

The Global Landscape of Vocabulary Complexity Research: A Bibliometric Analysis (2015–2025)

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Abstract. Vocabulary complexity remains a pivotal yet under-mapped construct within reading comprehension and language proficiency, where complex lexis often renders essential information inaccessible to large segments of the public. This study provides the first comprehensive quantitative science-mapping of vocabulary complexity research over the past decade, rigorously clarifying how the field has evolved and identifying where critical empirical gaps remain. A systematic bibliometric analysis was conducted on studies retrieved via Harzing's Publish or Perish using the keyword "Vocabulary Complexity" for the 2015–2025 period (initial $n=200$). By shifting the analytical focus from traditional qualitative synthesis to macro-level bibliographic data, this research minimizes selection bias and provides an objective, data-driven overview. After excluding conference papers, books, and non-relevant items via PRISMA screening, the remaining 17 records were exported as a RIS file and analyzed with VOSviewer to generate keyword co-occurrence, overlay, and density visualizations, alongside annual publication trends and a ranking of the ten most-cited articles. The co-occurrence network revealed four thematic clusters: (1) morphological awareness, (2) syntactic complexity, (3) task complexity, and (4) lexical richness, which linked these internal linguistic features with external outcomes such as writing accuracy, reading comprehension, and EFL performance. Overlay and density maps illustrated a significant temporal shift from broad structural constructs toward applied centers such as "lexical complexity," "vocabulary knowledge," and "comprehension." Annual publication outputs indicated a maturing field with cyclical peaks in 2018, 2020, and 2024. Citation analysis highlighted a decisive move from text-focused concepts of word difficulty toward multidimensional, pedagogical, and technology-mediated perspectives. Findings depict a rapidly consolidating research area where lexical and morphological complexity function as key predictors of learner proficiency. However, notable gaps persist in longitudinal designs, non-English and AI-mediated contexts, predictive modeling, and empirical work on threshold effects where increased complexity inadvertently impedes comprehension.

Keywords: Bibliometric Analysis; Lexical Complexity; Morphological Awareness; Reading Comprehension; Vocabulary Acquisition

Introduction

Reading proficiency is a foundational skill for effective information processing across essential global domains, including health, economics, education, and politics. At its core, vocabulary knowledge serves as the central mechanism enabling comprehension; a deficient lexicon directly impedes a reader's ability to extract and synthesize textual meaning. Research consistently demonstrates a reciprocal relationship between these variables: while reading skill accelerates vocabulary growth through exposure to specialized, low-frequency lexicons (Duff et al., 2015; Dong et al., 2020), early childhood reading practices are instrumental in expanding initial vocabulary size (Wasik et al., 2016). Despite this established necessity, vocabulary complexity remains a significant global barrier to literacy, impacting information access across vital sectors. This deficit is quantifiable: lexical complexity is the primary determinant of text difficulty, with recent findings suggesting that complex language renders over 50% of critical health information inaccessible to the public (Ownby et al., 2025). The impact of vocabulary extends beyond basic comprehension to broader linguistic performance. Studies highlight significant positive relationships between vocabulary knowledge and English as a Foreign Language (EFL) performance, where greater lexical depth enhances writing and overall proficiency (Karakoc

& Köse, 2017). Furthermore, lexical knowledge is intrinsically linked to learner psychology; in English-Medium Instruction (EMI) contexts, aural and self-rated vocabulary significantly bolster students' confidence in speaking and productive skills (Uchihara & Harada, 2018).

To clearly investigate these relationships, it is necessary to define what constitutes Vocabulary Complexity (VC). In the context of language research, VC is understood as a dual-faceted concept. First, it involves intrinsic linguistic properties, which include structural elements such as morphological variations, syllable structures, abstractness, and word frequency levels (Bulté & Housen, 2012). Second, it encompasses cognitive-pedagogical processing, which relates to the actual mental effort required by a learner to comprehend and use words within specific tasks and educational environments (Ortega, 2015; Yang et al., 2020).

Despite these insights, Vocabulary Complexity appears to be an under-researched topic regarding its evolving trends and structural landscape. While existing studies provide evidence of its importance, they often fail to address diverse student needs, leading to calls for more personalized, contextually integrated instruction (Ng & Muhammad Naim Rosli, 2023; Liu, 2018; Kansızoğlu & Bekiroğlu, 2025). Furthermore, a significant methodological gap exists in the current literature. Traditional systematic reviews in this field typically rely on qualitative synthesis, which—while valuable—is often limited in scope and subjective in its conclusions. To date, there is no comprehensive bibliometric analysis conducted to quantitatively map the intellectual landscape of vocabulary complexity.

The core research problem is that without a macro-level, quantitative mapping of the literature, the structural relationships, shifting thematic trends, and critical gaps within vocabulary complexity research remain fragmented and poorly understood. Researchers lack an objective overview of how isolated linguistic traits connect to broader student proficiency outcomes over time, particularly as the field faces new challenges in digital and AI-mediated learning environments.

Consequently, to overcome the limitations of traditional reviews and provide an objective, data-driven overview of the field, this study utilizes science mapping and bibliometric analysis. By analyzing bibliographic data, this research shifts the focus from qualitative evaluation to the volume, structure, and evolution of the research landscape (Aung & Hallinger, 2022, as cited in Adams et al., 2024).

The scope of this study is explicitly bound to the timeline of 2015 to 2025. Restricting the analysis to this specific ten-year period is highly deliberate. This decade captures a critical transition in language education, marked by a surge in digital learning platforms and the widespread use of automated, computer-driven tools designed to measure lexical features (Kyle & Crossley, 2014). Focusing on the literature published between 2015 and 2025 ensures that the findings reflect contemporary pedagogical frameworks and modern technology-mediated environments, rather than historical methods. This clear boundary allows for an accurate evaluation of where the field stands today and where future research must head.

Research Questions

This study aimed to conduct a bibliometric analysis to examine the literature on vocabulary complexity from 2015 to 2025. Specifically, this study aimed to:

1. analyze the co-occurrence links between keywords;
2. analyze the temporal evolution of research terms using overlay visualization to identify thematic transitions and emerging trends within the field;
3. identify the articles' annual publication trends over the 2015–2025 period; and
4. identify the ten most-cited articles.

Methodology

Research Design

This study utilized a quantitative bibliometric research design paired with science mapping to evaluate the structural landscape and evolving trends of global research on vocabulary complexity. Bibliometric analysis is an essential methodology for objectively identifying, mapping, and quantifying the most influential studies, thematic clusters, and conceptual structures within a specific academic domain, as outlined by Donthu et al. (2021) in their guidelines for conducting rigorous bibliometric analysis. By shifting the analytical focus from localized qualitative synthesis to macro-level bibliographic data, this design minimizes researcher bias and ensures a reproducible overview of the field's intellectual evolution over time. This approach aligns with Aria et al. (2024) work on comprehensive science mapping, which demonstrates how bibliometric analysis enables systematic, reproducible, and objective literature reviews that facilitate the elimination of sample selection bias while mapping conceptual structures and thematic clusters within academic domains.

Data Sources and Search Strategy

The bibliographic data for this study were systematically gathered using Harzing's Publish or Perish software. The database search was executed using the primary search string "Vocabulary Complexity". To capture contemporary developments in language acquisition and computational linguistics, the publication timeline was strictly limited to the years 2015–2025, and the maximum number of retrieved sources was set to 200. Google Scholar was selected as the primary data source for this retrieval process. This database was chosen due to its comprehensive coverage of diverse, international publications and its inclusive indexing of emerging journals, book chapters, and global repositories that might be omitted by more restrictive databases like Scopus or Web of Science. However, relying on a single database and a single keyword strategy presents distinct limitations. Specifically, Google Scholar exhibits fewer rigid metadata filtering compared to proprietary databases, requiring more intensive manual cleaning. Furthermore, the use of the isolated keyword "Vocabulary Complexity" may exclude related studies that utilize overlapping terminology, such as "lexical sophistication" "lexical richness," or "vocabulary depth" This specific phrase was maintained, however, to ensure the analysis focused strictly on literature explicitly framed around vocabulary complexity as a distinct construct.

Inclusion and Exclusion Criteria

To refine the initial dataset and ensure scholarly rigor, a strict screening process was applied based on predefined inclusion and exclusion criteria. The initial search on the Google Scholar database yielded a total of 200 studies. The screening criteria were established as follows:

Inclusion Criteria (IC): Studies were included if they were peer-reviewed journal articles published between 2015 and 2025, written in the English language, and focused directly on vocabulary complexity within reading, writing, or language acquisition contexts.

Exclusion Criteria (EC): Literature was excluded if it consisted of conference papers, books, book chapters, or dissertations. Additionally, non-relevant items — such as studies where "complexity" or "vocabulary" appeared only tangentially without treating vocabulary complexity as a core research variable were removed.

To refine the initial dataset and ensure scholarly rigor, a strict screening process was applied based on predefined inclusion and exclusion criteria. The initial search on the Google Scholar database yielded a total of 200 studies (Identification phase). The screening process began by applying predefined exclusion criteria to remove non-journal publications (e.g., conference papers, books, book chapters, and dissertations). A total of 79 records were removed at this stage, leaving 121 records for further assessment (Screening phase). These 121 records were then screened for relevance by evaluating their titles and abstracts; 104 studies were excluded due to a lack of direct focus on vocabulary complexity as a core research variable (Eligibility phase). Finally, 17 studies met all inclusion criteria and were included in the final bibliometric analysis. To ensure methodological transparency and replicability, this screening process was documented and mapped utilizing the standardized PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart (Page et al., 2021), as illustrated in Figure 1. The 17 included records were exported as a standardized RIS file (VocabularyComplexity.ris) for computational mapping.

Data Extraction and Analysis

The finalized RIS dataset was imported into VOSviewer (Version 1.6.20) to generate keyword co-occurrence, overlay, and density visualizations. These maps graphically present how research terms appear together across the literature, exposing both the frequency and strength of conceptual relationships within the field. To optimize map clarity and eliminate semantic noise, the text data extraction was restricted exclusively to the title fields of the selected articles. A binary counting method was applied, meaning a term was counted only once per document regardless of its frequency within that specific title, thereby preventing single, repetitive titles from skewing the overall network density. The minimum occurrence threshold for a keyword was set to 4. This parameter was selected deliberately because it successfully captured all 17 critical terms identified across the curated dataset, striking an optimal balance between network inclusivity and thematic clarity. All 17 terms were manually verified to confirm conceptual relevance before generating the final visualizations. Finally, a citation analysis was performed to identify and rank the ten most-cited articles, mapping the foundational "intellectual core" that shapes the modern vocabulary complexity discourse.

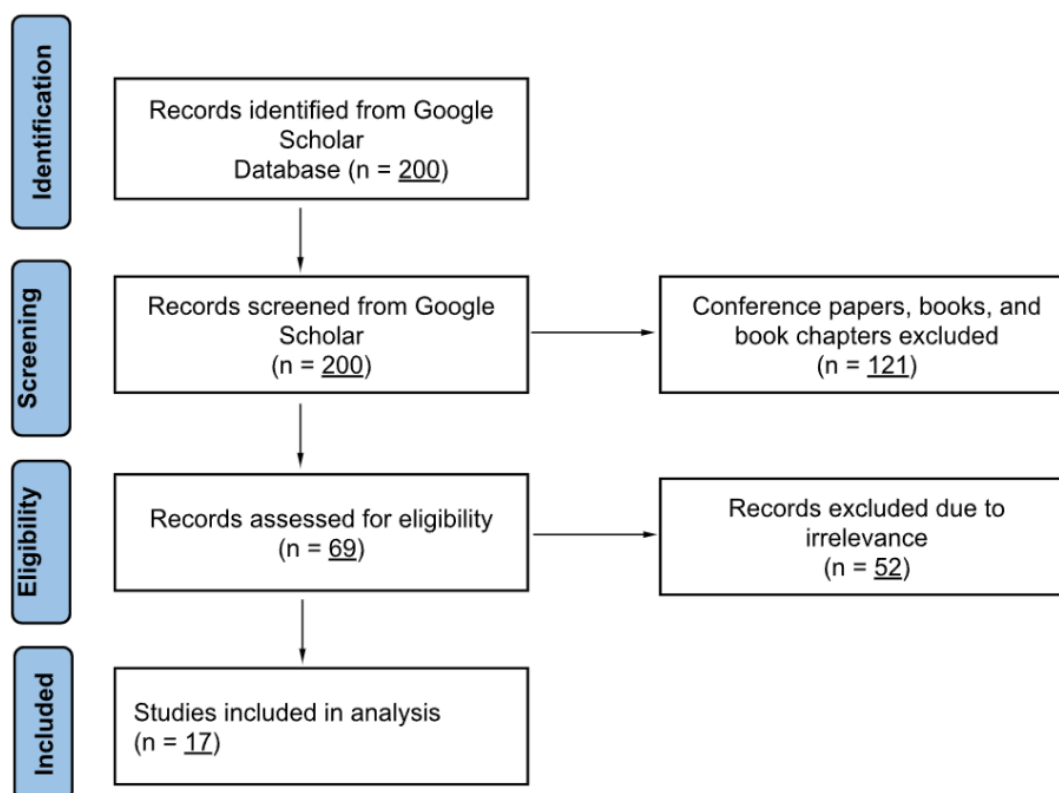


Figure 1. PRISMA Flowchart

Results and Discussions

Research Question 1: Analyze the co-occurrence links between keywords?

Keyword Co-occurrence Network

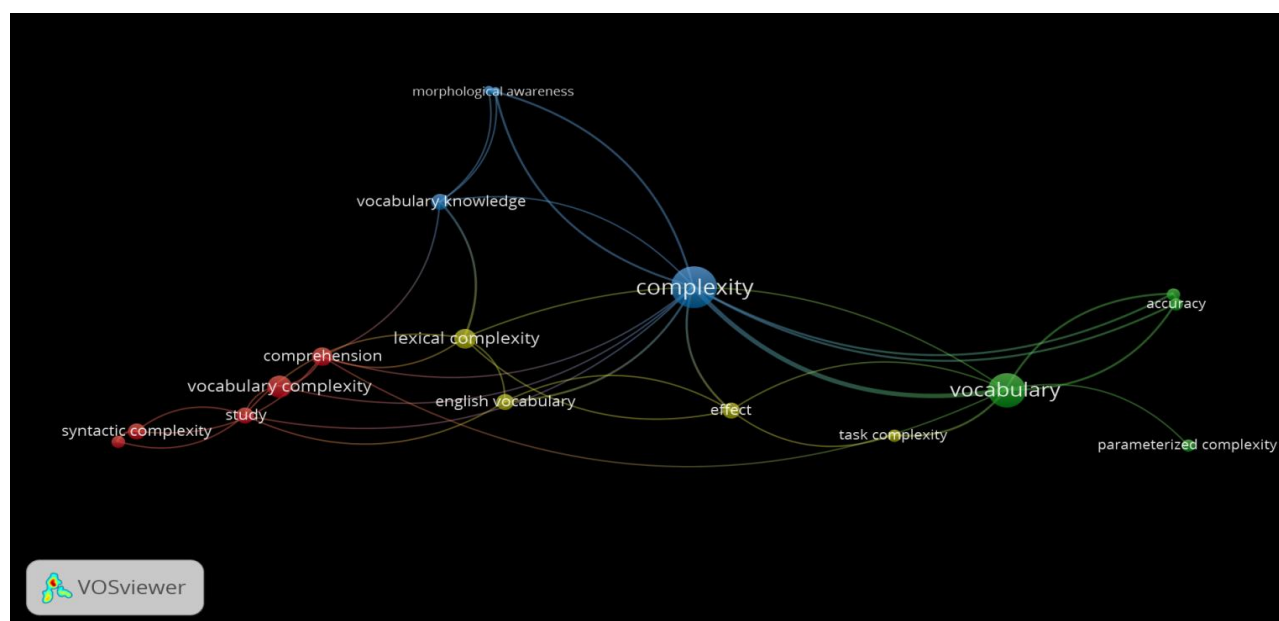


Figure 2. Keyword Co-occurrence Network on Vocabulary Complexity

The keyword co-occurrence network graphically represents the conceptual architecture of the vocabulary complexity domain, mapping the frequency and interpersonal strength of research terms across the selected literature. The generated visualization reveals that the field organizes around “complexity” and “vocabulary” as the primary, high-density central nodes. The structural arrangement splits into four distinct thematic clusters, indicating that the academic conversation is not uniform but divided into specialized sub-domains. The thematic distribution demonstrates that vocabulary complexity research successfully links internal linguistic traits with external performance outcomes. Rather than treating vocabulary as an isolated skill, the literature connects structural components to real-world performance metrics. However, a deeper interpretation of the network reveals specific structural tensions and theoretical contradictions within these clusters. For instance, within the blue cluster, “morphological awareness” acts as a central structural node, yet empirical evidence from Mercado (2025) and De Togni (2023) indicates that the immediate gains observed in vocabulary production often lack long-term retention. This suggests that while morphological structures are central to the literature base, their practical application requires sustained, explicit instruction to translate into permanent writing proficiency. Similarly, the green cluster bridges “task complexity” and learner performance, but this relationship is non-linear. As Lee (2018) points out, increasing the complexity of a task frequently forces learners to prioritize structural syntax, which unintentionally limits their lexical variety due to heavy cognitive workload demands. Furthermore, individual variations present a challenge to universal instructional claims; Révész (2011) establishes that individual learner differences and specific target features heavily moderate how task complexity influences actual language development. Consequently, the co-occurrence network reflects a field that has established clear conceptual connections but remains constrained by a lack of longitudinal evidence and individual assessments necessary to bridge the gap between language theory and learner proficiency.

Research Question 2: Analyze the temporal evolution of research terms using overlay visualization to identify thematic transitions and emerging trends within the field?

Overlay Visualization of Terms

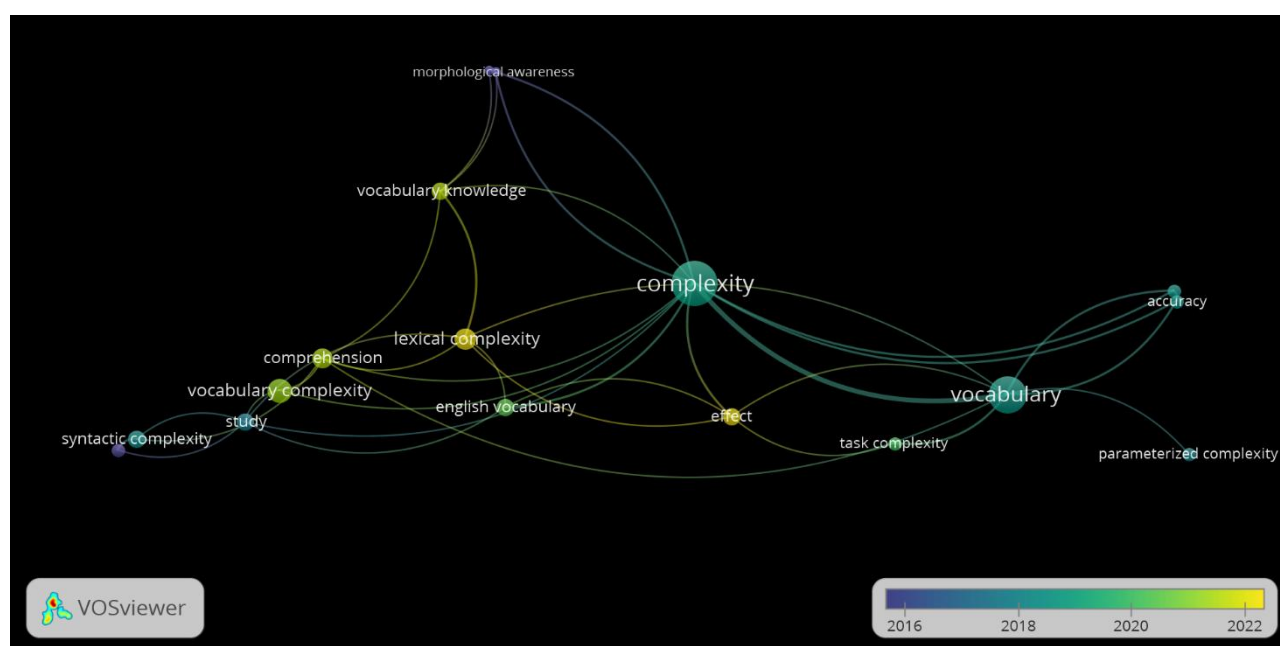


Figure 3. *Overlay Visualization of Terms on Vocabulary Complexity*

The overlay visualization captures the temporal evolution of the field, tracing how research terminology has transitioned over the 2015–2025 period. Node coloring indicates publication recency, moving chronologically from foundational, older research in 2016–2018 (represented by blue, violet, and dark green) to contemporary themes (represented by lime-green and yellow). The visual layout highlights a distinct conceptual shift over the decade. Foundational nodes including “complexity,” “vocabulary,” and “morphological awareness” form the historical basis of the network. In contrast, modern nodes such as “lexical

complexity," "vocabulary knowledge" and "comprehension" have emerged at the temporal forefront, indicating a clear paradigm shift from broad structural classification toward specific cognitive processes and applied learning outcomes. This temporal movement aligns with broader empirical shifts in applied linguistics. Early work by Spencer et al. (2015) treated "morphological awareness" as an isolated structural trait distinct from vocabulary breadth, explaining its peripheral, foundational placement in the earlier stages of the network. This structural groundwork paved the way for recent research where "vocabulary knowledge" and "lexical complexity" are studied as active, integrated mechanisms. This transition is supported by Yang et al. (2023), who demonstrated that modern studies treat these elements as joint predictors of overall "comprehension," mirroring their central, high-recency status in the current network visualization. Despite this consolidation, the temporal map exposes critical gaps. The progression of terms has concentrated heavily on English-centric and classroom-based frameworks, leaving a noticeable absence of modern terms related to predictive modeling or psycholinguistic processing in non-English and AI-mediated environments. The network thus illustrates a field that has modernized its focus toward comprehension outcomes but has yet to diversify its methodologies to match evolving digital spaces.

Density Visualization of Terms

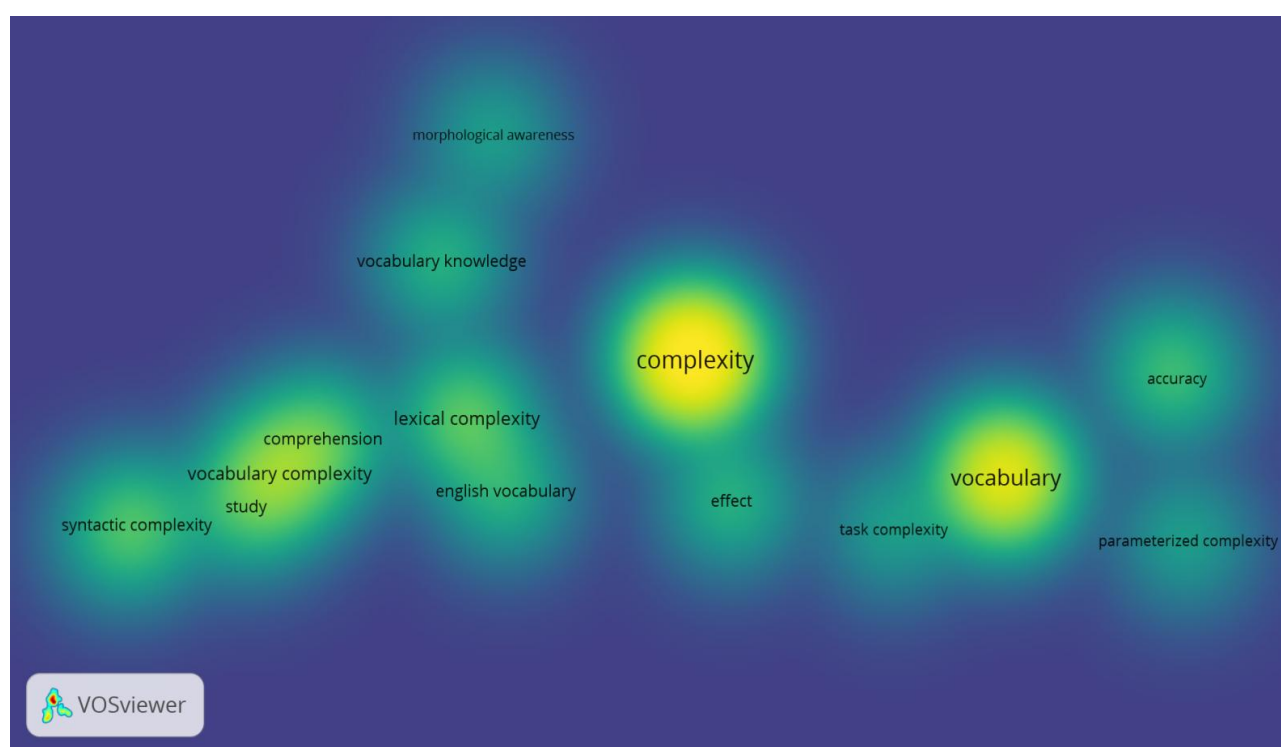


Figure 4. Density Visualization of Terms on Vocabulary Complexity

The density visualization provides an alternative analytical view of the network by highlighting the conceptual weight and concentration of research attention within the vocabulary complexity domain. In this map, area brightness and color intensity represent the saturation of keywords, with the most heavily researched topics appearing as vibrant "hotspots." The visualization identifies "complexity" as the primary central axis of current research, displaying the highest color density on the map. This structural concentration aligns with the theoretical consensus of Bulté and Housen (2012) and Ortega (2015), who argue that complexity must be treated as a multidimensional tool rather than a single metric when evaluating second language development. Furthermore, the secondary density concentrations reveal specific research trends and underlying gaps within the field:

- **Lexical Richness Cluster:** A high-density focus surrounds the intersection of "complexity" and "lexical complexity." This reflects the widespread, standard academic practice of using automated

computational tools to measure lexical richness as an indicator of learner proficiency, a trend supported by Kyle and Crossley (2014).

- **Structural Mediator Cluster:** A notable secondary hotspot involves “vocabulary knowledge” and “morphological awareness.” This concentration validates the empirical findings of Levesque et al. (2017), confirming that word-structure knowledge operates as a critical, central mediator connecting basic vocabulary breadth to advanced reading comprehension.
- **Syntactic-Comprehension Cluster:** On the left quadrant of the map, a distinct density cluster links “syntactic complexity” directly to “comprehension.” This pattern mirrors evidence from Casal and Lee (2019), demonstrating that mature sentence structures directly support a learner’s ability to integrate text meaning.

Despite these dense clusters of activity, a critical interpretation of the map's empty or low-density spaces exposes what is currently missing in the field. The high density is heavily concentrated in “snapshot” or cross-sectional studies that look at data at a single point in time. As Kalantari and Gholami (2025) note, there is a clear lack of density in longitudinal research that tracks how these linguistic traits change over time, particularly within modern AI-mediated writing environments. Additionally, while “comprehension” and “complexity” appear as dense, related areas, their connection masks a major theoretical gap regarding the “threshold effect.” As Webb and Nation (2017) suggest, there is an under-researched bridge concerning the exact point where increasing vocabulary complexity stops supporting a learner and instead begins to hinder real-world understanding. The density map thus demonstrates a field that is highly focused on measuring existing structural traits but lacks empirical depth regarding long-term development and functional processing limits.

Research Question 3: Identify the articles’ annual publication trends over the 2015–2025 period?

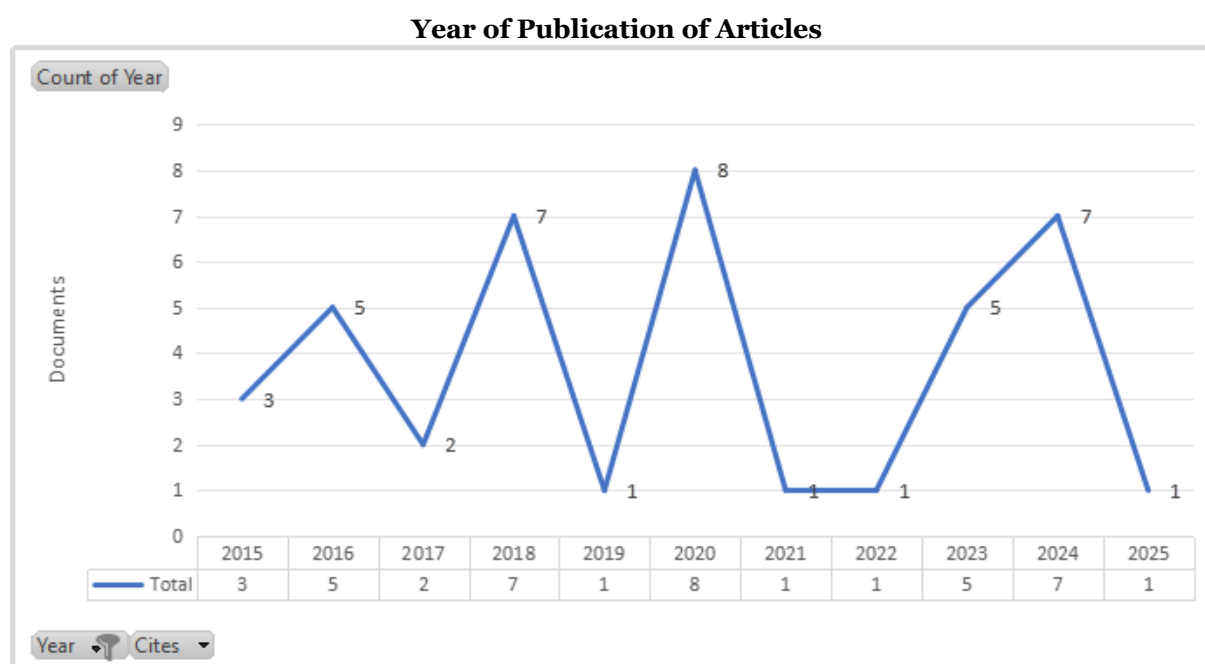


Figure 5. Year of Publication of Vocabulary Complexity Articles

The annual distribution of articles outlines the fluctuating yet steady development of vocabulary complexity research over the observed decade. The publication output exhibits distinct phases of activity, beginning with a stable growth phase from 2015 to 2018, where annual outputs rose to an early peak of seven documents. After a sharp decline in 2019, the field reached its highest level of productivity in 2020 with eight published articles, followed by a low-activity plateau during 2021 and 2022, and a recent resurgence peaking at seven articles in 2024. This cyclical pattern reflects how scholarly attention evolves in response to broader

academic and environmental contexts. The historical growth periods and peaks correspond with observations by Hakkaraki (2024), who notes that sudden rises in bibliometric productivity are often driven by expansions in digital databases and the availability of advanced computational extraction tools. Furthermore, the long-term resilience of the literature supports Farooq's (2022) assertion that repeated resurgences in publication volume indicate a field is maturing, consolidating its core theories, and gaining status as a critical area of study. The visual dips in output, particularly after 2020, should not be viewed as a loss of academic relevance; rather, as Kumari et al. (2025) note in their analysis of academic responses to global crises, such fluctuations represent strategic pauses where researchers shift focus from rapid data production to deeper theoretical consolidation. Tracking these publication years offers clear, data-driven proof of when the vocabulary complexity domain has been most active, demonstrating its steady institutionalization within the broader landscape of language acquisition research.

Research Question 4: Identify the ten most-cited articles?

Ten Most-cited Articles

Table 1. Ten Most-cited Articles on Vocabulary Complexity

Rank	Articles	Citations
1	Abidjanova, S. (2024). Examining Difficulties in Academic English: Vocabulary Complexity, Writing Conventions, and Critical Reading Skills. <i>Talqin va tadqiqotlar ilmiy-uslubiy jurnali</i> , 2(56), 89-93.	313
2	Yang, Q.-F., Chang, S.-C., Hwang, G.-J., & Zou, D. (2020). Balancing cognitive complexity and gaming level: Effects of a cognitive complexity-based competition game on EFL students' English vocabulary learning performance, anxiety and behaviors. <i>Computers & Education</i> , 148, 103808.	235
3	Mascareño, M., Snow, C. E., Deunk, M. I., & Bosker, R. J. (2016). Language complexity during read-alouds and kindergartners' vocabulary and symbolic understanding. <i>Journal of Applied Developmental Psychology</i> , 44, 39-51.	74
4	Zhan, J., Sun, Q., & Zhang, L. J. (2021). Effects of manipulating writing task complexity on learners' performance in completing vocabulary and syntactic tasks. <i>Language Teaching Research</i> , 28(3), 1011-1032.	52
5	Fitzgerald, W. J., Elmore, J., Kung, M., & Stenner, A. J. (2017). The Conceptual Complexity of Vocabulary in Elementary-Grades Core Science Program Textbooks. <i>Reading Research Quarterly</i> , 52(4), 417-442.	30
6	Milica Vuković Stamatović. (2019). Vocabulary complexity and reading and listening comprehension of various physics genres. <i>Corpus Linguistics and Linguistic Theory</i> , 16(3), 487-514.	27
7	Mancilla-Martinez, J., & McClain, J. B. (2020). What Do We Know Today about the Complexity Of Vocabulary Gaps and What Do We Not Know? 216-236.	15
8	Goodwin, A. P., Yaacov Petscher, Reynolds, D., Lantos, T., Gould, S., & Tock, J. (2018). When Complexity Is Your Friend: Modeling the Complex Problem Space of Vocabulary. <i>Education Sciences</i> , 8(4), 169-169.	14
9	Canning, D., McLean, S., & Vitta, J. (2024). Relative complexity in a model of word difficulty: The role of loanwords in vocabulary size tests. <i>Studies in Second Language Learning and Teaching</i> , 14(4), 631-659.	8
10	Irmala Sukendra. (2023). The Correlation Between Vocabulary Complexity Mastery and Student's Speaking Skill. <i>Indonesian Journal of English Language Studies (IJELS)</i> , 9(1), 12-25.	6

A critical analysis of the citation distribution reveals a distinct theoretical transition in how the academic community conceptualizes vocabulary complexity. The literature shows a clear shift away from viewing complexity purely as an internal, static trait of a word toward a dynamic, pedagogical perspective where complexity is defined by how the learner interacts with text through technology and specific tasks. Regarding the applied and technology-mediated core, the prominent citation impact of Abidjanova (2024) and Yang et al. (2020) demonstrates that the most influential modern literature focuses on applied solutions to vocabulary challenges. Rather than investigating language features in isolation, these studies anchor complexity within practical academic struggles—such as writing conventions—and modern educational technology, where cognitive complexity must be carefully balanced with digital game mechanics to optimize learner performance and manage anxiety. This interactive perspective is supported by developmental and task-based frameworks, where Mascareño et al. (2016) connect language complexity during active read-aloud sessions directly to vocabulary growth in early childhood, proving that complexity operates as a formative environmental factor. Similarly, Zhan et al. (2021) and Goodwin et al. (2018) provide highly cited frameworks showing that lexical difficulty is not fixed; instead, it can be strategically manipulated through task design and modeled as a complex problem space to help learners navigate structural obstacles. Furthermore, the historical trajectory of the list highlights a movement from text-focused evaluations to multidimensional learner environments. Older, established studies like Fitzgerald et al. (2017) focused heavily on evaluating the inherent conceptual complexity within printed science textbooks. In contrast, more recent high-impact works, such as

Vuković Stamatović (2019) and Sukendra (2023), investigate how complexity fluctuates across different communicative genres and directly correlates with productive speaking skills. Furthermore, the ongoing relevance of the domain is demonstrated by Canning et al. (2024), whose recent work on loanwords shows that the field continues to actively refine its metrics for testing word difficulty. Importantly, the high citation frequency of Mancilla-Martinez & McClain (2020) regarding the “vocabulary gap” indicates that the research community does not treat complexity as a purely linguistic abstraction. Instead, it is recognized as a profound educational hurdle linked to systematic equity gaps in language acquisition. In summary, the metric evidence shows that the intellectual core of the field has moved beyond simple textual descriptions. The most cited literature prioritizes applied, technology-supported, and task-based interventions, establishing vocabulary complexity as a dynamic challenge influenced directly by the medium of instruction and individual learner interactions.

Ethical Considerations

Although this study did not involve human participants, animals, or primary medical data, high ethical standards regarding research integrity and transparency were maintained. Ethical responsibility in secondary data analysis requires that all bibliographic records be sourced, handled, and reported without any manipulation or bias. To ensure total transparency, the data gathering workflow was clearly documented, and the exact search strings, software versions, and mapping settings were shared so that the study can be easily verified or repeated. Furthermore, the publication details, authors, and citation count of all included studies were recorded accurately without alteration, ensuring that the intellectual property of the original researchers is fully respected and that the mapping results truthfully reflect the academic field.

Conclusion

This bibliometric analysis provides a data-driven map of the global research landscape concerning vocabulary complexity from 2015 to 2025. The major findings indicate that scholarly interest has shifted from simply defining linguistic structures to understanding how those structures, particularly lexical complexity and morphological awareness, serve as critical predictors of reading comprehension. The study identified an overall upward trend in publication volume, with major peaks in 2018, 2020, and 2024 signaling that the field is maturing as researchers utilize advanced digital tools to address global literacy challenges. Furthermore, the analysis of high-impact literature suggests that complexity is no longer viewed merely as a static trait of a word but as a dynamic, interactive challenge that can be managed through educational technology and strategic task manipulation. Hence, this study fills a methodological gap by providing an objective, quantitative science-mapping of the field, moving away from traditional qualitative reviews. Theoretically, these findings show how internal language features and external outcomes interact during learning. Practically, the results emphasize the need for personalized instruction that addresses diverse student needs. Based on these findings, the study recommends that educators and curriculum designers integrate vocabulary instruction that considers lexical complexity, task difficulty, and individual learner differences to enhance comprehension while avoiding cognitive overload. It also encourages the use of adaptive and AI-supported learning tools to strengthen vocabulary development in diverse and multilingual learning environments. To systematically advance the field and address persisting empirical gaps, future research must expand upon these pedagogical needs through specific structural, methodological, and technological directions. First, to overcome current metadata limitations, scholars should pursue broader database coverage by expanding beyond Google Scholar to include comparative extractions from Web of Science, Scopus, and Dimensions AI, allowing for a more rigorous triangulation of international citation networks. Second, investigators should implement longitudinal approaches over extended instructional timelines to track the dynamic evolution of a learner’s lexical richness and morphological awareness, moving away from traditional cross-sectional, snapshot designs. Third, future studies should look into emerging AI-driven approaches in vocabulary complexity to analyze how Large Language Models and intelligent tutoring systems adaptively modify text difficulty in real-time. Finally, the field will benefit from applying predictive modeling in non-English contexts and further examining both the threshold effect and the complex interaction between task complexity and learner variability to develop more personalized language learning approaches.

Recommendations

Based on the findings of this bibliometric analysis, several comprehensive recommendations are proposed to advance both the theoretical and practical dimensions of vocabulary complexity research. First, future studies should expand data sources beyond a single database by integrating Web of Science, Scopus, and Dimensions AI to ensure broader coverage, improved metadata accuracy, and stronger triangulation of

global research trends. Second, researchers are encouraged to adopt longitudinal and mixed-methods designs to move beyond dominant cross-sectional approaches, enabling a deeper understanding of how vocabulary complexity evolves over time and influences long-term language development. Third, there is a need to diversify research contexts by including non-English languages, multilingual environments, and underrepresented regions to address the current English-centric bias and enhance the generalizability of findings. Fourth, scholars should explore the integration of emerging technologies, particularly artificial intelligence, natural language processing, and intelligent tutoring systems, to examine how vocabulary complexity can be dynamically measured and adaptively adjusted in real-time learning environments. Fifth, future research should investigate the "threshold effect" of vocabulary complexity to determine the optimal level at which lexical difficulty enhances comprehension without causing cognitive overload, as well as examine the interaction between task complexity and individual learner differences. Sixth, curriculum developers and educators are encouraged to design instructional materials that balance lexical richness, syntactic complexity, and cognitive demands, ensuring that vocabulary instruction is both accessible and developmentally appropriate. Seventh, there is a need to strengthen capacity-building initiatives for teachers by equipping them with data-driven tools and strategies for assessing and managing vocabulary complexity in diverse classrooms. Finally, policymakers and educational stakeholders should support the development of inclusive and adaptive literacy programs that leverage technology and evidence-based practices to address vocabulary-related learning gaps, thereby promoting equitable access to knowledge and improving overall reading comprehension outcomes in the context of rapidly evolving digital learning environments.

References

- Abidjanova, S. (2024). Examining Difficulties in Academic English: Vocabulary Complexity, Writing Conventions, And Critical Reading Skills. *Talqin va tadqiqotlar ilmiy-uslubiy jurnali*, 2(56), 89-93. <https://cyberleninka.ru/article/n/examining-difficulties-in-academic-english-vocabulary-complexity-writing-conventions-and-critical-reading-skills>
- Aria, M., Cuccurullo, C., D'Aniello, L., Misuraca, M., & Spano, M. (2024). Comparative science mapping: a novel conceptual structure analysis with metadata. *Scientometrics*, 129(11), 7055-7081. <https://doi.org/10.1007/s11192-024-05161-6>
- Aung, P. N., & Hallinger, P. (2022). The intellectual structure of the literature on sustainability leadership in higher education: an author co-citation analysis. *International Journal of Educational Management*, 36(5), 784-799. <https://doi.org/10.1108/ijem-09-2021-0371>
- Bram Bulté, & Housen, A. (2012). Defining and operationalising L2 complexity. *Language Learning and Language Teaching*, 21-46. <https://doi.org/10.1075/llt.32.02bul>
- Canning, D., McLean, S., & Vitta, J. (2024). Relative complexity in a model of word difficulty: The role of loanwords in vocabulary size tests. *Studies in Second Language Learning and Teaching*, 14(4), 631-659. <https://www.cceol.com/search/article-detail?id=1300809>
- Casal, J. E., & Lee, J. J. (2019). Syntactic complexity and writing quality in assessed first-year L2 writing. *Journal of Second Language Writing*, 44, 51-62. <https://doi.org/10.1016/j.jslw.2019.03.005>
- De Togni, L. (2023). Morphological Awareness and Vocabulary Acquisition. The contribution of Explicit Morphological Instruction in the acquisition of L2 vocabulary. *International Journal of Multilingual Education*, (24), 37-52. Retrieved from <https://multilinguaeducation.openjournals.ge/index.php/ijml/article/view/7651>
- Dong, Y., Tang, Y., Chow, B. W.-Y., Wang, W., & Dong, W.-Y. (2020). Contribution of Vocabulary Knowledge to Reading Comprehension Among Chinese Students: A Meta-Analysis. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.525369>
- Duff, D., Tomblin, J. B., & Catts, H. (2015). The Influence of Reading on Vocabulary Growth: A Case for a Matthew Effect. *Journal of Speech, Language, and Hearing Research*, 58(3), 853-864. https://doi.org/10.1044/2015_jslhr-l-13-0310
- Farooq, R. (2022). A review of knowledge management research in the past three decades: A bibliometric analysis. *VINE Journal of Information and Knowledge Management Systems*. <https://doi.org/10.1108/vjkm-08-2021-0169>
- Fitzgerald, W. J., Elmore, J., Kung, M., & Stenner, A. J. (2017). The Conceptual Complexity of Vocabulary in Elementary-Grades Core Science Program Textbooks. *Reading Research Quarterly*, 52(4), 417-442. <https://doi.org/10.1002/rrq.184>

- Goodwin, A. P., Yaacov Petscher, Reynolds, D., Lantos, T., Gould, S., & Tock, J. (2018). When Complexity Is Your Friend: Modeling the Complex Problem Space of Vocabulary. *Education Sciences*, 8(4), 169–169. <https://doi.org/10.3390/educsci8040169>
- Hakkaraki, V. (2024). Exploring the evolution of bibliometric analysis: A comprehensive study of scientific publications from 1974 to 2024 using the Dimensions AI database. *Asian Journal of Information Science and Technology*. <https://doi.org/10.70112/ajist-2024.14.1.3878>
- How Vocabulary Is Learned. (2026, January). Oup.com. <https://global.oup.com/academic/product/how-vocabulary-is-learned-9780194403559?cc=dk&lang=en>
- Irmala Sukendra. (2023). THE CORRELATION BETWEEN VOCABULARY COMPLEXITY MASTERY AND STUDENTS' SPEAKING SKILL. *Indonesian Journal of English Language Studies (IJELS)*, 9(1), 12–25. <https://doi.org/10.24071/ijels.v9i1.5619>
- Kalantari, R., & Gholami, J. (2025). Syntactic and lexical evolution in L2 writing through the lenses of Dynamic Systems Theory. *Studies in Language Assessment*. <https://doi.org/10.58379/bglt9542>
- Kansızoğlu, N., & Bekiroğlu, N. (2025). The effect of vocabulary development interventions on cognitive outcomes of vocabulary: A meta-analysis study. *Journal of Pedagogical Research*, 9(1). <https://doi.org/10.33902/jpr.202532083>
- Karakoç, D., & Köse, Gül Durmusoglu. (2017). The Impact of Vocabulary Knowledge on Reading, Writing and Proficiency Scores of EFL Learners. *Journal of Language and Linguistic Studies*, 13(1), 352–378. <https://eric.ed.gov/?id=EJ1140609>
- Kumari, N., Raj, R., Kumar, V., & Verma, P. (2025). Strategic response to organizational crisis: A bibliometric approach. *Journal of Contingencies and Crisis Management*. <https://doi.org/10.1111/1468-5973.70046>
- Kyle, K., & Crossley, S. A. (2014). Automatically Assessing Lexical Sophistication: Indices, Tools, Findings, and Application. *TESOL Quarterly*, 49(4), 757–786. <https://doi.org/10.1002/tesq.194>
- Lee, J. (2018). Digital Repository at the University of Maryland (DRUM). Umd.edu. <https://drum.lib.umd.edu/items/dce1eb92-cd91-464a-8c52-8dcd8224d5c4>
- Levesque, K. C., Kieffer, M. J., & Deacon, S. H. (2017). Morphological awareness and reading comprehension: Examining mediating factors. *Journal of Experimental Child Psychology*, 160, 1–20. <https://doi.org/10.1016/j.jecp.2017.02.015>
- Liu, D. (2018). Literature Review of the Breadth and Depth of Vocabulary. *Journal of Language Teaching and Research*, 9(5), 1002. <https://doi.org/10.17507/jltr.0905.14>
- Mahmoud Abdi Tabari, Lu, X., & Wang, Y. (2023). The effects of task complexity on lexical complexity in L2 writing: An exploratory study. *System*, 114, 103021–103021. <https://doi.org/10.1016/j.system.2023.103021>
- Mancilla-Martinez, J., & McClain, J. B. (2020). What Do We Know Today about the Complexity Of Vocabulary Gaps and What Do We Not Know? 216–236. <https://doi.org/10.4324/9781315676302-12>
- Mascareño, M., Snow, C. E., Deunk, M. I., & Bosker, R. J. (2016). Language complexity during read-alouds and kindergartners' vocabulary and symbolic understanding. *Journal of Applied Developmental Psychology*, 44, 39–51. <https://doi.org/10.1016/j.appdev.2016.02.001>
- Mercado, J. G. (2025). Morphological Analysis on the Level of Vocabulary Production of L2 Learners in Their Composition Writing. *International Journal of English Language and Linguistics Research*, 13(1). <https://ejournals.org/ijellr/vol13-issue-1-2025/morphological-analysis-on-the-level-of-vocabulary-production-of-l2-learners-in-their-composition-writing/>
- Milica Vuković Stamatović. (2019). Vocabulary complexity and reading and listening comprehension of various physics genres. *Corpus Linguistics and Linguistic Theory*, 16(3), 487–514. <https://doi.org/10.1515/cllt-2019-0022>
- Naveen Donthu, Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
- NG, W., & Muhammad Naim Rosli. (2023). Vocabulary Learning Strategies (VLS) In Second Language Acquisition (SLA): A Review Of Literature. *International Journal of Language, Literacy and Translation*, 6(2), 223–241. <https://doi.org/10.36777/ijollt2023.6.2.087>
- North, K., & Zampieri, M. (2023). Features of lexical complexity: insights from L1 and L2 speakers. *Frontiers in Artificial Intelligence*, 6, 1236963–1236963. <https://doi.org/10.3389/frai.2023.1236963>
- Ortega, L. (2015). Syntactic complexity in L2 writing: Progress and expansion. *Journal of Second Language Writing*, 29, 82–94. <https://doi.org/10.1016/j.jslw.2015.06.008>

- Ownby, R. L. (2025). Influence of Vocabulary and Sentence Complexity and Passive Voice on the Readability of Consumer-Oriented Mental Health Information on the Internet. *AMIA Annual Symposium Proceedings*, 2005, 585. <https://pmc.ncbi.nlm.nih.gov/articles/PMC1560876/>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & McGuinness, L. A. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, n71. <https://doi.org/10.1136/bmj.n71>
- RÉVÉSZ, A. (2011). Task Complexity, Focus on L2 Constructions, and Individual Differences: A Classroom-Based Study. *The Modern Language Journal*, 95(s1), 162–181. <https://doi.org/10.1111/j.1540-4781.2011.01241.x>
- Spencer, M., Muse, A., Wagner, R. K., Foorman, B., Petscher, Y., Schatschneider, C., Tighe, E. L., & Bishop, M. D. (2015). Examining the underlying dimensions of morphological awareness and vocabulary knowledge. *Reading and Writing*, 28(7), 959–988. <https://doi.org/10.1007/s11145-015-9557-0>
- Uchihara, T., & Harada, T. (2018). Roles of Vocabulary Knowledge for Success in English-Medium Instruction: Self-Perceptions and Academic Outcomes of Japanese Undergraduates. *TESOL Quarterly*, 52(3), 564–587. <https://doi.org/10.1002/tesq.453>
- Wasik, B. A., Hindman, A. H., & Snell, E. K. (2016). Book reading and vocabulary development: A systematic review. *Early Childhood Research Quarterly*, 37, 39–57. <https://doi.org/10.1016/j.ecresq.2016.04.003>
- Yang, H., Fan, L., & Yin, H. (2023). Knowledge mapping of the research on lexical inferencing: A bibliometric analysis. *Frontiers in Psychology*, 14, 1101241–1101241. <https://doi.org/10.3389/fpsyg.2023.1101241>
- Yang, Q.-F., Chang, S.-C., Hwang, G.-J., & Zou, D. (2020). Balancing cognitive complexity and gaming level: Effects of a cognitive complexity-based competition game on EFL students' English vocabulary learning performance, anxiety and behaviors. *Computers & Education*, 148, 103808. <https://doi.org/10.1016/j.compedu.2020.103808>
- Zhan, J., Sun, Q., & Zhang, L. J. (2021). Effects of manipulating writing task complexity on learners' performance in completing vocabulary and syntactic tasks. *Language Teaching Research*, 28(3), 1011–1032. <https://doi.org/10.1177/13621688211024360>