

An Empirical Study on Syntactic Complexity of Second Language Writing in China Based on Dynamic System Theory

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Abstract: Dynamic System Theory is the Latest Development in Applied Linguistics. It Focuses on the Interaction of Various Internal Systems in the Process of Language Acquisition and the Interconnection of Various Factors within the System. Second Language Writing is Not Only a Major Difficulty in Second Language Learning, But Also a Hot Topic in the Field of Second Language Acquisition. This Paper Studies the Syntactic Complexity of Second Language Writing in China by Using Dynamic System Theory. Research Shows That There is a Significant Positive Correlation between Complexity Measurement Factors and Composition Scores, and the Factors Composed of Measurement Variables Such as the Average Number of Clauses Per Sentence, the Average Number of Verb Phrases Per Unit, and the Average Number of Clauses Per Unit Have Higher Prediction Accuracy on Composition Scores. Meanwhile, Lexical Chunks Have Positive Effects on Improving Students' Second Language Writing Ability.

1. Introduction

As Language Output Requires Language Learners to Have a High Level of Comprehensiveness, Second Language Writing is Not Only a Major Difficulty in Second Language Learning, But Also a Hotspot in the Field of Second Language Acquisition [1]. Therefore, the Ability of Second Language Learners to Construct Complex Sentences is Undoubtedly an Important Part of Their Linguistic Competence. Some Methods Pay Too Much Attention to Grammar, Which Leads to the Neglect of the Practical Ability of Language, While Others Unilaterally Emphasize the Practical Ability of Language, Which Leads to the Lack of Basic Knowledge of Language [2]. in the Actual Vocabulary Teaching, Teachers Pay More Attention to the Evaluation of Learning Outcomes and Neglect the Interaction of Various Factors of Acquisition in the Explanation of Vocabulary Pronunciation, Meaning and Part of Speech and Various Exercises of Flexible Use. with the Development of Learners' Language Level, the Syntactic Complexity of Their Writing Has Also Increased [3]. Compared with Many Researches on Syntactic Complexity Abroad, Domestic Researches in This Field Started Late and the Number Was Also Small. This Study Focuses on the Syntactic Complexity of Second Language Writing Texts to Explore the Realization of Two Dimensions of Linguistic and Cognitive Complexity in Syntax, and Objectively Analyzes the Characteristics of the Development of Second Language Learners' Writing Ability from the Perspective of Combining Qualitative Research with Quantitative Research.

2. An Overview of Dynamic System Theory

The theory of dynamic systems represents the latest development in the field of applied linguistics. The theory holds that language development is neither a purely cognitive psychological process nor a completely social and cultural process, but a dynamic process in which multiple environments and multiple resources interact continuously at multiple levels, so its development trajectory is nonlinear and unpredictable [4]. The dynamic process of continuous interaction in multiple levels and dimensions. In recent years, the research of dynamic system theory in applied linguistics has developed rapidly, mostly focusing on foreign language learning ability, second

language learning motivation and dynamic assessment in foreign language teaching. The system is also dynamic, that is, the change of some factors in the system or the interaction of different factors can lead to the continuous development and change of the system itself [5]. Not only that, the system is very sensitive to the initial conditions, that is, the subtle differences at the beginning will have a great impact on the long-term development. This kind of learning is not a linear process, but is full of various variability and may retrogress, stagnation or even leap forward. Second language learners themselves can also be regarded as a dynamic system [6]. It is difficult to know exactly how many factors are involved, how they interact, and how a particular factor affects the learner. Change/Dynamics is the focus of dynamic system theory. Only in this way can we describe and explain how the interaction components of a complex system lead to the overall behavior of the system and how a system interacts with the environment. Complexity emerges, and specific behaviors emerge through the interaction of components and self-organization of the system [7]. The change of each factor will affect the effect of acquisition, such as the complexity of semantics, the frequency of acquisition, the factors of vocabulary knowledge (affixes, meanings), the acquisition environment and the nature of the learner [8]. Otherwise, we can not really understand the characteristics of vocabulary acquisition.

3. Objects and Methods of Experiment

3.1 Experimental Object

In this study, 79 freshmen were selected as subjects, and experimental group and control group were set up. Thirty-five students in the experimental group were from the Chemistry College, and 44 students in the control group were from the Engineering College. In order to ensure that the two groups had the same English proficiency before the experiment, the students were tested for their English proficiency before entering the university. When students fail to discover or correct the existing errors, teachers gradually give prompts from the most implicit way to the most explicit way until they get the expected correct form. Self-directed learning is the internal driving, and reasonable encourage students to learn initiative; writing counseling is based on the genre process writing method, paying attention to the effective intervention in the writing process. The SPSS software was used to analyze the test scores of the two classes. It was found that there was no significant difference in test scores, indicating that they were at the same level of English before enrollment.

3.2 Experimental Design and Process

This experiment involves 79 freshmen from the experimental group and the control group. I applied the lexical theory to the teaching of the college English intensive course in the experimental group, and the control group taught with the traditional teaching method. The test period is one semester. According to the textual machine scores and the four dimensions of content, language, text structure and technical specifications, the writing center tutors develop specific coaching plans and conduct targeted and instructional writing counseling. The primary feature of dynamic theory is that the system consists of a variety of variables or parameters, and these variables are related to each other and are in constant motion. During the semester, both groups of students are required to write two compositions that meet the requirements within the prescribed time in class. The first composition is taken as a pretest at the beginning of the semester and the second composition is taken as a posttest at the end of the semester. Finally, when the interaction between teachers and students fails to improve the article, it can provide corrected reference forms and corresponding explanations to make the context of the article clearer. The scores of compositions and lexical chunks used in compositions were counted and analyzed quantitatively by SPSS 13.0.

In this experiment, Nattinger&Decarrico's word fast classification method is used to divide lexical chunks into the following four types: multi-word combination, idiomatic discourse, restrictive phrase and sentence frame. The dynamic system theory focuses on the operation of "the whole system" and the interaction between different factors, so some of its assumptions or

principles cannot be falsified. Because the dynamic system theory emphasizes the “complete connection” of various factors in the system, rather than specific factors, it is sometimes impossible to know how many factors affect the operation of a certain system or how various factors are linked. This means that the internal variables of the language system (including pronunciation, vocabulary, grammar, etc.) are all interactive and influential. When students go to the writing center for counseling, the teacher asks the students to agree to record the counseling process. After the tutoring, the students fill out the counseling feedback form, and then conduct semi-structured interviews with the students to understand the students' assessment and attitude towards writing counseling. To apply complex theory to areas outside the physical system, it must be recognized that the number of variables that actually act in the system is enormous. The teaching process is mainly based on lexical theory. Through a series of teaching and learning activities of input, internalization and output, students are guided to identify, accumulate and use vocabulary flexibly, so that students can effectively master and skillfully use lexical chunks, thereby improving Student writing skills.

We mainly carry out pre-writing strategy guidance, and use the rich resources of the online teaching platform to guide students in the overall writing strategy training, including the training of words, sentence patterns, ideas and articles. In the course of the experiment, the students in the experimental class are required to learn independently before learning the text. In the process of self-learning, they grasp the meaning of the article and look for the word blocks appearing in the article. The acquisition of each vocabulary includes understanding from meaning to form. It is necessary to master multiple information such as phonetics, spelling, form, part of speech, and register. These influence each other. Dynamic system theory holds that the development of the system is non-linear, but how to simulate the non-linear change is very difficult, and if the process is non-linear, then how to make a scientific and reasonable prediction of the development of non-linear. The whole study involves three groups of data, which examine students' English writing status, writing problems and feedback from the three dimensions of pre-counseling, counseling and post-counseling. In the course of explaining the text, the teacher will explain the key lexical chunks and drill them repeatedly in the form of sentence-making and translation so as to deepen the understanding. In the stage of writing conception, teachers and learners interact to discuss the innovation of the selected theme.

Second language acquisition from the perspective of dynamic system theory differs fundamentally from other perspectives in terms of language development, so it is difficult to integrate them. Lexical chunk theory focuses on incorporating the new knowledge into the existing knowledge structure, making knowledge systematic and easy to memorize, store and retrieve. The activation of a word depends on activating other lexical and grammatical structures that are semantically related to it. Therefore, the larger the learner's vocabulary and the richer the multi-knowledge of a single word, the better the learner can understand the semantic and grammatical relationships between words. Students complete the first draft online submission, the teacher conducts a preliminary review of the student's writing situation, and if necessary, can make their own suggestions according to the theme and related issues to activate their imagination. The use of independent clauses and various subordinate clauses lies in the middle and late stages of complexity development, and the use of phrases such as noun verb phrases is close to the end of the stage. After the study of the text and the corresponding exercises, the students will accumulate a lot of lexical chunks, in order to make these lexicons better absorbed by the students, promote their use and master the new vocabulary. Therefore, the study of second language acquisition and the traditional research in the perspective of dynamic system theory are vastly different in nature, which makes the two difficult to be compatible.

4. Results and Analysis

Due to the differences in research purposes, there are significant differences in methods between the research on second language acquisition from the perspective of dynamic system theory and other perspectives. The research on second language acquisition from other perspectives mostly

adopts linear causality analysis, while the research from the perspective of dynamic system theory holds that individual language development is not only nonlinear. Among them, language, content and text structure have a significant impact on this difference, while technical specifications have no significant impact. This shows that the students' scores of technical specifications are less influenced by the writing genre, and the scores are relatively stable. Learners will undoubtedly increase the number of words to express more complex ideas in the process of using structures such as clauses and subordinate clauses with high complexity. In daily teaching practice, learning outcomes are often not directly proportional to the effort, and sometimes it takes a lot of effort to gain general gains, sometimes a slight change can bring unexpected results. The control group received traditional teaching and did not perform mixed dynamic evaluation intervention teaching. The entire learning process of the experimental group is dynamic, that is, students participate in three stages of the writing process, including topic selection, conception, and revision. At the beginning and end of the experiment, I conducted a limited-time writing exercise for the students in the experimental class and the control class. The time was 30 minutes. The two results were used as pre-test and post-test respectively. The relevant data were analyzed by SPSS 13.0. The results are as follows.

From Table 1 and Table 2, we can conclude that there is no significant difference in the essay performance between the experimental class and the control class (sig=.801, $P>0.05$), and the average score of the control class is slightly higher than the experiment. The average score of the class.

Table 1 Pre-Test Composition Score Grouping Scale Statistics

	Number	Average	Skewness	Kurtosis	Highest score	Minimum score
Experimental class	35	8.36	.368	-.277	15	5
Control class	44	8.14	.269	-.654	14	3

Table 2 t-Test of Two Paired Samples of Pre-Test Composition Scores

Composition	F	t	Sig.(2-tailed)	Mean difference
Pretest	.826	-.235	.801	-.1180

In view of the difficulties of empirical research caused by the complexity of dynamic systems, it is necessary to separate highly relevant factors from many factors of SLA system to reduce the complexity of the system, and then investigate the dynamics of these factors. Explore the complex beauty of large amount of information and compact syntax, appreciate and borrow its syntactic structure, and practice diligently to achieve perfect practice. We conduct analysis at two levels: task completion, the quantity and quality of intervention provided to help learners understand the writing theme, and interaction with learners to understand their response to intervention. It also draws on the development stage of syntactic complexity, and leads from the shallower to the deeper to improve the complexity, fluency and accuracy of writing, and improve the level of second language writing. Learners are prone to inertia in vocabulary learning, stagnation, and vocabulary collocation knowledge is relatively lagging. From the perspective of dynamic theory system, in addition to input, output, mother tongue influence, over-generalization of target language, there are also interactions between learners' motivation, learning environment, social and cultural environment and other external factors.

From Table 3 and Table 4, we can know that there is no significant difference in the use of lexical chunks between the experimental class and the control class in the pretest, but in the posttest, except for the conventional discourse, there are significant differences in the other two classes.

Table 3 t-Test of Paired Samples of Pre-Test Lexical Chunk

Number of lexical chunks	T	Sig.(2-tailed)	Mean difference
Multi-word combination	-.128	.890	-.069
Idiomatic speech	.337	.677	-.971

Table 4 t-Test of Two Paired Samples of Post-Test Lexical Chunks

Number of lexical chunks	T	Sig.(2-tailed)	Mean difference
Multi-word combination	4.361	.231	1.352
Idiomatic speech	2.891	.270	.034

From the perspective of internal and external resources of learning, the internal resources of language learning mainly refer to cognitive resources such as learners' cognitive ability and emotional strength, which are closely related to the psychological mechanism of language processing. External resources mainly refer to environmental resources, including learning environment and conditions, teaching methods and means, etc. Interlanguage is between the mother tongue and the target language in pronunciation, vocabulary, grammar, culture and communication. It is a dynamic language system that gradually moves closer to the correct form of the target language with the progress of learning. To be more in-depth, to convince people; language, compared with the general English text, the tutor emphasizes the tone and the use of words in the counseling. The vast majority of students are able to actively interact with teachers, and only a few students do not accept this type of learning. At the same time, through the online survey of students, it is found that the vast majority of students welcome this mixed dynamic evaluation method. Most of the students clearly indicated that they have significantly improved their English writing skills in this way. The prediction of writing achievement is the greatest. It is a collection of microscopes and telescopes. This unique feature will provide another possibility for syntactic complexity measurement of second language output, and even for accuracy and fluency measurement.

5. Conclusion

Compared with the traditional second language acquisition research, the second language acquisition research in the dynamic system theory perspective adopts new ideas and methods. It abandons the traditional research method based on linear causality, adopts the multi-factor dynamic interaction view, pays attention to the dynamic development of different levels of second language acquisition in different time periods, and thus is more suitable for the description of second language acquisition. A lexical chunk is a semi-finished product of language. Its role in language learning is like a prefabricated section in building materials. It can be learned and stored in memory as a whole. It can be extracted directly when used. Students do not need to spend time to form sentences based on grammatical rules. Reduce the pressure of time-limited writing so that students can conceive smoothly. In addition, the increasing enrichment of current corpus resources provides us with a broader source of corpus for syntactic complexity research, which will make up for the lack of current research samples and the lack of credibility. Finally, the scope of the research needs to be further expanded. However, due to the complexity of studying the dynamic interaction of multiple latent variables, some viewpoints or hypotheses are difficult to falsify. It is necessary to conduct more empirical investigations on the details of language development in the study of second language acquisition in this field of view. In this way, we can find out the law of dynamic development of language, and then predict the results of second language acquisition, and are compatible with traditional second language acquisition research.

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