

“SUSTAINABILITY” IN ECOLINGUISTICS RESEARCH ARTICLES: A CORPUS-BASED ANALYSIS

Arina Isti’annah

Universitas Sanata Dharma, Sleman

arina@usd.ac.id

Abstract: As a newly developed concept, ecolinguistics has been closely associated with language diversity and endangerment. However, the existence of critical discourse analysis (CDA) in the early '90s triggered scholars to start questioning the role of discourse in affecting our planet's sustainability. In 2014, Stibbe and Alexander proposed the term “ecological discourse analysis” (EDA) to emphasize the term ‘ecological’ as a paradigm instead a discourse type. Drawing upon the availability of research articles on ecolinguistics, this paper examines the lexeme “sustainability” and its collocation to conclude further how ecolinguistics locates sustainability in its discussion. Data were downloaded from the Scopus database by inserting the ‘ecolinguistics’ keyword and uploaded to Sketch Engine, an online corpus tool developed by Adam Kilgarriff. To specify the analysis, this paper focused on finding the collocates of ‘sustainability’ and examined its context through concordance lines. Of the 42 research articles (514,011 tokens) analyzed, this paper found 132 ‘sustainability’ lexemes. The researcher further limited the collocation in the 3L-3R span of a minimum of 5 frequencies in the corpus and used logDice score to measure the co-occurring word in the given span. The analysis found that ‘sustainability’ is collocated, among others, with ‘planetary’ (9.56), ‘reports’ (9.56), ‘webpages’ (8.42), ‘corporate’ (7.96), ‘justice’ (7.95), ‘reporting’ (7.84), and ‘environmental’ (7.78). It is found that the issue of sustainability is not limited to environmental issues but is scattered in corporate discourses. The interwoven between sustainability and corporate discourse proves that the recent application of ecolinguistics has contributed to critical discourse studies that concern taken-for-granted discourse as an important factor affecting how we think, talk, and act toward the environment. Applying the corpus-based method helps the researcher conclude the role of ecolinguistics in empirically criticizing the issue of sustainability.

Keywords: corpus, discourse, ecolinguistics, research articles

INTRODUCTION

The notion of ‘sustainability’ has been widely used in many research areas, not limited to energy and technology, but also in education and other social sciences. Triggered by the environmental movement in the 1970s, ‘sustainability’ has transformed into two major schemes: a scientific discipline and a normative agenda. The first concept pertains to a holistic science-based system that concerns networks and fractal scales of analysis. On the other hand, ‘sustainability’ as a normative agenda denotes values, beliefs, and politics. The term ‘sustainability’ used in the Brundlant Report in 1987 marked the concern of ‘sustainability’ to create new social and ecological concerns of consumer societies and accommodate future economic development and growth. The second half of the 20th century influenced the intertwined concept between sustainability and environmental awareness because of population growth, pollution, and non-renewable source depletion. At the same time, linguists also concern the role of language that shapes our view of the world. Through the terms

'language and ecology' and 'ecolinguistics', linguists have proven the relationship between language and its biological, sociological, and ideological dimensions. In the biological dimension, language endangerment is regarded as a result of endangered biodiversity. The sociological dimension of language is accessed through how a society maintains its relationship with the ecosystem through language, as apparent in local wisdom by cultural practices. The ideological dimension pertains to the cultural cognition that motivates a society's language choice in treating the environment.

This corpus ecolinguistics paper aims to investigate the collocations of the lexeme 'sustainability' by limiting the collocates from particular grammatical relations. Previously, research on corpus ecolinguistics has been found to discuss various discourses, such as 'tree(s)' and 'forest(s)' in the US discourse, plastic waste in the UK, copper mining in Arizona, and genetically modified seed discourse. Those studies exemplify how ecolinguistics, as a new paradigm, is interested in how the environment is embedded in varied discourse both synchronically and diachronically. This paper intends to address how the lexeme 'sustainability' is used in ecolinguistic articles.

This paper specifically addresses how the term 'sustainability' is used in research articles on ecolinguistics. As publishing database such as Scopus becomes the leading platform for academicians to disseminate their research, it is necessary to map how research is produced, distributed, and expanded. The interwoven relationship between ecolinguistics and environmental issues is integral with the term 'sustainability', whose definition and application are still contested. Therefore, this paper aims to highlight how research papers on ecolinguistics locates 'sustainability' in its discussion in relation to Walker's criticism of 'sustainability' as a science or normative agenda.

METHOD

This paper is a corpus-based study that took a set of data from Scopus-indexed research articles under the keyword "sustainability ecolinguistics" accessed on March 6, 2023. The corpus-based study enables researchers to figure out language patterns of a set of texts. As a research method, the corpus-based study also provides some linguistic tools to help researchers critically interpret the ideology, frames, and representation of varied issues, such as education, racism, politics, and environment. The data consist of 42 articles published between 2001-2023 in varied types: review articles (1), research articles, proceeding articles (5), encyclopedia (3), book reviews (2), and editorials (2). Therefore, the tokens of each data range from 2,710 to 26,007 tokens. In total, there were 514,011 tokens. The 42 articles were treated as the 'ecolinguistics articles' corpus and uploaded to Sketch Engine, an online corpus tool developed in 2013 by Adam Kilgariff.

Using the Word Sketch tool, the author inserted the lexeme 'sustainability' in the query and found its collocations based on different word categories. Collocation is a common tool used in corpus study to figure out word combinations frequently appearing in a corpus. It shows a tendency of a word to co-occur with another word, shown statistically in significance scores such as logDice. Sketch Engine provides part of speech tags so that the author can map the collocations of the lexeme 'sustainability' into its modifiers, nouns modified by the lexeme, verbs with the lexeme as the object, verbs with the lexeme as the subject, 'sustainability' and/or, prepositional phrases, and 'sustainability' is. However, this paper is limited to three grammatical relations that show how ecolinguistics locates sustainability in its discussion. This research displays the most significant collocates of 'sustainability' from the 'modifiers', 'nouns the lexeme modify', and 'the lexeme is'. This paper sheds light on how 'sustainability' is articulated in ecolinguistics.

FINDING AND DISCUSSION

This paper aims to examine the term 'sustainability' in articles on ecolinguistics. From the corpus analysis, this paper found that the word 'sustainability' (n) appears in 132 times. Besides showing the frequency of the collocates of 'sustainability', this research also shows the logDice score. logDice score of 5.0 or higher proves that two words are collocated, not by chance. The logDice score below 5.0 means that two words co-occur by chance. Therefore, this paper only includes the collocates with 5.0 or higher of the logDice score.

Modifier of 'sustainability'

Sketch Engine provides grammatical relation analysis of a word in query. The modifier of the lexeme 'sustainability' shows the most visible relation. Based on the collocation analysis, by limiting to the ones having more than 5.0 logDice score, the modifiers of 'sustainability' are as follows: 'Planetary' (11.41), 'long-term' (10), 'Global' (9.71), 'local-to-planetary' (9.38), 'Anthropocene' (9.27), 'environmental' (9.19), 'experience' (9.12), 'practice' (9.06), 'CSR' (9.02), 'Earth' (8.93), 'anthropocentric' (8.52), 'system' (8.04), 'social' (5.45), 'linguistic' (5.4), and 'ecological' (5.28).

Syntactically, the modifiers of 'sustainability' are in the form of adjectives and nouns. The adjective collocates are visible in the word 'planetary', 'long-term', 'local-to-planetary', 'global', 'anthropocentric', 'social', 'linguistic', and 'ecological'. A similar term in the form of a different word category, noun, is identified in the words 'anthropocene'. The other noun collocates are 'experience', 'practice', 'SCR', 'earth', and 'system'. The domination of adjective collocates in the data display that 'sustainability' is entailed with particular attributes to define the term. The collocations functioning as modifiers above depict ecolinguistics locates sustainability as both a scientific area and a normative agenda. Ecolinguistics criticizes the normative agenda of environmental violence and locates planetary sustainability as one of the goals of ecopedagogies. Below is an example of concordance in which the lexeme 'sustainability' is used.

1. Ecopedagogies, which ground this article's arguments, are critical-based environmental pedagogies for literacy to read the politics of environmental violence and their inseparable connections to social injustices, as well as **planetary sustainability** beyond anthropocentric lenses.

Example 1) above reveals that ecolinguistics positions education or pedagogical setting as an essential field to raise future generations' awareness of the environmental violence scattered around them. Students should be exposed to the impacts of capitalistic culture that result in massive production, consumption, and social injustice.

The lexeme 'sustainability' is found in ecolinguistic articles to raise critical thinking awareness. Ecolinguistics has been located as a contributor of transdisciplinary development. This finding endorses the idea that ecolinguistics can be regarded as both a discipline and a method. Besides being integrated in an education setting, ecolinguistics is also applied in critical discourse studies to criticize neo-liberal discourses voicing consumerism and economic growth that threaten our planet's long-term sustainability.

The example 2) below shows an ecological discourse analysis that involves the lexeme 'sustainability'.

2. the "present scientific praxis is dialectically determined by modern capitalist culture" (Døør and Bang, 2002: 416), one that is characterized by a specific mode of production (Marx' Produktionsweise) that erodes ecological balance by promoting economic growth that lacks **long-term ecological** sustainability.

Criticism towards modern capitalist culture is palpable in example 2). Ecolinguistics claims that economic growth does not always benefit our planet. The discourse of ‘profit’ and ‘sale’ scattered around us, in a way, influences the way we think, talk, and treat our environment. The role of language in ecolinguistics is taken as a cognitive structure that determines how society acts toward the environment. Stibbe criticizes the triple bottom line logic, which explains how sustainability is defined in terms of people, planet, profit or society, environment, and economy. The role of sustainability in a capitalistic culture, thus, articulates a normative agenda instead a science.

Further criticism given by ecolinguistics is to the reproduction of dominant discourse about development. The author argues that education, notably higher education, should become a vital agent to oppose or counter the dominant culture that positions global development as the ultimate goal of our living. The example 3) below shows the context.

3. Opposingly, development is internationally and planetarily holistic as development goals are globally all-inclusive progress and grounded on **local-to-planetary sustainability**.

The example above shows that ecolinguistics is applied in a transdisciplinary work that criticizes the role of higher education in raising people’s awareness about the danger of dominant culture. The justification of massive development and growth should be encountered with critical thinking about the importance of local to planetary sustainability.

The other example of how ecolinguistics criticizes an eco-modernist ideology is shown below.

4. As a normative stance, we posit that for safeguarding Earth **system sustainability** in a hybrid planet, biosphere and technosphere must be coupled via co-evolutionary technologies that undergird proper functioning in both spheres, and which enhance sympoietic resilience of human and non-human niches.

As many areas of life locate technology to solve environmental problem, ecolinguistics is applied in an interdisciplinary study where natural science and humanities interrelate. In example 4), the author criticizes the role of policies and legislation regulating how to face new technologies. Ecolinguistics proposes the importance of a nature-based solution that contributes to biospheric evolutionary potential following ethical principles of humans and non-humans recognition in designing and evaluating the technology.

Nouns modified by ‘sustainability’

By investigating nouns modified by ‘sustainability’, this paper addresses how ‘sustainability’ explains the nouns following it. Syntactically, the noun head of ‘sustainability’ modifier explains how ecolinguistics is exercised in varied data and research objectives. From the logDice score that shows the word co-occurrences, it can be shown that ‘sustainability’ is collocated with ‘webpage’ (10.7), ‘report’ (10.57), ‘reporting’ (10.33), ‘transition’ (10.21), ‘imaginarie’ (9.61), ‘Ethics’ (9.44), ‘tension’ (9.41), ‘transformation’ (9.27), ‘Index’ (9.19), ‘amount’ (9.09), ‘standard’ (9.09), ‘protection’ (8.98), ‘indicator’ (8.96), ‘scenario’ (8.91), ‘issue’ (8.72), ‘paradigm’ (8.34), ‘goal’ (8.31), ‘type’ (8.27), ‘review’ (8.25), ‘topic’ (8.22), ‘student’ (8.18), ‘Science’ (7.99), ‘research’ (7.97), ‘behavior’ (7.81), ‘discourse’ (7.64), ‘concept’ (7.52), ‘University’ (6.79), ‘value’ (6.66), and ‘science’ (6.6).

In general, nouns modified by ‘sustainability’ unveils ecolinguistics as a methodological basis and transdisciplinary field. As a methodological basis, ecolinguistics is interested in corporate discourses. The examples below show the noun phrase with ‘sustainability’ as its modifier.

5. Some scholars have also analyzed the role that **sustainability webpages** play in presenting companies as socially responsible agents.
6. The blending of different types of language is indeed a feature which is frequently perceived in environmental **sustainability reports**.

The two examples above show that ecolinguistics, as a method, takes corporate discourse as its data. Corporations are often blamed as the actor contributing environmental crisis, including climate change. Using company social responsibility (CSR) reports is important to build the corporate image. It is argued that CSR communicates the company's responsibility to society and persuades stakeholders' business compatibility with environmental protection.

In the CSR discourse, ecolinguistics also performs as a paradigm that criticizes the linguistic and multimodal choice in CSR. The role of metaphor and other lexical strategies are used to frame, localize and normalize dominant organizational discourse to obscure their responsibility. Researchers have started to investigate non-ecological discourse in an ecological paradigm. In line with Stibbe and Alexander's viewpoint, ecolinguistics has transformed from ecology and language to ecological discourse analysis to facilitate us criticize any kinds of discourse in an ecological way.

Ecolinguistics inevitably provides a vast array of research collaborations in the form of interdisciplinary studies. As a field of research rooted in the role of language in both cognitive and social dimensions, ecolinguistics expands its discussion to the role of language in shaping people's views and behavior towards the environment. The collocation of 'sustainability' with 'transitions' and 'research', as shown below, tell us how ecolinguistics addresses environmental issue academically.

7. This article's goal is to help mobilize the social sciences and the Environmental social sciences humanities on the topic of **sustainability transitions**, but also call for a meaningful research Transdisciplinarity agenda to acknowledge the profound implications of the advent of the Anthropocene epoch.
8. Conceptual developments in environmental and **sustainability research** are often motivated by the need to communicate between researchers and the policymakers and administrative bodies on different levels (municipalities, regions, national governments) and to mobilize commitment by various stakeholders and interest groups

The ecological crisis as the essential root of ecolinguistics should be the priority for researchers, academicians, government, and, to be particular, policymakers. From the collocation of 'sustainability' with 'transitions' and 'research', we can infer that ecolinguistics addresses the contribution of linguistics to problems in the Anthropocene age. This finding affirms Zhou's statement about the need of linguistics to challenge unecological ideologies, such as classisms. The danger of human stewardship in controlling the environment needs collaborative work between linguists, biologists, and ecologists. Ecolinguistics takes part in criticizing the 'linguistic proper' that we have accepted as the 'correct' and 'common' ways of communicating about our planet.

Sustainability is...

The last grammatical relation involved in this paper is "A lexeme is...". From the word sketch, this paper found that 'sustainability' is defined as an achievement (13.41) as shown below.

9. Using language does not amount to consuming its resources, but to making use of a sustainable means of cognition and communication. </s><s> Viewing grammar as steering

that sustainability is a central achievement of ecolinguistics; it is related to Chomsky's creativity thesis but differs from it in including the environment

Example 9) above emphasizes the role of language as a means to promote sustainability. The exclusion of human beings in an ecosystem is often excluded from achieving sustainability. Meanwhile, human beings are the elements having language that influences how they think, talk about, and treat the environment. In this manner, ecolinguistics proves its critical turn that surpasses the 'language and ecology' definition.

CONCLUSIONS

This paper concludes that the lexeme 'sustainability' has been loaded in discussions on ecolinguistics. Other than locating sustainability as a science only, ecolinguistics also regards sustainability as a normative agenda embedded in non-ecological discourse, such as education and corporate discourse. As a newly developed perspective, ecolinguistics provides a critical framework for how discourse scattered around is loaded with linguistic structures promoting economic growth and consumerism. Considering the collocates of 'sustainability', this paper concludes that ecolinguistics aims to use language as a means to achieve sustainability. Language is a cognitive structure responsible for constructing humans' behavior towards the planet. Since this study limits its discussion on 'sustainability' to Scopus-indexed papers, future research is invited to expand the analysis by involving data from various publishing databases.

ACKNOWLEDGMENTS

I would like to thank Dr. Suhandano, M.A. and Dr. Daru Winarti, M.Hum. for providing this paper valuable feedback. This paper is a part of my dissertation at the Doctoral Program of Humanities, Faculty of Cultural Sciences, Universitas Gadjah Mada

REFERENCES

- Adamou, E. (2019). Corpus linguistic methods. in *Handbooks of Linguistics and Communication Science series (HSK)*, De Gruyter, pp. 638–653. Accessed: May 03, 2023. [Online]. Available: <https://shs.hal.science/halshs-02370347>
- Afzaal, M., Hu, K., Ilyas Chishti, M. and Khan, Z. (2019). Examining Pakistani news media discourses about China–Pakistan Economic Corridor: A corpus-based critical discourse analysis. *Cogent Social Sciences*, vol. 5, no. 1, pp. 1–18, doi: 10.1080/23311886.2019.1683940.
- Aijmer, K. and Altenberg, B. (2013). *English Corpus Linguistics*. New York: Routledge.
- Alexander, R. (2017). Investigating texts about environmental degradation using critical discourse analysis and corpus linguistic techniques. *The Routledge handbook of ecolinguistics*, no. Query date: 2023-05-11 19:05:01, 2017, [Online]. Available: <https://api.taylorfrancis.com/v4/content/chapters/edit/download?identifierName=doi&identifierValue=10.4324%2F9781315687391-14&type=chapterpdf>
- Alexander, R. and Stibbe, A. (2014). From the analysis of ecological discourse to the ecological analysis of discourse. *Language Sciences*, vol. 41, pp. 104–110, doi: 10.1016/j.langsci.2013.08.011.
- Alexander, R., Bang, J. Chr. and Døør, J. (1993). *Eds., in Ecolinguistics: Problems, theories and methods*, pp. 21–30.
- Arnawa, N. (2016). Representasi Ekolinguistik dalam Satua Bali: Menumbuhkan Kearifan Anak terhadap Lingkungan Alam. [repo.mahadewa.ac.id](http://repo.mahadewa.ac.id/id/eprint/256/). [Online]. Available: <http://repo.mahadewa.ac.id/id/eprint/256/>
- Bang, J. Chr. and Døør, J. (1993). *Eco-Linguistics: A framework*.
- Bang, J. Chr., and Trampe, W. (2014). Aspects of an ecological theory of language. *Language Sciences*, vol. 41, pp. 83–92, doi: 10.1016/j.langsci.2013.08.009.

- Blühdorn, I. (2017). Post-capitalism, post-growth, post-consumerism? Eco-political hopes beyond sustainability. *Global Discourse*, vol. 7, no. 1, pp. 42–61, doi: 10.1080/23269995.2017.1300415.
- bt Setik, R., et al. (2018). Exploiting Malay Corpus On Islamic Issue using Sketch Engine. in 2018 International Seminar on Research of Information Technology and Intelligent Systems (ISRITI), pp. 281–286. doi: 10.1109/ISRITI.2018.8864337.
- Buckingham, L. and Alali, N. (2020). Extreme parallels: a corpus-driven analysis of ISIS and far-right discourse. *Kōtuitui: New Zealand Journal of Social Sciences Online*, vol. 15, no. 2, pp. 310–331, doi: 10.1080/1177083X.2019.1698623.
- Ertuna, B. Karatas-Ozkan, M. and Yamak, S. (2019). Diffusion of sustainability and CSR discourse in hospitality industry: Dynamics of local context. *International Journal of Contemporary Hospitality Management*, vol. 31, no. 6, pp. 2564–2581, doi: 10.1108/IJCHM-06-2018-0464.
- Fernández-Vázquez, J.-S. and Sancho-Rodríguez, Á. (2020). Critical discourse analysis of climate change in IBEX 35 companies. *Technological Forecasting and Social Change*, vol. 157, p. 120063, doi: 10.1016/j.techfore.2020.120063.
- Franklin, E., Gavins, J., and Mehl, S. (2022). I don't think education is the answer': A corpus-assisted ecolinguistic analysis of plastics discourses in the UK. *Journal of World Languages*, vol. 8, no. 2, pp. 284–322, doi: 10.1515/jwl-2022-0017.
- Frayne, C. (2021). Corpus-based analysis of genetically modified seed discourse. *Discourse and Society*, doi: 10.1177/09579265211023234.
- Helmon, S. (2020). Tradisi Lisan Torok Sebagai Manifestasi Jati Diri Masyarakat Manggarai: Kajian Ekolinguistik Metaforis. Program Studi Bahasa Indonesia Program Magister ..., no. Query date: 2023-05-11 19:05:01, 2020.
- Herrmann-Pillath, C., Hiedanpää, J. and Soini, K. (2022). The co-evolutionary approach to nature-based solutions: A conceptual framework. *Nature-Based Solutions*, vol. 2, p. 100011, doi: 10.1016/j.nbsj.2022.100011.
- Kim, Y. S. and Oh, S.-Y. (2020). A Corpus-based Analysis of Collocations in Korean Middle and High School English Textbooks. *Lang. Res.*, vol. 56, no. 3, pp. 437–461, doi: 10.30961/lr.2020.56.3.437.
- Ndruru, F. (202). Ecolexicon of Gae in Nias Society. *Indonesian Ecolinguistics Journal*, no. Query date: 2023-05-11 19:05:01, 2022, [Online]. Available: <https://www.ojs.wahanapublikasi.com/index.php/iej/article/view/77>
- Ndruru, M. and Umiyati, M. (2017). Metaphorical lexicon in Maena lyrics of wedding in Nias: ecolinguistic study. *RETORIKA: Jurnal Ilmu Bahasa*, vol. 3, no. 2, Art. no. 2, doi: 10.22225/jr.3.2.339.281-289.
- Perangin-Angin, D. M., and Dewi, N. (2020). An ecolinguistic analysis of folksongs in endangered Pagu language. *SKASE Journal of Theoretical Linguistics*, vol. 17, no. 5, pp. 175–191.
- Poole, R. and Micalay-Hurtado, M. A. (2022). A corpus-assisted ecolinguistic analysis of the representations of tree/s and forest/s in US discourse from 1820-2019. *Applied Corpus Linguistics*, vol. 2, no. 3, p. 100036, doi: 10.1016/j.acorp.2022.100036.
- Poole, R. (2018). Ecolinguistics, GIS, and Corpus Linguistics for the Analysis of the Rosemont Copper Mine Debate. *Environmental Communication*, vol. 12, no. 4, pp. 525–540, doi: 10.1080/17524032.2016.1275735.
- Prihantoro, P. (2022). *Buku Referensi Pengantar Linguistik Korpus*. Semarang: Badan Penerbit Universitas Diponegoro.
- Rajandran, K. (2016). Corporate involvement brings environmental improvement: the language of disclosure in Malaysian CSR reports. *Social Responsibility Journal*, vol. 12, no. 1, pp. 130–146.

- Robinson, J., and Cole, R. J. (2015). Theoretical underpinnings of regenerative sustainability. *Building Research & Information*, vol. 43, no. 2, pp. 133–143, doi: 10.1080/09613218.2014.979082.
- Rychlý, P. (2008). A Lexicographer-Friendly Association Score. in Proceedings of Recent Advances in Slavonic Natural Language Processing, RASLAN. Brno: Masaryk University, pp. 6–9.
- S. Al-Maadeed, J. Alja'Am, B. Khalifa, and S. A. Elsaud, "MOALLEMCORPUS: A large-scale multimedia corpus for children education of Arabic vocabularies," presented at the IEEE Global Engineering Education Conference, EDUCON, 2021, pp. 885–890. doi: 10.1109/EDUCON46332.2021.9453983.
- Sanjaya, F. and Rahardi, R. (2021). Kajian Ekolinguistik Metaforis Nilai-Nilai Kearifan Lokal Upacara Pernikahan Adat Manggarai, Flores, Nusa Tenggara Timur. ... Pendidikan Bahasa dan Sastra Indonesia, no. Query date: 2023-05-11 19:05:01, [Online]. Available: <http://jurnal.ugj.ac.id/index.php/Deiksis/article/view/3283>
- Stibber, A. (2020). Ecolinguistics and economics: the power of language to build worlds. *WEA Commentaries*, vol. 10, no. 3, pp. 2–7.
- Walker, P. (2017). Sustainability: a discipline and a political agenda?. *Environmental Hazards*, vol. 16, no. 2, pp. 93–98, doi: 10.1080/17477891.2017.1296810.
- Yuniawan, T. (2018). Ecolinguistic study of conservation news texts in Indonesian mass media. *International Journal of Humanity Studies (IJHS)*, vol. 1, no. 2, Art. no. 2, doi: 10.24071/ijhs.v1i2.686.
- Zhou, W. (2021). Ecolinguistics: A half-century overview. *Journal of World Languages*, vol. 7, no. 3, pp. 461–486, doi: 10.1515/jwl-2021-0022.