improperly used, the concentrated burst of new forms shows the syntactic system is in a highly active stage of self-reconstruction. Nonlinearity is reflected in fluctuating syntactic performance: correct idiomatic use in the first half contrasts with elementary errors in the second half, revealing temporary disruption of established forms as the system assimilates new structures.

At the discourse cohesion level, the rhetorical inconsistency and logical leaps point to unstable self-organization. The abrupt shift from first-person narrative to second-person moralizing indicates the discourse system fails to integrate different narrative layers into a unified whole. The detail of movable body parts in the source text is amplified into a core self-rescue strategy, which demonstrates the butterfly effect, but the amplification is not aligned with the original tone of collective rescue, resulting in slight overall discourse imbalance.

4.2.4 Case 4

At the lexical level, the errors are typical manifestations of emergence and variability. Emergence is reflected in the dense occurrence of self-created expressions. With limited lexical resources, the student creatively deploys existing knowledge to complete narration, proving the lexical system is generative rather than purely mnemonic. Variability is shown in the confusion and misuse of near-synonyms, indicating semantic competition among similar words has not yet concluded.

At the syntactic level, the errors can be explained by emergence, nonlinearity and variability. The student’s attempt to build nested attributive clauses, though resulting in a missing main predicate due to cognitive overload, is itself an emergent act of active syntactic complexification. The student has mastered the formal framework of attributive clauses but not the internal semantic subject-patient relations, presenting the nonlinear pattern of advanced structure preceding basic rules. Isolated tense errors coexist with generally consistent past tense narration, meaning tense marking for individual lexical items remains in a state of variability without a stable attractor.

At the discourse cohesion level, paragraph imbalance and logical leaps reflect limitations in self-organizing capacity. The severe length disparity between the two paragraphs shows the discourse system lacks a balancing mechanism for information allocation and has not formed a stable attractor to guide narrative rhythm. The student creatively introduces “oil” as a key friction-reducing clue, which constitutes sensitive capture of latent input resources and represents effective application of the

butterfly effect.

4.3 Writing Suggestions

Based on the above error classification and the interpretation of CDST theory, senior three students can improve their continuation writing scores from the following aspects.

The nonlinear fluctuation of language performance shows that the occasional back-implementation is an inherent feature in the process of language development, rather than a lack of ability. Learners should pay attention to the consolidation of basic grammatical rules, such as tense consistency and subject-predicate consistency, and should not blindly pursue advanced expression; after writing, it is helpful to check the tense and verb form in a targeted manner to reduce unnecessary fluctuations.

The emergent linguistic forms reflect that the interlanguage system is undergoing active reconstruction. Learners record the structure they try to use for the first time in each writing task, and use it consciously and repeatedly in subsequent exercises, so that the accidental knowledge can be gradually transformed into stable productive knowledge. For recurrent forms of instability, they can be clarified with reference materials or teacher feedback, and then applied.

The self-organizing ability of discourse can be improved by structured pre-writing planning and post-writing modification. Before writing, it takes 2 to 3 minutes to sort out the core plot according to the framework of “beginning-development-climax-solution”, which helps to ensure the logical connection between the information points. Reading through the full text after writing will help to find logical vacancies and supplement the necessary transitional means in time.

The obvious butterfly effect in plot construction highlights the importance of close reading. Learners can identify details with potential for expansion before writing, such as character relationships and item clues, and ensure that they are inherently consistent with the context of the source text during the expansion process. At the same time, the enlarged details should be kept in a proper proportion with the overall plot, so as not to damage the narrative coherence.

Language variability is a natural precursor to the stability of the system. Learners can classify common variability errors in writing (such as spelling substitution, non-standard collocation, etc.) and strengthen the target language form through comparative exercises. Regular review of error records is helpful to gradually eliminate non-standard variants and make the language system gradually approach the target language norms.

In general, the above strategies help learners understand the operation of their own language system from the perspective of CDST, and regard fluctuation and variability as opportunities for development, rather than just as defects. On this basis, learners consciously regulate the writing process, which is helpful to achieve the continuous improvement of the continuation task.

5. Conclusion

Taking Complex Dynamic Systems Theory as its analytical framework, this study conducts a qualitative analysis of 14 senior three students' English continuation writing texts across lexical,

syntactic, and discourse cohesion dimensions, focusing on five core CDST features: nonlinearity, emergence, self-organization, the butterfly effect, and variability. The findings can be summarized as follows. At the lexical level, students' texts exhibit improper word choice, collocation errors, Chinglish, and spelling mistakes; at the syntactic level, errors include tense confusion, subject-verb disagreement, non-finite verb misuse, and clause structure defects; at the discourse level, deficiencies include missing conjunctions, unclear reference, and logical leaps. The butterfly effect is particularly prominent, which means varying sensitivity to minor initial details in the source text leads to substantially divergent continuation trajectories. These findings carry implications for both learning and teaching. For students, fluctuations and variabilities in language should be regarded as opportunities for development, not just as errors, while taking into account the accumulation of basic training and advanced expression. For teachers, the dynamic concept of CDST can be integrated into their daily teaching: designing progressive tasks from simple to complex, assigning differentiated homework for students of different levels, providing formative feedback, affirming the tentative expression and progressive progress in discourse organization in time, and helping students enhance confidence in fluctuations. Based on the in-depth analysis of 14 texts, the conclusion of this study has a strong explanatory power for the sample. However, due to the limitation of sample size and source, the generalization of the conclusion needs to be further verified. The sample is only taken from one class in one school, which lacks cross-school comparison, or it is difficult to fully represent the wider group of senior three students. The follow-up study can further expand the sample range, include multiple schools and students at different levels to test the generalization of the research conclusions, and combine qualitative analysis with quantitative methods to cross-validate the research results from multiple perspectives.

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