English Language Teaching and Linguistics Studies
ISSN 2640-9836 (Print) ISSN 2640-9844 (Online)
Vol. 7, No. 3, 2025
www.scholink.org/ojs/index.php/eltls

Original Paper

An Empirical Study on Corpus-based Lexical Approach and Second Language Fluency

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Received: April 22, 2025 Accepted: May 11, 2025 Online Published: May 27, 2025

doi:10.22158/eltls.v7n3p15 URL: http://dx.doi.org/10.22158/eltls.v7n3p15

Abstract

Although lexical approach has been widely recognized as an effective method for improving second language (L2) fluency, there is limited empirical evidence on its impact on acoustic indicators of L2 oral fluency. This study analyses the effects of a corpus-based lexical approach in enhancing oral fluency of 40 students of non-English major at a university in Western China. The results indicated significant improvements in mean length of silent pause and reductions in repetitions, suggesting enhanced language organization and confidence in expression. However, no significant changes were observed in speech rate and number of filled pause. The findings suggest that corpus-based lexical approach can effectively reduce long silent pauses and improve fluency, though its short-term impact on speech rate and short pauses is limited.

Keywords

lexical approach, corpus, oral fluency, silent pause, filled pause

1. Research Background

A key factor that differentiates native speakers and highly proficient language learners from less proficient learners is their extensive command of semi-fixed lexical chunks (Pawley & Syder, 1983). The lexical approach, introduced by Michael Lewis in 1993 work, represents a paradigm shift in language teaching methodology. Its foundational premise—*language consists of grammaticalized lexis, not lexicalized grammar*—challenges traditional language teaching paradigms by positioning phraseological lexis at the core of language instruction. In the past thirty years, this approach has gained widespread recognition for its pedagogical advantages, with numerous scholars contributing to its theoretical construction and empirical research. Previous research has demonstrated that the lexical approach can significantly enhance second language (L2) oral proficiency. Despite its theoretical endorsement and empirical findings, the implementation of chunk teaching in practice remains predominantly reliant on traditional methods, wherein instructors primarily explain and transmit lexical chunks to learners. These conventional approaches, whether evaluated in terms of the quantity, variety,

or function, are inherently limited in scope. Consequently, the potential of the lexical approach to enhance language learning remains underexplored in practical settings, highlighting a critical gap between theory and application.

2. Literature Review

2.1 Lexical Approach in Language Teaching

The Lexical Approach has garnered significant attention across various disciplines, including psycholinguistics, neurolinguistics, and second language acquisition (SLA). Empirical studies suggest that native speakers achieve fluency and accuracy in producing complex sentences not through the storage of individual words, but rather through the retention of a vast repertoire of lexical chunks in their cognitive systems (Siyanova-Chanturia et al., 2011; Leedham, 2012; Skadden, 1999; Bale, 2014). Lexical chunks, defined as pre-stored multi-word units in memory, are typically retrieved as holistic units during language production. This allows native speakers to allocate greater cognitive resources to higher-level linguistic processes, such as content integration and syntactic structuring.

The central tenet of the lexical approach is to foster learners' awareness of lexical chunks and to equip them with strategies to identify, memorize, and utilize these chunks effectively. Nattinger and DeCarrico (1992) argued that excessive reliance on learner autonomy may prove insufficient, as learners often encounter challenges in accurately identifying authentic lexical chunks without explicit instructor guidance. Lewis (1993, 1997, 2000) pioneered this approach, advocating for pedagogical techniques such as "chunking" exercises, collocation frameworks, and pattern recognition to facilitate learners' engagement with lexical chunks. Consequently, it is imperative for educators to provide direct instructional support to expedite learners' acquisition and application of lexical chunks.

In pedagogical practice, the selection of lexical chunks is frequently based on frequency criteria. However, this approach has limitations, as the pool of high-frequency lexical chunks is inherently restricted and may not adequately address the needs of learners beyond intermediate proficiency levels (Moon, 1998a, b). To address this issue, researchers propose incorporating additional criteria, such as "teaching value" and "memorability," into the selection process. These supplementary criteria enable educators to more effectively identify and prioritize lexical chunks that are both pedagogically relevant and conducive to long-term retention, thereby optimizing the instructional efficacy of the lexical approach.

In the field of second language acquisition, Zheng Zimin (2015) proposed a "listening-promoting-speaking" teaching model based on chunks, and Xiao Wuyun (2011) proposed a "writing-promoting-speaking" teaching model based on chunks. The prior researches predominantly focused on teacher-centered instruction, where the meaning and usage of lexical chunks from textbook are explained in traditional classroom settings, supplemented by in-class and after-class exercises. The quantity and variety of lexical chunks instructed with this approach are inevitably limited in the constrained class time. Additionally, this approach often overlooks the potential of students'

autonomous learning outside the classroom.

In response to these limitations, this study seeks to innovate the lexical approach by shifting the instructional focus. Instead of explicating the meaning and usage of individual chunks during class, the instructor provides an overview of the definition, classification, and structural and functional properties of lexical chunks. To facilitate autonomous learning, students are equipped with self-constructed corpora and online resources, including oral language learning videos, textual materials, frequency tables of lexical chunks, and retrieval tools. These resources are designed to encourage students to engage in independent learning after class, thereby enhancing their ability to store and retrieve lexical chunks from long-term memory through targeted practice and homework assignments.

2.2 Phraseology in Corpus Linguistics

Since Harold E. Palmer (1925), for the first time, emphasized the importance of lexical chunks in conversation, phraseology has now become a major field of theoretical and applied research for linguistics, including two research paradigms: theory-driven and corpus-driven. The theory-driven paradigm is grounded in linguistic theoretical models and primarily investigates fixed expressions, idioms, and other structurally cohesive language units. In contrast, the corpus data-driven paradigm relies on the analysis of linguistic corpora, emphasizing the empirical examination of phrase frequency and the diversity of linguistic forms in actual usage (Sinclair, 1991; Altenberg, 1998).

Altenberg (1998) introduced a corpus-based framework for phraseology research, advocating for the inclusion of both fixed and semi-fixed word combinations, as well as complete and incomplete phrases, within the scope of phraseological studies. This framework proposes the frequency of lexical chunks in corpora as a key criterion for their selection. A significant advantage of this paradigm is its foundation in authentic language use, which allows researchers to avoid the constraints of specific theoretical frameworks and to explore a broader spectrum of linguistic units. Within this framework, lexical chunks are classified into three categories: Full clauses, Clause constituents, and Incomplete phrases. This classification further elucidates the structural roles that phrases play in language production and comprehension.

Regarding the dynamic generation mechanism of phraseology, Altenberg (1998) introduces a linear discourse generation model, referred to as the "sewing" theory, which builds upon Halliday's (1967) subject-predicate framework. This model posits that discourse sequences are composed of two primary components: *Thematic springboard* and *Propositional core*. *Thematic springboard* serves to convey known information and is further subdivided into *Frame*, *Onset*, and *Stem*. In contrast, the *Propositional core* is responsible for expressing new information and includes *Rheme*, *Tail*, and *Transition*.

Within this theoretical framework, the process of spoken language production is conceptualized as a dynamic and continuous activity that involves the selection and integration or “sewing” of linguistic chunks. This mechanism highlights the incremental and cohesive nature of discourse construction, wherein pre-stored lexical and phrasal units are sequentially assembled to generate coherent and

contextually appropriate utterances. This process emphasizes the interplay between stored linguistic knowledge and real-time language production, facilitating the seamless flow of discourse while maintaining syntactic and semantic coherence.

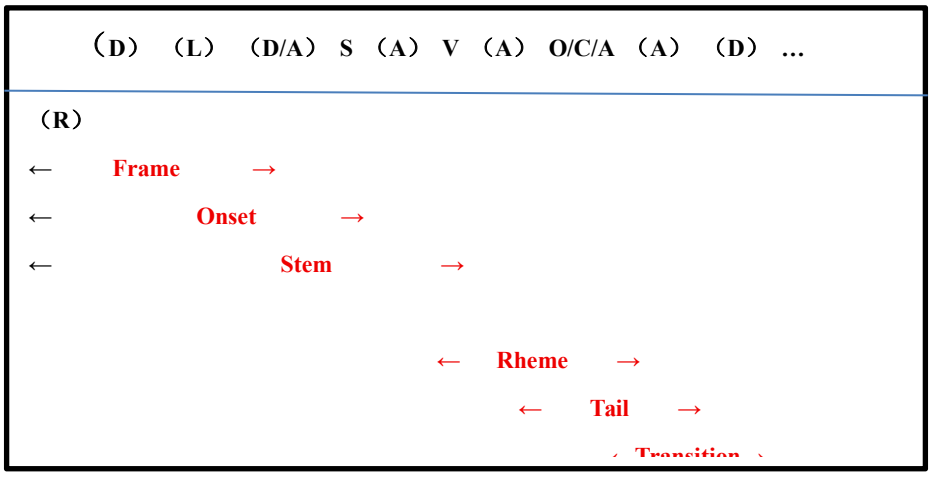

Figure 1. Linear Distribution of Multiple Clause Constituents

Abbreviation: A=adverbial, C= complement, D=discourse item, L=linking word, O=object, R=response, S=subject, V=verb element.

2.3 Research on Second Language Fluency

Oral fluency has long been a central focus of research within the field of SLA. Lennon (1990) categorizes fluency into two distinct concepts: broad and narrow. The narrow sense of fluency, which emphasizes the smoothness of the language generation process, has become a primary area of investigation. Segalowitz (2010) further advances the theoretical understanding of fluency by proposing a three-dimensional framework from a cognitive perspective, encompassing cognitive fluency, discourse fluency, and perceptual fluency. This framework has provided a robust theoretical foundation for empirical studies in the field.

In terms of methodological approaches, researchers commonly integrate objective acoustic measurements of discourse fluency with subjective ratings of perceptual fluency. For instance, Cucchiarini et al. (2002) identified the number of phonemes per second for beginners and the average syllable length for intermediate learners as critical indicators for predicting perceptual fluency. Similarly, Derwing et al. (2004) demonstrated that pause frequency and normalized trimmed syllable rate are significantly correlated with fluency ratings. Kormos and Dénes (2004) expanded on these findings by identifying speech rate, average length of discourse, proportion of speaking time, and the number of accented words as the most reliable predictors of fluency.

However, these studies exhibit considerable methodological variability, and the collinearity among acoustic measures often complicates the interpretation of results. To address this issue, recent research

(e.g., De et al. 2013.) has emphasized the importance of employing low-collinearity measures to enhance the validity of fluency assessments. Building on these advancements, the present study introduces a novel methodological perspective by selecting specific acoustic measures across six dimensions of fluency: speed, pauses, and repairs. This approach aims to mitigate the issue of dimension confusion, thereby offering a more precise and comprehensive framework for analyzing oral fluency in second language learners.

3. Methodology

3.1 Research Purpose

This study seeks to develop a corpus-based lexical approach tailored to the specific context of first-year students at universities in Western China, who demonstrate a strong foundation in English language proficiency but exhibit deficiencies in oral fluency. The model prioritizes the use of lexical chunks as the core instructional focus, emphasizing both the frequency of chunk usage and the explicit explanation of their grammatical structures and functional applications. By integrating online and offline corpus resources, the research aims to identify an effective pedagogical approach to enhance the fluency of university students' spoken English. Furthermore, it intends to foster students' motivation for autonomous practice and promote the development of lifelong learning skills.

3.2 Participants

The study involved intact first-year non-English major classes at a universities in Western China. A sample of 40 students, with a mean age of 17.75 years, was selected to participate in a 16-week corpus-based lexical approach experiment. The participants' average score on the English section of the National College Entrance Examination (Gaokao) was 112.3, reflecting a solid foundation in English language knowledge. Pre-experiment interview revealed that English listening section were excluded from college entrance examination in the participants' respective provinces, and no targeted training in listening and speaking was conducted in high school English teaching. Participants lack confidence in their English listening skills and speaking abilities, with more than half of them admitting that they don't know how to start speaking.

3.3 Experiment Design

In contrast to previous emphases on teachers' explanation of a small set of chunks excerpted from textbook and practice in the classroom, this experiment design emphasizes students' autonomous learning and practice process. Teachers provide students with theoretical instructions on the definition, classification and function of lexical chunks, and multimodal corpus materials for practice and autonomous learning. Through oral imitation practice, students are guided to identify, analyze, and use lexical chunks, thereby forming long-term memory of lexical chunks and improving the fluency of oral expression.

This study provides students with a multimodal corpus for autonomous learning and practice after class. The corpus is created within two modalities: video and text. The links of twenty TED talk videos

covering topics such as education, culture, economy, environment, technology, and health are offered as practicing materials. The text content of the videos is transcribed, cleaned, and edited into a database with a capacity of approximately 38,000 characters. Referring to Altenber's chunk extraction criteria, the standard for extracting chunks from the text corpora is set to word-combinations consisting of 3-5 words occurring at least 3 times in the corpus. Using the N-grams function in the corpus software AntConc, all word-combinations that meet the frequency requirements are extracted, and then manually filtered one by one, removing disfluent fillers (e.g. *ehm, ah*) and repetitions or fragments (e.g. *and the the, out of the*), thus forming a frequency table of lexical chunks in presentations.

3.4 Acoustic Indicators of Fluency

Based on human-annotated speech recordings, six objective acoustic indicators were computed for each recording in this study (see Table 1). To ensure that each indicator captures a distinct dimension of disfluency and to prevent inter-dimensional confounding, all frequency-based metrics were calculated using speaking time (excluding silent intervals) rather than total time (including silence). Drawing on the theoretical framework established by Bosker (2012), which identified speech rate, pause, repetition, and repair as key factors influencing evaluators' perception of fluency, this study operationalizes fluency across three dimensions: rate fluency, disfluency, and repair fluency.

Rate fluency is measured using a single indicator, the mean length of syllables (MLS), which was logarithmically transformed to normalize its distribution. disfluency is assessed through three indicators: the number of silent pauses per unit of speaking time (NSP), the number of vocalized pauses per unit of speaking time (NFP), and the mean length of silent pauses (MLP), with MLP also subjected to logarithmic transformation. These indicators were selected to quantify both the frequency and duration characteristics of pauses, while distinguishing between silent and vocalized pauses. Repair fluency is evaluated using two metrics: the number of repetitions (NR) and the number of repairs per unit of speaking time (NC). All indicators are designed with consistent directionality, where higher values correspond to lower fluency levels. Additionally, this study adopts a pause threshold of 250ms (Towell et al., 1996), with micro-pauses (Riggenbach, 1991) below this threshold excluded from consideration as disfluencies affecting fluency.

Table 1. List of Six Selected Acoustic Measures

Aspect	No.	Acoustic measure	Calculation
Speed	1	Mean length of syllables (MLS)	Log (spoken time / number of syllables)
Breakdown	2	Number of silent pauses (NSP)	Number of silent pauses / spoken time
	3	Number of filled pauses (NFP)	Number of filled pauses / spoken time
	4	Mean length of silent pauses (MLP)	Log (sum of length of silent pauses / number of silent pauses)
Repair	5	Number of repetitions (NR)	Number of repetitions / spoken time

6	Number of corrections (NC)	Number of corrections / spoken time

Note. Spoken time = duration of speech fragment excluding silence of >250ms.

3.5 Experiment Procedure

Grounded in the pedagogical framework for lexical chunks proposed by Boers & Lindstromberg (2011) and leveraging advancements in corpus technology and internet resources, this 16-week experiment was conducted as follows:

Pre-test Administration (Week 1): A speaking test from Chinese College English Test Band 4 (CET4) was adopted as a pre-test to the 40 participating students. Six indicators of speaking fluency were extracted from the recordings, and the corresponding data were documented for baseline analysis.

Introduction of Corpus Resources (Week 2): Instructors provided students with corpus-based learning materials, including online video links, offline text libraries, and a frequency table of spoken lexical chunks. Additionally, students were introduced to the Collins Cobuild Online Collocations website (http://www.collins.co.uk), a comprehensive resource for exploring lexical chunk usage.

Instruction on Lexical Chunk Theory and Classification (Weeks 2-4): Instructors delivered lectures on the foundational theory of lexical chunks and their functional classification. Following Altenberg's (1998:103) research framework, lexical chunks (ranging from 3 to 6 words) were initially categorized at a primary level into three structural types: Full clauses, Clause constituents, and Incomplete phrases. Subsequently, Clause constituents and Incomplete phrases were further classified at a secondary level based on linear discourse generation mechanisms. The frequency of use for each category of lexical chunks was quantified and presented in tabular form. Concurrently, students were trained to utilize the Collins Cobuild Online Collocations corpus. By engaging with high- and medium-frequency lexical chunks derived from authentic spoken language materials, students gradually developed familiarity with chunk-based knowledge, cultivated chunk-based expression habits, and reinforced their retention of lexical chunks.

Autonomous Learning and Speech Preparation (Weeks 2-16): Beginning in the second week, students were required to independently practice with corpus after class. Activities included video shadowing, chunk querying, and practice exercises. Simultaneously, students began preparing their own speeches. Throughout the experiment, each student delivered two impromptu speeches in class, each limited to 5 minutes. During the preparation process, instructors encouraged students to incorporate lexical chunks from the TED Talk corpus into their speeches and to verify the collocational accuracy of phrases using the Collins Cobuild Online Collocations corpus.

Post-test Administration and Data Analysis (Week 17): After the 16-week intervention, a post-test was conducted using another set of CET4 speaking test questions. The same six fluency indicators were extracted from the recordings, and paired-sample t-tests were performed to compare the pre-test and post-test data.

4. Results and Finding

To evaluate the changes in participants' oral fluency between the beginning and end of the semester, the following statistical methods were employed: 1. Normality Test (Shapiro-Wilk Test): This test was conducted to assess whether the data followed a normal distribution, thereby informing the choice between parametric and non-parametric tests for subsequent analysis. 2. Paired Sample t-test: Applied to compare the mean values of fluency indicators at the beginning and end of the semester for data that adhered to a normal distribution. 3. Wilcoxon Signed-Rank Test: Utilized for data that did not conform to a normal distribution, providing a non-parametric alternative to the paired sample t-test. 4. Cohen's d Effect Size Analysis: This metric was calculated to quantify the magnitude of observed changes, offering a standardized measure of the intervention's impact. 5. Data Visualization: Box plots were employed to visually represent the distribution and trends of the data, facilitating an intuitive understanding of the results.

The comparison of pre- and post-semester data revealed changes in certain fluency indicators, though the overall magnitude of these changes was relatively modest. Detailed results are presented in Table 2 below:

Table 2. Paired-samples t-test Statistics for Fluency Index

Metric	Shapiro-Wilk p-value	Test Used	t-statistic	t p-value	Wilcoxon statistic	Wilcoxon p-value	Cohen's d (Effect Size)
MLS	0.007621597	Wilcoxon	N/A	N/A	91	0.621513367	N/A
NSP	0.420446783	t-test	0	1	N/A	N/A	0
MLP	0.242230445	t-test	2.880467782	0.009580871	N/A	N/A	-0.64409218
NFP	0.360741556	t-test	-1.544291	0.13901079	N/A	N/A	0.345313966
NR	0.071201175	t-test	-0.72134393	0.479481138	N/A	N/A	0.161297406
NC	0.099540107	t-test	-1.85348978	0.07940638	N/A	N/A	0.414452914

Significance level $\alpha = 0.05$, if $p < 0.05$, it indicates that there is a significant change in the indicator between the beginning and the end of the semester.

The data indicate that students' speech rate did not show a significant change by the end of the semester ($p > 0.05$), suggesting their oral expression speed remained consistent. However, both the frequency and duration of silent pauses decreased, with the duration demonstrating significant improvement ($p < 0.05$), reflecting enhanced language organization skills and reduced cognitive processing time. While the reduction in the number of silent pauses was not statistically significant ($p > 0.05$), the number of vocal pauses (e.g., "uh," "um") exhibited considerable variation ($p > 0.05$), aligning with Cenoz's findings that vocal pauses are more individual-specific and have a lesser impact on fluency compared to silent pauses. Additionally, significant reductions in repetitions and corrections ($p < 0.05$) were observed, indicating increased confidence and fluency in students' oral expression by the end of the semester. Overall, these results highlight improvements in specific aspects of fluency while

underscoring areas where progress remains limited.

In the following Figure 2, the box plot of oral fluency metrics further presents the distribution of the six oral fluency indicators at the beginning (blue) and end (orange) of the semester, to help analyze the changing trend of the data, outliers, and the variability of the data.

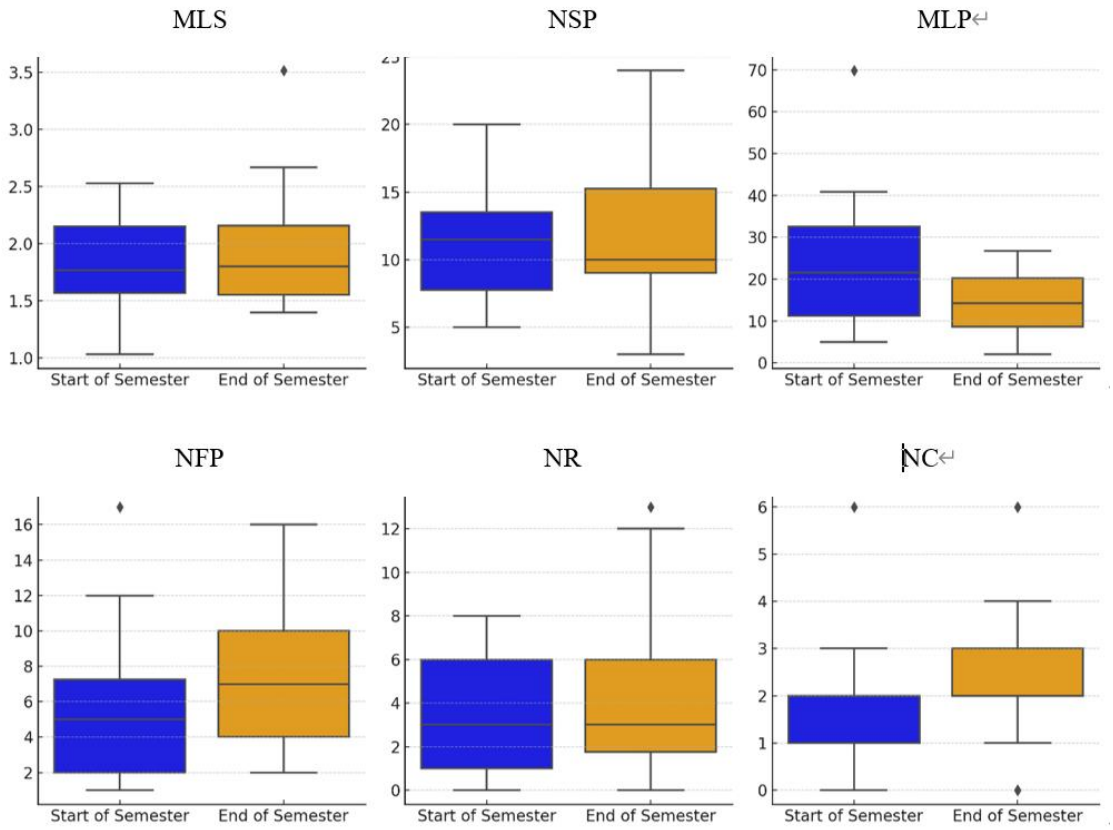

Figure 2. Box plot of Oral Fluency Metrics

The box plot reveals that the median speech rate (MLS), one of the fluency indicators, is slightly higher at the end of the semester compared to the beginning, suggesting a modest overall improvement in students' speaking speed. However, the data distribution remains relatively concentrated, with a few outliers (upper dots) present. While the trend indicates an enhancement in speech rate, the improvement is not statistically significant. Regarding pause-related fluency indicators, the median number of silent pauses (NSP) at the end of the semester is comparable to that at the beginning, but the data variability has increased, as evidenced by the wider interquartile range. This suggests that while some students continue to exhibit frequent silent pauses, the overall distribution has shifted significantly, highlighting individual differences. The median mean length of silent pauses (MLP) has decreased by the end of the semester, and the data distribution range has narrowed, indicating that most students have achieved greater stability in pause duration. This trend reflects a significant reduction in silent pause duration, implying improved fluency and reduced cognitive processing time during speech. Conversely, the

median number of filled pauses (NFP) shows an inverse increase by the end of the semester, with greater data variability, suggesting that some students still rely on filler words (e.g., "uh," "um") while others have reduced their usage. This variability underscores the individual-specific nature of filled pauses. For the final two fluency indicators, the median number of repetitions (NP) has decreased by the end of the semester, indicating a reduction in self-corrections, although outliers suggest that some students still exhibit high levels of repetition. The median number of corrections (NC) is slightly higher at the end of the semester, implying that students may still be correcting their language output. The overall data variability for repairs is considerable, with some students reducing their repair frequency while others increase it, reflecting divergent individual progress in fluency.

5. Discussion

This study investigates the impact of a corpus-based lexical approach on the development of spoken fluency. By analyzing six core indicators – speech rate, number of silent pauses, duration of silent pauses, number of vocalized pauses, repetitions, and self-repairs – this study examines changes in participants' oral fluency before and after the experiment. The findings align in part with previous research, reaffirming that lexical chunk instruction contributes to improved oral fluency. However, distinct developmental patterns emerged across all fluency indicators. The following section presents a detailed discussion of the results, along with pedagogical implications and directions for future research.

Speech rate is widely regarded as a key measure of spoken fluency. Statistical analysis indicates a slight overall increase in the speech rate of the participants by the end of the semester, though the change was not statistically significant. However, box plot analysis reveals a relatively concentrated data distribution, suggesting that while some students demonstrated substantial improvement, the overall effect remained modest. Follow-up interviews with participants who exhibited significant gains in speech rate, as well as those who showed little to no change, revealed several potential explanations. The relatively short duration of the experimental period, the students' initially low oral proficiency, and limited after-class practice were identified as possible factors contributing to the minimal overall improvement. To enhance speech rate development in future instructional settings, it is recommended that educators implement interactive incentive mechanisms to encourage active participation in authentic conversational activities and shadowing exercises. Such practices can facilitate faster retrieval of lexical chunks and promote a more natural and continuous speech flow.

This study examined five disfluency indicators: NSP, MLP, NFP, NR, and NC. Among these, the most notable change was the significant reduction in MLP ($p < 0.05$), suggesting increased student confidence, reduced hesitation, and more fluid language production. While the number of silent pauses also declined, the change was not statistically significant, indicating that students initially addressed the duration of pauses rather than their frequency during the short-term intervention. The findings suggest that lexical approach facilitates faster retrieval of pre-stored chunks from long-term memory, thereby

reducing cognitive load and significantly shortening long silent pauses (i.e., pauses exceeding 1.000 seconds). Analysis of students' oral test transcripts indicates that the most frequently employed lexical chunks were stem chunks (i.e., core structural components of speech), which played a crucial role in improving fluency by linking ideas and reducing long pauses. However, due to the limited duration of the intervention, no significant improvement was observed in shorter silent pauses (0.250 < MLP < 1.000 seconds). Future research should encourage the accumulation of predicate chunks (*Rheme*) to further reduce both the duration and frequency of intra-sentential pauses.

With regard to vocalized pauses, prior research has established that these pauses are common even in the speech of native speakers and are influenced by individual differences. The results of the present study are consistent with this finding, suggesting that vocalized pauses may not serve as a definitive measure of oral fluency and should be considered with caution in future studies. For the remaining two disfluency indicators, the number of repetitions decreased significantly, indicating smoother and more confident speech production among participants. Conversely, self-repairs showed a slight increase, suggesting that lexical chunk instruction may contribute to reduced hesitation in speech while simultaneously prompting greater attention to linguistic accuracy. This observation implies that some students, having become more aware of appropriate lexical chunk usage, were able to self-monitor and correct language errors during speech production.

The findings of this study provide evidence that corpus-based lexical approach contributes to improvements in oral fluency. However, several recommendations can be made for future research. First, the 16-week experimental period was relatively short, making it difficult to observe long-term developmental trends. Future longitudinal studies spanning one to two years are recommended to track the sustained impact of lexical chunk learning on oral fluency. Additionally, expanding the scope of the corpus to include a greater variety of spoken language genres—such as interview programs and debates—may enhance students' exposure to diverse lexical chunks and improve their ability to use them in spontaneous speech. Furthermore, incorporating multimodal teaching approaches, including role-playing, debates, and public speaking activities, can foster greater student interaction, enhance engagement, and facilitate both the retention and application of spoken lexical chunks.

6. Conclusion

This study investigated the spoken fluency of 40 university students in Western China at the beginning and end of a semester using a corpus-based lexical approach. The findings offer significant insights for future pedagogical approaches in spoken language instruction. The results indicate this approach effectively reduces long pauses in students' oral expression and enhances the smoothness of language organization. However, its short-term impact on speech rate and the frequency of short pauses remains limited. Therefore, future pedagogical approaches should emphasize long-term training to increase students' exposure to and usage of lexical chunks, while stimulating their expressive interest through diversified oral tasks, such as role-playing and debates. A notable limitation of this study is its short

duration; future research should incorporate longitudinal tracking to observe the sustained development of spoken fluency over time. Additionally, compiling students' spoken expressions into a corpus could provide a valuable resource for self-review, enabling students to access and reflect on their performance anytime and anywhere. This approach would foster greater student interaction and promote independent, lifelong learning practices.

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