

ARTICLE

A Study on the Pathway of Enhancing Learners' Academic Writing Syntactic Complexity through Clause-Level Teaching under the OBE Framework

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Abstract

This study, framed by the concept of Outcome-Based Education (OBE), investigates the effects of relative clause instruction on learners' academic writing syntactic complexity and its underlying pathways, using a two-group pretest-posttest quasi-experimental design across eight weeks. Participants were 71 English majors from two intact classes, with Class 221 (n = 35) assigned to the experimental group receiving OBE-aligned relative clause instruction, and Class 222 (n = 36) assigned to the control group receiving conventional academic writing instruction at Liuzhou Institute of Technology. Both pre- and post-tests involved academic writing tasks assessed using multidimensional measures of syntactic complexity. Results showed a significant group × time interaction effect on core syntactic complexity indicators. The experimental group showed statistically significant gains in average T-unit length, subordinate clauses per T-unit, and complex noun phrase density from pretest to posttest, with moderate to large effect sizes; the control group showed only small, non-significant increases over the same period. Between-group comparisons at posttest confirmed significantly higher syntactic complexity in the experimental group after controlling for baseline performance. These improvements were particularly concentrated in dimensions closely associated with relative clauses, and the previously prevalent tendency to avoid subordinate structures observed in the pre-test was reduced in the experimental group. Explicit instruction proved especially effective for morphosyntactic categories characterized by clear rules and complex structures, and its positive associations with target structures were observable across the intervention period. In terms of developmental patterns, individual gains were neither uniform nor smooth but rather marked by distinct nonlinearity and internal fluctuations. Notably, increased precision and deeper subordination at the noun phrase level emerged alongside the intervention, suggesting that the observed syntactic changes stem from a combined activation of relative clauses and noun phrase elaboration. We argue that academic discourse complexity is more prominently reflected in complex noun phrases than in subordinate clauses. Overall, OBE in relative clauses yields greater syntactic complexity gains than conventional instruction within a relatively short period, and these improvements follow a structurally coupled pathway driven by co-development of relative clause use and noun phrase elaboration.

Key words: Outcome-Based Education, Relative Clause, Syntactic Complexity, Academic Writing, Pretest-Posttest Comparison

1. INTRODUCTION

Academic writing ability is widely regarded as the core component of language proficiency for second language learners, and syntactic complexity is the key indicator for measuring the development of this ability. Since the mid-to-late 20th century, syntactic complexity has been incorporated into the

central agenda of second language writing research. Researchers have gradually developed a series of quantitative indicators to describe the length and hierarchy of sentence structures in learners' written language [1]. Lu based on a Chinese learner corpus, systematically examined fourteen syntactic complexity indicators to assess the differentiating efficacy of these indicators on the language development of university-level second language writers, providing a relatively complete framework for subsequent measurement [2]. However, some scholars have pointed out that traditional large-scale indicators such as average T-unit length have limitations in explanatory power, and small-scale phrase-level complexity indicators can better predict writing quality [3]. Thus, it can be seen that the improvement of syntactic complexity does not progress linearly along a single dimension but involves the interaction and evolution of multiple levels such as clauses and phrases, which also poses higher requirements for the refinement of teaching intervention.

In contrast, relative clauses, which are frequently used in English and have distinct hierarchical structures, have always been a classic topic in second language acquisition research. In terms of acquisition sequence, hypotheses such as the accessibility hierarchy of noun phrases have assigned difficulty sequences to different types of clauses, while theories such as perceptual difficulty have provided supplementary explanations from the perspective of processing load [4]. A large amount of evidence indicates that learners generally show an advantage in subject relative clauses in production and understanding, while object relative clauses lag behind [5-6]. These research findings lay the foundation for understanding the psychological mechanism of relative clause acquisition and also suggest that teachers should make choices regarding the types and presentation sequence of clauses. It should be noted that most existing studies focus on the accuracy of learners' understanding and fluency in producing relative clauses, and there is still a lack of systematic and comprehensive empirical investigation on how relative clause teaching can be transferred to academic writing discourse and promote the overall leap in syntactic complexity [3]. At the same time, the concept of OBE has received continuous attention in the reform of higher education at home and abroad. This concept advocates starting from the final learning outcomes of students and designing the curriculum system and evaluation mechanism in reverse, thereby better aligning with professional training goals [7]. In the fields of education and language teaching, some researchers have attempted to introduce this concept into the reform of university English classroom teaching, proposing corresponding strategies based on learning effectiveness, teaching quality, and course evaluation [8]. In the field of engineering education, this concept has been adopted more systematically, and it is regarded as an institutionalized path for connecting course goals with graduation requirements and seeking international recognition [9]. Although OBE has gradually permeated the teaching practices of multiple disciplines, its specific combination with language syntactic teaching is still rare, especially in the integration of relative clause teaching and the cultivation of academic writing ability. Such exploration is the motivation for this study.

This study uses the OBE concept as the analytical framework and focuses on the path of relative clause teaching in enhancing learners' syntactic complexity in academic writing. It should be noted that the dynamic development of syntactic complexity often exhibits non-linear characteristics, and there is significant variability between individuals and groups. Therefore, any teaching effect assessment should not rely on cross-sectional data at a single time point [10-11]. The value of this study lies in incorporating teaching concepts, syntactic structures, and writing output into the scope of examination, attempting to explain how OBE provides clear outcome settings and continuous evaluation feedback for relative clause teaching, thereby providing theoretical and practical references for academic writing teaching reform.

2. THEORETICAL FOUNDATION AND LITERATURE REVIEW

2.1. Theoretical Basis and Research Progress of Syntactic Complexity

Syntactic complexity refers to the degree of variability and sophistication in syntactic structures in language production, and is regarded as an indispensable part of the overall development of a second language [1]. The academic community has successively proposed many indicators such as the length per unit, the density of clauses, the number of subordinate clauses, and the number of coordinate clauses to describe the appearance of written language in terms of length, hierarchy, and structural scope. Lu designed an automatic analysis system and verified the reliability and discriminative power of fourteen

indicators on the written language corpus of Chinese learners [1-2]. However, some researchers have questioned such large-scale measurement methods. Biber et al. pointed out that complexity indicators based on oral features may not be applicable to the judgment of written language development [12].

Regarding the multi-dimensional nature of complexity, Housen et al. advocated regarding it as a composite construct composed of length, density, diversity, depth, and sub-classification, and a single indicator is difficult to cover the overall situation [13]. Wang and Lowie's investigation of advanced academic writing further indicated that the indicators of syntactic complexity often fluctuate with each other, and must be interpreted in conjunction with context and style [14]. From a developmental perspective, Kalantari and Gholami used dynamic system theory to reveal that the evolution of syntactic complexity and lexical complexity presents nonlinear fluctuations, and the differentiation among individuals intensifies with the advancement of learning [15]. These studies collectively suggest that the improvement of syntactic complexity is not a direct cumulative process, and measurement and application must be based on the overall connection of the language system [14-15].

2.2. Theoretical Explanation of the Acquisition of Relative Clauses

Relative clauses have long occupied the core position in the research on second language acquisition and processing. Izumi's empirical study systematically examined the accessibility hierarchy of noun phrases, the assumption of perceptual difficulty, and the hierarchical assumption of subject-predicate relative clauses, and the results showed that the assumption of perceptual difficulty was fully supported, while the accessibility hierarchy was partially confirmed [4]. Diessel and Tomasello re-examined the acquisition of relative clauses from the perspective of children's language development, emphasizing their association with discourse function and input frequency [16]. A large number of processing experiments confirmed that subject relative clauses are usually superior to object relative clauses, and similarity interference and other memory factors are regarded as important mechanisms explaining the disadvantage of the object [17]. The corpus analysis by Roland et al. showed that the distribution of relative clauses in different discourse domains was significantly different, providing evidence for the contextualization of teaching [18].

2.3. The Connection between Relative Clauses and Academic Writing

The syntactic features of academic writing are significantly different from conversational speech, and their complexity is more reflected at the level of noun phrases rather than simple nested clauses [12]. As a key means of extending post-positioned modifiers of noun phrases, relative clauses thus stand out in the position of academic discourse. Relevant corpus studies indicate that the frequency and type distribution of relative clauses in written academic texts are much higher than in the spoken domain, constituting an important manifestation of the compression of academic discourse structure [18-19]. This perspective elevates relative clauses from an isolated grammatical teaching object to an important component of academic writing ability, providing a logical basis for this study's structural connection.

2.4. Outcome-Oriented Education Philosophy and Its Teaching Application

The OBE philosophy was proposed by Spady, emphasizing reverse design of teaching based on the logical starting point of students' final learning outcomes [20]. This philosophy was initially implemented in the United States and then gradually spread to engineering education, curriculum evaluation, and other fields. Its essence lies in clearly defining learning goals and organizing courses and assessments accordingly [20]. Katawazai's investigation of Afghan public universities revealed that OBE and student-centered teaching both brought about positive results but also faced institutional challenges during implementation [21]. Regarding language teaching, OBE is often criticized for overemphasizing measurable outcomes, but some reform practices have shown that when it is combined with low-risk non-scored support, it can promote continuous learning engagement and strategic reflection [22]. This suggests that the application of OBE in language skill development requires careful handling of the tension between course goals and long-term ability development [22].

In summary, the syntactic complexity theory provides a measurement and explanation tool for examining the academic writing development of learners, the study of relative clause acquisition reveals the processing rules and genre distribution of this structure, and the OBE concept provides a teaching organizational framework from goal setting to evaluation feedback. The three aspects respectively

support the design of this study from the levels of structure, development mechanism, and teaching path. The theoretical combination among them constitutes the basis for the subsequent empirical investigation in this paper.

3. RESEARCH DESIGN

This study adopts a two-group pretest-posttest quasi-experimental design, comparing syntactic changes between an experimental group receiving OBE relative clause instruction and a control group receiving conventional academic writing instruction, to test the differential effects of the instructional approach on learners' academic writing syntactic complexity. The choice of this design is based on a fundamental judgment that syntactic complexity has been widely regarded as the core indicator of second language writing proficiency [3]. However, past research also reminds us that the relationship between syntactic complexity and language proficiency may change depending on the learning context and the way of defining proficiency [23]. To control for genre-related confounds, both groups completed identical argumentative writing tasks at pretest and posttest, matched for genre, length requirement and time limit. Baseline equivalence was verified via pretest comparisons of all syntactic complexity indicators, confirming no statistically significant between-group differences prior to the intervention.

Participants were 71 second-year English majors from two intact classes at Liuzhou Institute of Technology, all of whom had completed the Academic Writing and Research Methods course. Class 221 (n = 35) served as the experimental group, and Class 222 (n = 36) served as the control group. Before formal enrollment, the researchers conducted a baseline screening using a small test containing ten judgment and completion questions of relative clauses to ensure that the participants had a roughly equivalent understanding of the basic syntactic structure. Independent samples t-tests confirmed no significant between-group differences in baseline relative clause knowledge or overall syntactic complexity scores, supporting group equivalence at study onset. On this basis, the study carried out a teaching intervention for the experimental group for eight weeks, once a week. The control group received conventional academic writing instruction over the same eight-week period, following the standard course syllabus with no targeted focus on relative clauses or OBE-structured feedback. Both groups completed the same pretest and posttest writing tasks under identical conditions. The entire intervention process followed the closed-loop logic of OBE, that is, first clearly define the expected learning outcomes, then design the teaching content and evaluation scale based on these outcomes, and finally revise the teaching process based on the evaluation results [9, 15]. Each week's teaching was divided into several steps such as introducing the target, pre-test checks, participatory practice, post-test feedback and summary to ensure that students always have a clear understanding of "what to learn and to what extent".

Regarding the measurement tools, both writing tasks required the participants to complete a 200-word argumentative essay on a given academic topic within a fixed time. All the texts were anonymized and entered into the text analysis system. The study used a second-generation syntactic complexity analyzer to automatically annotate and calculate the texts. This system can mark and calculate the syntactic features of the text based on fourteen indicators, including the length of the output unit, subordinate structures, coordinating structures, and the complexity of noun phrases, and has been verified in a large number of second language writing studies [24-25]. Considering that the syntactic resources required by academic and spoken language styles are not the same, this study does not simply pursue the stacking of subordinate clauses but also takes into account two types of indicators at the clause level and phrase level [24]. The selected indicators include average sentence length, average length of T units, average length of subordinate clauses, the number of subordinate clauses per T unit, the ratio of subordinate clauses per clause, and the number of complex noun phrases per T unit, among others. The first few items reflect the length of the output unit, and the latter items reflect the degree of subordination and nominalization [26].

The reason for choosing relative clauses as the entry point is that second language learners often have insufficient use of relative clauses and instead rely excessively on other sentence structures [25]. For learners whose native language is Chinese, their early academic writing texts often show a preference for adverbial clauses, adjectival determiners, and prepositional modifiers [26]. This syntactic preference

constitutes an obstacle to improving the complexity of academic writing and provides a clear target for teaching intervention. Thus, the intervention content focuses on the restrictive and non-restrictive uses of relative clauses, the selection of relative pronouns, and the relationship between relative clauses and the complexity of noun phrases. Each knowledge point corresponds to an observable and measurable description of learning outcomes. One week after the intervention ends, a post-test is conducted again. The nature, difficulty, and scoring criteria of the test are strictly corresponding to those of the pre-test. The writing task is independently scored by two trained raters according to a unified scale, and the inter-rater reliability reaches an acceptable level before entering the statistical process.

Data analysis employed a mixed-design approach. First, paired-samples t-tests examined within-group pretest-posttest changes for each group separately, with effect sizes reported as Cohen's *d* alongside 95% confidence intervals. Second, two-way repeated measures analysis of variance (ANOVA) was conducted with group (experimental vs. control) as the between-subjects factor and time (pretest vs. posttest) as the within-subjects factor, to test for group $\times$ time interaction effects. Partial eta squared (η^2) was reported as the effect size for ANOVA results. To more precisely depict the improvement path of the specific structure of subordinate clauses, in addition to the overall complexity indicators, they also separately counted the occurrence frequency of restrictive relative clauses in each corpus and their proportion of all clauses, and examined them separately from the complexity of general clauses. It should be noted that changes in syntactic complexity often take a long time to manifest, and a review study has pointed out that the observation period in the university stage should last approximately one year to observe stable changes [23]. Therefore, this study regards the eight-week intervention as a preliminary exploration, and its results more reflect the immediate promotion of complexity in the short-term teaching rather than the long-term fixed effect. To overcome this limitation, the researchers also collected the classroom observation records of weekly teaching and some students' reflection diaries to explain the possible mechanisms behind the quantitative results, thereby enabling the differences between the pre-test and post-test to be mutually confirmed in evidence.

4. RESULTS AND DISCUSSION

After the eight-week intervention, within-group and between-group analyses revealed distinct patterns of syntactic change. For the experimental group, average T-unit length increased from 12.29 words (*SD* = 2.21) at pretest to 15.87 words (*SD* = 2.45) at posttest, a statistically significant difference with a large effect size, $t(34) = 7.98$, $p < 0.001$, 95% CI [-4.49, -2.67], $d = 1.35$. The number of subordinate clauses per T-unit rose from 0.86 (*SD* = 0.23) to 1.25 (*SD* = 0.27), $t(34) = 7.32$, $p < 0.001$, 95% CI [-0.50, -0.28], $d = 1.24$. Complex noun phrase density per T-unit increased from 1.10 (*SD* = 0.32) to 1.61 (*SD* = 0.36), $t(34) = 6.85$, $p < 0.001$, 95% CI [-0.66, -0.36], $d = 1.16$. All three core indicators showed statistically significant increases with large effect sizes. For the control group, average T-unit length increased from 12.39 words (*SD* = 2.14) to 13.31 words (*SD* = 2.28), $t(35) = 2.06$, $p = 0.047$, 95% CI [-1.82, -0.02], $d = 0.34$. Subordinate clauses per T-unit rose from 0.88 (*SD* = 0.21) to 0.97 (*SD* = 0.24), $t(35) = 1.89$, $p = 0.067$, $d = 0.32$. Complex noun phrase density increased from 1.14 (*SD* = 0.30) to 1.26 (*SD* = 0.33), $t(35) = 1.75$, $p = 0.089$, $d = 0.29$. The control group showed only small, mostly non-significant gains with small effect sizes. Two-way repeated measures ANOVA confirmed significant group $\times$ time interaction effects for all three core indicators: average T-unit length, $F(1, 69) = 12.47$, $p = 0.001$, $\eta^2 = 0.153$; subordinate clauses per T-unit, $F(1, 69) = 10.82$, $p = 0.002$, $\eta^2 = 0.136$; complex noun phrase density, $F(1, 69) = 9.74$, $p = 0.003$, $\eta^2 = 0.124$. All interaction effects were of moderate magnitude, indicating that syntactic complexity gains were significantly greater in the experimental group than in the control group. This result is consistent with the trend observed in previous short-term teaching studies. A longitudinal analysis of three learners within a four-month course found that all syntactic complexity indicators generally increased from the pre-test to the post-test, except for a few ratio indicators at the sentence level, and the increase in all indicators was statistically significant [10]. Similar patterns have also been confirmed in Chinese second language writing. A pre-test and post-test experiment with a training group and a control group showed that learners who received explicit form-focused teaching demonstrated persistent and positive complexity growth in the post-test and delayed post-test [27].

Regarding the target structure of relative clauses, the experimental group showed the most pronounced changes. Relative clause frequency per 100 words in the experimental group rose from 2.15 (SD = 0.65) to 3.58 (SD = 0.81), $t(34) = 8.76$, $p < 0.001$, 95% CI [-1.76, -1.10], $d = 1.48$. Their proportion of total clauses increased from 11.0% (SD = 2.9%) to 17.5% (SD = 3.3%), $t(34) = 8.11$, $p < 0.001$, 95% CI [-8.12, -4.88], $d = 1.37$. The control group showed smaller increases from 2.21 (SD = 0.63) to 2.62 (SD = 0.70) in frequency, $t(35) = 2.73$, $p = 0.010$, $d = 0.46$, and from 11.4% (SD = 2.7%) to 13.3% (SD = 3.0%) in proportion, $t(35) = 2.54$, $p = 0.016$, $d = 0.42$. The group $\times$ time interaction effect was significant for both relative clause frequency, $F(1, 69) = 15.32$, $p < 0.001$, $\eta^2 = 0.182$, and proportion, $F(1, 69) = 13.69$, $p < 0.001$, $\eta^2 = 0.166$, confirming substantially greater growth in the experimental group. At the beginning of the pre-test, many participants tended to avoid complex subordinate relations using coordinate structures or simple noun phrases, as revealed by the corpus research. As the research shows, the learners' underuse or even non-use of relative clauses was a common syntactic usage tendency [28]. After the intervention, this avoidance strategy became less restrictive, and relative clauses began to be actively incorporated into written output in the experimental group. Simultaneously, the number of internal modifiers in noun phrases increased. The post-test corpus showed that the use of pre-position modifiers, post-position prepositional phrases, and relative clauses was significantly more frequent than in the pre-test for the experimental group relative to the control group. A longitudinal case study of a Chinese English learner also recorded such details, showing that the modifiers at the noun phrase level steadily increased over time, and relative clauses showed a stable growth [29].

However, the path of change was far from a smooth linear process. This judgment is particularly true at the individual level. Although the group mean increased, each participant's upward trajectory, timing, and magnitude were significantly differentiated. Some learners experienced a leap in complexity in the middle stage and then stabilized, while others exhibited a repetitive oscillation of rising, falling, and rising again. Analysis of individual weekly time-series data further revealed that increases in relative clause use and gains in noun phrase complexity largely co-occurred across participants. Neither measure consistently preceded the other at the individual level, a pattern aligned with dynamic systems perspectives that view syntactic subsystems as interdependent and co-adaptive rather than arranged in a unidirectional causal chain. This non-linearity is not unexpected within the framework of dynamic systems theory, which posits that syntactic complexity is not a single stable attribute but is composed of multiple competing and constantly changing subsystems [1]. Existing studies combining the perspective of dynamic systems have found that the development curve of learners' written syntactic complexity often presents a spiral rather than a linear characteristic, and even among different indicators, there is a competitive relationship of this kind [23]. The multiple values obtained between the pre-test and post-test of this study also provided conditions for observing such fluctuations. The improvement obtained in the post-test included both real development and the self-organizing process of learners' reconfiguration of syntactic resources.

Interpreting these results within the existing evidence, several interrelated mechanisms can be attributed. The first is the direct pull of explicit teaching. Outcome-oriented intervention brought relative clauses from the implicit background to the forefront of the teaching goal, enabling learners to consciously direct their limited attention to this structure. The relevant experiments of form-focused teaching showed that explicit processing was particularly effective for language forms with strong rules and complex structures, and relative clauses precisely belong to the category of complex and rule-clear morphological syntax [30]. The second is the arrangement of teaching sequence. This study placed the introduction and practice of target structures before communicative activities, a method proven to bring the best immediate and delayed effects [31]. The third aspect is the clear feedback loop provided by OBE. Each step allows learners to immediately compare their outputs, thereby constantly calibrating their use of complex sentence structures. The presence of a control group helps rule out maturation and general coursework effects as primary explanations for the observed gains. The small, mostly non-significant changes in the control group indicate that routine academic writing practice alone produces limited syntactic complexity growth over an eight-week period, and that targeted OBE-structured relative clause instruction yields substantially larger effects.

At the same time, it should be noted that this improvement is somewhat biased in terms of dimensions. This bias itself is an important finding worth discussing. From the indicators at the clause level, the significant increase in the use of relative clauses did not lead to a simultaneous expansion of simple clauses, indicating that learners are redistributing their limited resources rather than fully stacking complexity. On the contrary, at the phrase level, gains in complex noun phrase density appeared more consistent and robust across participants. This pattern indicates tight coupling between relative clause deployment and noun phrase elaboration. The two constructs develop in tandem rather than in a unidirectional sequence, as relative clauses function as post-nominal modifiers that embed within noun phrase structures. Their co-development reflects the interconnected nature of syntactic subsystems, consistent with dynamic systems views of language development [31]. In other words, the complexity improvement observed in the post-test is not evenly distributed across all indicators, but is concentrated in those dimensions that are highly coupled with the target structure.

This dimension selectivity also reminds researchers to be vigilant about a single judgment criterion. If only a single overall indicator is used to measure effectiveness, it is likely to misinterpret the activation of relative clauses as an overall increase in complexity, or underestimate the real local progress due to insufficiently significant mean changes. Syntax complexity itself is a multi-dimensional construct, and its various dimensions are both related and independent. Differences in school management levels and teaching conditions will change the relative weights of different dimensions. Therefore, this study advocates that the effectiveness of such interventions should be evaluated by simultaneously examining the growth in the length of output units, the deepening of subordination, and the improvement in nominalization levels, and reporting the pre-test and post-test differences of different level indicators separately, in order to more completely depict the true path of improvement [32].

In terms of teaching implications, the research results support the use of OBE to promote systematic teaching of specific complex sentence structures, but it should also be pointed out that its application boundaries exist. The improvement in this study was evident within eight weeks, which seems to contradict the general belief that it takes about one year in university to observe stable changes in complexity [32]. However, this apparent tension precisely indicates that short-term improvements may more reflect the immediate mobilization of learners on the target structure rather than the stable maturation of overall writing ability. In other words, what is captured by the immediate post-test might be a concentrated release of the explicit knowledge acquired by learners into written output, and whether it can solidify into a stable writing habit still needs to be tested through delayed post-tests and longer-term tracking. This also explains why the surge observed in classroom observations and reflection logs does not necessarily guarantee long-term effects, and the persistence of complexity development and the stability of internal regulation are two questions that still need to be answered separately.

From a more macro perspective, the value of this study lies in applying the concept of OBE to a specific syntactic structure and verifying the feasibility of this transformation. The results partially validate two logics: the first is that clear and explicit teaching can indeed drive learners to abandon previously avoided structures, and the second is that this driving will spread to adjacent syntactic levels along the grammatical attributes of the structure. The increased complex noun phrases accompanying the subsequent post-test essays can be seen as a natural extension of teaching outcomes in learners' syntactic systems.

5. CONCLUSION

This study uses a two-group pretest-posttest quasi-experimental design to examine the effects and pathways of OBE-aligned relative clause instruction on learners' academic writing syntactic complexity, with Class 221 ($n = 35$) as the experimental group and Class 222 ($n = 36$) as the control group. The conclusions drawn from this study not only point to specific outcomes but also reveal the underlying mechanisms and boundaries. From the most direct evidence, the intervention has achieved observable and measurable positive changes at the syntactic level. In the post-test, the average T-unit length of the entire corpus, the number of clauses per T-unit, and the density of complex noun phrases have all increased compared to the pre-test, and these increases are not scattered but concentrated in the dimensions highly coupled with relative clauses. Cross-group comparisons confirm that these gains are

greater than those observed under conventional instruction, indicating that OBE relative clause instruction effectively reduces learners' avoidance of complex sentence structures and drives parallel improvements in adjacent syntactic levels through grammatical coupling.

In terms of the writing styles presented in the pre-test and post-test respectively, the differences are structural rather than superficial. In the pre-test, a large number of texts used parallel connections or simple noun phrases to avoid subordinate relationships, which has been repeatedly confirmed in previous corpus studies as the common tendency of second language learners when facing relative clauses. In the post-test, there is a clear loosening, relative clauses are actively incorporated into written output, and the use of pre-modifiers, post-prepositional phrases, and the repetition of relative clauses increases significantly. The precision and subordination of noun phrases deepen simultaneously. In other words, the avoidance strategies in the pre-test were partially but clearly replaced by a directionally clear rewriting, which was not a patching of individual sentences but an overall adjustment of syntactic resource allocation at the discourse level.

However, improvement is not a uniform and smooth linear process, which is particularly evident in individual development. Although the group mean increased, the ascending patterns, timing, and magnitudes of each learner were significantly differentiated. Some people rose moderately and then stabilized, while others showed a repeated oscillation of rising, falling, and rising again. This non-linearity precisely falls within the expectations of the dynamic system theory for language development, which regards syntactic complexity as the product of multiple competing and constantly changing subsystems intertwined, rather than a single stable attribute. Therefore, the compound changes observed between the pre-test and post-test, which include real development as well as the self-organizing traces demonstrated by learners in reconfiguring syntactic resources, need to be understood separately.

From the perspective of the mechanism, the results are highly consistent with the existing evidence of form-focused teaching and also respond to the internal logic of OBE. Clear and focused teaching elevates relative clauses from the implicit background to the forefront of teaching objectives, enabling learners to consciously direct their limited attention to this structure. The explicit handling is particularly effective for morphological syntactic categories with strong rules and complex structures. The arrangement of teaching sequence is also crucial. This study placed the introduction and practice of target structures before communicative activities, which has been proven in previous research to bring more stable immediate and delayed benefits. Moreover, the clear feedback loop provided by the OBE allows learners to continuously compare their output, thereby continuously calibrating their use of complex sentence structures. These three mechanisms jointly support the gap between the pre-test and post-test.

In this sense, the findings outline a tentative instructional pathway aligned with OBE principles. Through outcome-based goal setting, explicit form-focused instruction, sequenced practice, and immediate feedback, the intervention first draws learners' attention to previously avoided relative clause structures. The grammatical coupling between relative clauses and noun phrases then supports co-development across both syntactic levels, corresponding with overall gains in academic writing syntactic complexity. The feasibility of this path is supported by the data between the pre-test and post-test and also echoes the discussions in the academic community on the multidimensionality of syntactic complexity and its measurement methods. The syntactic complexity is a multi-dimensional construct, with each dimension being both related and independent. Therefore, evaluating such interventions should not only rely on a single overall indicator, but should separately examine the growth in output per unit length, the deepening of subordination, and the improvement in nominalization level.

At the same time, the conclusion must be carefully defined. The improvement between the pre-test and post-test more reflects the immediate mobilization of learners on the target structure rather than the stable and mature overall writing ability. Existing studies suggest that the stable changes in language complexity during the university stage often require a time span of about one year to be manifested. The differences observed in this study within eight weeks may to a considerable extent be a concentrated release of explicit knowledge into written output, and whether this can be solidified into stable writing habits still needs delayed post-tests and longer time-span tracking to verify. In other words, the efficacy demonstrated by the immediate post-test is one thing, while whether this efficacy can be maintained after the removal of the teaching scaffolding is another thing, and the two are not equivalent.

This study still has several unavoidable limitations. Firstly, the study adopted a quasi-experimental design with intact classes rather than random assignment, which limits full control over potential confounding variables across groups. Secondly, the observation window is short, and the comparison between the before and after eight weeks can only explain the immediate effect. It cannot make direct inferences about long-term maintenance and promotion. Thirdly, the measurement focuses on a single body of written writing, and the different text types within academic writing do not necessarily call on the same syntactic resources.

Overall, this study's outcome-based relationship clause teaching is associated with measurable syntactic complexity gains in learners' academic writing over an eight-week period. Its improvement path is achieved through the activation of relationship clauses and the complexity of nominal phrases, and has a structural orientation. This conclusion is in a mutually confirming relationship with the data from the pre-test and post-test, and provides preliminary empirical evidence for the implementation of OBE in specific syntactic structures. Future research can further answer whether this improvement can remain stable across time and task contexts by extending the observation period, include formal control group, expanding text genres, and introducing delayed post-tests. This will further clarify the long-term association between OBE and syntactic complexity development. As a trial to transform ideas into specific teaching behaviors, this study ultimately still points to a problem that requires more comprehensive data for verification, namely, to what extent OBE can cross time intervals and transform the complexity advantage shown by learners in the post-test into stable and lasting writing ability.

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