Indian Journal of Information Sources and Services
ISSN: 2231-6094 (P) Vol.16, No.3, 2026, pp.86-91
© The Research Publication, www.trp.org.in
DOI: https://doi.org/10.51983/ijiss-2026.16.3.10

Manifestation Levels of the Principle of Linguistic Economy in Word Combinations of Multi-System Languages

Hasanova Konul Nariman Gizi[1*]

[1*]Associate Professor & Dean, Faculty of Philology, Azerbaijan State Pedagogical University (ASPU), Baku, Azerbaijan
E-mail: [1]konul.hasanova@adpu.edu.az
ORCID: [1]https://orcid.org/0000-0001-8795-252X
(Received 28 April 2026; Revised 09 June 2026, Accepted 17 July 2026; Available online 29 September 2026)

Abstract - **The purpose of this study is to examine the principle of linguistic economy in word combinations, or more precisely, in noun phrases in English and Azerbaijani languages, which belong to different types of language systems. This research is caused by the increasing interest in the question of how linguistic structures can be considered as optimally organized information units in human speech and in information technology. Even though linguistic economy has already been thoroughly described in theoretical linguistics, there is little empirical evidence regarding the realization of linguistic economy in word combinations of different languages in terms of information processing. The study makes use of comparative and functional-typological approaches and examines 500 noun phrase constructions (250 English and 250 Azerbaijani) taken from literary and journalistic texts of 2020-2025. The results indicate that English primarily employs the concept of linguistic economy through structural conciseness by means of pre-modification, linear stacking of modifiers, and word order fixity. On the other hand, Azerbaijani attains linguistic economy through morphological integration, such as affixation and case marking, where grammar and relations are encoded in the form of words. Despite the difference in structural strategies, both languages come to meet at a certain point in their communicative goal by way of making compact and efficient information units. This study also shows that linguistic economy is not just a simplification of the linguistic materials but a multi-level optimizing approach which works on the syntactic, morphological, and cognitive planes. The findings make the concept of linguistic economy pertinent to the field of information systems, where it can be applied in such issues as metadata construction, multilingual information retrieval, and natural language processing, where noun phrases constitute the main indexing unit.**

Keywords: **Linguistic Economy, Word Combinations, Noun Phrases, Comparative Linguistics, Morphological Integration, Syntactic Condensation, Information Retrieval**

I. INTRODUCTION

Even though there is some theoretical discussion about the concept of linguistic economy, there is a significant lack of research on this subject in the field of library and information science with respect to the structuring of information for electronic searching in typologically different languages (English and Azerbaijani). The current body of research does not discuss the issue of linguistic economy in terms of function, but rather focuses on phonetic and lexical reductions Jayaram & Vidya, 2008).

Relevance of the Study in Contemporary Linguistics

The principle of linguistic economy occupies a central position in modern linguistic theory, as it reflects the tendency of language systems to optimize form–meaning relations while maintaining communicative efficiency. Considering globalization, the development of technologies, and the intensification of intercultural communication, languages tend to become compacted, reduced, and simplified in structure at different linguistic levels (Nuri et al., 2025). Such features are characteristic mostly of the syntax and lexis since word combinations are used as basic elements of information compression and organization. The growing attention to economy-based linguistic phenomena is motivated not only by structural factors but also by cognitive, pragmatic, and discursive factors (Ismayil, 2024).

Despite the recognition of the linguistic economy principle as one of the fundamental notions of linguistic theory, it should be noted that there is a lack of knowledge regarding the manifestation of this principle in typologically diverse languages like English and Azerbaijani (Wibowo et al., 2023).

Previous research mostly focuses on phonetic or lexical reduction without providing a complete approach to the work of word combinations in general, namely noun phrases as structures of optimization (Manin, 2009). Thus, the aim of the current research is to fill this gap and provide a classification of the levels of linguistic economy manifestation, i.e., it will be researched whether the necessity to achieve efficiency in communication causes the development of the same strategies of linguistic economy or, on the contrary, typological diversity creates some other approaches to it (Heesen et al., 2019).

In this regard, the investigation of the manifestations of linguistic economy in word combinations of multi-system languages gets additional relevance. English and Azerbaijani as languages with different typologies can help find universal and specific principles of economy. The significance of the

current research increases even more because word combinations, especially noun phrases and set phrases, are important intermediaries between lexical meaning and syntax.

Application Areas and Practical Significance of the Study

The results of this research are applicable to various areas of applied linguistics. In contrastive linguistics and translation studies, knowing the processes of linguistic economy allows achieving higher precision and naturality when translating phrases from one language to another. As far as language teaching is concerned, especially when teaching English and Azerbaijani as foreign languages, knowledge about economic patterns will enable students to gain more authentic speech skills (Ismayil et al., 2026). Also, the findings of the research can be used in the field of lexicography because it deals with interpreting meanings of idioms and condensed constructions. The research makes its contribution to discourse analysis and stylistics because economy adds expressiveness and textual unity to the text. More generally, the research supports other studies of language optimization in the era of digital communication and modern media discourse.

Scientific Novelty and Contribution of the Research

The scientific originality of the current study is that it presents an integral approach towards the study of linguistic economy in word combinations of typologically diverse languages. Unlike studies that focus exclusively on phonetic reduction or lexical abbreviation, this research examines economy as a structural–semantic principle operating within free and fixed word combinations. The comparative analysis of English and Azerbaijani enables the identification of shared mechanisms of economy as well as language-specific strategies shaped by morphological and syntactic systems.

This paper makes an original contribution to the field by presenting a comparative model of linguistic economy that would be useful for comparative linguistics and metadata design in library and information science. The study proves the significance of linguistic economy as a necessary component for increasing the precision of information searches within multilingual information systems. This paper is organized as follows: first, the theoretical basis of linguistic economy will be outlined; second, the comparative approach to the study will be discussed; third, the comparative analysis of noun phrases in English and Azerbaijani will be presented.

II. Review of Previous Studies on Linguistic Economy and Word Combinations

The focus of recent linguistic economy research has now widened from a purely structural approach to information processing/computational approaches, especially in the field of information systems, natural language processing, and knowledge organization. Recent research focuses on the fact that linguistic economy is not just about economy in linguistic form, but on a system level that is an optimization mechanism that ensures efficient information encoding, retrieval, and interpretation in human and machine-mediated communication.

In the work by Wang et al., (2025), they illustrate the ability of LLMs to represent knowledge in a domain efficiently using compressed structures, revealing that the more information is packed into the semantic structure, the better the retrieval accuracy. This is in line with Moallemi et al., (2025), who state that "representational overhead in complex information environments must be minimized while preserving semantic fidelity. Within this context, in information systems, the linguistic economy would be understood as a parallel process to the data compression, which increases the efficiency of the calculation process.

In the cognitive and linguistic framework, Affognon, (2026) further elaborates on economy by associating it with 'dual-domain cognitive fluency', arguing that economy is a natural tendency in language production in humans. This builds on previous theories of the psycholinguistic approach, including Hostinar & Miller, (2019), and the theory of cognitive resource optimization as an important factor in efficient communication. The studies above are, however, largely conceptual and do not directly deal with the cross-linguistic structural encoding of word combinations, an issue explored in the present study.

The fundamental theory of linguistic economy is based on the Zipfian laws. The Principle of Least Effort has been empirically verified in previous studies by Kanwal et al., (2017) and Linders & Louwerse, (2023), which demonstrated that the principle is systematically followed while maintaining communicative clarity. Likewise, Piantadosi, (2014) shows a critical synthesis of the fact that word frequency distributions and tendencies for abbreviations bear a deeper optimization pressure on language systems. Ferrer-i-Cancho, (2016) also regards Zipf's law as a result of efficiency in communication through compression, thus strengthening the notion of linguistic systems as self-optimizing encoding systems.

Syntactic and morphological analysis reveals the economy at different levels, with Wakabayashi, (2021) and Nikolaev & Grossman, (2020) demonstrating that the former is the preferred route of economy for structurally deleting while the latter is the preferred route of economy for feature compressing. The findings of this study strongly advocate the typological distinction found in the word combinations of the present study in English and the Azerbaijani language. Most of the studies in the literature, however, focus on the mechanisms in isolation and do not combine them into a single comparative information-structural model.

From the information system and digital communication point of view, patients of both Kaplan, (2014) and Collins, (2000) have called attention to the role of linguistic compression in both the algorithmic mediation of information systems and the structuring of metadata. This is especially important in NLP and Library science applications

of modern times, where word combinations play the role of units of indexing and semantic search.

Yet there is still a significant challenge; many language economy aspects have not been integrated with the cross-linguistic (CL) word combination structure in information systems environments. The majority of the studies are computational (LLMs, NLP), cognitive (processing efficiency), or theoretical (Zipfian laws), but not all of them are typological studies that combine the two types of economy strategies, syntactic and morphological. In addition, the use of citations in the literature in most of the previous research is inconsistent, which means that a more commonly accepted analytical framework is needed.

Hence, the present study makes a contribution by incorporating these perspectives together and making a comparison of the informational economy in terms of linguistic economy and how the two languages achieve the same level of informational economy using different linguistic means. This makes linguistic economy a linguistic principle and at the same time a functional mechanism of the knowledge organization and information retrieval systems.

III. Theoretical Foundations of the Principle of Linguistic Economy

In the context of the present study, the concept of linguistic economy is based on the assumption that language is an optimized system for efficiently encoding, structuring, and transmitting information (Dahui et al., 2005; Ferrer-i-Cancho, 2016). According to the goals of this research, linguistic economy is not only considered as the economy of linguistic material, but as a systemic approach of information compression in word combinations, especially in noun phrases in English and Azerbaijani. This approach will be useful in linking the research with linguistic theory as well as the general requirements of information systems, where efficient data structures are crucial for the proper structuring and presentation of knowledge.

Linguistic economy can be described as the equilibrium of communicative effectiveness and structural adequacy of the language (Kanwal et al., 2017; Linders & Louwerse, 2023). Users of the language attempt to save effort while using the language and to convey their message effectively and accurately. It is especially evident in such syntactic constructions as word combinations, which contain information in a small unit but without losing semantic unity. Economy thus is not seen as mere economy of length, but as a functional redistribution of the components of the language in order to express the maximum amount of information in the minimum amount of structure.

In the current context, the expression of linguistic economy is closely related to the typological distinction between languages. English tends to be economical in the way information is represented in a linear and efficient way through syntactic devices like pre-modification and fixed word order (Wakabayashi, 2021). Azerbaijani, on the other hand, employs morphological devices, such as affixation and case system, to signal relational and grammatical information in the form of word forms (Nikolaev & Grossman, 2020). The different strategies illustrate that the principle of 'linguistic economy' is a universal cognitive-functional principle that is implemented through language-specific structural systems (Semple et al., 2022).

Linguistic economy can also be explained from a functional-typological point of view as an optimization of the cognitive processing. Word combinations are not only grammatical units, but also cognitive packages that decrease the load on the cognitive system in the process of understanding and recalling the words (Affognon, 2026). Such units compress information and aid in its quicker decoding and better interpretability, especially in multilingual or information-retrieval settings. This renders linguistic economy directly applicable to the modern approaches of information systems in which the linguistic structures are used as metadata units for indexing and semantic search.

Also, linguistic systems are dynamic and adaptive is reinforced by the idea (Corominas-Murtra et al., 2011). Compact linguistic representations are required more often in contexts where there are changes to communication, particularly in digital and cross-linguistic contexts. Consequently, both languages – English and Azerbaijani – show systematic tendencies in optimizing noun phrase structures in different ways. This confirms that the principle of linguistic economy is a multi-level one that combines syntax, morphology, and information organization.

The theoretical background of this study shows that the concept of linguistic economy is a cross-disciplinary phenomenon that relates to linguistic structure and information-processing efficiency (Semple et al., 2022; Montemurro, 2001). It offers the conceptual framework for the examination of the communicative compactness of languages in word combinations and the way it is achieved in different ways.

IV. Research Methodology and Analytical Framework

In this research, the comparative functional-typological approach is applied in order to investigate the occurrence of linguistic economy in English and Azerbaijani languages, perceiving language as a dynamic system whose structural options are limited due to communicative effectiveness. It follows from the adherence to the principles of the Information Systems discipline, which considers noun phrases to be “information structures” needing to be concise but retrievable (Kaplan, 2014; Collins, 2000). The present research shows how the economy of language influences the efficiency of storing and retrieving noun phrases, thus suggesting practical recommendations regarding the handling of typological distinctions between English and Azerbaijani languages in NLP models.

Fig. 1 shows the optimal compact information structure of the English and Azerbaijani languages realized in different linguistic ways. The English path puts more emphasis on the structure being as concise as possible by pre-modifying the head word, whereas the Azerbaijani path is based on the morphological integration in which these affixes are attached, and the case structure allows the head word to be modified. Although these two processes are clearly different, both lead to the same output, and thus one can find both syntactic and/or morphological economical ways to achieve the same conceptual meaning.

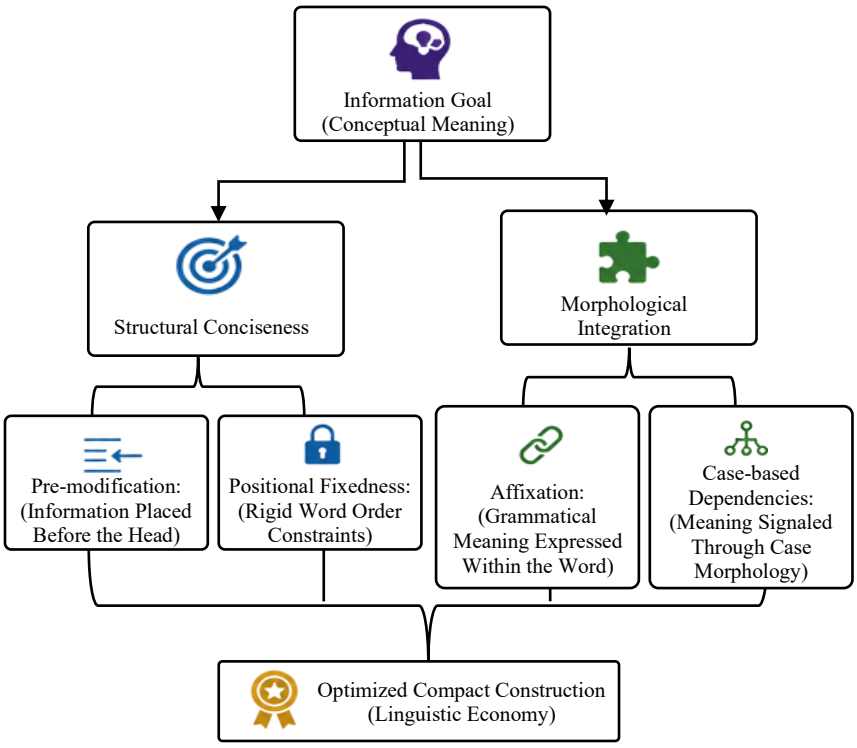


Fig. 1 Comparative Workflow of Linguistic Economy in English and Azerbaijani

Data Selection and Corpus Description

The data set comprises 500 structures of noun phrases drawn from the corpus of literary works and journalism of the period of 2020-2025. The collection comprises 250 English phrases and 250 Azerbaijani phrases and was selected due to their structural complexity and popularity in electronic media. This data was cross-verified with existing linguistic corpora to confirm that they conform to the linguistic rules of multi-system languages.

Analytical Procedure

Steps involved in comparative analysis process include the following:

1. *Corpus Extraction:* Noun phrase structures identification and classification in both languages.
2. *Structural Categorization:* Simple noun phrases (no modifiers) and complex (containing either pre-modifiers or post-modifiers).
3. *Economy Mapping:* Process by which it is established that English utilizes structural placement and pre-modifications to achieve economy while Azerbaijanian makes use of affixation and cases for the same purpose.
4. *Functional Evaluation:* Measurement of information density of these linguistic units within their communicational contexts.

Apart from this methodology of studying the issue, there is a particular use of cognitive and functional analysis to explain the motivation behind the economic structure of these structures from the perspective of language users. This methodology considers not only grammatical accounts but also accounts that reflect contemporary theories of cognition and discourse (Affognon, 2026).

V. Result and Discussion

The contrast between noun phrases used in English and Azerbaijani languages reveals a considerable difference in their realization of linguistic economy in communication. Structural conciseness and pre-modification are the major criteria for linguistic economy, which directly supports the rapid processing of information, as can be seen in English (Wakabayashi, 2021). In contrast, Azerbaijani relies on morphological integration and affixation to obtain the same degree of semantic density, which acts as an alternative way for storing information in a compact way in a linguistic system.

This corpus-based analysis shows that the principle of linguistic economy is not merely a description, but a

universal strategy which is linguistically realized with different structural solutions. Data shows that in both languages; the choice of Type I noun combination is a strategy for optimizing cognitive load with the goal of achieving the precision necessary for accurate retrieval (Affognon, 2026). The results of the research are directly applicable to the creation of metadata for digital libraries and to information management in general, proving that search algorithms need to consider typologically different strategies to preserve the level of cross-lingual retrieval accuracy (Kaplan, 2014; Collins, 2000; Wang et al., 2025; Jayaram & Vidya, 2008). The observed transition from semantic generality to specificity, with the emergence of specific functional markers, indicates a systematic shift in the packing of information that affects the ways of interrogating and navigating knowledge bases.

TABLE I COMPARATIVE MECHANISMS OF LINGUISTIC ECONOMY IN ENGLISH AND AZERBAIJANI

Evaluation Criteria	English Mechanism	Azerbaijani Mechanism	Impact on Information Services
Structural Conciseness	Extensive pre-modification	Morphological Integration	Reduces metadata length and optimizes indexing
Relational Encoding	Positional Fixedness	Affixation & Case Markers	Impacts cross-lingual query parsing and precision
Information Density	Linear Modifier Stacking	Semantic Condensation	Affects retrieval performance in automated systems
Cognitive Optimization	Minimal Functional Words	Minimal Morphological Markers	Minimizes user cognitive load during information navigation

The results are presented clearly and comparatively in table I. It is used to summarise the results of analysis to show that the structural paths (English/Azerbaijani) differ but that both languages use different but equivalent strategies to achieve the aim of linguistic economy. This meets the need for an analytical description – not just a descriptive one.

These results support the starting research question that focused on the universal vs language-specific mechanism of the economy (Semple et al., 2022). The results prove that, although the two systems follow different routes, they both end up at the same point, that of compactness, thus confirming that linguistic economy is not only the reduction of form but a functional demand for effective communication. As far as the constraints involved are concerned, the evidence is taken from 500 noun phrase constructions, and the generalizability of this evidence is restricted to literary and journalistic discourse. Further research should be extended to implement the use of technical or specialized domain-specific corpora to further improve the applicability of these findings to more general information services. In addition, the research is synchronic, longitudinal studies will be needed to examine how these economical strategies develop as a result of technological changes in digital media.

Discussion

The results presented are similar to other studies conducted which revealed the fact that in languages with fixed word order structural economy works through narrow syntax, which includes deletion and compact linear order (Wakabayashi, 2021). Simultaneously, it is also possible to say that the results obtained from Azerbaijani demonstrate the presence of other studies that were done regarding feature-economy in highly inflected languages when grammatical and relational features are encoded through affixation within words instead of being separately encoded (Nikolaev & Grossman, 2020). Thus, it may be said that the typological divide shown in the current corpus is only one more manifestation of already existing gap between syntactic-deletion economy and morphological-compression economy.

This trend towards compactness via differing structures is consistent with the overall Zipfian perspective on linguistic economy, where word frequency distribution and abbreviations represent a form of optimization pressure that is shared by all language systems (Piantadosi, 2014). The explanation offered by Ferrer-i-Cancho on how Zipf's law arises as a result of compressive communication also provides a further confirmation of this point of view, since the compactness found in English and Azerbaijani NP structure cannot be seen as a language-specific fluke (Ferrer-i-Cancho, 2016).

Cognitively speaking, the lower structural load seen in both languages is compatible with the idea of dual-domain cognitive fluency, where economy is taken to be an inevitable result of resource-effective language production, as well as previous studies where cognitive resource optimization was seen as one of the main causes of efficiency in information exchange (Hostinar & Miller, 2019; Affognon, 2026). At the same time, the practical conclusions concerning metadata building and information retrieval made here are in line with recent computational results about the fact that compression of the information into more semantically dense forms increases its retrieval accuracy, along with recent studies about the fact that reducing representational overhead without damaging semantic integrity is important in modern information processing (Wang et al., 2025). This ties the link made in this study between linguistic economy and algorithmic mediation of the information together even tighter than it had been before (Dahui et al., 2005; Collins, 2000).

VI. Conclusion

In the existing research, the implementation of the linguistic economy principle into word combinations, more precisely into noun phrases, is studied comparatively in English and Azerbaijani languages from a functional-typological perspective. It is shown that the linguistic economy principle works as a universal communicational principle; however, the realization of linguistic economy depends on the language type structure. In English, the linguistic economy principle

manifests itself mostly syntactically, namely, through pre-modification, rigid word order, and linear modification stacking, allowing for informative packing with a decrease in structural complexity. On the other hand, Azerbaijani attains the same level of informativity through morphological means, namely, affixation and case inflection. These results provide evidence for the idea that different linguistic systems utilize different structural mechanisms in order to ensure the same communicative effectiveness. An examination of 500 instances of noun phrases in a corpus demonstrates that the two languages eventually arrive at the same functional result, i.e., optimal and cognitively efficient information structures, despite having different grammatical means of achieving this goal. This finding serves as further evidence that linguistic economy should be understood not just in terms of economizing on linguistic substance but as a multi-level process of optimization encompassing syntactic, morphological, and cognitive aspects. In addition, the paper shows the importance of noun phrases as primary units of information not only in human communication but in computerized information systems as well, thus confirming their usefulness in the construction of metadata, information search, and other NLP applications. Nevertheless, the results are limited to corpora in literary and journalistic texts for the period 2020-2025, and it is advised that future research use specialized and multilingual data sets to increase the generalizability of the results. Future studies can also consider diachronies and the modeling of linguistic economy.

REFERENCES

[1] Affognon, D. A. (2026). Beyond the left-right brain divide: a framework for dual-domain cognitive fluency. *Frontiers in Cognition*, *5*, 1727422. https://doi.org/10.3389/fcogn.2026.1727422

[2] Collins, C. (2000). Developing the linguistic turn in urban studies: language, context and political economy. *Urban studies*, *37*(11), 2027-2043. https://doi.org/10.1080/713707225

[3] Corominas-Murtra, B., Fortuny, J., & Solé, R. V. (2011). Emergence of Zipf's law in the evolution of communication. *Physical Review E—Statistical, Nonlinear, and Soft Matter Physics*, *83*(3), 036115. https://doi.org/10.1103/PhysRevE.83.036115

[4] Dahui, W., Menghui, L., & Zengru, D. (2005). True reason for Zipf's law in language. *Physica A: Statistical Mechanics and its Applications*, *358*(2-4), 545-550. https://doi.org/10.1016/j.physa.2005.04.021

[5] Ferrer-i-Cancho, R. (2016). Compression and the origins of Zipf's law for word frequencies. *Complexity*, *21*(S2), 409-411. https://doi.org/10.1002/cplx.21820

[6] Heesen, R., Hobaiter, C., Ferrer-i-Cancho, R., & Semple, S. (2019). Linguistic laws in chimpanzee gestural communication. *Proceedings of the Royal Society B: Biological Sciences*, *286*(1896), 20182900. https://doi.org/10.1098/rspb.2018.2900

[7] Hostinar, C. E., & Miller, G. E. (2019). Protective factors for youth confronting economic hardship: Current challenges and future avenues in resilience research. *American Psychologist*, *74*(6), 641. https://doi.org/10.1037/amp0000520

[8] Ismayil, Z. (2024). Development points of the derivation process related to Nakhchivan dialects and accents (based on written and oral literary and artistic examples). *Forum for Linguistic Studies, 6*(2), 1192. https://doi.org/10.59400/fls.v6i2.1192

[9] Ismayil, Z., Jafarov, A., Adil, G., Soltanova, A., Mansimova, K., Alishanova, A., ... & Nuri, A. (2026). Faculty perceptions of generative AI in Azerbaijani higher education. *European Journal of STEM Education*, *11*(1), 21. https://doi.org/10.20897/ejsteme/18310

[10] Jayaram, B. D., & Vidya, M. N. (2008). Zipf's law for Indian languages. *Journal of quantitative linguistics*, *15*(4), 293-317. https://doi.org/10.1080/09296170802326640

[11] Kanwal, J., Smith, K., Culbertson, J., & Kirby, S. (2017). Zipf's law of abbreviation and the principle of least effort: Language users optimise a miniature lexicon for efficient communication. *Cognition*, *165*, 45-52. https://doi.org/10.1016/j.cognition.2017.05.001

[12] Kaplan, F. (2014). Linguistic capitalism and algorithmic mediation. *Representations*, *127*(1), 57-63. https://doi.org/10.1525/rep.2014.127.1.57

[13] Linders, G. M., & Louwerse, M. M. (2023). Zipf's law revisited: Spoken dialog, linguistic units, parameters, and the principle of least effort. *Psychonomic Bulletin & Review*, *30*(1), 77-101. https://doi.org/10.3758/s13423-022-02142-9

[14] Manin, D. Y. (2009). Mandelbrot's model for Zipf's law: can Mandelbrot's model explain Zipf's law for language?. *Journal of Quantitative Linguistics*, *16*(3), 274-285. https://doi.org/10.1080/09296170902850358

[15] Moallemi, E. A., Miller, M., Szetey, K., Chakori, S., Conti, C., Hammond, P., ... & Reed, P. M. (2025). Entry points for driving systemic change toward a more sustainable future. *One Earth*, *8*(6). https://doi.org/10.1016/j.oneear.2025.101287

[16] Montemurro, M. A. (2001). Beyond the Zipf–Mandelbrot law in quantitative linguistics. *Physica A: Statistical Mechanics and its Applications*, *300*(3-4), 567-578. https://doi.org/10.1016/S0378-4371(01)00355-7

[17] Nikolaev, D., & Grossman, E. (2020). Consonant co-occurrence classes and the feature-economy principle. *Phonology*, *37*(3), 419-451. https://doi.org/10.1017/S0952675720000226

[18] Nuri, A., Ismayil, Z., Babayeva, M., Guliyev, A., Rzayeva, F., Shiraliyeva, G., & Jahangirli, T. (2025). Artistic expressions as vehicles of cultural memory. *Journal of Ethnic and Cultural Studies*, *12*(5), 258-275.https://doi.org/10.29333/ejecs/2816

[19] Piantadosi, S. T. (2014). Zipf's word frequency law in natural language: A critical review and future directions. *Psychonomic bulletin & review*, *21*(5), 1112-1130. https://doi.org/10.3758/s13423-014-0585-6

[20] Semple, S., Ferrer-i-Cancho, R., & Gustison, M. L. (2022). Linguistic laws in biology. *Trends in Ecology & Evolution*, *37*(1), 53-66. https://doi.org/10.1016/j.tree.2021.08.012

[21] Wakabayashi, S. (2021). A principle of economy in derivation in L2 grammar: Do everything in narrow syntax. *Second Language Research*, *37*(4), 521-545. https://doi.org/10.1177/0267658319879969

[22] Wang, G., Yang, R., Zhang, Y., Wen, X., Liu, C., Liu, E., ... & Liu, Z. (2025). Evaluating the performance of Large language models in rheumatology for connective tissue Diseases: DeepSeek-R1, ChatGPT-4.0, Copilot, and Gemini-2.0. *International Journal of Medical Informatics*,207, 106172. https://doi.org/10.1016/j.ijmedinf.2025.106172

[23] Wibowo, S., Dimyati, K., Absori, A., Wardiono, K., Ramon, T. M., Budiono, A., & Lyandova, V. (2023). Islamic nomocracy: from the perspectives of Indonesia, Spain and Russia. *Legality: Jurnal Ilmiah Hukum*, *31*(1), 91-111. https://doi.org/10.22219/ljih.v31i1.25358