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Ecolinguistics: Consolidating a research paradigm

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- to disseminate theoretically grounded research and advance knowledge pertaining to the field of Linguistics developed both in Russia and abroad;
- to publish results of original research on a broad range of interdisciplinary issues relating to language, culture, cognition and communication;
- to cover scholarly activities of the Russian and international academia.

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Журнал Russian Journal of Linguistics – периодическое международное рецензируемое научное издание в области междисциплинарных лингвистических исследований. Журнал является международным как по составу редакционной коллегии и экспертного совета, так и по авторам и тематике публикаций.

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- освещать научную деятельность как российского, так и международного научного сообщества.

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Introductory article / Вступительная статья

Ecolinguistics: Consolidating a research paradigm

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Abstract
As the ecological crisis facing our planet deepens, understanding the role of language in shaping perceptions and behaviour in relation to the environment becomes ever more critical. This special issue focuses on ecolinguistics, an interdisciplinary domain of linguistics that explores issues of ecological significance through the lens of language and its functioning. Although the field has a rather eclectic history with researchers invoking the term *ecolinguistics* in diverse spaces from language contact and language acquisition to language policy and bi/multilingualism, it now seems quite clear that contemporary ecolinguistics is most reflective of and aligned with a discourse analytic approach that examines language use in a variety of contexts with aims to either critique language use that perpetuates ecological degradation or elevate alternative language practices that contribute to wellbeing and sustainability. This introductory article overviews recent developments in the field and outlines the main directions of ecolinguistic studies, specifying the range of its methods and approaches. It then introduces the exemplary collection of articles in this special issue and highlights their contribution to ecolinguistics research. The challenges we face are global in nature, and the dialogue between Russian and Western scholars in this issue underscores the importance of collective action and shared knowledge in confronting the ecological crisis. It is hoped that this growing body of ecolinguistics research will deepen our mutual understanding of ecological discourse and inspire concrete initiatives in the direction of a more sustainable and resilient future and foster a united approach to the urgent ecological challenges of our time.
Key words: *ecological challenges, ecolinguistics, interdisciplinarity, environmental discourse, econarrative, discourse analysis*

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Эколингвистика: объединяя исследовательские парадигмы

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Аннотация
По мере углубления экологического кризиса, с которым сталкивается наша планета, роль понимания того, как язык формирует восприятие и поведение человека в отношении окружающей среды, становится особенно важной. Этот специальный выпуск посвящен эколингвистике — относительно новой междисциплинарной области лингвистики, которая изучает вопросы экологической значимости через призму языка и его функционирования. Данное направление имеет довольно эклектичную историю, и исследователи использовали термин «эколингвистика» в различных областях — от языковых контактов и освоения языка до языковой политики и би-/мультилингвизма. Однако сейчас представляется совершенно очевидным, что современная эколингвистика связана с дискурсивно-аналитическим подходом. Она исследует использование языка в различных контекстах с целью либо критиковать те дискурсивные практики, которые усугубляют экологическую деградацию, либо приветствовать альтернативные языковые практики, которые способствуют экологическому благополучию и устойчивости. В этой вступительной статье дается обзор последних достижений в области эколингвистики, выделяются основные направления исследований, уточняется спектр их методов и подходов. Она знакомит читателей со статьями этого номера, которые предлагают динамичные и многогранные взгляды на лингвистические аспекты экологических проблем, и подчеркивает их вклад в эколингвистические исследования. Проблемы, с которыми мы сталкиваемся, носят глобальный характер, и диалог между российскими и западными учеными в этом номере подчеркивает важность коллективных действий и совместных знаний в противостоянии экологическому кризису. Хочется надеяться, что растущий объем эколингвистических исследований углубит наше взаимопонимание в области экологического дискурса, вдохновит на конкретные инициативы в направлении более устойчивого и жизнестойкого будущего и будет способствовать единому подходу к решению неотложных экологических проблем современности.
Ключевые слова: *экологические вызовы, эколингвистика, междисциплинарность, экологический дискурс, эконарратив, дискурс-анализ*

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1. Introduction

Ecolinguistics is an interdisciplinary domain of inquiry that “explores the role of language in the life-sustaining interactions of humans, other species, and the physical environment” (International Ecolinguistics Association, n.d.). Though the field has a rather eclectic history with researchers invoking the term *ecolinguistics* in diverse spaces from language contact (Bastardas-Boada, 2017, Mufwene, 2001) and language acquisition (Lam & Kramsch, 2003, Leather & Van Dam, 2003) to language policy (Hornberger, 2003) and bi/multilingualism (Hornberger, 2002,

Phillipson & Skutnab-Kangas, 1996). And while ecolinguistics may continue to serve as an "umbrella term" for research in the aforementioned spaces and beyond (Fill, 2017, p. 2), it seems now quite clear that contemporary ecolinguistics is most reflective of and aligned with a discourse analytic approach that interrogates language use in myriad contexts with aims to either challenge and critique ways of speaking and being that perpetuate ecological degradation or extol and elevate alternative language practices that contribute to wellbeing, sustainability, and justice. This special issue reflects and contributes to the burgeoning growth and broadening international scope of the field in recent years.

2. Recent developments

This issue is an additional data point amongst many illustrating the vitality of ecolinguistics. Presently, the International Ecolinguistics Association (IEA) boasts approximately 1,300 members and the online course developed and administered by the IEA has had greater than 5,000 registered participants since its inception less than a decade ago. Further, the International Conference on Ecolinguistics recently convened its eight meeting with iterations in Odense, Denmark; Beijing, China; Graz, Austria; Liverpool, United Kingdom and with a ninth forthcoming in Rennes, France in 2026. These international events are supported by a growing international community of scholars and active regional organizations in China, Uruguay, Italy, Japan, Cameroon, and Brazil as well as partnerships with groups such as International Environmental Communication Association, the Centre for Human Interactivity at the University of Southern Denmark, the International Systemic Functional Linguistics Association, and numerous others. Perhaps this special issue will give rise to further development of ecolinguistics within Russia.

The growth of ecolinguistics reflected in the previous discussion is further illustrated in the increase in scholarly publications in recent years. While *Language & Ecology* has long been devoted to publishing research in the field, it has been joined by the *Journal of World Languages* which similarly focuses upon scholarship in ecolinguistics. In addition to regularly featuring articles on ecolinguistics, it also released three special issues from 2022 to 2024 (Chau & Jacobs 2022, Ponton 2024a; Virdis 2022a). Additional special issues in ecolinguistics have been published by the journals *Text & Talk* (Ponton & Sokół 2022), *Cogent Arts & Humanities* (Goatly 2024), *Languages* (Ponton 2024b), and *Language Sciences* (Steffensen & Fill 2014). Further, Bloomsbury Academic Publishing now supports the Advances in Ecolinguistics Series—at the time of this writing, the series includes ten books on a diverse range of topics with the most recent being "Ecolinguistics and Environment in Education: Language, Culture and Textual Analysis" (Bellewes 2024), "Exploring Ecolinguistics: Ecological Principles and Narrative Practices" (Ponton 2024c), and "Language as Ecological Phenomenon: Languaging and Bioecologies in Human-Environment Relationships" (Steffensen, Döring, & Cowley, 2024). With the forthcoming books

"How We Talk about Animals, and Why it Matters" (Sealey 2025) and "Ecolinguistics, Social Justice and Sustainability: Voices from the Global South" (Miless et al. 2025), the series' record of excellence will certainly continue. And while Routledge released the first handbook devoted to the field in 2018 (Fill & Penz 2018), a second handbook is forthcoming from Bloomsbury. This impressive publication record of the field is documented in the free, online, publicly-available Zotero bibliography maintained by the IEA—it now includes approximately 700 publications.

These developments are indeed laudable and the international community of ecolinguistics should be proud of their achievements in recent years to raise attention to various issues of ecological importance. However, and unfortunately, this growth seems inexorably and undoubtedly tethered to and prompted by our worsening ecological crisis. As the consequences of continued climate inaction are realized in ever more frequent and severe disasters, researchers across applied linguistics and a variety of other disciplinary orientations are increasingly compelled to utilize their expertise and devote their research agendas to efforts towards ecological wellbeing and the formation of sustainable and just futures. In the seminal essay from Michael Halliday (1990/2001), which is broadly recognized as the impetus for ecological discourse analysis, he closed with the assertion that ecological crises are "not just problems for the biologists and physicists" but rather are "problems for the applied linguistics community as well" (Halliday 1990/2001: 199). Though the broader applied linguistics community may have been somewhat slow to recognize this reality and heed this call to action, researchers are turning their gaze to language use and its role in mediating our perceptions of and shaping our actions toward the more than human world.

3. Ecolinguistics today

Halliday's groundbreaking essay (1990/2001) contributed significantly to the formation of ecolinguistics, but more recently, the influence of Arran Stibbe on the current state of the field has been unmatched as he has published multiple influential books and countless articles focused upon ecolinguistics. "The Handbook of Sustainable Literary" (2009) and "Animals Erased: Discourse, Ecology, and Reconnection with the Natural World" (2012) are both valued texts, but neither matches the profound influence that "Ecolinguistics: Language, Ecology and the Stories We Live By" (2015, 2020) had on the field. Providing a robust, unified, and comprehensive framework, he demonstrated how ecolinguistics could challenge the *stories-we-live-by* that exist and operate in the minds of individuals and across cultures which reflect, normalize, and (re)produce attitudes, beliefs, and practices that contribute to ecological degradation. Further, Stibbe illustrated how one must assert and acknowledge their individual ecosophy through which they may subsequently evaluate language use as beneficial, ambivalent, or destructive. More recently, Stibbe published "Econarrative: Ethics, Ecology, and the Search for New

Narratives to Live By" (2023). Forwarding a theory of econarrative, the book is poised to continue Stibbe's influence on research in contemporary ecolinguistics.

Research in contemporary ecolinguistics is pursued in a variety of sites and with a range of methods and approaches. Perhaps unsurprisingly, researchers frequently advance studies into discourses of climate change and the environment within media, political, religious, advocacy, and corporate discourses (e.g., Al-Shboul 2023, Angwah 2019, 2022, Bednarek et al. 2022, Castello & Gesuato 2019, Chen & Liu 2024, Cunningham et al. 2022, Doring & Rattner 2018, Fløttum et al. 2014, Fløttum & Dahl 2011, Gjesdal & Andersen 2023, Poole & Hayes 2022, Penz 2022, Wang & Liu 2024). An additional site of analysis concerns the representation of animals with studies exploring how the discursive framings of animals often function to minimize and obscure animal suffering and oppression while justifying their consumption (e.g., Arcari 2017, Brown 2018, 2022, Cook & Ancarno 2019, Forte 2015, 2020, Frayne 2019, Fusari 2018, Gilbert et al. 2024, McClaughlin et al. 2022, Sealey & Oakley 2013, Stibbe 2001, 2003, 2005, 2012, Zhdanava et al. 2021). Research in these spaces may share an interest in climate change discourse or animal representation yet this body of work is far from homogenous, as studies employ various qualitative and quantitative methods to explore language use in countless contexts from opinion-editorials, user comments, social media, political debates, corporate sustainability reports, animal industry texts, non-governmental organization reports, wildlife documentaries, and much more.

Though these domains of climate change discourse and animal representation are often interrogated, and rightly so, ecolinguistics has broadened its scope in recent years with researchers exploring an ever-expanding range of sites through an array of analytic approaches. One area gaining increased attention is English language education, as researchers explore whether ecologically harmful discourses are embedded in textbooks and learning materials in classrooms from Pakistan (Zahoor & Janjua 2020), the United Kingdom (Akcesme 2013), Jordan (Al-Jamal & Al-Omari 2014), Indonesia (Triyono, Sahayu & Fath 2023), to China (Wang & Zainal 2024)—perhaps most noteworthy of the research in this space is Goulah and Katunich's edited volume "TESOL and Sustainability: English Language Teaching in the Anthropocene" (2020) and Bellewes' detailed treatment of how ecolinguistics can contribute to sustainable education (2024). Other scholars have extended ecolinguistics to stylistics and the analysis of poetic and literary texts (Goatly 2017; Virdis 2022b, 2022c, 2024; Zhu et al. 2023), storytelling and its potential for ecological transformation (Hampton 2022; Nanson 2021), representations of nature and human engagement in/with the more than human world (Istianah et al. 2024; Istianah & Suhandano 2022; Ponton, 2023a, 2023b), as well as disaster discourse and the representations of events such as wildfires and hurricanes (Bednarek et al. 2022; Potts 2015; Poole 2022; Poole 2024).

Again, this is not an exhaustive accounting of the many spaces in which ecolinguistics is pursued, and readers desiring to explore further are encouraged to

visit the Zotero bibliography maintained by the IEA and also Steffensen's (2024) recent bibliometric analysis of ecolinguistics research in the *Journal of World Languages*.

4. Comments on the Special Issue

The growth and diversification of ecolinguistics in recent years is well displayed in this special issue. First, just as ecolinguistics has become an international endeavor, so too are the authors of this collection from diverse national contexts. Ecolinguistics has experienced extraordinary international growth, but evidence of its development in Russia is rather limited–this issue is poised to rectify this absence. Importantly, each of the studies probes important and diverse issues of ecological relevance through rigorous and innovative approaches. The first article from **Alexander** and **Ponton** continues the rich tradition of ecolinguistics of exploring greenwashing practices which function to obscure corporate responsibility for ecological degradation and minimize the impact of their actions while simultaneously promoting themselves as champions of sustainability. And while this first entry in the special issue conducts this critical analysis of the discourse of a particular oil corporation, **Bondi** and **Nocella** similarly interrogate corporate discourse but with their attention focused upon a rail company and the narratives of responsibility and sustainability which it produces. The innovation of the special issue is best demonstrated in articles from **Druzhinin** on entrapped cognition, **Frayne** on nonverbal communication in environmental discourse, and **LaParle** on generative conversation and embodied narratives. While the first contributes to the development of cognitive ecolinguistics and the challenges posed by entrapped cognition for realizing more sustainable ways of being, Frayne demonstrates the insights to be reached through the analysis of nonverbal communication in environmental discourse and LaParle highlights the possibilities for generative conversation as a means to counter climate fatalism and promote ecological hope. Continuing, **Filardo-Llamas** and **Pérez-Hernández** continue an emerging trend that seeks not to analyze discourse of immediate and obvious ecological relevance such as a sustainability report from a corporation or an assessment report from the Intergovernmental Panel on Climate Change but rather extends their focus to a space—cycling discourse—where ecologically-positive identities and their concomitant language practices might be identified and then promoted. An additional study from **Abbamonte** and **Hughes** contributes to the emerging sub-domain of corpus-assisted ecolinguistics in its diachronic analysis of the eco-keyword *solastalgia.* Notably, this study contributes also to the development of diachronic corpus-assisted studies as well. And while these articles reflect trends and interests of contemporary ecolinguistics, **Kravchenko** challenges us to re-imagine the language sciences and ecolinguistics and undertake a paradigm shift for theorizing language and languaging in ways which might help us probe more deeply into "the elusive nature of humanness."

5. In closing

In my view, this special issue makes a measurable and meaningful contribution to the continued development of ecolinguistics. Indeed, it represents the best characteristics of contemporary ecolinguistics for the studies perform essential critical analyses of discourses such as those from oil and rail industries that powerfully shape our worlds, contribute to the development of new lines of inquiry in cognitive ecolinguistics and nonverbal communication, applies corpus techniques for diachronic analysis of constructs of ecological relevance, and conducts positive discourse analysis in a space that to my knowledge has not yet been investigated. It achieves all of these goals while also challenging us to reflect deeply and carefully on the field and what it may yet become. I commend the editors of this volume for compiling such an eclectic, thoughtful, and innovative collection and applaud the authors for producing such high-quality research surely to inspire many in the ecolinguistics community.

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Роберт ПУЛ — доцент кафедры прикладной лингвистики и TESOL Университета Алабамы, США. В сферу его научных интересов входят корпусный дискурс-анализ, корпусная эколингвистика, устойчивое развитие языкового образования, использование корпусов в преподавании и изучении языка. Он является автором книги *Corpus-Assisted Ecolinguistics* (Bloomsbury Academic, 2022) и многочисленных статей в журналах *Applied Corpus Linguistics, Corpora, Journal of Corpora and Discourse Studies, Journal of World Languages* и др. В настоящее время является ведущим редактором «The Bloomsbury Handbook of Ecolinguistics», одновременно занимаясь исследованиями в области диахронической корпусной эколингвистики.
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Ecolinguistics: A paradigm shift

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Abstract
Unlike other modern sciences that have dramatically transformed our way of life over a historically short period of time, linguistics cannot boast of any serious achievements that affect our daily life. This raises the issue of practicality of linguistic theories and their applicability in our praxis of living. Confined to the methodologically erroneous and theoretically untenable framework based on the code model of language and communication, linguistics of the mainstream persists in viewing language as a cultural tool in the service of the mind rather than a biologically and ecologically functional feature of humans as a species. Reification of language precludes any productive theorizing about its nature and function, and the biological function of language and its role in the evolution of our species is ignored. Based on constructivist epistemology and the biology of language and cognition, the study explores how a systems approach to language as the cognitive domain of humans allows for a new conception of language as part of the organism-environment system in which the flow of linguistic interactions (languaging) within a community constitutes its ecological self-constructed niche (language) as a relational domain in which humans develop as living systems. It is argued that a systems approach used in theorizing language opens an entirely new horizon in the study of languaging and language as crucial biological and ecological factors that define the evolution of humans. A different set of core concepts in the study of language as the human praxis of living signals an ascending revolution in the language sciences and a paradigm shift to ecolinguistics — the study of language that addresses the question of what makes *Homo loquens* ecologically special, shedding light on the elusive nature of humanness.
Key words: *ecology, ecolinguistics, language, languaging, systems approach, organism-environment system*

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Эколингвистика: смена парадигмы

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Аннотация
В отличие от других современных наук, самым существенным образом изменивших наш образ жизни за исторически короткий период времени, лингвистика не может похвастать сколько-нибудь серьезными достижениями, повлиявшими на нашу повседневную жизнь. Это заставляет задаться вопросом о практичности лингвистических теорий и их применимости в нашей жизненной практике. Ограниченная методологически ошибочной и теоретически несостоятельной системой взглядов, основанной на кодовой модели языка и коммуникации, лингвистика мэйнстрима продолжает рассматривать язык как культурный инструмент на службе у разума, но не как биологически и экологически функциональную особенность человека как вида. Объективизация языка исключает какое-либо продуктивное теоретизирование о его природе и функции, при этом игнорируется биологическая функция языка и его роль в эволюции нашего вида. Основанный на конструктивистской эпистемологии и биологии языка и познания системный подход к языку как когнитивной области человека позволяет концептуально по-новому взглянуть на язык как часть системы организм–среда, в которой поток языковых взаимодействий (языковая деятельность) внутри сообщества образует его экологическую, им самим конструируемую нишу (язык) как реляционную область, в которой люди развиваются как живые системы. Приводятся доводы в пользу того, что теоретизирование языка с использованием системного подхода открывает совершенно иной горизонт в исследованиях языковой деятельности и языка как ключевых биологических и экологических факторов, определяющих эволюцию человека. Иной набор ключевых понятий в исследовании языка как жизненной практики человека указывает на начавшуюся революцию в науках о языке и смену парадигмы в сторону эколингвистики — такого изучения языка, при котором ставится вопрос о том, что делает «человека говорящего» экологически особенным, проливая свет на ускользающую от нас природу человечности.
Ключевые слова: *экология, эколингвистика, язык, языковая деятельность, системный подход, система организм–среда*

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1. Introduction

As a specific venue of research, ecolinguistics today is an established branch of linguistics[1], and the number of researchers interested in finding and exploring possible correlations between our daily linguistic practices and the alarmingly wide range of various ecological issues keeps growing. On the homepage of the *International Ecolinguistics Association* (http://ecolinguistics-association.org), ecolinguistics is defined as the exploration of "the role of language in the life-sustaining interactions of humans, other species and the physical environment"

[1] For a historical review, see (Couto 2014, Penz & Fill 2022).

with the primary aim "to develop linguistic theories which see humans not only as part of society, but also as part of the larger ecosystems that life depends on". However, the purport and the primary aim of ecolinguistics thus defined raise important questions about its epistemological and methodological foundations. For one thing, if ecolinguistics is seen as a branch of linguistics commonly defined as the scientific study of language as a principal means of human communication, and communication is viewed as a process of exchanging information, it is not clear how, if at all, language sustains life in interactions of humans with the physical environment, including other species. It is hard to imagine how the ability to talk affects, in a decisive way, the physiology of a human body and the bodily functions, neither do we exchange information (whatever it is) in linguistic communication with non-talking animals, let alone the physical environment. Moreover, since ecology is a branch of biology, "ecolinguistics" implies a specific focus on the relationship between languaging human organisms and their environment, and if it is just physical environment, it remains unclear what role and exactly how language plays in this relationship other than being a tool used, either constructively or destructively, in human interactions with the environment.

Another point of concern is the subject matter of "linguistic theories" to be developed in the framework of ecolinguistics, and the possible number of such theories. Is the subject matter of these theories language, humans, or both? If the latter, as the IAE definition suggests by appealing to larger ecosystems as compared with the ecosystems of human societies, then the nature of the ecosystem of a human society and its constitutive components should be explained, and the relationship between linguistics and biology clarified. As ecolinguistics doesn't seem to have a common agenda with the so-called "biolinguistics" (Jenkins 2000) propounding Chomskian idea of language as a mental organ, nor is its alleged relationship with biology clearly formulated, what the aforementioned "linguistic theories" are going to be about one can only guess. And how many linguistic theories should one expect to be developed within the framework of ecolinguistics as a branch of linguistics? A theory is a system of ideas intended to explain something; if there are several theories explaining the same thing, then there are several different explanations, and different explanations of the same thing indicate a general lack of understanding of the explained. This takes us to the question, "How well does (eco)linguistics understand its subject matter, language?" One might argue that, in science, pluralism is not a vice, but this brings up another question, "What is science for and what is the purpose of a scientific explanation?"

These and other related issues are in the focus of the discussion of what ecolinguistics is, what its relationship with linguistics is, and what it should be if it aspires to be a science. In what follows, I am going to briefly discuss the role of science in our life, the relationship of language to science, and the status of linguistics as a science as it was envisioned by Saussure. It will be argued that the empirical inadequacy of the epistemological and methodological implications inherent in the very term "linguistics" result in some unresolved core issues that

arise from adhering to the code model of language and communication still dominant in contemporary mainstream language studies (section 2). In section 3, this conceptual-theoretic error of linguistics, along with the reification of language as a communication tool, is shown to be a constitutive part of the objectivist epistemology incapable of shedding light on the biological nature of language and its function and its role in the developmental dynamics of human organism–environment systems from the point of view of evolution. It will be argued that, to make language studies a true science that can affect our praxis of living, a constructivist systems approach should be used along with a new perspective on the function and role of language in human society as a living system. In section 4, a critique of the current concept of ecolinguistics, as a branch of linguistics, and its research domain will be given, and some constructive steps offered to rid the concept of its metaphoric lining, specifically, by clearly and explicitly defining human ecology as the relationship between human organisms and their self-constructed environment, the semiosphere of language. This may serve as a basis for working out a scientific ecolinguistic agenda by identifying the range of issues that should be dealt with in theoretical ecolinguistics and applied ecolinguistics, respectively. It will be concluded, in section 5, that although contemporary ecolinguistic research comes short of becoming a new paradigm in the explorations of language, the prospects are good, and the language science is on the way to a revolution that is bound to change the established view of language, its nature and function, taking us closer to understanding the nature of humanness.

2. Science and linguistics

The role of science in the public eye is to learn something important about the way things are in this world, gaining knowledge that would — or so we believe — help us to better adapt to the world, making our life better. However, as a systemically organized quest for knowledge, science is power that allows humans to not just adapt to the world they inhabit, but to transform it in a radical way. Over the past hundred years or so the changes in our daily life, brought about by the stunning advances in technology, have been mind-boggling. What used to be just figments of sci-fi writers' imagination — videophones, pocket size computers, autonomous robots with AI, cloned organisms, etc., you just name it — has become part and parcel of our routine living in the brave new world we continuously reshape and remold to make our living more comfortable if not downright lazy.

The profound effects of fundamental research in the so-called "hard sciences" of physics and chemistry, geology and astronomy, biology and meteorology are obvious and undeniable. Dealing with tangibles, these sciences have great predictive power, facilitating new discoveries and inventions humans use to their benefit. When scientific knowledge no longer serves that purpose, it becomes questionable and eventually loses its value (Glasersfeld 1984). Compared to the hard sciences, the overall effect on our life of the "soft" sciences dealing with intangibles has been very modest, if not negligible. Although arguments have been

voiced against such a division of sciences on the grounds of their not differing much in general methodology and/or their cumulative effect (Hedges 1987), the difference in the magnitude of their impact on human life cannot be denied. Moreover, while the material aspects of our life have changed to such a degree that our adaptation to the physical conditions of the environment does not seem to be an existential issue anymore, the social dimension of our living as the subject area of the soft sciences has been very little understood despite all the efforts of scientists, remaining largely the kind of research that produces nothing but books instead of social benefit. Instead of minimizing frustrating social tensions and working towards a social harmony that would ensure sustainable global equilibrium, humanity as a whole continues its deplorable practice of ruining the delicate balance between nature and culture, oblivious of the fact that everything in the universe is connected with everything. This makes one wonder whether we really know what we are doing in our persistent attempts to conquer the material world and subdue Mother Nature in our blind desire for unconditional dominance in the world of the living. Do we really know what we are, and why we are what we are and do what we do? Where should our quest for knowledge begin to ensure that the great power we acquire over the world does not bring our own demise in the end?

A good way to start answering this question is to recall Socrates' philosophical commandment, "Know thyself". Paradoxically, all the knowledge of the world accumulated by humans notwithstanding, we do not even seem to begin to understand ourselves as the knowers, and admiring the tree of knowledge in the garden of our civilization we still do not understand where its roots go and how its fruit can best be used to sustain our civilization and keep it thriving (Maturana & Varela 1987). We owe this awkward situation to the deeply entrenched view that we are genetically endowed with supreme cognitive powers because of the kind of brain we have and its unsurpassed ability for abstract thought and reason. However, were that the case, would it not be natural to expect *Homo sapiens*, "wise man", to live up to the name, using wisdom as a guiding light in our living praxis? Where does science go wrong in its assessment of the nature of humanness as a phenomenon, and what needs to be done if we want to see the light at the end of the tunnel? Much of what makes the grand river of life into troubled waters threatening to wash us off our flimsy civilization raft comes from the failure of the soft sciences to understand the phenomenon of humanness scientifically, by using a systems approach. And the blame lies, above all, on linguistics as a self-defined science.

Although, as a term, *linguistics* appeared in mid-nineteenth century, it began to be used in the sense 'scientific study of language', acquiring the status of an academic discipline, in the first decades of the 20th century, mostly thanks to Saussure and his aspiration to make language studies a true science. The purpose of linguistics as it was envisioned by Saussure was to make the study of language, historically the domain of philology, a true empirical science with a well-defined object of study and a set of scientific (that is, objective) methods. The problem was that while other sciences had clearly identified observable phenomena as their

objects, it was not the case with language studies that lacked a scientific definition of language. Saussure attempted to make up for this by suggesting that language (*langue*) is a conventional semiotic (*semiological*) system with a signifying function manifested in speech (*parole*) as concrete instances of the use of language (including texts), and that linguistics as a science is the study of language as a semiotic system, a tool for the expression and exchange of meanings.

Over the past hundred years there have been changes in the focus of interest of linguistic research, from procedures for describing individual languages to the universal, defining properties of language; however, by and large the instrumentality of language as a specific mode of human communication has not been questioned. Viewed as a communication tool, language was, and still is, conceived as an object "out there", a social phenomenon within the speech community, a code made up of a system of signs (words as arbitrary pairings of form and meaning, or the lexicon) organized and used according to the underlying system of rules (grammar). Typically, language is analyzed on the levels of phonology, morphology, syntax, and semantics, and because the relationship between words and their meanings is arbitrary, such an analysis should follow the principle of synchrony, without taking the history of language into account. Thus, the main explanatory goal of (synchronic) linguistics is to account for the features of language as a communication tool, both structurally and functionally, by creating a theoretical framework and explaining the theoretical presuppositions of that framework (Rastall 2010).

In the currently established research paradigm, language has been mostly studied and explored as a system of signs "in itself and for itself", as a cultural tool used in communication to exchange thoughts (mental content). Viewing language as a kind of packaging for thoughts invented by the smart humans results in an inevitable inference that language is secondary to intelligence — a firmly established "scientific" belief similar to the pre-Copernican belief that the earth was the center of the universe. Failing to see language as part of the human bio-ecology (Cowley 2014) — species-specific interactional coordinated cooperative behavior with an adaptational (orientational) function — and reifying linguistic signs as independently existing material objects that contain meanings allegedly exchanged in communication, linguistics with its written language bias (Linell 2005) comes short of identifying its subject matter in a consistent and uncontroversial manner (Kravchenko 2008). Unable to make noticeable progress, it remains, at best, what Kuhn (1962) called a "pre-science", raising questions about the intellectual health of the discipline of linguistics (Yngve 1986), while some researchers go further and simply deny linguistics its status as a science (Finch 2003, Harris 2005). This poses the question of the relationship between science and language.

Language is prior to science. As was shown by Harris (2005), science itself is a construct of language because scientists impose their language on what they assume is there to be named by that language. Lavoisier (1789, 3d paragraph) argued that it is impossible to disassociate language from science or science from

language "because every natural science always involves three things: the sequence of phenomena on which the science is based; the abstract concepts which call these phenomena to mind; and the words in which the concepts are expressed. To call forth a concept a word is needed; to portray a phenomenon a concept is needed. All three mirror one and the same reality." This observation, that words, concepts, and phenomena, although interrelated, are separate object-like entities "out there", informs Cartesian dualist epistemology that underlies the methodology of mainstream linguistic research based on the assumption that the function of linguistic signs is to stand for, or represent, material entities, actions, ideas, and beliefs. This brings up the issue of the roots of our knowledge about what we believe exists in "external" reality: if words (linguistic signs) stand for something external to them, serving as special marks (names) of the various aspects of the world, how do we come to know that particular objects, actions, and ideas exist, in the first place? While our sensory experience of the material aspects of the environment lies at the basis of phenomenology, first-person experiences of thought, understanding, and appreciation of meaning do not have a sensory character, and the debate on whether there is a distinctive 'cognitive phenomenology', a kind of phenomenology that has cognitive or conceptual character, has not been settled (Bayne & Montague 2011).

Another unresolved issue arising from the representational theory of language as a symbolic system is the biological function of mental representations. Even if we assume that there is, indeed, mental content constituted by representations as images of external reality encoded by linguistic signs (ignoring, for the sake of the argument, the problem of the existence of concepts as part of this reality), and it is this mental content that humans exchange in linguistic communication, it remains unclear why and to what end such an exchange between humans as living organisms should take place. However, thoughts do not travel, and the code model of communication as exchange of linguistically encoded thoughts (information, knowledge) between the "sender" and the "receiver", or "telementation", has very little to do with science, constituting the language myth (Harris 1981). And this is the myth mainstream linguistics lives by. Prompted by common sense and sustained by formal education, it has been deeply engrained in our perception and interpretation of the relationship between language and the world, becoming an epistemological trap (Kravchenko 2016a).

As a system of knowledge of the world obtained, first and foremost, through observation and expressed in language, science pivots on the crucial concept of observer and an understanding that there are no observations independent of observers describing the world: "The logic of the world is the logic of the description of the world" (Segal 1986: 4). Because observation is always subject-dependent, scientific arguments cannot be validated on the assumption that objects exist independent of the observer. As was emphasized by Piaget (1976: 13), knowledge arises neither from objects nor from the subject, but from interactions between the subject and those objects, and objectivity is in no way an initial property. In other words, knowledge is not a substance used as a commodity, it is

"the process that integrates past and present experiences to form new activities as nervous activity perceived either internally as thought and will or externally as speech and movement" (Foerster 1981: 194).

When we as observers attempt to describe and explain a particular aspect of our existence in the world, we must not forget that both the world and the observer arise in language (Maturana 1988); therefore, language constrains how we perceive, think, and act. Language is not a mirror-like tool that allows scientists to see the image of the world. As Foerster (2002: 71) put it, the world is "an image of language. Language comes First, and the world is a consequence of it". The notion of objective reality is generated by denotative language (Midgley 1986: 151, Segal 1986: 8), and because "everything said is said by an observer to another observer" (Maturana 1970), to understand the world we must understand language and the epistemological constraints it puts on our cognitive ability. To get out of this trap, a conceptual jump is needed: rather than viewed as a tool in the service of the mind, language should be reconceptualized in the framework of general systems theory, as the operational mode of humans living in language as their cognitive domain. This was done by Humberto Maturana (1978, 1988) in his seminal work on the biology of language and the role of the observer in understanding the nature of humanness. Maturana's constructivist epistemology is a good theoretical foundation on which a true language science could be built (Raimondi 2019, Kravchenko 2022a). This requires a change of perspective on language as part of the dynamics of humans as organism-environment systems.

3. From the pre-science of linguistics to a language science: changing the perspective

Various authoritative online resources, such as *Encyclopedia Britannica, Merriam-Webster Dictionary, Oxford English Dictionary* etc., define linguistics as the study of language and its units, and language as a system of symbols used by humans in communication as exchange of information. However, loaded at its very inception with a host of unsubstantiated assumptions about the nature and function of language, the notion of linguistics as a science bears the birthmark of structuralism, including the view of language as an abstract system underlying communication (speech). As argued by Yngve (1986), thus understood, language as the object of study is created by a certain point of view not supported by empirical evidence, and the goal of linguistics as a science is, therefore, incompatible with the goal of studying language.

Methodologically, identification of the function of language with communication as exchange of information is the cornerstone of contemporary linguistic orthodoxy [2] and the root of all trouble with disparate theoretical

[2] I am aware that there is a host of various views on language circulating in the academia that began to arise decades ago, when the conceptual-theoretic limitations of Saussurean linguistics became more and more obvious. However, these ideas have not gained enough momentum to replace structuralism as the "normal science", and the name "contemporary linguistic orthodoxy" refers to

frameworks constitutive of modern linguistic theory that is, in fact, an assortment of various, often incompatible points of view (Koshelev 2019). All living organisms communicate; biologically, communication is "the action on the part of one organism (or cell) that alters the probability pattern of behavior in another organism (or cell) in a fashion adaptive to either one or both of the participants" (Wilson 1975: 176). Communication is part of the adaptation mechanism of everything living, and to identify it with language is to make a category mistake: while any linguistic interaction between humans is communication in the biological sense, not any instance of communication between organisms is language. With its focus on linguistic signs as a denotational symbolic system used in an instrumental function, mainstream linguistics reifies language as part of "external" reality, failing to see the biological centrality of talk in understanding humans (Jennings & Thompson 2012) and acknowledge that language is our Rubicon that other animals cannot cross (Müller 1861: 340).

Interestingly enough, a commonly stated aim of linguistics is "to define the notion of 'human language'" (Crystal 2019: 351). However, the very phrase "human language" implies the existence of "non-human language", and some researchers promote the idea of continuity between animal and human behavioral capacities, including communication, and cognitive powers (Savage-Rumbaugh & Lewin 1994). The institutionalized instrumental view of language as something external to human organisms is responsible for the recklessness with which it is used: because the objective world appears as independent of what we as cognizers think and say about it, and because we think that language is used to represent (denote) external reality, we can use this denotational tool in any good old way we choose because — or so we believe — what we do in and with language does not affect the way things are in reality. However, not only can we *do* things with words, but we can also *make* things with words (Kravchenko 2024a), thereby bringing new objects into the world as "objectivity with parentheses" (Maturana 1988) that begin to affect our ability to orient others and self in this world because of its forever growing complexity. Such an understanding comes with a systems approach to language as our cognitive domain. A change of perspective is needed to begin to see that objectivity is what the language we speak, our "house of being" (Heidegger 1978), allows us to see. And what we see, how far and how deep our gaze can go, is constrained by the architectural design of our very home, that is, language in which we arise as observers.

As was noted by Whorf (1956: 214), "all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated". Ontogenetically, similar linguistic backgrounds are the result of a history of fine structural coupling of individual humans with their environment, when a human organism forms a

the general body of knowledge that informs the public attitude to daily social practices constituted, primarily, by linguistic interactions, or discourse (the "use" of language, both spoken and written, in communication in specific social contexts) — such as education and mass media responsible for maintaining the currently established worldview.

dynamical system with its ecological niche constituted, first and foremost, by a community of languaging observers in a consensual domain of interlocked conducts, that is, the relational domain of language. Developmentally, it is not as if prelinguistic but already thinking humans first acquired knowledge about the "objective" reality and then language as a tool for processing this knowledge: "Thinking and language belong together. A child learns a language in such a way that it suddenly begins to think in it" (Wittgenstein 1975: 5). Because "all doing is knowing, and all knowing is doing" (Maturana & Varela 1987: 248), the established view of the world as self-contained "objectivity" is nothing more than a distorted picture that we are allowed to see from our epistemological trap. The co-evolution of language and the brain (Deacon 1997) is the core aspect in understanding the developmental dynamics of human organism–environment systems as units of interactions with the medium that contains these systems — language, the human cognitive/existential domain .

As observers, we live in a world constructed in language through the fundamental operation of distinction, the specification of an entity operationally cleaved from a background:

> [T]hat which results from an operation of distinction and can thus be distinguished, is a thing with the properties that the operation of distinction specifies, and which exists in the space that these properties establish. Reality, therefore, is the domain of things, and, in this sense, that which can be distinguished is real. Thus stated, there is no question about what reality is: It is a domain specified by the operations of the observer (Maturana 1978: 55).

The properties of a thing specified by an operation of distinction form a concept — a dynamic neuronal structure or mental representation (state of relative neuronal activity) caused by the organism's experience of external or internal interactions and "grasped" by the word/name (that is, by its mental representation in the above sense). And our belief, largely instilled by linguists, that words are objects in the world, is at the root of our belief in "objectivity without parentheses":

> "Once a concept is constructed, it is immediately externalized so that it appears to the subject as a perceptually given property of the object and independent of the subject's own mental activity. The tendency of mental activities to become automatized and for their results to be perceived as external to the subject is what leads to the conviction that there is a reality independent of thought" (Elkind 1958: xi–xii).

However, because everything said is said by an observer to another observer, there are as many realities as kinds of distinctions the observer performs (Maturana 1988: 11). These realities are established through evidence of a second observer: "Reality is that which can be witnessed: hence, rests on knowledge that can be shared, that is, "together-knowledge", or *con-scientia*" (Foerster 1966: 4). Depending on the stance taken by a particular observer with regard to language—whether it is seen as evolutionarily preceding or following sapience—the distinctions he makes may affect the entire architecture of the universe as his "house

of being" constructed as an image of language witnessed by another observer. This raises two interrelated questions important for understanding why linguistics remains a pre-science and what steps must be taken to change this dismal situation: (1) How is "together-knowledge" achieved in general? (2) How can it be achieved with regard to language as the object of scientific explorations? Coherent answers to these questions are impossible without moving the focus of research from linguistic "objects" to interacting human organisms (Yngve 1986). Interacting human organisms are living systems, and their interactions are mostly linguistic interactions — coordinations of coordinations of behavior in a consensual domain. If we want to understand language and explain its nature and function, we must approach it as a biological phenomenon, and "nothing in biology makes sense except in the light of evolution" (Dobzhansky 1973).

Evolutionarily, language is an extension of the human sensorium:

> The response to things through the intermediacy of signs is […] biologically a continuation of the same process in which the distance senses have taken precedence over the contact senses in the control of conduct in higher animal forms; such animals through sight, hearing, and smell are already responding to distant parts of the environment through certain properties of objects functioning as signs of other properties. This process of taking account of a constantly more remote environment is simply continued in the complex processes of semiosis made possible by language, the object taken account of no longer needing to be perceptually present. (Morris 1938: 32)

The senses in higher animals help them to orient in their adaptive interactions with the environment; therefore, biologically, the function of natural language is *orientational*. For the species *Homo sapiens*, the ability, through linguistic semiosis, to take account of perceptually absent objects in controlling their interactions with the world becomes, to use Bateson's (1972) catchphrase, "a difference which makes a difference", setting humans apart in the world of the living as talking animals, *Homo loquens*. Therefore, if we want to come up with a scientific explanation of language, we must approach it and describe it as species-specific interactional semiotic activity with a biological (orientational) function.

It should be noted that such an understanding of the function of language is not similar to the function of language in systemic functional linguistics. For Halliday (2003), all languages have evolved to serve three interwoven metafunctions, ideational (meaning making), interpersonal (linguistic enactment of interpersonal relations), and textual (a distinct mode of meaning responsible for managing the flow of discourse); these metafunctions are mapped onto the information structure of the clause as the object of linguistic analysis ("information is made of language" — Halliday 2001: 191) that aims to explain the organization of the semantic system of language as a social semiotic system. The view of language as a network of interrelated sets of options for making meaning and information conveyed in messages bears the birthmark of linguistics as an objectivist science with all the inherent implications, particularly, the assumption of rationalist epistemology that sapience evolutionarily precedes language. By contrast, an

understanding that the biological function of language is to orient others and self in adaptational interactions with the environment marks an epistemologically novel approach to the evolution of language, mind and consciousness. Such an understanding comes with the integration of scientific semiotics with Maturana's constructivist ontology and helps us to arrive at a holistic view of language. However, the way to a holistic view of language is handicapped by our failure to understand the subject-dependent nature of science as a cognitive domain defined by descriptions that researchers make in language as observers. This cannot but tell on the adequacy of scientific theories, and the mainstream theory of language as a system of signs used in an instrumental function is no exception.

Maturana's systems approach has two epistemologically important implications: (i) the system becomes defined by the organization that it conserves rather than the structures through which that organization is instantiated and the functions that we ascribe to those structures, and (ii) a "double view of systems" is needed, when any system is described simultaneously in two separate non-intersecting domains, one operational (system as a collection of components) and the other phenomenological (system as a singular entity in interaction with a medium which contains the system and makes it possible). Viewed as a (social) living system, a human organism is a unit of interactions that exists in the niche as that part of the environment (including other humans) with which it interacts and which it specifies. Because these interactions are, first and foremost, linguistic interactions (languaging), they become the defining feature of the system's organization that the system (a community of languaging humans) conserves. Thus, the call to study language "in itself and for itself" is, strictly speaking, unscientific.

Neither can mainstream linguistics see the conceptual difference between language viewed as a structured system of tangible objects — vocalizations (signs as unities of form and meaning) — produced by human organisms (language system as a collection of components), and language as a manner of living of human organisms in recurrent interactions with their self-constructed medium, the relational domain of coordinations of coordinations of consensual behaviors, or, languaging (human living system as a singular entity described in the phenomenological domain). As collections of structural elements, languages may be very different, yet these differences do not specify languaging as orientational behavior that helps conserve the system's organization. And because orthodox linguistics describes language mainly in the first domain, the established view of the function of language (transfer of information via linguistic sign vehicles) is far from being adequate, much less scientific. A scientific description of language is impossible if the phenomenal domain is ignored, in which the system (an individual human) is viewed as a singular entity, a unit of interactions with the medium (a community of talking humans) that contains the system and makes it possible. Such a view takes us to the realm of human ecology and informs a systemic approach to language as a crucial ecological factor in human evolution (Kravchenko 2021). As was argued in (Kravchenko 2020), organisms as living systems do not exist in a vacuum but form a functional unity with their immediate environment, or an

organism-environment system (Järvilehto 1998), and because language is not an artifact used as a tool in human interactions with their environment but biologically functional behavior that defines the organization of the human organism-environment system, to become a true science linguistic explorations need a radically new perspective on the function and role of language in human society as a living system.

4. Ecolinguistics: defining the agenda

Such a change of perspective characterizes, to a certain extent, *ecolinguistics* as an emerging new paradigm in the scientific explorations of language (https://en.wikipedia.org/wiki/Ecolinguistics). However, it is not enough to proclaim something a new paradigm to really make it so; a new paradigm replaces what used to be "normal" science, and if this does not happen (and it hasn't yet), any talk of a new paradigm is premature. In its current, largely underspecified metaphorical use, "ecolinguistics" serves as a cover term for various venues of research concerned with the role of language in addressing, discussing, and finding possible solutions to ecological issues (Fill & Penz 2018). In this, it remains largely Haugenian ecolinguistics (Haugen 1972), a methodologically inconsistent venue of research because of the implicit biomorphic metaphor, the language myth, and indiscrimination between the two different approaches to language known as cognitive internalism and cognitive externalism (Kravchenko 2022a: 32) — in other words, all the ungrounded epistemological assumptions implicit in the very term "linguistics".

From contemporary ecolinguistic research one can learn, for example, that "central to ecolinguistics […] are the core concepts of language, the environment, and the *interaction between them*" (Zhou 2017: 125, emphasis added). Haugen's idea that a natural language interacts with its environment was also shared by Halliday (2001: 195), and is reiterated, for example, in *The International Encyclopedia of Linguistic Anthropology* (Stanlaw 2021), where ecolinguistics is defined as a "subfield of language scholarship which takes into account the physical and social ecological context in which language operates, and in turn, how language and discourse affect the environment and ecology". However, language is not an agent-like entity that 'interacts' with, or operates in, the environment, much less affects it; it is humans that do. Neither does it make much sense to speak of the 'relationship' between language and the environment, unless we subscribe to the biomorphic metaphor "LANGUAGE IS A NATURAL ORGANISM", forgetting Haeckel's (1866) definition of "ecology" as the relationship of particular organisms with their particular environment. Therefore, to avoid the metaphor becoming a theory, ecologically oriented research must focus on defining language as a whole, and this is possible only by using a systems approach to language as a *biological feature* of our species, by treating languages as *integral* to living and the ecology (Steffensen, Döring & Cowley 2024: 5), as the organizational principle of the human organism-environment systems as living (cognitive) systems.

This poses the question whether the term "ecolinguistics" should continue to be used in its current sense, "a branch of (traditional) linguistics", or as a general name for the new science of language grounded in constructivist, rather than rationalist, epistemology. In the latter case, a clear distinction should be made between the range of issues that form the theoretical fundaments of the ecologically oriented language science, or *theoretical ecolinguistics*, and the broad range of ecological problems facing the humankind that could be effectively resolved by utilizing the theoretical principles, or the domain of *applied ecolinguistics*. Understandably, the ability of applied ecolinguistics to bear fruit and transform our praxis of living to the better by eliminating the clear and present danger of global ecological disaster will depend on the epistemological consistency and explanatory clarity of the principles of theoretical ecolinguistics. Remarkably, Halliday's influential 1990 talk "New ways of meaning: The challenge to applied linguistics" (Halliday 2001), in which the ecologically potent use of language as a system of constructing experience of the world was emphasized, was a resolute step towards reconceptualizing the role of language in our life. Continuing the Whorfian tradition and stressing how our world view is constructed by language, he outlined three problematic spheres for a new applied linguistics (what I would call "applied *eco*linguistics"): language planning, the register of scientific discourse, and of language and prejudice, involving the deployment of resources within the system that constructs sexism, racism, growthism and classism. However, because Halliday did not address the function of language as a biological phenomenon that played a crucial role in the evolution of our species, becoming our operational mode of living in the recursive flow of consensual coordinations of coordinations of behavior, his rallying cry to change the "tactics" of linguistic research was not backed up by a well-developed new "strategy". And this is the major problem with the contemporary ecolinguistic movement as a whole, largely confined to the SFL and CDA frameworks (Law & Matthiessen 2023).

Notably, the emergence of ecolinguistics, while being a step forward in bridging the gap between linguistics and life sciences, does not signal a radical conceptual departure from the established view of language as a code (Kravchenko 2016b). As Steffensen & Baggs (2024: 75) observe, "ecolinguistics has adopted its linguistic toolbox from twentieth-century linguistic methodologies which rest upon the view that the foundational function of language is to transmute mental representations into publicly shareable (vocal or graphic) meaning-bearing symbolic structures", and the 'conduit metaphor' continues to underpin the majority of ecolinguistic writings (Mühlhäusler 2019), sustaining the externalist account of language. For example, Steffensen, Döring and Cowley (2024: 1) argue that activities involving language are ecological and that much is masked by the verbal focus of linguistic theories. However, when one starts speaking of "human activities involving language", the implication is that there may be human activities that do not involve language, and this is possible only if language is viewed as something external to human organisms as living systems. This takes us back to the question of the nature of humanness and the language-mind relationship, without a clear prospect of finding a resolution acceptable both theoretically and empirically.

On the one hand, speaking of the role of language in life-sustaining interactions makes sense only if there is an adequate understanding of the biological mechanism of life-sustaining processes in general. If, indeed, linguistic interactions sustain human life, an explanation is required of what and how actually happens in the world of the living that allows us to speak of human life as essentially different from all other life-forms, such as the great apes, for example. There is a necessity to address the question of the biological function of language — something that ecolinguistics in its current guise seems unwilling or unprepared to do. On the other hand, without understanding the biosocial function of language one cannot hope to approach it holistically, taking into account all the intricate relationships between humans and their environment viewed as an integral whole, an organism-environment system. As observed by Mühlhäusler (2019: 20), "it may be desirable to have a holistic approach, but in the absence of any clear understanding what the whole actually is, the best we can do is to enlarge the number of parameters we consider — an indefinitely large number, many of them beyond our comprehension". Regretfully, this is precisely what seems to inform much of ecolinguistic discourse, showing "a discrepancy between what ecolinguistics wants to be and what it actually is" (ibid.: 18).

To give more impetus to the already started process of reconceptualizing language as a scientific object of study approached holistically, it is not enough to view language as multi-scalar dialogical activity distributed over space-time (Cowley 2014, Hodges 2014), as something that extends the human ecology (Steffensen 2011); ecolinguistics must address the question of what makes *Homo sapiens* ecologically special (Kravchenko 2024b), or how human ecology is different from non-human ecologies, because "neither genes nor culture, singly, can account for what […] makes humans different from other species" (Sinha 2009: 291). This is possible only if the concept of human ecology is clearly and explicitly defined — specifically, the human environment must be identified as that which makes our species so unique. This was done by Lotman (1990) who introduced the concept of semiosphere as the constructed meaningful environment reproduced from generation to generation with the human organism itself. And the core part of this environment is the relational domain of language that characterizes and conserves the organization of human communities as living systems. This resonates with Piaget's insight (1976: 15) that "[t]he living organism itself is not a mere mirror image of the properties of its environment. It evolves a *structure* which is reconstructed step by step in the course of epigenesis, and which is not entirely preformed" (emphasis in original. — *A.K.*).

The uniqueness of the human organism-environment system lies in language as a cognitive niche of the community of humans speaking the same language. It is this niche in which humans 'happen' as living systems: the ability to talk distinguishes human agents from non-human agents, it is a biological adaptation responsible for making us not only ecologically special but what we really are, *Homo sapiens sapiens*. To ignore the biological groundedness of human societies in language as that which organizes and conserves them as living systems, is to

overlook the obvious, that human society in general is an *ecological phenomenon*. To avoid becoming just another fashionable venue of research within the pre-science of linguistics, falling in line with socio-, psycho-, ethno-, bio-, neuro- etc. linguistics, ecolinguistics must clearly and *non-metaphorically* define its agenda as a science, that is, something that can help us understand our place and role in the world of the living better. Such a tentative agenda has been outlined in (Kravchenko 2022a) and includes issues that fall into three main categories: methodological issues, conceptual-theoretic fundaments, and applied tasks.

Methodologically, to come up with a coherent answer to the question of what and why should be the object of the ecologically oriented language science, linguistic research should focus on the biology of language and cognition as a non-dualist (constructivist) epistemological framework, using a systems approach that synthesizes scientific knowledge across various disciplines bearing on particular aspects of humanness, such as evolutionary biology, (bio)semiotics, interaction studies, cognitive psychology, neuroscience, etc. Applied consistently and unwaveringly, such a methodology will allow language scientists to formulate the *conceptual-theoretic fundaments* of the ecologically oriented language science in the form of coherent answers to questions about the subject matter of linguistic research, such as: What is languaging as uniquely human behavior? What is the role of language in defining and sustaining the human organism–environment system? What is the role of language in human ontogeny and phylogeny? What bio-ecological mechanism makes abstract thought possible? Answers to these and other related questions should *inform the social praxis of humans* in solving applied tasks, with a special emphasis on the ideology of education (Kravchenko 2016c), which must be divorced from the socially destructive code model of language and given back its original purpose — to bring out the potential of the human self that arises, together with the world, in the cognitive domain of language as the source of humanness.

5. Conclusion: What's next?

In science, a change of paradigm is a revolution (Kuhn 1962) — "a great change in conditions, ways of working, beliefs, etc. that affects large numbers of people" (www.oxfordlearnersdictionaries.com). The advent of Saussure's structuralism as a unified theory in linguistic research was such a revolution in the 20th century, and the scale and magnitude of its effect on the "soft" sciences and, understandably, on much of social practices, first and foremost in education, is yet to be assessed and evaluated. It is often claimed that there was another, "cognitive" revolution in the soft sciences (Gardner 1985) that marked the emergence of "cognitive" linguistics as an interdisciplinary research project aimed at understanding the mind through the study of the role of language in cognition. However, despite the progress in its conceptual-theoretic development from first-generation (disembodied) cognitive science to the embodied, and then the enacted cognitive science, cognitive linguistics still may not be described as a unified theory; it is "a flexible framework rather than a single theory of language"

(Geeraerts 2006: 2), comprising various strands in contemporary research. As such, these strands may be compared, metaphorically, to crafty tactics in the absence of a general strategy (Kravchenko 2022b: 64), and without a well-defined strategy any revolution is doomed from the start.

Are there grounds to believe that ecolinguistics can bring about a revolution in the language sciences that would affect humanity by dramatically changing our beliefs and social practices, bringing hopes for a better, more balanced and harmonious world for everything living? I am certain that a paradigm shift signaled by the change of perspective in the study of language is not just imminent, it's been long overdue. Moreover, not only is it possible, but it is also inevitable, if we are determined to do our best to sustain all life on Earth. It is our responsibility as the key species in the world of the living. This simple truth will dawn on us if we take a view of language based, not on a metaphor (either biomorphic or instrumental), but on an understanding that language is a crucial functional feature of humans as a species biologically, ecologically, and evolutionarily. Ecolinguistics is not about language and ecology. It is about the origin and nature of humanness.

However, from nothing comes nothing. To facilitate the slow process of abandoning the time-old beliefs and misconceptions about language to which linguistic research has been held hostage far too long, a consorted effort should be taken by the community of ecologically oriented language scientists to show, clearly and convincingly, what is wrong with linguistics as the "normal" science and why it has been unable to affect, in any noticeable way, the human praxis of living, failing to meet the standard criteria for theory adequacy — accuracy, consistency, scope, simplicity, and fruitfulness (Kuhn 1977: 321ff). The road to new knowledge and a new worldview may be long and winding, and it is going to take time. But ecologically minded language scientists must not be discouraged, because only the one who walks will master the road. And the road itself is created through walking.

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Language, nature and entrapped cognition

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Abstract
As a subfield of ecolinguistics, cognitive ecolinguistics is concerned with the impact of language and cognition on our way and quality of life by approaching language as a medium in and off which a human lives, with which she operates. This paper focuses on linguistically traceable patterns of knowing (perception and thought) that have negative environmental outcomes. It argues that these patterns result from what I call 'entrapped cognition' — a human-specific mode of cognition when ways of knowing naturally supersede the known, but at the same time, unnaturally reduce adaptivity to the changing environmental conditions. The study aims to prove that cognitive entrapment is not the fault of the brain or body or environment alone, but rather our brain-body-environment engagement that we harness in and through language. To achieve this aim, I bring methods of systems thinking along to cognitive ecolinguistics and describe four major factors that account for entrapped cognition: a constraint on human agency that creates an illusion of control; the derivative structure of cognition whereby one deals with novelties through older ways of understanding; the observer fallacy by which one phenomenological experience, although occurring post factum, is taken to explain another in hindsight; the confusion of orders of abstraction in understanding experiences due to the 'sameness' of linguistic form. An investigation of entrapped cognition in discursive practices reveals four patterns of understanding: traps of allness, stillness, symmetry and sameness. All these ways of cognitive entrapment pose ecological dangers for human flourishing and a healthy, sustainable development of the environment.
Key words: *ecosystem engineering, human agency, languaging, cognitive ecology, cognitive system, semiotic modeling*

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Язык, природа и ловушки познания

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Аннотация
Когнитивная эколингвистика, являющаяся подобластью эколингвистики, занимается изучением влияния языка и познания на наш образ жизни и ее качество, рассматривая язык как среду, в которой живет человек и с которой он вступает в физическое, операционное и эмоциональное взаимодействие. В данной статье анализируются лингвистически определяемые паттерны познания (т.е. восприятия и мышления), которые оказывают пагубное влияние на окружающую социальную, природную и материальную среду. Данные паттерны являются результатом «ловушек познания», т.е. специфичной для биологического вида человека познавательной деятельности, в ходе которой естественным образом происходит замещение познаваемого способами познания, однако при этом неестественным образом снижается адаптивность к меняющимся условиям окружающей среды. Цель статьи — доказать, что ловушки познания обусловлены не столько особенностями мозга, тела или окружающей среды человека, сколько взаимодействием этих трех компонентов когнитивной системы, которое осуществляется посредством и внутри языка. Для достижения данной цели используются методы системного мышления в рамках когнитивной эколингвистики и описываются основные факторы ловушек познания: социокультурные ограничения, создающие иллюзию контроля; деривативная структура когниции и склонность полагаться на прежний опыт при взаимодействии с новым; иллюзия наблюдателя и феноменологическая подмена процесса его результатом; смешение уровней абстракции в процессе осмысления опыта из-за идентичности языковой формы. Выделяются четыре типа ловушек познания: ловушка «всещности», ловушка одинаковости, ловушка симметрии и ловушка статичности. Данные ловушки представляют существенную экологическую угрозу для человека, а также здоровью и устойчивому развитию окружающей среды.
Ключевые слова: *эдификация, человеческая агентивность, ориентирующее взаимодействие, когнитивная экология, когнитивная система, семиотическое моделирование*

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1. Introduction

Is language eco-friendly? In addressing this question, one will probably recognize its figurativeness as language proper cannot be either eco-friendly or not — human practices can. It is commonly believed that physically, not linguistically, we can and should be effective in working for life-sustaining relations. Yet, language can be linked to ecology by a more meaningful relationship. Our attitudes to the nature of the human and more-than-human world depends on the language we use. This use and its environmental consequences became a

subject-matter of natural ecolinguistic and econarrative studies (Chawla 2001, Schultz 2001, Ponton 2023, Stibbe 2024).

However, there is more than just language use in how we treat life and environmental conditions. As living beings, we are not placed into our environment and given the task of treating it in a certain way, we find ourselves in and of nature (Johnson & Shulkin 2023) and come to know it by means of engaging (with) it the way this (or better, our) nature affords. The role that language plays on such a deeper, experiential level of acting on, in and with nature has become central to cognitive ecolinguistics (Steffensen 2008). This subfield of ecolinguistics builds on a third-generation of cognitive science inspired by Gregory Bateson's ecological epistemology (1972) and James Gibson's ecological psychology (1979). It approaches language as a *cognitive extension* (and even a distribution (Thibault 2021)), rather than a mere description, of life and a lived world. This, in turn, takes cognition one step further than knowing. Cognition is a system, life-sustaining process that binds bodies, brains and extracorporeal environment linked together in a functional systemic whole. Meaning that humans construct in this ecology of life (or cognition) is a mesh of material and biotic, bodily and environmental, natural and artificial factors (Steffensen & Fill 2014, Cowley & Gahrn-Andersen 2022, Cowley 2021, 2024a, 2024b, Kravchenko 2024a).

Yet, why can our language and cognition be destructive? Why do people die by suicides and engage in mass psychosis, wage wars and escalate ecological crisis? In this paper, I will attempt to answer these questions by focusing on the environmentally damaging and destructive effects of human cognition that are perpetuated through and in linguistic practices. I aim to trace the roots of this ecological inadequacy of cognition to neither precarious environment nor any neurological or bodily pathology, but rather to how our bodily doings enable patterns of knowing (or, in a broader cognitive sense, patterns of perception and thought) that may be dangerously incompatible with the (un)known. To achieve this aim, I will elaborate on how language gives rise to cognitive entrapment, what theories account for entrapped cognition as well as outline four main cognitive traps rooted in language.

2. Rise of entrapped cognition

2.1. Language in and of nature

Over the past century, across multiple scientific disciplines (cf. Knyazeva 2023), it has been demonstrated that animals and human beings share some basic means of ecosystem engineering. They shape their surrounding world by means of their actions and come to live in and through what they do. Drawing on their bodily resources, living creatures create and navigate their place of living (niche) to be who (and what) they are. The environment which situates an organism extends the organism, its needs and their satisfaction, just as, of course, the organism is part of the environment's affordable resources and situated domains (Johnson & Shulkin

2023). Along these ecological lines, a living being is integrated with its medium that can be understood both as a means by which a life is lived and as a habitat in which the life is lived. Given that a human's body is linguistic (Di Paolo 2021), the medium off and in which it lives must also be linguistic. Indeed, without these consistent relations we humans would lack the environmental affordances to understand ourselves and our surroundings in ways that enable us to become both who and where we are.

Such a natural integration, meshing, or conflation of the where, who and how can be described in terms of *modeling* (Yu 2021) — an ecosystemic process that marks all living beings and in humans enables linguistic construction of a habitat. Modeling occurs on multiple levels of organization of life, from cellular to semiotic. Its most important feature is that it has an adaptive function for a living being who does not need to go beyond its biological capacity to act in sync with the environment because the environment becomes an appropriated version of what the living creature can do as well as what these doings lead to. This type of the organism-environment symbiosis can be called *supersession*:

> In any act or instance of modeling, the model supersedes and, in a manner of speaking, is brought to the front for salience, accessibility, and operability, whereas at the same time the modeled recedes and "exists" in the background, inaccessible and inoperable… The model is taken to be or lived as the only reality, physical or not (Yu 2021: 650ff).

We humans come to live in a (model of the) world that is an extension of ourselves (Casey 2001) and become who we are by virtue of our worldmaking tools and techniques that derive from our biological ability and bodily capacity for (self-)construction. In other words, our environment is enlanguaged (Cowley & Gahrn-Andresen 2022a) and we, without being fully aware of it at all times of our functioning, are linguistic constructors of where we live, how we live and what we live for. This functional, ecological, cycle of life and language has neither beginning nor end: we both come from and find ourselves in nature by becoming part of material contingencies that change its course. However, part is *not* the whole, and as much of the contingencies and nature remain hidden behind what we reach, know and use, we face a cognitive problem. Our ways of knowing may become not good enough for what is known and, as a consequence, for what is not. In many cases, the supersession of the known by ways of knowing loses an adaptive value for humans because our knowing is faulted by our ways of knowing. To describe this occurrence I choose the term 'cognitive entrapment.' In what follows, I will explain why all our human cognition can be called entrapped and what language has to do with it.

2.2. When entrapped and why language?

On the one hand, a human, like every other living being, is conservative by nature. She relies on the recurrence and repeatability of what she experiences and

functions by relying on predictive means: what happened once will occur again (Gash 2020). Engagement in text and talk ensures this predictability of functioning in a most energy-efficient way.

On the other hand, a human is a conversing creature by virtue of her pragmatic living in nature. As humans engage with one another (and even themselves), they change their bodyhoods (actions and emotions) and personhoods (explanations of actions and emotions). The results transform their experience and enable new understandings of who, where and what they are.

Such a mode of epistemic functioning, when one's linguistic medium brings conservative pattern to one's perception and thought under the conversing conditions, gives rise to cognitive entrapment. We converse and set off innovation by means of, and for the sake of, conserving and stabilizing. We construct and conceptualize change in patterns that are not meant to construct and conceptualize change at all. In our linguistic construction of experience, conducive to change and innovation, we draw on patterns that are not easy to change.

The ecological problem of limitations of how we know the world is similar to Michael A. K. Halliday's critical concern with "a metalanguage by which we live" (2001: 195). According to Halliday, we have reached a certain life crisis — a crisis in our semiotic praxis that makes us "no longer equipped to deal with the kinds of change that are happening now" (ibid: 192). Hence, our "strategies for survival" should change and this change should involve a much deeper layer of action, namely "ways of meaning" — grammatical construals of reality that guide our actions. According to Halliday, if we are to combat classism, growthism, species destruction, pollution and the like, we should explore and transform how "work of meaning" is done to make it healthier for the living world.

Although Halliday's perspective on ways of meaning illuminates what I understand by entrapped cognition, there are several important differences that I would like to discuss. First, Halliday views language dualistically — as a system "about which we have no choice" and as an actual exercise of choice within this system (ibid: 198). This Chomsky-Saussurean partitioning is irrelevant to cognitive ecology where language is action and knowledge at the same time, a prerequisite and/or the outcome of much of what humans do. That is why entrapment is not the wrong choice of the knowable (resources affordable by the "linguistic system") to make better sense of the known (what Halliday calls "reality"), but a failure to adequately understand the unknown (newly emerging or hidden relations) based on the knowable (established patterns of understanding). Second, Halliday's ontological assumption allows him to put the blame on the system that fails humans while, in my conception, entrapment is what humans themselves unwittingly construct. If any system is to blame, it is the cognitive system of human beings.

Finally, Halliday's flawed ways of meaning result in flawed ways of acting towards the environment but it remains unclear what they result from and why they have become ecologically inadequate in the course of evolution. With entrapped cognition, 'how we mean' results directly from 'how we experience,' and this in

turn presupposes a system where our acting body and its neural makeup respond to the environment and produce the environment's 'better' version — something that we can speak, write and/or gesticulate. Sometimes, this controllable, linguistic, version of the world becomes not so good: We fail to adequately respond to the changing environmental conditions because of the language in which this response and these conditions appear to us. As a result, our ecological functioning proves disabled by our own abilities.

3. Theoretical foundations of entrapped cognition

Like every assumption, a scientific hypothesis should have a beginning, or better, beginnings. These can be stated as theoretical grounds on which it is based and from which it can be developed into something more practical. There are at least four theoretical accounts that can be given for what I call entrapped cognition from within the broader realm of cognitive ecolinguistics. These are arguments from:

- agency (human cognition operates within and on constraints it cannot escape);
- the observer (human cognition is grounded in phenomenological experience that cannot 'tell a story' of its appearance);
- genesis (human cognition is a derivative, retroactive process);
- abstraction (human cognition operates through abstraction in the course of which more qualities of a situation are lost than gained).

3.1. Entrapment as a constraint on agency

Cognitive ecolinguistics with the focus on (sometimes radical) embodiment and enactivism emphasizes constraints as an ecological factor. It is both a natural limitation on artificial practices and an artificial limitation on natural processes. Let me explain how language becomes a constraint according to this theory.

If we take a 'pristine' perspective on a human, first and foremost, as an embodied creature (Druzhinin & Fomina 2023), and not as a language user, our analysis will focus on what her body does as it coordinates its movements, sensations and feelings. Every doing produces results, some of which are more valuable than others. Those which are of value become an object of interest and the body wants to re-achieve them in further actions. In such a way, results of prior actions become "repeatables" and guide further practices to make them more effective and efficient. At some point we realize that doings (something that pertains to sensorimotor bodily functioning) and things done (something that links the sensorimotor body to an environment of various sorts — material, practical, social, etc.) become enmeshed. In the course of ongoing engagement with the environment, patterns and novelties, doings and makings, are impossible to disintegrate from each other.

There are two entailments from this theoretical stance that may account for how cognitive entrapment occurs. If we follow the first line of thought, we will focus on the aspect of doings. As the body performs more actions and enacts more patterns, it grows skilled. Skill gives rise to a sense of confidence that smoothens the performance of actions and makes it more automated. However, actional confidence reduces control. A skilled body tends to pay little attention to how, when or where the process of doing takes place, rather it directs most of its attention to *what* is being or intended to be done. Any unforeseen circumstance may affect the outcome in a negative way. It is usually the case with experienced drivers whose over-reliance on skill is one of the common causes of accidents on the road. It follows that, on the one hand, skill enables the body to do and make new, more and better things, on the other hand, it begins to constrain the body in how it can control its actions, which may affect the quality of these actions, and this, in turn, may change their results. New and better things intended to be done may turn out old and not as good.

On such an enactivist-embodied view, language is identified with skill that constrains actions performed by skill. In this sense, it is an abstraction from empirical experiences that, at the same time, gives rise to them. Therefore, any skilled action performed by a sensorimotor body in its concrete, empirical engagement with the environment is slightly different in nature (and ontology) from skill itself. This difference is indicated by another term used in cognitive ecolinguistics — *languaging*. While languaging is, broadly, a skilled action, language is a skill. While languaging is controlled bodily movements 'here and now', language is a sociocultural constraint on this control and/or movements across time and space. By movements we can understand vocal, manual and facial gestures physically repeated or recurrently evoked (Steffensen & Harvey 2018). In sum, language is an 'external force' that scaffolds our (recurrent) behavior for better and for worse (Steffensen 2024).

The second entailment from the constraint-point-of-view focuses not on doings but things done. I will give an example of consumer behavior that will help better understand how results of our actions become ecological constraints on these actions. Most of us should be familiar with such a marketing practice when one prominent and well-known service provider (e.g. bank) uses its brand name to offer other services (e.g. a place for buying and selling things, a mobile network, a taxi service, etc.). In other words, a bank that we knew as a bank not a very long time ago becomes a system — a bank, a marketplace, mobile network operator and taxi company. To attract more customers, these services work interdependently: they can offer bonuses, discounts or cashback to encourage us to buy, sell, pay, make calls and travel only with one particular service provider. It is interesting to note how our consumer habits change if we readily accept the benefits and become active users of these important services. We become loyal to the brand and our choices that sustain our living on a daily basis create an ecosystem. When we are hungry, we open the familiar application on the smartphone and order food; when we need

or have money to pay for this food, we take it from or keep it in the familiar bank; when this food is not delivered on time, we call the retailer using the phone number that is serviced by the familiar operator. The logic may be continued. As consumers, we begin to live in an ecosystem of our choices: once we chose a bank, it determined our choice of a marketplace and a taxi provider. At some point we do not even bother to shop for food and order a taxi elsewhere but with the familiar brand. We know that we can find almost everything necessary for our daily life in the system of marketing products that comes under the familiar brand name. In such a way, we distribute our (consumer) agency to others (interrelated service providers) and rely on them to offer what we need. We allow other agents to control our choices or even make them for us. The resulting ecosystem where we function as consumers also constrains our consumer choices as we voluntarily lose this freedom of shopping around and looking for more attractive sales. When the familiar marketplace overprices certain items, we may not be aware of it. To some extent, we are entrapped, and sometimes in a very negative way, by our own choice making.

By analogy, our language provides an extended ecology that constrains how we live in an environment. Through language we engage with others, their thoughts and feelings. When we engage, we orient ourselves to what others think and how they feel. When we stabilize, or 'attach' a concept or name to, our orientations, we make them reemergent in our own behavior (Gahrn-Andersen 2021). As a result, we come to think and feel what others afford. Our environment becomes other-oriented and distributed (Cowley 2024a, Transmundi & Steffensen 2024): Our orientations depend on others and what we do is a matter of participation in the doings of others. We begin to rely on what we have done or made in/through language (with others) to provide us with what we need. Thus, our agency is constrained by our language — engagement with others and their agency. Along these lines, our agential freedom is limited by what we do as cultural and social beings, i.e. a cultural and social environment that we create. In other words, language provides an *illusion of control*.

3.2. Entrapment as a genetic discrepancy in the construction of knowledge

In its genetic account, "living structure is always a record of previous development" (Capra 2022: 9) and no matter how sophisticated is the knowledge that we humans construct, it can only derive from primitive experience. Behind almost all scientific inquiries is the need to come to terms with the bodily experience of the surrounding world. Even quantum theory is nothing but an attempt to explain the physically observable effects of non-observable interactions that may happen beyond our physical and mental control.

The derivative and incremental structure of knowing causes a certain epistemological discrepancy between the history of a cognitive system and its future becoming. As we continuously engage with our environment, we cause each other to change, which implies dealing with new tasks and operating with faster

technologies, facing increased challenges and experiencing new needs. However, in our emerging practical environment, we do not have new resources to adequately satisfy the novel needs. Instead, human cognition renews its old resources by making them work in a 'tricky way.' It relies on simple mechanisms to handle complex processes — it uses "*simplex tricks*" (Cowley & Gahrn-Andersen 2022). Such a tendency in the formation of knowledge can give rise to entrapment as we are not always aware that "what seems a novelty, always embeds layers of the past" (Dufva 2024).

3.3. Entrapment as the observer fallacy

From another perspective, cognition can be analyzed in accordance with bio-logic — the logic of 'life as it is lived.' In such a biocognitive account, offered by Humberto Maturana and his followers, language does not derive from perceptual processes, language *is* perceptual processes integrated in the praxis of human living. According to this logic, "everything said is said by an observer to another observer" (Maturana 1975, Kravchenko 2020) whose ecological functioning depends on what they can distinguish and how they link actions with appearances. Yet, appearances can proverbially be deceptive.

Phenomenologically, distinctions do not show where they come from, they show only what they lead to. Following up on these implications in what she does, the observer finds herself explaining (the appearance of) these distinctions. Since the explanation and the appearance have different origins and ontologies, they must not be conflated with each other. To do so is fallacious in that an explanation — often pictured as unobservable and abstract — pertains to the observed. By the same token, the explained — purportedly observed — still belongs to the unobservable in the sense that appearances are limited to their appearing and not to their implications. In other words, explanations (results) are put by the observer ahead of appearances (processes) in ways that obscure the latter's functioning:

> 'The result of a process does not ever participate in its genesis.' We frequently forget this when we wish to see a purpose in a process, and we argue as if its result were an argument for its occurrence. (Maturana 2008: 84)

The observer entraps herself by adopting the belief that she observes more than she does, making phenomenological substitutions in and as a result of recursive behavior — doing things in the process of one doing for the sake of another doing. In such recursion, processes give rise to things (objects) that become indistinguishable from these processes. Indeed, things (objects) are an illusion of observation, and language as a recursive behavior reinforces this illusion in every instance of observation. Functional relations imposed by language "obscure everything and do not let us see what processes are taking place" (Maturana 2012: 158): When we name things, we tend to forget that naming does not explain them because things named and their names 'happen' in different operational domains.

I will use a simple example to illustrate how the non-observed (the named) is mistakenly conflated with the observed (the naming). Let us imagine a fifteen-year-old boy named John. John grew up in the warmth of a loving mother whose unwavering presence has painted his childhood with happiness and nurtured his spirit every step of the way. One day he learns that he is an adopted child. In his perception, childhood years, his mother and his own identity immediately change their quality. It turns out that his mother has not been there all the way, or he was not cradled in the 'real' warmth of his 'real' mother, or his childhood is not as happy. His experience is not the experience he thought it was before he learnt the news. His perception of himself and his mother as well as his childhood memories change because of the way he describes them now. New names and new facts cannot but affect, if not wholly transform, what is (was) already a thing of his past. This thing reappears in a new way. Yet, in reality, what emerges are new experiences of hearing what others say now rather than old experiences of what was then. His past remains phenomenologically unaffected — what functions as a new version of the past is his language. But it is fallacious to substitute an experience with its linguistic version. A prior experience cannot be denied by an emergent explanation. What was before did not happen because of the new terms that we think describe it better now. However, we tend to believe otherwise as observers who are entrapped into taking names as the origin of phenomena.

3.4. Entrapment as a fallacy of identity in abstraction

The founder of general semantics, Alfred Korzybski, approached language ecology in an agnostic way (Druzhinin & Rakedzon 2024a, 2024b). He viewed the surrounding world as made up of "events" that living beings cannot fully know and sense, but with which they can interact through abstraction — an organic life-sustaining process of taking in from environmental "events" what is structurally valuable and leaving out other components as organically meaningless.

Abstraction has a number of levels or orders. Sensorimotor objects (feelings) can be abstracted from events and ordered by "labels" (mnemonic patterns of language) from which descriptions (uses of labels) can be drawn. On higher levels are inferences from which other inferences may be abstracted ad infinitum. Each level has its own value for the human organism that is lost if it is "translated" onto another level. For example, if we feel something, we should evaluate it as a feeling. If we "express" what we feel, we should evaluate it as descriptions rather than our feelings. If we think that others feel something, we ascribe what we think we feel to others and should evaluate these ascriptions as our inferences from our descriptions of our feelings rather than others' feelings (ibidem).

According to general semantics, humans have a tendency to confuse orders of abstraction for two reasons. First, in the natural course of experience we first and foremost deal with processes that 'impress' us inside our skin. By contrast, as an acquired bodily reaction, language helps us express our impressions and orient ourselves outwards. Accordingly, impressions should come first and expressions

(linguistic labels) should come second. In the general run of things, however, the order is reversed. This is because children are born into a linguistic environment where words shape, if not are, first impressions. Rapidly, these first *im*pressions are associated with other *im*pressions before a child learns to use an appropriate mode of *ex*pression. The results, in Korzybski's view, are highly damaging.

Second, due to the Aristotelian structure of our language we have a primitive semantic tendency of identification. We tend towards an over-emotional generalization of similarity, equivalence, equipollence that even reaches to absolute sameness in all respects. However, in a world of ever-changing processes and a human world of indefinitely many orders of abstractions, identity appears structurally impossible. I will elaborate on how such linguistic 'sameness' of experiences is created and illustrate it with examples in one of the sections that follow.

4. Data and methodology

To investigate cognitive entrapment using evidence from language, a certain metacognitive perspective is needed on:

1) the difference between adaptive and maladaptive ways of knowing;

2) the difference that language makes to human-specific ways of knowing;

3) linguistic regularities (patterns of text and talk) that make our ways of knowing maladaptive.

To address the first two methodological objectives, I will summarize the key theoretical insights of cognitive ecolinguistics and synthesize them with my hypothesis of entrapped cognition.

Analysis of entrapped cognition on the basis of patterning of text and talk has its methodological basis in principles of systems thinking. I will reconstruct some of the basic lineage-specific patterns of human-environment interdependencies that fail, at least in part, because of spatiotemporal constraints that arise with these patterns. To provide illustrative evidence for my analysis I will combine the use of media discourse, neurolinguistic data, lexicographic and my own constructed examples.

5. Results: Patterns of entrapped cognition

There are four major regularities established in and through language that entrap human thinking into a delusional simplification of the world. I name these as 'the four traps' — those of allness, stillness, symmetry and sameness.

1) The *trap of allness* is an all-instead-of-one understanding of the world whereby individual items of experience are ignored because they fall within a larger boundary, i.e. they are collected under a certain umbrella term.

A tendency to use common nouns, especially category names, in daily speech entraps us into a binary logic that is adequate for many social practices.

Categorization is pervasive because it is a simplex means of dealing with recurrent experiences

The trap of allness is exacerbated in both the media and populist discourse that strives to make accounts relatable to many. Thus, news stories use category names that make media content more sensational and clickable. For example, a recent article posted by the Huffington Post on May 2024 is headlined as follows:

(1) Mom Texted 'Say Goodbye To Your Son' To Ex Before Fatally Shooting Boy, Herself. [1]

The use of four category names in one sentence prompts the reader to relate to what happened in an (over)emotional way. The subjects of the story are made to appear more understandable and 'real' because of how they are termed — in plain words that evoke experiences that recur in almost every person's life. In fact, the circumstances may be less understandable and the subjects more distant from an ordinary media consumer than the category terms suggest.

Only in the middle of the article is it revealed who the subjects of the criminal case were by name. A reversion of two types of naming — proper and that of categorization — would render the story more informative. For example, the headline could have run as follows:

(2) Savannah Krieger, 32, is suspected of killing a 3-year old Kaiden Krieger.

The problem of entrapped cognition is that, while such renderings appear in professional, legal discourse, they are not typical of everyday language.

Categorization, thus, appears as an ecosocial tool because it sustains an environment where one is in a top-down relationship with another, where group identity and membership status of an individual prevail over the value of being who she is of her own free will. It is also interesting to note how categorization is used to link social and natural environments. The all-instead-of-one pattern of understanding our social reality may be a source of hurtful stereotyping for others, and when applied to nature and environment it can also be ecologically unfriendly and unfair. When names of natural objects become categories of people, myriads of important ecological complexities and nuances are simplified out of the picture. Let us take a look at how the word 'river' extends the speaker's agency to the needs and choices of others at the expense of an ecological phenomenon understood socially and too simplistically:

(3) I'm being called on in my life to love people and to protect people and to be a *river* to my people (Will Smith, acceptance speech at the Oscars ceremony, March 2022)

Linking his identity to a river, Smith alludes to the speech given by Lawrence of Arabia star Anthony Quinn featured in the 1962 movie. In doing so Smith categorizes experiences that he has had with other people involved in the film

[1] https://www.huffpost.com/entry/mom-murder-suicide-custody-battle_n_663bc495e4b07664ada0847d

production under the term that accounts for being protective, supporting, helpful, caring, committed, selfless in relation to others. Yet, this term also evokes an experience with a river in the natural environment. As a category name, a river is understood as a pool of resources for people while naturally it is an ecosystem whose inner biodiversity is supposed to sustain itself rather than humans who populate the surrounding area. Not all rivers protect, even more rivers need protection. The allness of categorization in this particular case may entrap one into ecologically unfriendly practices.

2) The *trap of stillness* is a product-instead-of-process understanding of the world whereby motor experience is ignored for its more stable sensorial effects that can be morphologically objectified by substantives.

Physically, objects are more 'real' than processes in that the former are bounded and easy to manipulate (they can contain or be contained, transfer or be transferred). Linguistically, substantives (e.g. the noun 'building') seem more 'real' than verbals (e.g. the gerund 'building') because they have an appearance of finiteness or endedness (e.g. one's building or a beautiful building) and can be manipulated in collocations (e.g. one can put up, sell, own, etc. a building but one cannot put up, sell or own a process of building). Yet, in this case we are sensitive to differences between the process (building) and the product (a building) because, above all, these invoke processes and products that we can see, touch or hear. The process we call 'building' does not appear frozen or hidden by its product.

The situation gets trickier when we cannot deal with the results of processes in an empirical way. For example, the Russian word *znaniye* means both 'knowledge' and 'knowing' and can be used as a noun and a verbal respectively. In such a way, Russian allows a process-oriented 'semanticization' of what in English is referred to as 'knowledge.' Yet, this semanticization does not do any good as the tendency to rely on substantives rather than on verbals 'substantivizes' our understanding of the process — the only empirically validated form of what we call 'knowledge.' Since knowledge can be demonstrated or observed only in, or better, as the process of somebody's knowing something, we could indicate it through language by treating the word *znaniye* as a verbal, but, typically, we do not. By force of linguistic habit, *znaniye* becomes knowledge more often than knowing in our understanding of, and interactions with, the world. This stillness of the substantive hides the nature of a natural dynamic activity.

Let us illustrate this product-instead-of-process understanding of znaniye with the help of English by comparing some of the normative and non-normative collocations for the words "knowing" and "knowledge":

Table 2. **Some of the grammatical and ungrammatical collocations for the words 'knowing' and 'knowledge'** [2]

	knowing	*knowledge*
Grammatical collocations	participate in, engage in, start	Give, gain, have
Ungrammatical collocations	Give, gain, have	participate in, engage in, start

[2] Based on Corpus of Contemporary American English (https://www.english-corpora.org/coca/)

We say that somebody gains the knowledge others give and, thus, expect somebody to know what others do. As we do not say that somebody engages or participates in the knowledge that others start, we do not expect somebody to do (their share of) knowledge. As a result, a prerequisite for well-being and even survival in this world — a process of knowing — appears as something material, still or lifeless rather than as dynamic and practicable. Such a trap of stillness of our own linguistic making lies behind the misconstrual of our ecology and processes that sustain our living.

3) The *trap of symmetry* is based on a matching-instead-of-fitting understanding of the world whereby one ignores experiences that do not contrast or compare. Fitness, or 'fittingness', means that items can work together or, if not, changes can be made to achieve workability. Matching implies the existence of some model against which items are judged to be good or bad, right or wrong, true or false. Matching seems to be a more popular way of dealing with the world than fitting because everyday language itself is based on the principle of symmetry.

Let me explain what I mean by symmetry and its trap. Symmetry is commonly defined as a quality of something perceived (or thought of) when we can distinguish equal or similar parts against or around an axis. For example, when we look at Barcelona Cathedral, we can easily draw an imaginative line that divides the building into fully identical towers. When we are watching a football match, we can hardly attend to every individual player on the pitch, instead the two distinctive colors of their uniforms help us perceive the 22 people as two competing teams. According to gestalt psychology, the symmetry of objects is the principle of grouping perceived stimuli based on color, shape and orientation in space. From a disorderly mass of what we see or hear, our attention selects items that can compare or contrast to each other and focuses on these collections first ignoring the rest of the items that do not match. Symmetry lies at the heart of our aesthetic experience and is commonly used in artistic practices.

However, symmetry is not a feature of material objects. Rather, it is our bodily way of doing and making things in nature (Johnson 2007). As our physical body is symmetrical, ways of its meaningful expression, too, tend to draw on symmetry. Gestures, vocalizations, marks on paper are physical projections of what our body can do. There should be some pattern in tones, lines or movements that we produce, otherwise we will not be able to reproduce them accurately. This patterning depends on how well we can group items, associate them with each other. Only after applying this bodily method of making things symmetrical can we draw comparisons and parallels that later give rise to abstract thought.

It can be argued that language, the corporeal text and talk of our everyday life, enacts, entrains and entrenches symmetry. In other words, we create linguistic forms based on symmetry and by doing so we train ourselves to be even more 'symmetrical about' the world. Every meaningful sequence of sounds or letters can be divided into parts that have their roles (consonants in a syllabus, prefixes in a word, attributes in a sentence, etc.) that compare (similar consonants, same prefixes

in other words or other prefixes with similar meaning, similar attributes in other sentences, etc.) or/and contrast (vowels, prefixes and attributes with the opposite meaning). That almost every lexical item 'has' a synonym and antonym is presumably the natural result of our need for symmetry in what we encounter.

According to Korzybski, for example, our analytical subject-predicate (view of) language enforced by Aristotle's Categories implies that everything can be divided into subject (what/who) and whatever can be said (predicated) of it. This binary breakdown of 'everything' we can conceive of accounts for our tendency to perceive and search for symmetry even where it is not present. If we say that A did something somewhere and B did the same in the same place, we tend to think that A and B are related to each other just because syntactically they are both the subjects of the sentence. Consequently, A and B are understood as 'they', which brings A and B together even closer. From this togetherness we usually infer transitivity of relations according to which A together with B is the same as B together with A.

Through language, symmetry guides our perception of many social practices. When we encounter a situation when two or more interacting parties disagree on something, our first and most natural interpretation will be that they disagree with each other, which may not be entirely true. Drawing the imaginative line(s) between these parties and placing them opposite each other is how we satisfy our bodily need for symmetry and (non-consciously) use the so-called "dualizing mode" of thinking and speaking (Cyzman-Eid 2024). Yet, having different opinions means describing things differently, which also means describing different things because things in such a situation begin to appear differently to those who describe them. Instead of dealing with a highly nuanced situation where people trigger change in each other's understandings, one most often understands negotiation in a dualizing way because it is linguistically more familiar: our language readily affords dualizing terms for such a situation, particularly based on ARGUMENT IS WAR metaphor (Lakoff & Johnson 1980).

In other words, when two or more parties negotiate something, they fallaciously believe that, and act as if, there is one object of one description they should agree on by conceding or accepting, winning or losing. On these grounds, negotiators are induced to feel that one description is 'better' than another. Yet, if approached without dualizing, descriptions of an object constitute new and different objects of descriptions: when negotiators describe something and respond to each other's descriptions, new objects arise and whatever object the negotiators thought they had in mind before the negotiation is transformed by the changing experiential conditions of every written or uttered description. The task of negotiators is to fit emerging descriptions (and objects) together and make them work. Conversely, descriptions are not fitted and taken in multiplicity — they are compared as matching or not matching some 'model' description that the negotiators had (have) in mind. Creating and enacting this symmetry negotiators fall into a trap.

4) The *trap of sameness* can refer to a consistence-instead-of-persistence understanding of the world whereby experiential changes and inconsistencies are ignored if a precursor of the experience persists throughout the experience. In order to illustrate how and why the trap of sameness occurs in neurolinguistic terms, I will sketch a neural representation of how we act on our world. My analysis of neuromapping (neuroimaging) is based on the terms used and facts described in neurobiological studies of brain-body-mind functioning (Johnson 2007, Lakoff 2014, Damasio 2021, Johnson & Shulkin 2023). By doing so, I will show that we can delude ourselves linguistically by making our organism do what it never does or, perhaps, can never do.

When we say that we recognize a certain item of our environment (X), we do so because our organism sensitizes to an item X using a certain neural assembly (A). When we relate to X (e.g. we focus our attention on it, name it or recognize it by name, feel a certain way about it), the neural assembly A activates some other assembly (B). When we construct another relation to X (describe it, express our opinion), the neural binding A*B 'fires' together with other more or less stable connections (potentiations) or pathways to other assemblies. As a result, a neural cluster (A*B*C) may be formed. When we decide to relate to X in another instance of our interaction with the world (e.g. make a new judgement that builds on our opinion of X expressed before), the neural cluster A*B*C grows more complex and activates other neural assemblies or bindings or clusters (A*B*C*D*E*…). Given such cognitive activity, even if the stimulus X persists in our interactions of first, second, third, etc. orders, it no longer appears as the same pure X. New items add to this X and make it different when we feel it, think about it and act on it in our decision making. For example, our recognition of X will not be equal to our opinions of X; further, in other people's descriptions X is not the same X as it appears in inferences from other people's descriptions. However, language, in its daily use, blinds to these differences and entraps us into treating multiple X's as identical because one and the same word is used to recognize, describe or judge X. Although X in other people's descriptions remains the same X in our reactions to these descriptions, the effect is, neurologically unnatural. When one word is invariably used across multiple levels of abstraction, we fall into the trap of sameness.

The trap of sameness also lies at the core of unhealthy linguistic behavior ranging from logical fallacies to hate speech and verbal assault. The mechanism of distorted reasoning is simple; a language user entraps herself positing the identity of experiences by ascribing identical linguistic characteristics to different(ly) abstracted experiences.

Along the lines of general semantics, I will use an anecdotal example of a misbehaving boy on the children's playground to sketch how the mechanism of fallacious abstracting can work in everyday life. When one reacts to misbehavior, certain sensations and feelings arise on a non-verbal level, which is not yet unhealthy. The problem usually occurs when verbal levels of abstractions become involved:

Table 3. **Different orders of abstraction in the 'children's playground case'**

Level of abstraction	Possible abstractions
Event	Something is happening here and now
Object	The boy's behaving makes me feel bad here and now
Label	The boy is behaving badly
Description	The boy is badly-behaved
Inference$_1$	The boy is bad
Inference$_2$	The boy's parents are bad

One may continue the bottomless hierarchy of abstractions which, in extreme cases as exacerbated by the trap of allness, can become racist or fascist rhetoric. Conversely, the trap of sameness may be recognized and fallacious abstractions avoided by making the assumption that the boy experienced as object becomes a slightly "different" boy when referred to by a common name let alone when described. What one refers to, in this case, is a sensorimotor and emotional experience of the boy's emplaced behavior — not the boy. What one describes is one's reference, or linguistic reaction, to sensorimotor and emotional experience of the boy's behavior. Therefore, to act by finding words for what is happening is acting on one's experience of what is happening. By extension, describing what is happening is acting on linguistic knowledge of one's experience of what is happening. The logic can be continued.

Summing it up, patterns of entrapped cognition that arise in and from language are intrinsic to thought and perception. This cognitive entrapment does not make us eco-friendly creatures, and in the section that follows I will explain why.

6. Discussion: Ecological impact of entrapped cognition

A living organism lives in a world of plurality — the expanding multiverse where biodiversity and biocomplexity sustain the ecosystem, ensure its healthy functioning and flourishing. Adaptive biosystems are those which can live not only in but also off and for this multiverse. Human flourishing is "not one homogeneous thing, but rather many activities blended in a fluid equilibrium" (Johnson 2023: 65):

> The notion of radical autonomy and independence is a symptom of developmental failure to attach ourselves to others and establish the kind of intensive sociality that makes us who we are that gives us a sense of connectedness, cooperation, and moral responsibility toward others — all of which are conducive to our flourishing (ibidem).

The pluralistic notion of flourishing becomes elusive for the human ecology. Our pervasive patterns of knowing and understanding that we project onto the known and understood entrap us into the stillness, symmetry, allness and sameness of what can never be stable, dichotomous, universal and identical — the multiverse with which we interact.

Entrapped cognition may be viewed as a significant factor behind crippled decision-making on climate change and human health. Dichotomous and binary thinking induced by daily language distorts conceptualization of a "more-than-human world" where nature is interconnected with culture (Gash 2020). Perhaps, more people choose to ignore or deny climate change because climate (unlike the imaginary word 'climating') is often perceived as a still object under the pressure of a language in which it 'exists.' The tendency to objectify processes through substantives informs a world where knowledge and education become commodities while language is reduced to an instrument to be used or a system that self-operates. This shift from a natural 'how-' to an unnatural 'what-thinking' in language dehumanizes our reality: It ensures that we do not recognize responsibility for, or participation in, events that occur as if independently of us (or, perhaps, do not occur at all). Decision-making can become paralyzed because we tend to think that we do not decide on how and where we live. We ascribe intelligence to technologies enveloping them in intelligent descriptions; our "grammar of narratives" grants agency to corporations, institutions and other abstract entities. It brings us to believe and trust them to make choices and decisions for (instead of) and even against the individuals that they include (Krippedorff 2023: 91); we identify the natural facts of language with cultural artefacts ending up in prescribing the symmetry and stillness of text to the dynamics of talk (Kravchenko 2024b). Our product-oriented way of thinking encourages us to prefer easiness, convenience and profit that are at odds with an empirical world of participatory processes that require effort if we are to live in an eco-friendly way. Solutions, evidence and information tend to be grammatically found rather than constructed, worked out or negotiated, which biases us against the bio-ecological and emplaced towards a disembodied and dualistic worldview.

The linearity and predictiveness of language render us disrespectful of the irreducible multiplicity (Lachs 2023) of natural habitats and the social world. By categorizing people, we create vocabularies of value-laden differences and deny the categorized the opportunity to define their own identities (Krippendorff 2023). This is especially alarming today, in an era of (social) media technologies where we engage with those whom one cannot see, need not know and even cannot count precisely. These virtual others that emerge in mediated conversations cannot be readily categorized in ways that satisfy each of them. Accordingly, we should avoid simple choices and enact values of participatory languaging (Fomina 2024). The cancel culture movement exemplifies how hurtful and hateful conservative patterns of language (and behavior) come out in conversational practices where virtual participants lose or diminish their "sense of mattering" (Goldstein 2023). Conflicts arise and tension grows.

7. Conclusion

Language is at the heart of our ecology because it is a medium that we use as well as a medium in which we use it to engage with what we can know

of as our environment. In order to sustain our life and well-being, we should not only be adaptive but also easily adaptable to what is or becomes known to us. However, language makes us aware of the unknown and, for some of the reasons that I have discussed in this article, this awareness often catches us unawares, when we prove unable to deal with the unknown in an adaptive and ecological way.

On the one hand, our body naturally tends to conserve its self-organization, preserve life and energy resources despite the disbalancing engagement with the world. On the other hand, what our body does and makes in this engagement extends this organization and distributes resources far beyond what the body can reach and control. Our body with experience sculpted by it and things we construct through this experience (e.g. social realities), although interdependent with each other, have different ontologies, or function in domains that have different origins. An understanding of what we do and make in conversations requires more than the recurrence of conservative patterns of experience. However, our everyday language is based on these patterns and by enacting them we train our body to be even less conversational — less ready and able to grasp what is yet unknown. In this way we entrap ourselves: our linguistic ways of knowing supersede the known and become inadequate for the unknown. This cognitive entrapment has serious ecological implications as it prevents us from sustaining our (social, natural and material) environment and even life.

The research has many implications for ecolinguistic studies and beyond. First, it can provide theoretical grounds and concrete evidence for further transdisciplinary investigations of eco-friendliness — working for life-sustaining relations — that use symbolic modes of action. The findings bring new light to why ecological education is hard to popularize. Besides, the concept of entrapped cognition has the potential to contribute to the theory of bounded rationality and heuristics. In spelling out the threats of entrapped cognition, I have shown that human knowing uses cognitive biases and distortions that stem from illusions of symmetry, stillness, allness and sameness. While brain-enabled, these arise from human-specific modes of operating in, through and with language.

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Big oil and climate change: An ecolinguistic perspective

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Abstract
In the context of the ever-worsening climate crisis, the global debate around fossil fuels is keener than ever. The Intergovernmental Panel on Climate Change (IPCC) Press Release of 20 March 2023 stated: "In 2018, IPCC highlighted the unprecedented scale of the challenge required to keep warming to 1.5°C. Five years later, that challenge has become even greater due to a continued increase in greenhouse gas emissions. The pace and scale of what has been done so far, and current plans, are insufficient to tackle climate change." Against this background, this paper investigates the discourse of oil giant TotalEnergies in its report "More Energy, Less Emissions: Sustainability & Climate 2024 Progress Report". The paper throws an ecolinguistic light on one of the main drivers of climate change, and explores the extent to which such a report may represent an instance of greenwashing. The aim of the study is to reveal linguistic strategies that enable such companies — who have played, and continue to play the most significant role in producing global warming — to present themselves as agents for environmental good. From the critical, discourse-historical perspective, the paper highlights the circulation in government, environmental, corporate and public contexts of both positive and destructive discourses. The findings appear to support the greenwashing hypothesis; the paper thus contributes to the growing tradition of ecolinguistic studies that expose the role of (corporate) language in perpetuating situations of environmental harm.
Key words: *corpus linguistic methods, critical discourse analysis, climate change, greenhouse gas emissions, greenwashing, ecolinguistics*

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Большая нефть и изменение климата: эколингвистический аспект

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Аннотация
В условиях постоянно обостряющегося климатического кризиса глобальные дебаты вокруг ископаемого топлива становятся как никогда острыми. В пресс-релизе Межправительственной группы экспертов по изменению климата (МГЭИК) от 20.03 2023 г. говорится: «В 2018 г. МГЭИК сформулировала беспрецедентную по масштабу задачу, которую необходимо решить, чтобы удержать потепление на уровне 1,5°C. Пять лет спустя эта задача стала еще более серьезной из-за продолжающегося роста выбросов парниковых газов. Темпы и масштабы того, что было сделано до сих пор, а также текущие планы недостаточны для решения проблемы изменения климата». В свете данной дискуссии в статье анализируется дискурс нефтяного гиганта TotalEnergies. Материалом исследования послужил отчет компании за 2024 г. «Больше энергии, меньше выбросов: работа в области устойчивого развития и изменения климата». С позиций эколингвистики рассматривается одна из главных причин изменения климата и исследуется, в какой степени данный отчет может представлять собой пример «зеленого пиара». Цель исследования — выявить лингвистические стратегии, позволяющие компаниям, играющим существенную роль в процессе глобального потепления, позиционировать себя в качестве представителей рациональной экологии. С точки зрения критического и дискурсивно-исторического подходов рассматриваются как позитивные, так и деструктивные дискурсы, циркулирующие в правительственных, экологических, корпоративных и общественных контекстах. Полученные результаты подтверждают гипотезу о «зеленом пиаре». Таким образом, работа вносит вклад в развитие эколингвистических исследований, раскрывающих роль корпоративного дискурса в сохранении пагубного влияния компаний на окружающую среду.
Ключевые слова: *корпусные лингвистические методы, критический дискурс-анализ, изменение климата, выбросы парниковых газов, зеленый пиар, эколингвистика*

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1. Introduction: The aims of the research

The attention paid in public discourse to the topic of global warming over the past couple of decades (Stern 2007), in the contexts of media, social media and scientific discourse justifies the attention paid to the phenomenon in Ecolinguistics. However, though many recent studies in Ecolinguistics have dealt with climate change (Norgaard 2011, 2019, Fløttum 2016, Gabrys 2020, Augé 2023), there remains a need for studies that present a thick, detailed picture of the scientific

background alongside those that focus mainly on rhetorical or discursive aspects. This paper uses critical discourse analysis and corpus linguistics to highlight the role of discourse in maintaining social practices connected to fossil fuel extraction that perpetuate an unsustainable trend in energy production. From a perspective mainly inspired by Ruth Wodak's (2001) Discourse Historical approach, the paper provides a rich picture of the contemporary scenario, detailing relevant information from political and commercial agents, environmentalists and civil society. It sheds light on the extent to which companies use, among other self-presentation strategies, that of greenwashing (Miller 2018) to suggest that they are fully on board with environmental goals, while in reality they remain at the heart of the problem. A complementary methodological approach uses corpus linguistics to uncover strategies by means of which commercial actors such as major energy production companies present themselves. The question is how far such positive self-presentation may be viewed as greenwashing or if, by contrast, it may represent a genuine shift in orientation by the companies involved.

The organization of the paper is as follows. Section 2 briefly presents the discourse-historical background and context of the paper, covering the role of fossil fuel in the climate emergency.

2. Discourse-historical background and context

2.1. Scientific background

The science is clear: greenhouse gas emissions, such as carbon dioxide (C02) and methane (CH4) from human activities, are wrapping the Earth in a blanket of pollution that has warmed the planet and led to severe impacts such as more intense storms and hurricanes, droughts and famines, floods and wildfires. Today, there is more carbon dioxide in the atmosphere than there ever has been in at least the past 2 million years. During the 20th and 21st century, the level of carbon dioxide rose by 40%. Moreover, as the study by Cook et al. (2019) made clear:

> Scientists working for the fossil fuel industry knew about the potential warming effects of C02 emissions as early as the 1950s. Exxon's internal documents show that their own scientists were explicitly aware of the potential dangers of human-caused climate change caused by their products, but instead of taking action or warning the public, they spent millions of dollars on disinformation campaigns designed to obscure the scientific reality.

According to the National Oceanic and Atmospheric Administration (NOAA), a U.S. government agency that provides weather, climate, ocean, and coastal science and services, the most important number of the climate crisis is 426.7 atmospheric CO_2 in parts per million, on 7 June 2024. The baseline NOAA employs is 280ppm — the preindustrial average. A safe level and a stabilisation scenario set out by the IPCC entails limiting the world's temperature to below 2 degrees C. The International Panel on Climate Change (IPCC) (2022),

meanwhile, states that the results of climate change will pose great risks for human and natural systems, on all continents, across all oceans.

Until the mid-19th century, traditional biomass — the burning of solid fuels such as wood, crop waste, or charcoal — was the dominant energy source used worldwide. But with the Industrial Revolution came the rise of coal; followed by oil, gas; and hydropower by the turn of the 20th century. It was not until the 1960s that nuclear energy was added to the mix. What is often referred to as 'modern renewables' — solar and wind — were only added much later, in the 1980s.Renewables, including solar, wind, hydropower, biofuels and others, are at the centre of the transition to less carbon-intensive and more sustainable energy systems. According to Dowson (2022): 'Overall, in 2020 wind and solar accounted for just 10 per cent of global electricity generated, and only 1.6 per cent of total primary energy supply.' The accompanying problem Dowson pinpoints at the same time is that:

> the increasing share of renewables in the energy mix has been outstripped by soaring usage of all forms of energy, including oil, gas and coal. Increasing sales of larger SUVs (Sports Utility Vehicles) are creating more pollution than electric vehicles are saving. Greenhouse gas emissions are at record highs and continuing to rise.

2.2. The role of Big Oil

Big Oil is a name sometimes used to describe the world's six or seven largest publicly traded and investor-owned oil and gas companies, also known as supermajors. The term, particularly in the United States, emphasizes their economic power and influence on politics. Big Oil is often associated with the fossil fuels lobby and also used to refer to the industry as a whole in a pejorative or derogatory manner. Given their size, the numbers of barrels of oil they annually produce, the financial power they wield, in terms of revenue, profit (net income) or market capitalization, especially the Big Five (Exxon Mobil Corp., Shell PLC, TotalEnergies SE, Chevron Corp. and BP PLC) control and dictate the movements of the world oil market. Globally, net income of the oil and gas industry reached a record US$4 trillion in 2022. After the COVID-19 pandemic, energy company profits increased with higher fuel prices resulting from the Russian invasion of Ukraine, falling debt levels, tax write-downs of projects shut down in Russia, and backing off from earlier plans to reduce greenhouse gas emissions. Independent journalist Nick Dowson asks the reader to:

> Imagine for a moment what life could be like if we were free of our dependence on oil and gas. Stepping out into a neighbourhood without the noise of the combustion engine, you breathe deeply, fresh air filling your lungs. It could be a world with fewer resource conflicts, one with good quality green jobs, where everyone has access to the renewable energy they need. Climate change's worst effects could be avoided. Standing up to dictators would be easier. (Dowson 2022)

For Dowson the oil and gas industry is blocking that future. He cites Tessa Khan, the director of Uplift, which campaigns to end North Sea fossil fuels: 'We need to clearly identify the organizations that are not only driving, but also profiting from, the climate crisis: namely the fossil fuel industry.'

Research and advocacy group Oil Change International claim that major oil companies are lagging behind their climate targets. They examined climate plans from the eight largest US and European-based international oil and gas producers. They assessed the eight largest U.S. and European-based international oil and gas producers — BP, Chevron, ConocoPhillips, Eni, Equinor, ExxonMobil, Shell, and TotalEnergies — on their climate and sustainability pledges and plans. The ten assessment criteria are based on ambition, integrity, and people-centered transitions. Six out of eight companies — ConocoPhillips, ExxonMobil, Eni, Chevron, TotalEnergies, and Equinor — have explicit goals to *increase* oil and gas production within the next three years or beyond. To meet climate targets, companies are planning to rely heavily on the "net" in "net-zero," particularly by investing in carbon capture and carbon offsets, which may prolong the life of fossil fuels.

Oil Change International argue that governments should end new licensing and permitting of fossil fuel extraction or infrastructure. They say governments and investors need to go far beyond the scope of current policies and engagement strategies towards the industry. The study found that the companies' climate pledges and plans are "Grossly Insufficient" on most of the criteria analysed. Governments thus need to eliminate subsidies and domestic and international public finance for fossil fuel extraction or infrastructure, including technologies like CCS (carbon capture) that perpetuate the industry's pollution. Meanwhile, a Greenpeace (2023) report, *The Dirty Dozen: The Climate Greenwashing of 12 European Oil Companies*, written by oil market expert Dr Steffen Bukold, reveals that fossil fuel companies are deceiving the public about their willingness to transition to renewable energy and to curb their climate-damaging impact. The profits, revenues and investments of 12 fossil fuel companies were analysed for this report. It claims that the oil and gas industry is lacking in almost every aspect of the actions it would need to take to become a protagonist, or even a neutral bystander, in global energy transition and climate protection. Firstly, fossil fuel profits have risen sharply, lining the pockets of shareholders and executives, but their investments in sustainable solutions remain minimal. Secondly, fossil fuel companies' renewable energy production is still minuscule. No company's share of renewable energy produced exceeded 1.35% of their total 2022 energy production, according to the report. Thirdly, fossil fuel companies have no genuine strategy to achieve net zero. Instead, they deceive with false solutions:

> Transitional technologies that actually should play a role in decarbonisation such as advanced e-fuels or green hydrogen are often mentioned, but the provision is largely left to other industries. Most talk about sales targets, but rarely about production targets or concrete investment volumes. Plus: All options are ultimately designed to extend their own fossil fuel business model. A far-reaching reduction of emissions is not possible on this path.

Fourthly, contrary to greenwashing claims, fossil fuel production is set to continue growing until at least 2030. Greenpeace demands that the oil and gas industry should be rapidly, economically and politically downsized, their profits should be properly and heavily taxed, plans should be made to reduce the risk of stranded assets and, above all, oil and gas demand should be rapidly reduced by government planning.

3. Literary review

By now a fully established trend within linguistic research, Ecolinguistics addresses linguistic dimensions of the relationship between humans and ecosystems (Fill & Penz 2017). Studies focus on topics such as place metaphors and frames (Döring & Ratter 2018), media representation (Döring 2017, Chua et al 2022, Ponton 2023), embodiment (Steffensen & Cowley 2022), econarrative (Stibbe 2023, Ponton 2024).

Some recent studies in Ecolinguistics focus on the discourse of fossil fuel companies, repeated by mainstream media, that influences public perception of the climate crisis. One element identified is the strategy of greenwashing, particularly through the use of items like 'renewable', 'transition', 'green', 'clean', 'sustainable', 'carbon neutral', etc., which mask the companies' harmful practices under an eco-friendly cloak (Stibbe 2021). Ecolinguists show how such manipulative language obfuscates responsibilities and delays public realisation of the urgency of the crisis. Hansen and Machin (2020), for example, explore how by framing the crisis as a manageable problem, the oil industry traces an optimistic prognosis and thereby wards off regulatory pressure. Fill (2023) explores the role of social media in enabling corporate greenwashing and at the same time grassroots ecological resistance, shedding light on the contested nature of environmental discourse. Greenwashing, also known as 'semantic engineering', is also critiqued in Penz and Fill's critical overview of the development of Ecolinguistics (2022).

Alongside work in Ecolinguistics are texts produced in the field of more strictly ecological studies. As the scientific consensus on climate change emerged and strengthened, the fossil fuel industry and its political allies have attacked the growing consensus on climate change, and attempted to exaggerate the uncertainties. This is the theme addressed by Cook et al. (2019), who write that:

> Over the past few decades, the fossil fuel industry has subjected the American public to a well-funded, well-orchestrated disinformation campaign about the reality and severity of human-caused climate change.

Their work shows that climate denial lacks consistency, and may be viewed as an attempt to continue business as usual in the face of climate disruption. The authors conclude that disinformation about climate change has a clear purpose, which is simply to block action on the question. In America, they say, this has been largely successful.

Sylvia Jaworska (2018) employed corpus-linguistics methods to investigate the discourses of climate change in corporate social responsibility and environmental reports produced by major oil companies from 2000 to 2013. One conclusion to this study claims that 'responsibilities are clandestinely shifted to other stakeholders or the future'. The author suggests that this discourse

> obscures the industry's contribution to the environmental degradation and reinforces the neoliberal credo that the market and technology are the only solutions to ecological problems.

Westervelt (2021) summarizes the work of academic researchers who say the fossil fuel industry has a new tool to delay efforts to curb emissions — a social justice strategy. As she writes: "A casual social media user might get the impression the fossil fuel industry views itself as a social justice warrior, fighting on behalf of the poor, the marginalized, and women — at least based on its marketing material in recent years." Westervelt (2021) further writes: 'These campaigns fall into what a handful of sociologists and economists call 'discourses of delay', and continues: 'now the industry's messaging is far more subtle and, in many ways, more effective than outright climate science denial.' (see also Lamb et al 2020, Noor 2024). Timmons Roberts, a co-author of the "discourses of delay" paper, catalogued how fossil fuel interest groups and utility companies in particular used discourses of delay to try to defeat clean energy legislation (Ciplet & Roberts 2017).

Ajit Niranjan (2024b) looks at the Norwegian case. He summarises his analysis: "As it rapidly adopts clean technologies while drilling furiously for oil and gas, the Nordic nation is a paradox." He argues: "Europe's northernmost country is the closest the world has to what could be called a green petrostate." "It is a paradox that has led some to paint Norway as a climate hero and others to decry it as a carbon villain." As Niranjan puts it: "The Norwegian defence is that its fossil fuels are produced more cleanly and with higher ethical standards than those of the autocracies and flawed democracies that dominate petroleum production." Their politicians justify what they are doing, with some politicians like Elisabeth Sæther, state secretary of Norway's petroleum ministry, arguing that the country was working to reduce its "already low" production emissions, but that 'the world will still need oil and gas'."

According to Nina Lakhani (2024) some of the world's most profitable — and most polluting corporations — have invested in carbon offset projects that have fundamental failings and are "probably junk". This suggests that industry claims about greenhouse gas reductions were likely overblown, according to new analysis. Major corporations, like Delta, Gucci, Volkswagen, ExxonMobil, Disney, easyJet, and Nestlé have purchased millions of carbon credits from climate friendly projects that are "likely junk" or worthless when it comes to offsetting their greenhouse gas emissions, according to a classification system developed by Corporate Accountability, a non-profit, transnational corporate watchdog. Their study suggests at least some claims about carbon neutrality and emission reductions have been exaggerated according to the analysis. The fundamental failings leading to a

"likely junk" ranking include whether emissions cuts would have happened anyway, as is often the case with large hydroelectric dams, or if the emissions were just shifted elsewhere, a common issue in forestry offset projects. They show that the voluntary carbon market (VCM) industry works by carbon credits being tradable "allowances" or certificates that allow the purchaser to offset one ton of carbon dioxide or the equivalent in greenhouse gasses by investing in environmental projects anywhere in the world that claim to reduce carbon emissions.

4. Materials and methods

We analyse the "Sustainability and Climate Change Progress report", a significant recent document produced in 2024 by one of the super-majors, TotalEnergies. It purports to support a range of clean energy programmes, to be a roadmap for energy transition away from fossil fuels, to highlight achievements in this sector and in sum to present the company as a force for environmental good. As such it may be viewed as a branding exercise or, if the document's basic premise is felt to be insincere, as a climate greenwash. The foregoing details of the climate science, the social background and the role of Big Oil are provided to support our enquiry in this area. The Discourse-Historical approach pioneered by Ruth Wodak (Wodak 2001, Weiss & Wodak 2007) offers a principled model for the in-depth study of contemporary discourse, and it is precisely via triangulation of discursive effects with details and perspectives from other disciplines (in this case, contemporary climate ecology) that the richest results from Wodak's methodology are obtained. Wodak argues for the inclusion of data and perspectives from a range of contexts, including, 'more or less systematically', the 'historical, political, sociological and/or psychological dimension' (Weiss & Wodak 2007: 21–22). Wodak (2001: 64) envisages the D/H method as a 'problem-oriented science', aligning it with the overall socially constructive mindset and methodological outlook of other CDA paradigms.

In our study the aim of the foregoing sections has been to provide part of a thick socio-historical picture of the role of Big Oil in the current energy crisis, on the basis of which possibly hidden meanings in the discourse fragments that are analysed will emerge. From an Ecolinguistic perspective, this approach is particularly useful since it allows to appreciate both the role of alternative, environmentally damaging 'stories we live by' (Stibbe 2015) in the oil companies' discourse, and the extent to which the greenwashing rhetorical strategy is present.

As well as critical discourse analysis the study uses corpus linguistic methods to scrutinize material from the website of an energy company (Alexander 2017, Poole 2022). The analyses undertaken will be facilitated by the use of computer-generated concordances, [1] used to reveal how specific linguistic features are

[1] The program was compiled by Laurence Anthony and is available at his web site. www.laurenceanthony.net (accessed: 23 September 2024).

associated with or serve to uphold larger-scale discourse processes, such as evaluation, argumentative strategies and discourse tactics. We thus receive additional evidence to supplement the descriptive background and sustain our qualitative analysis of argumentation structures.

One of the most basic techniques of language data-processing is the production of alphabetical frequency lists which provide details of key lexical items, and can aid us to explore collocational co-texts which a cursory reading may well have overlooked. Focuses of semantic interest are reflected in lexical patterns including repetition.

Wodak's approach engages three levels: from the broadest to the finest these are topics, discursive strategies and linguistic means (Wodak 2001: 72). In terms of topics, we are dealing with background knowledge that concerns the activities of oil companies in the area of environmental sustainability, with climate activists and their discourse, as well as with that of politicians. Relevant discursive strategies are the deployment of representation patterns such as greenwashing, vagueness or mendacity on the part of the companies, including the use of vacant slogans or positive sounding 'purrwords'.

At the level of linguistic means, analysis focuses on frequency data and the contribution of frequent lexical items to the processes of framing and argumentation developed in the discourse.

Thus, our research questions are as follows: what are the main linguistic and lexical patterns by means of which the company in question represents its activities, and how do these meanings match up with the ideational details we have described in the sections on the discourse-historical background? 2.i, 2.ii.).

5. Results. TotalEnergies' Report and Corpus Analysis

5.1. Case study: TotalEnergies, Iustainability and Climate Change Progress report

We begin with a look at TotalEnergies' 2024 "Sustainability & Climate Progress report", a title which already *presupposes* (Levinson 1983) a favourable climate action profile for the company, i.e., that a) they have made progress towards climate sustainability, and b) that climate goals are among their core aims. The website version runs to 112 pages, and section titles continue the company's green rhetoric. Early pages contain a message from Patrick Pouyanné, Chairman and CEO, and one from Jacques Aschenbroich, Lead Independent Director. Among the messages are headings and sub-titles with environmentally-friendly content:

(1) Anchored on two pillars, the Company is building a strong position to support the energy transition of its customers (p.3)

(2) TotalEnergies stays the course of its balanced multi-energy strategy..(p.3)

(3) Responsibly producing low-cost, low-emission hydrocarbons (p.3)

Both texts exemplify what was claimed in the study by Westervelt (2021) outlined above, i.e. that the company is at pains to associate itself with green ideologies via purr-words (p. 4–9 include: *balanced, integrated, renewable, clean, transition, equitable, decarbonised, solar, wind, low-carbon, sustainable, sustainable development, net zero, integrated power, environmental risks*, etc.), and are full of impressive claims such as:

> (4) The Company is building a world class cost-competitive portfolio combining renewable (solar, onshore wind, offshore wind) and flexible assets (flexible gas power plants, storage) to deliver clean firm power to its customers (p. 4)

Purr-words (as non-linguists call them) are positive-sounding or euphemistic words. They are transparent and recognizable indicators of self-representation. When one analyzes how purr-words are employed in corporation discourse, a number of common features emerge. The use of such words and phrases, and, particularly, their tendency to cluster, or their cumulative effect when used often with each other, reflects a self-assured, unquestioning perspective. They confer a confident and categorical note on the discourse, hence transmit an authoritative message to the readership.[2]

Twenty pages entitled 'Our Ambition and Progress' give further proof of green credentials, and page 27 introduces 'Energy and Climate: Our orderly energy transition'. At an inferential level, these section headings contain nested propositions whose pragmatic function is to undercut the document's ostensible message. For example in this case, the notion of an 'orderly transition' associates the company with the socially-valued quality of 'responsibility' in dealing with the climate crisis. It insinuates that it would also be possible for energy multinationals to effectuate a *disorderly* energy transition, i.e. abandon fossil fuel extraction and switch to renewables in a panicky way, compromising the world's energy supplies. Moreover, for a 'transition' to be 'orderly' it must be slow, since it entails all kinds of research, decision-making processes and the like.

The final section, 'Performance Indicators', from page 96 to the end consists of tables with figures, supposedly backing the company's green rhetoric. To a degree, for a non-specialist readership, this mass of complex mathematical detail obfuscates rather than illuminates the actual impact of whatever TotalEnergies has done in this sector.

The document is a mixed multimedia report, with occasional photographs that support the overall pro-green messages of the text. For example, on p.83 there is a glossy image of two beaming black workers in a tropical agricultural setting, illustrative of a section entitled, in large blue letters: 'Having a Positive Impact for

[2] Orwell (2013) noted in the well-known essay Politics and the English Language that such words, which were called 'glittering generalities' in 1938 by the Institute for Propaganda Analysis, allow their users to equivocate, since they are too imprecise to admit of a single recognised meaning. The hearer is bound to conclude that the speaker means what they themselves imagine them to mean, which may not be the case.

Stakeholders'. It is not hard to unpack the message in such an 'image-text' (Mitchell, in Wiesenthal et al. 2000): TotalEnergies' environmental policies are impacting just the kind of areas where people are usually felt to be most at risk from climate change.

5.2. Concordancing study of TotalEnergies' Sustainability & Climate Progress Report

The report has 27,774 tokens — the total number of words (i.e. of running words), and 4,472 types — the number of different words (word-forms or 'lemmata'). This gives a type-token-ratio (Baker 2010) of 0,1610. Maximum diversity, i.e. every other word being different, equals unity (1). The more repetitive the text, the closer to zero (0) the ratio will be; hence, the element of repetition is reflected in this ratio, a datum which may well reflect focuses of semantic interest. If function words are ignored, and only content words counted, frequency data is obtained on which, predictably, the most frequent item is 'TotalEnergies'.

Studying frequency allows us to unearth specific areas that TotalEnergies presents as its major interests and sets out to emphasise for the general reader. The three most frequent content terms are 'TotalEnergies', 'energy' and 'emissions' (table one, below):

Table 1. **Frequency list**

Word	Hits	Frequency
TotalEnergies	234	12
Energy	205	15
Emissions	161	19
Company	106	28
Transition	82	32
Carbon	81	33
Year	79	36
Gas	78	37
Electricity	77	38
Production	75	40
Development	70	45
Renewable	69	46
Projects	66	48

Alongside expected items for a fossil fuel multinational such as 'energy, production, company, projects, gas' are found items with an environmental orientation like 'emissions, transition, renewable'.

Many passages in the report document and demonstrate the environmental credentials of TotalEnergies, such as this extract, which aims to show how humanely the company treats people in the Global South:

> Access to clean energy, particularly for cooking, is a prerequisite for economic and social development in emerging countries. Today, 2.3 billion people in the world do not have access to it.
> By substituting Liquefied Petroleum Gas (a fossil fuel) in the form of bottled gas for wood and charcoal, 'clean cooking' has a positive effect on people's health, the environment and the economy. LPG is more efficient for cooking and emits less CO2 than charcoal. It improves air quality, reducing the risk of respiratory complications and cardiovascular disease. It also reduces some of the negative impacts of traditional biomass use, notably on women (time saved facilitating access to education, employment or entrepreneurship, and financial independence) and on the environment (deforestation)

The text rehearses some of the standard arguments proposed in favour of liquefied petroleum gas as a transition fossil fuel towards cleaner energy sources . However, though it has some advantages it is still a fossil fuel, hence unsustainable in the long-term, and its use represents a sideways step in terms of meaningful transformation of the energy market. It has been claimed that, though cleaner than petrol in the context of cars, it performs worse than diesel (Synák et al. 2019). In any case, as a by-product of the petrol extraction and refining process (Raslavičius et al. 2014), it is plain that its adoption on a wide scale would simply mean business as usual for TotalEnergies. There is some merit in the claim that there are environmental benefits associated with its use in ex-colonial contexts (fewer trees cut down, health benefits, etc.). However, the presupposition that third-world women will be able to access 'education, employment and entreneurship' because they are freed up by the use of LPG is unsubstantiated. Hence, it assumes as real and actual benefits which in reality are at best contingent, or currently *irrealis*. The text is accompanied by a radiant image of a 'Kenyan woman using bottled LPG to cook, replacing charcoal'; again, an instance of visual persuasion (Messaris 1996). Like a magazine advert, the image is carefully constructed, with the woman's bright orange dress a perfect match for the gas bottle in the foreground, the company name in prominent position.

Analysis now focuses on some of the key lexical items in table one, as well as others of interest identified by the software. We begin with *ambition*, not one of the most frequent items, but relevant for what it reveals about the company's intentions and self-presentation strategies. Somewhat curiously, for an ostensibly future-oriented document that promises significant changes, the term only occurs 35 times. Some examples are shown in table two, below:

Table 2. **'Ambition'**

wind developers in 2023, and we have the	**ambition**	to be among the world's top 5 by 2030
production (15 TWh in 2023). As part of its	**ambition**	to achieve carbon neutrality by 2050
or the 4th consecutive year, the company's	**ambition**	in terms of sustainable development and energy
er with Society TotalEnergies reaffirms its	**ambition**	to be a major player in the energy transition
integrating new skills. Our	**ambition**	to rank among the top 5 producers of wind and

The co-text contains numerous instances of eco-friendly lexis (here *wind developers, carbon neutrality, sustainable development, energy transition, new skills*). 'Ambition' thus operates like a corporate purr-word; moreover, the irrealis element here — these desirable outcomes are all as yet only future possibilities — allow the company to bank positive capital now on the basis of future scenarios which may not be realised.

Secondly, *company* (106 hits). As expected, a picture of the company emerges that paints a highly positive picture, especially in terms of its green credentials:

Table 3. **'Company'**

strategy from production to customer, the	**Company**	implementing its transition strategy supporting
urns of the traditional Utilities model. The	**Company**	is building a world class cost-competitive portf
et Zero in 2050, together with society, the	**Company**	has placed sustainable development at the hear
ing them to deepen their knowledge of the	**company's**	specific features, its sustainability challenges
2024 confirmed the progress made by the	**Company**	in the field of energy transition and sustainable
from processes and water discharges. The	**company**	often goes beyond compliance with applicable

By contrast with the last item, the general orientation here is to the present tense, the area of present measures, construed predominantly in Material processes (*to implement, to build, to place, to make + progress, to go*, etc.). To expand some of these snippets is to make manifest the extent to which the texts play up the company's environmental credentials. It self-represents as going the extra mile:

> (5) The company often *goes beyond compliance* with applicable regulations to limit the quantities discharged into the various environments.

It uses purr words:

> (6) the company has placed *sustainable development* at the heart of its strategy, projects and operations.

It poses as deeply committed to renewable energy:

> (7) The company is building a world class cost-competitive portfolio combining renewable (*solar, onshore wind, offshore wind*) and flexible assets (flexible gas power plants, storage) to deliver clean firm power to its customers 24/7."

It paints a picture of its role in an ongoing process of transition to a decarbonised economy:

> (8) the company is implementing its *transition strategy* supporting its customers and stakeholders in their *decarbonization.*

Many of these claims are vague. For example, no details are given in (c) of the proportions involved. A possible inference is that the company's portfolio is split 50–50 between renewables and fossil fuel, but all that is indicated is that there is a 'combination'. In (a) too the adverb 'often' is non-specific regarding the form this action takes, how often it is carried out, what it consists in, etc.

Next, *energy*, after TotalEnergies the second most frequent lexical item, with 205 hits:

Table 4. **'Energy'**

ctives of tripling the amount of renewable	**energy**	and doubling energy efficiency by 2030, as well
tments are needed, not only in renewable	**energy**	but also in electricity networks and systems
gress thanks to sales growth of renewable	**energy**	by notching a 13% reduction in the lifecycle carb
ers numerous opportunities for renewable	**energy**	and flexible production. TotalEnergies has built
enewables: activities related to renewable	**energy**	(wind, solar, bio- energy and hydropower), as wel
accelerating our investments in renewable	**energy**	Relentlessly Reducing Our Scope 1+2 Emissions,
accelerating our investments in renewable	**energy**	Scope 1+2 Emissions Reduction by 2030
weather conditions contrary to renewable	**energy**	and to face demand fluctuations. In addition,
gned agreements to acquire the renewable	**energy**	aggregator Quadra Energy, which has a 9 GW
of water using electricity from renewable	**energy**	sources. Synthetic fuels, e-fuels CO2 can be co e-

The left collocation of the keyword with the adjective 'renewable' is the outstanding finding here. Moreover, in the corpus results, 'transition' occurs 33 times as a direct right collocate. 'Efficiency' occurs 13 times as a direct right collocate to 'energy', while the adjective 'transitional' occurs twice as a left collocate. From table four it is plain at a glance that TotalEnergies is concerned to present itself as almost exclusively concerned with the left collocate, or 'renewable' energy. Yet, as indicated above, TotalEnergies is one of the 'supermajors', a group of the world's largest publicly traded oil companies that includes ExxonMobil, Chevron, BP, and Shell. In 2019, its oil output was 1.845 million barrels per day (Toledano et al. 2022: 50). The significant presence of the term 'energy' in the corpus, with this collocation pattern exemplify the company's rhetorical goals throughout the document, i.e. to shift attention from its role as among the planet's heftiest polluters and contributers to global warming (Toledano et al, ibid.) and to re-shape the image of its global brand as an environmentally-friendly concern.

The next item is the third most frequent, *emissions*, of which there are 161 instances. The semantic prosody (Hunston 2007) of company discourses about 'emissions' can be observed simply by listing all the processes that figure left of the term, either directly or in company with other words:

> we have reduced / aiming for zero / reduce / slashing / reducing / aiming for zero /reduction / find solutions to reduce /slashing / reducing / elimination / drastically lowering / reduce / reducing / Reducing / curbing / Our objective of cutting / Reduce / help our clients reduce / lower / reduce / Relentlessly reducing / substantially reduce / a priority to / reduce / reduced / minimizing / the reduction in / to avoid and reduce / Our actions aiming to reduce / to reduce/ reducing / aims to gradually reduce / efforts to reduce / We are also working to reduce/ reducing / reduce / has already reduced / beyond the 75% reduction / near-zero Upstream / reduce / reduce / Reduce / reduce / reduce / reduce / reduce / reduce / reduce / reducing / reduce / reduce / reduce / lowering / reduce / Reduce / definitely contribute to lower / Reduction / reductions / reducing / reduction / reducing / reduce / help to reduce / achieve net zero / reducing / aiming for zero / reducing / target of 75% reduction / reduced.

This list makes clear how substantial this semantic area is within TotalEnergies' discourse in the report. The central terms employed are 'reduce' or 'reduction' and a wide range of related synonyms. In parallel with this point, we can note that the most frequent adjective in the report is 'low', which occurs 46 times; in more than half the instances (27) as a left collocate of 'carbon'. Right collocates are: 'break even' (3 instances), 'emission' (5 instances), 'cost' (7), 'greenhouse gas emissions' (2) 'production costs' (once) 'low permeability deposits' (once). Not only, then, does the company ostensibly position itself as actively engaged in the reduction of carbon emissions, but it paints a picture of energetic activity in this direction via high intensity lexical terms (Martin and White, 2005) such as: *slashing /aiming for zero / elimination / drastically reducing / relentlessly reducing.*

6. Discussion

At this point we can draw together the above linguistic analysis with the details provided of the context in which this discourse appears. The repeated use of green lexical items such as 'carbon neutral' and 'reducing emissions', as well as discursive practices such as the striking insistence on 'renewable energy' identified above, support the company's strategy of self-presenting as environmentally on point. TotalEnergies, as pointed out above, was selected for study as a representive of 'Big Oil', the group of super-majors whose core business activities contribute greatly to global warming and hence to the ongoing climate crisis (Gutstein 2018). These companies are regularly accused of greenwashing (Vasta 2005, Bowen & Aragon-Correa 2014, Seele & Gatti 2017, etc.). The last of these studies describes Shell's 2007 campaign, 'Don't throw anything away. There is no away', which featured 'a colourful picture of an industrial landscape with several refineries and four chimneys emitting colorful flowers into a bright blue sky' (Seele & Gatti 2017). The Guardian criticized this misleading advertisement, and the environmental organisation Friends of the Earth complained to the UK's Advertising Standards Authority, accusing Shell of 'inconsistency between its communication and its actual environmental performance', successfully compelling the company to withdraw the advertisements. Greenwashing allows these corporations to project a false image of leadership in the fight against climate change when it is a scientifically accepted fact that fossil fuels are the largest source of greenhouse gas emissions, driving global warming and forcing the climate to the brink of collapse. Moreover, as pointed out by Lamb (2020) and Westervelt (2021) in works cited above, these rhetorical methods play a role in the delaying strategies of Big Oil, whose true interests coincide with the 'drill, baby, drill!' slogan recently announced by Donald Trump as official Republican policy on the fossil fuel issue.[3]

[3] ABC News, online: https://abcnews.go.com/Politics/drill-baby-drill-donald-trump-oil-gas-rnc/story?id=112108980 (retrieved 9/10/2024).

The linguistic and semiotic patterns identified in the above analysis confirm that the Report is another attempt by a protagonist of climate change to re-brand itself as a force for environmental good. That this is largely a rhetorical performance is manifest in the profusion of green purr-words that have been identified, as well as in the glossy, climate-friendly images described above. However, to highlight such linguistic and semiotic elements without an in-depth account of the surrounding context is to offer a superficial, partial picture of the company's behaviour. The discourse-historical approach entails the situation of the discourse analysed in its appropriate context, where disparities between rhetoric and reality may emerge in a natural fashion.

Actions speak louder than words, and the reality of TotalEnergies' daily commercial activities shows them deeply engaged as one of the most significant players in fossil fuel extraction, while their renewable sector is trivial by comparison. The rhetorical smoke-screen thrown up by documents like the Report obfuscates the true state of affairs, while allowing supporters of Big Oil to represent them as responsible, cooperative organisations. All this delays the process of a real transition towards renewable sources of energy, and maintains intact the structures of dependence on fossil fuels.

We need to ask whether there are steps that can be taken to expedite energy transition on a world scale. Perhaps surprisingly the latest UN climate summit, COP28, was the first COP to officially acknowledge that fossil fuels are the root cause of climate change. Most countries wanted a strong statement on phasing out or at the very least phase down (reducing) of fossil fuels. Instead, countries agreed a statement saying we must

> transition away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science.

The rhetoric may sound like it was a breakthrough. However, one notices here the same kind of vague, destabilising, irrealis patterns as those found in the TotalEnergies report itself. The can is kicked away down the road — to 2050, by which time it will be the problem (and responsibility) of a new generation of politicians. The need for dramatic, rapid, instant action (now!) is pushed away by emphasising the need for a 'just, orderly and equitable' process.

But Big Oil has already had decades to do the right thing — it can't, and it won't. Therefore, enabling a just transition must mean, first of all, bringing private oil and gas companies into public ownership. To really achieve downsizing of energy companies much more is needed; for example, requiring transnational companies and financial institutions to monitor, assess, and transparently disclose risks and impacts on the climate through their operations, portfolios, supply and value chains. This may sound like an appeal to act voluntarily. But a realist would say that it is going to take a long time, to initiate legal requirements enforced by international law and administered by national governments.

7. Conclusion

The study aimed to highlight the main linguistic and lexical patterns by means of which the company in question represents its activities to conform with a desirable social profile which, we have argued, is out of synch with their real nature. It shows how the language used by an oil company like TotalEnergies to represent itself as environmentally conscious, fully committed to respecting the goals of international climate frameworks such as COP 28, raises questions about how far such discourse may be seen as a case of greenwashing (Grasso 2022).

As the impacts of climate change become more apparent, the need for a true shift to renewable energy becomes more critical. Thus, it is essential to hold companies like TotalEnergies to account, to require them to substantiate their rhetorical claims, to do more than propose eye-catching but ultimately superficial investments in renewables. What the report presents is, in the final analysis, a marketing exercise rather than what it purports to be, a sort of manifesto for change.

The paper thus contributes to the growing tradition of ecolinguistic studies that expose the role of (corporate) language in perpetuating situations of environmental harm.

Hopefully, this study will encourage researchers to provide more indications of the steps being taken to counter climate change, and of the enormous effects on ecological degradation in the world by the fossil fuels industry, as well as who or what is contributing to this deterioration, and what can be done about it.

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Solastalgia: A comparative corpus-based study of environmental lexicon

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Abstract
This study focuses on the evolving environmentally related lexicon and the new meanings that have progressively arisen or born of the combination of pre-existing terms and lemmas. The increasingly widespread practice among news professionals, psychologists, sociologists etc. of listening, recording and collecting narratives centred upon environmental alterations has enhanced the tendency to coin new words. Neologisms, such as *eco-grief, eco-anxiety, solastalgia*, are progressively entering mainstream communication, though due to its more complex morphological makeup the term 'solastalgia' requires more in-depth analysis. The objective of the present study is to investigate the early use of the term *solastalgia* in scientific communication and trace its subsequent development and transition to mainstream communication. The progressive shift was investigated through an integrated methodological approach, based on a comparative corpus-based analysis (time span 2007–2023), and further informed by an ecolinguistics perspective. The data were obtained from two diachronic sub-corpora, specifically created for the purpose of this investigation: the *Eco-PubMed corpus*, extracted from the PubMed Central archive, and the *Eco-Guardian* corpus taken from the online international version of the Guardian newspaper. Both quantitative and qualitative aspects were taken into account, together with the cultural-pragmatic implications of this fast-emerging new locution. The results reveal that the term 'solastalgia' has only reached mainstream communication to a limited extent, since it occurs in 31 *PubMed* articles vs 17 *Guardian* articles. The diffusion of the term belied the authors' expectations regarding the greater neutrality of scientific dissemination compared to mainstream communication. The study raises awareness of the dissemination of environment-related terminology and its interdisciplinary relationship to other domains.
Keywords: *climate change, ecolinguistics, corpus linguistics, environmental lexicon, neologism, solastalgia*

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Соластальгия: сравнительное корпусное исследование экологической лексики

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Аннотация
Данное исследование посвящено развивающейся сфере экологической лексики и новым значениям, которые постепенно возникают или рождаются из комбинации уже существующих лексем. Все более распространенная среди журналистов, психологов и социологов практика прослушивания, записи и сбора нарративов, связанных с изменениями в окружающей среде, усилила тенденцию к созданию новых слов. Такие неологизмы, как *eco-grief* «эко-горе», *eco-anxiety* «эко-тревога», *solastalgia* «соластальгия», постепенно проникают в СМИ. Из-за своей сложной морфологической структуры термин *solastalgia* требует более глубокого анализа. Цель настоящего исследования – выявить особенности раннего использования термина *solastalgia* в научной сфере и проследить его последующее развитие и распространение в СМИ. Этот постепенный переход изучался с помощью комплексной методологии, основанной на сопоставительном корпусном анализе (временной период 2007–2023 гг.) и опирающейся на эколингвистический подход. Данные были получены из двух диахронических субкорпусов, специально созданных для целей данного исследования: корпуса Eco-PubMed, извлеченного из архива PubMed Central, и корпуса Eco-Guardian, взятого из международной онлайн-версии газеты *Guardian*. Учитывались как количественные, так и качественные аспекты, а также культурно-прагматические особенности данного неологизма. Результаты показали, что термин *solastalgia* используется в массовой коммуникации в ограниченной степени, поскольку он встретился в 31 статье в *PubMed* и только в 17 статях в *Guardian.* Таким образом, ожидания авторов относительно большей нейтральности термина *solastalgia* в научной сфере по сравнению с массовой коммуникацией не оправдались. Данное исследование обогащает знания о функционировании экологической терминологии и ее междисциплинарной связи с другими областями.
Ключевые слова: *изменение климата, эколингвистика, корпусная лингвистика, экологическая лексика, неологизм, соластальгия*

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1. Introduction

Over the last few decades, the prominence granted to discourses regarding the environment, ecology and climate change has progressed from a soft breeze to a howling gale. This is due, in the main, to the escalation of cataclysmic,

environmentally related events and to the consequent social and political interest that has given rise to the mobilization of novel organisations, bodies and, of course, words. This study focuses on the evolving environmentally related lexicon and the new meanings/acceptations that have progressively arisen, be they emergent, or born of the combination of pre-existing terms and lemmas.

The increasingly widespread practice among news professionals, psychologists, psychiatrists, sociologists etc. of listening, recording and collecting narratives (often those of Indigenous or First Nations populations) centred upon environmental alterations or disasters has enhanced the tendency to coin new words and encompass new, still unrecognised complexities of meaning. Neologisms, such as eco-grief, eco-anxiety, solastalgia, are progressively entering mainstream communication, and while the meanings of 'eco-grief', and 'eco-anxiety' are easy to apprehend, the term 'solastalgia' requires more in-depth analysis. The immediate reference is to 'nostalgia' (or homesickness), which stems from the Greek words νόστος (return) and -αλγία (a composite element constructed from ἄλγος, pain), i.e., the suffering induced by a yearning to return to one's place of origin, more likely to arise when the absence from home is imposed rather than chosen.

With 'solastalgia' a new layer of meaning is added: the neologism is formed through the combination of the Latin words *sōlācium* (comfort) and the previously mentioned term -αλγία, to the effect of describing a form of emotional or existential distress, caused by a negative environmental change leading to the loss of the erstwhile comfort/solace derived from living in a healthy, unharmed environment.

Coined in the early 2000s by the environmental philosopher Glenn Albrecht, the term was initially employed to describe the feelings and emotions of a growing number of people distressed by the impact of open cut coal mining and power stations in the Upper Hunter Region of New South Wales. In his words:

> The people I was concerned about were still 'at home' but felt a similar melancholia as that caused by nostalgia connected to the *breakdown of the normal relationship between their psychic identity and their home*. […] In addition, they felt a profound sense of isolation about their inability to have a meaningful say and *impact on the state of affairs* that caused their distress. 'Solastalgia' was created to describe the specific form of melancholia connected to lack of solace [derived from their relationship to 'home'] and intense desolation. (2005: 48, our italics)

Accordingly, the research questions we set out to address in this study are:

How was the term solastalgia coined when it first appeared? In what way has the term evolved over time in both the layman and scientific context?

After providing context and background to the notion of solastalgia, we will illustrate our two-pronged methodological approach (corpus investigation and narrative analysis). We will then present and discuss our findings and draw our conclusions.

2. Background

Despite the morphological resemblance to the term nostalgia, a fundamental difference between the terms lies in the fact that while nostalgia is past-oriented, solastalgia can also be future-oriented in so much that it may induce people to take action against the alteration or destruction of their physical environment by participating in collective grassroots movements, such as Landcare or Dunecare which promote the indigenous culture.

Besides these collective uprisings, a further route towards healing passes through narratives, "We also recognise the importance of language. By translating and writing Aboriginal story, there are oftentimes *unacknowledged depths to the meaning behind the words*. We wish to acknowledge the space between each word, the content of 'More than Words'" (Upward et al. 2023, our italics). In the context of stories, vital information about country and land and cultural heritage are shaped and transmitted through 'dreaming' and 'songlines'. It was to fill in the gap between existing words and the new depths of meaning, that the researchers utilised the recently coined term 'solastalgia', which effectively conveys the sense of loss and grief. The term has since been embraced by indigenous scholars (Fook 2018, Maguire 2020, Standen et al. 2022) who are concerned with the mental and physical welfare of aboriginal people, increasingly exposed to the emotional consequences of climatic events.

In today's pervasive, multifaceted mediascape, some controversy has emerged around the idea that such a sense of environmental grief and loss can effectively be perceived on a personal, individual level, with political manipulation being called into question. Even though harmful contemporary ecological events, such as the melting of the icebergs, fracking, desertification, land clearing etc. now reach us all in real time with a strong audio-visual impact, the different intensity of such feelings among diverse populations, depending on their levels of immersion/symbiosis with natural environments, cannot be ignored (Ponton 2023).

With the passing of time, the notion of solastalgia has gained momentum in the wide domain of mental health care, suffice it to refer to some of the titles of the PuBMed articles we have investigated (Albrecht et al. 2007, Breth-Petersen et al. 2023, Cáceres et al. 2022, Upward et al. 2023, see References). The shared aim of experts working in this ambit is to heal the condition by restoring a sense of unity between people and their ecosystem, through sustainable ethical responses to the desolation of the environment, not only for First Nations, but also on a global level (see among others, Testoni et al. 2019, Wood et al. 2015).

2.1. The emergence and the need for new words

As emerges from our corpus (see below 3.1) 'nostalgia', solace' and 'homesickness' are also employed to conceptualise solastalgia which, in given contexts, has become an umbrella term to describe the peculiar feeling of "homesickness at home" characterized by distress, psychological desolation, guilt,

fear, helplessness and melancholia brought about by environmental change or destruction.

Albrect (2019: 63–9) repeatedly remarked that a new term was needed to convey the emotions felt upon witnessing the degradation of the planet in the Anthropocene. As previously stated, the perception of changing environmental conditions has led to the emergence of negative emotional conditions which he defined as 'psychoterratic states', i.e. emotions that people feel in relation to the earth. In addition to nostalgia and solastalgia, these states include 'biophobia', 'ecoparalysis', 'ecoanxiety', 'ecocide' and 'ecophobia', together with neologisms such as 'terrafurie' and 'meteoranxiety', which he used to describe the emotional states people can experience in the face of environmental disasters. Recent additions in mainstream communication include 'climate despair' together with the emerging figure of the 'climate-aware therapist' to whom Americans are increasingly turning (Haupt 2024).

3. Methodology and Data

In order to carry out a thorough investigation, we opted for both a quantitative and qualitative approach. The latter adopted the multi-faceted ecolinguistics framework which is increasingly gaining momentum in the contemporary arena, while the former exploited the consolidated resources and tools of corpus linguistics to study two collected datasets and uncover linguistic patterns which go towards the construction of specific discourses that are crucial to the way knowledge of social reality is constructed.

3.1. Corpus building

When focusing a diachronic lexical investigation upon an emergent term such as 'solastalgia', it is crucial to remember that the way in which the term is initially disseminated and popularized will clearly condition the way it is subsequently employed, reiterated and re-contextualised by those who encounter it. We chose to investigate the term solastalgia by building up the Solastalgia Corpus comprising two separate diachronic sub-corpora both dating back to the initial emergence of the term.

Our initial aim was to investigate whether a higher number of topical occurrences would emerge in a more restricted scientific context or in the more generic field of a daily broadsheet. We investigated the emergence of the term within the PubMed Central archive and the online international version of the Guardian newspaper in an attempt to access widespread non-nationally connoted texts.[1]

1. Although the two online repositories are widely used for research purposes, a brief description may serve to situate the archival context in a clearer manner: PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/about/intro/) is an online archive containing over eight million full text versions of biomedical and life science journal articles which can be perused free of charge

From a temporal perspective, our investigation spanned the initial emergence of the term 'solastalgia' until the 1st of August 2023. The two sub corpora were respectively denominated the *Eco-PubMed corpus* and the *Eco-Guardian corpus*.

The Eco-Guardian sub-corpus spans a period from 2014 to 2023. It contains a total of 17 articles equivalent to 36,359 tokens and 31,120-word types, with a type-token ration of 0,85 (85%) thus encompassing a relatively high vocabulary variation. 15 out of the 17 articles which make up the small newspaper corpus belong to the 'Climate crisis + Opinion' section of the online newspaper. The other two belong to the book review section.

The Eco-PubMed sub-corpus spans a period from 2007 to 2023. It contains a total of 31 articles equivalent to 161,100 tokens and 133, 745 types, with a type-token ratio of 0,83 (83%). Here too the lexical diversity is relatively high. The greater number of articles in the Eco-PubMed sub-corpus points to the fact that the origin and first use of the term relate to scientific rather than lay communication.

3.1.1. Corpus investigation

To carry out our corpus investigation, we made use of the text analysis tool Sketch Engine. We uploaded the Eco-PubMed and Eco-Guardian sub corpora and proceeded to question the software. We opted to start by observing the frequency wordlists of the two sub corpora as such inventories can serve as a generic source of information which can illuminate a number of phenomena to then be investigated. We eliminated the function words (pronouns, determiners, conjunctions, prepositions, articles) which tend not to be subject to linguistic innovation or change, and concentrated on the content words which could provide us with an initial reading.

The reason for the early cut off (first ten content words only) was due to the noticeable numerical drop-off which emerged between the 10th and the 11th occurrence in both the sub-corpora, a drop from 1,088 to 763 in the Eco-Guardian sub-corpus, and from 3,003 to 1,642 in the Eco-PubMed one.

We had expected a more marked difference between the two lists, considering the more popular, informative nature of the former and scientific nature of the latter. Due to space limitations, we will briefly outline the manner in which each term appears in the two corpora:

- Verb to be – mostly used to define the notion of solastalgia.
- People – mostly used as agents of destructive environmental actions.
- Climate – as the underlying discourse.

by the general public simply by inserting the desired term or phrase into a search box. Available to the public online since 2000, PubMed Central was developed and is maintained by the National Center for Biotechnology Information. The Guardian International online version is one of the five global editions (UK, Europe, US, Australia, International) of the historical British broadsheet. Launched in 2015, the aim of this specific edition is to "Help the guardian.com become a destination for readers living elsewhere, giving them the option to see a more global selection of stories when they visit the site" (https://www.theguardian.com/info/2023/nov/09/how-to-access-the-guardian-global-editions).

- Change – to describe the devastation reaped by man.
- Anthropocene – as a contextual situation of place and time.
- New – to signal novel information.
- Mental and research – both connected to the scientific discourse.
- Distress, grief and loss – to convey the emotional burden.

Table 1. **The two sub-corpora frequency lists**

Solastalgia Corpus – Word frequency list	
Eco-Guardian sub-corpus	**Eco-PubMed sub-corpus**
1) is	1) is
2) climate	2) are
3) are	3) climate
4) people	4) change
5) change	5) solastalgia
6) solastalgia	6) mental
7) new	7) people
8) anthropocene	8) research
9) grief	9) distress
10) distress	10) loss

We next proceeded to investigate a number of concordance lines from the two sub-corpora, to provide a detailed, context-rich illustration of how the term 'solastalgia' fits into both the scientific and journalistic environmental discourse. This typically allows researchers to see patterns in usage, collocations, and thematic associations, and to gain insights into the meanings and social functions of a word; all the more so when the concordance lines are extended.

As can be seen from the examples reported below, two main discursive domains emerge around the term solastalgia: 'DEFINITIONAL' and 'PAIN'.

Extended DEFINITIONAL concordance lines – Eco-Guardian:

- He combined the Latin word solacium (comfort – as in solace) and the Greek root – algia (pain) to form *solastalgia*, which he defines as "the pain experienced when there is recognition that the place where one resides and that one loves is under immediate assault."
- *Solastalgia* speaks of a modern uncanny, in which a familiar place is rendered unrecognisable by climate change or corporate action: the home become suddenly unhomely around its inhabitants.
- Albrecht's *solastalgia* is one of the bureau's terms, along with "stieg", "apex-guilt" and "shadowtime", the latter meaning "the sense of living in two or more orders of temporal scale simultaneously" – an acknowledgment of the out-of-jointness provoked by Anthropocene awareness.
- Loss, this summer, after it was lost to climate change, was a pure expression of "*solastalgia*", a term coined by philosopher Glenn Albrecht and defined as "The pain or sickness caused by the loss of, or inability to derive solace from, the present state of one's home environment."

- In 2003 the Australian philosopher Glenn Albrecht coined the term *solastalgia* to describe the anguish caused by environmental alterations due to droughts and destructive mining.

Extended DEFINITIONAL concordance lines – Eco-PubMed:

- We examined how authors define *solastalgia* in their work using textual analysis of verbatim definitions employed. A common element of definition of solastalgia included: a description of the transformation of the environment (i.e., unwelcome environmental change associated with resource extraction).
- The concept of *solastalgia* can be defined as the distress caused by a change in an appreciated place and its cumulative impact on the mental health of those who live in that specific location.
- This definition includes two dimensions of the concept *solastalgia*: (1) desolate because of the degradation of the environment where an individual lives and (2) distress linked to this degradation.
- Our definition-related findings summarise the emotions associated with *solastalgia*, as described in Australian literature, its relationship to a sense of self, belonging and familiarity, and highlights the importance of 'place' as a conceptual comparison to other eco-psychological terms.
- All *solastalgia* definitions are place-centric, using the term "place" or the term "home environment".

Extended PAIN concordance lines – Eco-Guardian:

- Where the pain of nostalgia arises from moving away, the pain of *solastalgia* arises from staying put.
- Where the pain of nostalgia can be mitigated by return, the pain of *solastalgia* tends to be irreversible.
- Take the threat seriously and risk succumbing to *solastalgia* or blot it out and be accused of opting out of reality.
- "We are searching for terms to capture this deep feeling of pain in Arctic nations – words like eco-anxiety or ecological grief – but for me, something called "*solastalgia*" perfectly sums up how people living on the frontline of climate change feel.
- *Solastalgia* is a "heartbreaking" phrase mentioned in the book to describe the distress of communities affected by the Australian droughts.
- For our generation, the toll isn't just physical, but mental: *solastalgia*, the stress caused by environmental changes to one's home, is on the rise.

Extended PAIN concordance lines – Eco-PubMed:

- *Solastalgia* integrates the ideas of solace, desolation, and place, capturing feelings of distress and pain as a result of expected or imminent environmental degradation and ecological loss in the face of the lived experience of a desired transformation of the environment.
- *Solastalgia* can be related to the ecological pain caused by the loss of species, ecosystems, and landscapes.

- The term *solastalgia* can harken back to our most basic, preverbal vulnerabilities based on distressing body-states and their relationship to hunger, pain, and separation from vital sources of life.
- The stories which narrate feelings of *solastalgia* allow us to see the joy of these memories but also the pain of their loss.
- The pain experienced as *solastalgia* when there is recognition that the place where one resides and that one loves is under immediate assault. It is manifest in an attack on one's sense of place, in the erosion of the sense of belonging.
- For example, with *solastalgia*, a space that used to be a childhood favorite can become a trigger for intense emotional pain given the state of its present disruption.

Besides the predictable stylistic variation, in the two sub-corpora there is a degree of overlap. A possible reason for this is the incipient emergence of the term which is still striving to find its path in both scientific and mainstream communication.

Furthermore, a comparison of the two sub-corpora with the Environment corpus (an integrated Sketch Engine corpus) as a reference corpus revealed the following results (Table 2.)

Table 2. **Keyness of the two sub-corpora**[2]

The Eco-Guardian Corpus	The Eco-PubMed Corpus	Acronyms
1) solastalgia	1) solastalgia	
2) anthropocene	2) UOGD	Unconventional oil and gas development
3) Carew	3) distress	
4) grief	4) grief	
5) Utqiaġvik	5) PTSD	Post-traumatic stress disorder
6) Rasmussen	6) CROSSREF	
7) Kigutaq	7) Albrecht	
8) Albrecht	8) nostalgia	
9) Rushton	9) post-wildfire	
10) chinstrap	10) EDS	Environmental Distress Scale

In the Eco-Guardian sub-corpus, the term 'solastalgia' is key, followed by the names of the people (explorers, environmentalists, authors) mentioned in the broadsheet articles.

Conversely, in the Eco-PubMed sub-corpus, the key term 'solastalgia' is followed by terms which refer to the causes/effects of solastalgia. Predictably, 'Albrecht' appears in both lists.

2. In corpus linguistics, Keyness refers to the measure of how much more (or less) frequently a word appears in one corpus compared to another, usually in comparison to a reference corpus. It helps identify words that are characteristic or prominent in a specific text or collection of texts.

3.1.2. Occurrences of the term across web-based sources

To give a clearer indication as to how rare the term 'solastalgia' remains today, reported below are the results of two online searches. Table 3 shows how rarely the term occurs in a number of news sources.

Table 3. **Emergence of the term in online news sources**

Online news sources	Number of articles	Year of publication
The Economist	1	2022
The Telegraph	1	2023
Time Magazine	3	2017, 2021, 2023

Table 4 further illustrates the rare occurrences of the term solastalgia. To highlight the scarcity of the phenomenon, the occurrences of the phrase 'climate change' have been investigated on a comparative basis, across a range of web-based corpora

Table 4. **Emergence of 'solastalgia' in web-based corpora with 'climate change' employed as a comparative term**

Web-based corpora	Words	Occurrences
BNC (100 million words)	solastalgia	0
	climate change	196
enTenTen21 (52 billion words)	solastalgia	432
	climate change	1,434,897
Now Corpus (51.1 billion words)	solastalgia	297
	climate change	1,049,633
Environment Corpus (61 million words)	solastalgia	4
	climate change	44,590
Ecolexicon Corpus (23.1 million words)	solastalgia	0
	climate change	7,611

Observing Table 4, it is interesting to note that in the Sketch Engine domain specific 61-million-word Environment Corpus, created in November 2011, the term 'solastalgia' only appears four times and only as a noun.

In the Ecolexicon corpus, described on the Sketch Engine platform as 'an English corpus of contemporary environmental texts prepared by the LexiCon Research Group at the University of Granada', the term solastalgia never occurs.

3.2. Ecolinguistic perspectives – an overview

Linguistic research on climate change pertains mainly to the domain of ecolinguistics (EL), whose main objective is to raise awareness of the role language can play in either ecological destruction or nature protection. EL shares the pro-active attitude and civic engagement of critical discourse analysis, in that it too aims to disclose what is hidden and to reveal forms of injustice, inequality or power abuse within the natural world. As Sune Vork Steffenson states:

> For the last few decades, ecological linguists […] have sought to re-orientate linguistics to 'external landmarks' that could lead the language wanderer from the structural wasteland into a fertile terrain of human activity, saturated by language, interactivity and co-existence. (Steffensen & Fill 2014: 7)

The origins of the Ecolinguistics movement can be traced back to Haugen's 1972 publication "The Ecology of Language", which defined the notion of language ecology as "the study of interactions between any given language and its environment" (Haugen 1972: 225), and influenced other linguists such as Fill (1998, 2001), Mühlhäusler (2000a, 2000b, 2001), Mühlhäusler and Peace (2006), Robbins (2012) and Garrard (2014), who investigated the interrelation of language, society and politics, and ecology. EL's incipient purposes are:

> to explore the role of language in the life-sustaining interactions of humans, other species and the physical environment. The first aim is to develop linguistic theories which see humans not only as part of society, but also as part of the larger ecosystems that life depends on. The second aim is to show how linguistics can be used to address key ecological issues, from climate change and biodiversity loss to environmental justice. (International Ecolinguistics Association n.d.)

'Eco-linguists' were encouraged to use language as an active response to the increasing dangers of environmental damage caused by uncontrolled technological development (Talebi-Dastenaee & Poshtvan 2021). One of the key features of EL is its ideological orientation to promote change through a more conscious and ethical language use. Indeed, in 1990, in his "New Ways of Meaning: The Challenge to Applied Linguistics" Halliday had already highlighted how linguists could make the difference by promoting a deeper awareness of the potential of language for doing either good or bad, as it is through language that humans acquire and shape their experience. Hence, in sensitive domains, such as racism, sexism, classism, and environmental issues, where human attitudes to sustainability need to undergo considerable modification, the use of language is of paramount importance. In his words:

> The material and non-material conditions of a culture are reflected in the grammar of its language, which is not arbitrary; when these change the language changes in response. The language thus optimizes itself in relation to its environment: new forms will arise when called for – they do not need to be borrowed. (Halliday 1990: 179)

And again:

> [T]he grammar presents them [natural resources] as if the only source of restriction was the way that we ourselves quantify them: a barrel of oil, a seam of coal, a reservoir of water and so on–as if they in themselves were inexhaustible. […] Production is a major semantic confidence trick; […] we don't produce anything at all–we merely transform what is already there into something else, almost always with some unwanted side effects. (Halliday 2009: 165)

Ecological discourse analyses have also investigated how language and linguistic issues (lexico-grammar, discursive strategies, metaphors – see Goatly 2017) and the treatment of environmental matters through the media (e.g. the multimodal languages of advertising and corporate communication) can raise awareness about environmental challenges (Abbamonte 2021, Abbamonte & Cavaliere 2017, 2019, 2022); overall, EL has been identified as the future promise of a better science of language (Finke 2014).

Following the narrative or narrativist turn (Kreiswirth 1995), tales and stories have increasingly been prioritised as a way to promote positive changes, as further clarified in Arran Stibbe's inspiring book, *Ecolinguistics: language, ecology, and the stories we live by* (2015) – in a planet that is becoming increasingly hostile to both human life and the lives of other species, a different kind of society, based on different stories, is needed. In his words:

> Ecolinguistics can explore the more general stories we live by – patterns of language that influence how people both think about, and treat, the world [. . .]. Ecolinguistics can investigate mental models that influence behaviour and lie at the heart of the ecological challenges we are facing [. . .]. There are certain key stories about economic growth, about technological progress, about nature as an object to be used or conquered, about profit and success, that have profound implications for how we treat the systems that life depends on. How we think has an influence on how we act, so language can inspire us to destroy or protect the ecosystems that life depends on. (Abridged and distilled from Stibbe 2015: iii and passim)

The consilience between language and the environment and the pragmatic value of the ecolinguistics stance and approach have been effectively represented by Stibbe in his works. In his view, by advancing critical language awareness, EL can unveil the modern, dystopic myths of unlimited progress and success, omnipotent science, endless growth and the human domination of nature. It is by critiquing these and other discourses underlying consumerism and individualism through powerfully fabricated stories and by seeking out stories which can guide human decisions and actions that a healthy environmental conscience will emerge – the role of language being pivotal in leading people towards new forms of eco-civilisation (Stibbe 2017). As he states: a story is 'a cognitive structure in the minds of individuals which influences how they perceive the world. Types of stories include ideologies, metaphors, framings, identities, evaluations, convictions, erasures and salience (2015: 207)'. For the purposes of our current research, (see section 3.3.1), we have exploited the 'evaluation' and 'salience' frameworks.

Stibbe's search for new stories to live by is crucial to promote change at a discursive and societal level. In methodological terms, it can be said that a major feature of EL is its proactive, pragmatic stance – not merely based on scientific discourse or semantic analyses per se, but also on dynamic agendas of transitive actions, for a healthy, sustainable revaluation of social mores.

3.2.1. Stories of solastalgia – the EL perspective

To better illustrate the meaning and quality of the stories revolving around solastalgia, we have selected the most significant narratives from our corpus.

3.2.1.1. *Eco-PubMed Corpus* – solastalgia and pain

Narrative analysis serves to conduct research on numerous aspects of individual and social health, especially where emotional disorders are concerned. Reporting such narratives, whether partially or in their entirety, often conflicts with the word limit of research articles. Thus, in the Eco-PubMed Corpus, out of the 31 research articles, only two articles report narratives, in abridged form.

I. In McNamara and Westoby's article, 'Solastalgia and the Gendered Nature of Climate Change: An Example from Erub Island, Torres Strait' (2011) the major focus is on older women's ('Aunties') experiences of climate and other environmental changes in the mentioned territories.[3] By collecting, reporting and analysing such experiences, the researchers investigated the negative effects of the perceived climate change on women in particular. The Aunties' responses revealed solastalgia, i.e. 'feelings of sadness, worry, fear and distress, along with a declining sense of self, belonging and familiarity', which eroded their identity. Here follows an excerpt from one of the Aunties who was a passionate earth artist:

> It's like an opening for me to really get into my culture, my identity, where I come from; it's all about my artwork […] We live on the island surrounded by sea, and I took my artwork from here and the land […] The tide is getting higher now. We used to have the shells. There's not much now. We used to go out and collect octopus but it's really hard now to find octopus and for the shell as well, like clam shell or spider shell; it's really hard. (ivi)

The ingredients of her art come from the land and sea and are now dramatically reduced by environmental changes. On the basis of Stibbe's framework for narrative analysis, the salient[4] area of her life is endangered, and her negative evaluation of such changes conveys her sense of loss. In this case, the term refers not only to the lack of solace she used to derive from her natural environment, but also to the waning of her artistic inspiration.

Another Aunty complained about feeling out of touch with her home environment, due to ongoing adverse changes:

[3.] Interviews were conducted also with (male) Elders, yet only the Aunties expressed explicit feelings consistent with Solastalgia.

[4.] Evaluation – an established story in people's minds about whether an area of life is good or bad (e.g. low sales are bad). What to look for: Common appraisal patterns of language, which represent things positively or negatively and need to be investigated/denaturalized; […] Salience – a story in a person's mind that an area of life is important or worthy of attention (e.g. animals are important). What to look for: Salience patterns, i.e. patterns of language which foreground an area of life that need to be investigated. (Distilled and abridged from Stibbe 2015).

> We used to read the landscape. But now it changes, you have to guess now. Everything changes, make it so hard […] You never know, it just change like that, even the tide […] Like before, you can know what's gonna happen. So hard now, guessing all the time, through from 2000 is sort of getting worse. I think it start changing in the 1980s, the changes start […] Am sad at home, think about the good old days, we always talk about the good old days. Now everything is changing, even the trees, you can see changes in them, even the fruits, like before, we haven't had mango season. (ivi)

Her evaluation of the ongoing phenomena is consistently negative, and she expresses feelings of solastalgia: her native soil was a salient component of her life, but now she no longer recognizes it.

COMMENT. Through the lens of EL narrative analysis, (see note 6), we can see how the Erub Island inhabitants initially express positive evaluation of an area of life that used to be good and highly salient -i.e. their land, their soil, their very homes – only to progressively transform their appraisal into a deeply negative sentiment tinged with anguish. The climate and weather are no longer identifiable as a re-assuring cyclic alternation of the seasons; on the contrary, their devastating effects now underlie community distress.

II. A more immediate and direct effect of human agency is denounced in 'Mountaintop Removal Coal Mining and Emergent Cases of Psychological Disorder in Kentucky' (Canu et al. 2017: 802–10), where researchers report on how coal extraction techniques (MTR), used in Appalachia for decades and which have brought about dramatic environmental changes, have had a significant psychological impact on the communities living in the area, with an increased risk of negative mental health outcomes and feelings of solastalgia, as individual narrations show. In these narratives, major issues such as the destruction of historical gathering places, environmental disasters, and human damage are foregrounded. A sense of threat and personal loss are commonly expressed, as in the following excerpts:

> if you go up the river there, you'll see that they've destroyed the very place I growed up. The place where I played in the creek and swung on the grapevines. (Carl Shoupe, a former Kentucky coal miner, p. 804).

> our place defines us. We're a distinct mountain culture, and our culture means something […] the blasting literally makes you feel like you're in a war zone […] It shakes your house, damages your home […] You feel like you're being attacked. It does something to your psyche […] the kids [in Whitesville] are sleeping fully clothed at night, plotting out escape routes, just waiting for the next Buffalo Creek (Judy Bonds, a resident of Whitesville, West Virginia, pp. 804–805).

COMMENT. Such statements show how the loss of connection with the land and the community, as well as an ongoing perception of physical danger can lead to long-term emotional and mental disorders. Again, as mentioned previously, the linguistic patterns that portray salient dimensions of community life and heritage

become negative and convey a growing sense of distress. In the narratives from the PubMed sub-corpus, pain and mental distress emerge as the most commonly expressed feelings.

3.2.1.2. Eco-Guardian Corpus – solastalgia and resilience

The 17 Guardian articles address a wider, more mainstream audience; thus, predictably, the communicative strategies employed are more direct and aim to engage their addressees through emotion-tinged tonalities, while spurring them to action. Opinion columnists and science journalists address a variety of climate issues with a focus on the psychological consequences for people stricken by negative changes and disasters. Their journalistic voices become more persuasive when describing events that involved them personally, or when reporting the statements of empathetic novelists and nature writers. Topics include the decision not to have children owing to the lack of certainties induced by the climate crisis; how such a crisis can exacerbate long-standing socioeconomic and mental health problems especially in First Nation populations; the need to appreciate the interconnectedness of living things and the urgency to care of insects, birds and all animal and vegetal species; the eerie sound of icebergs melting; the grief felt for our dying natural world accompanied by a refusal to give in to despair; the awareness that solastalgia is more acutely felt by the indigenous populations, because of their deeper connections to their homelands and natural environment.

The Guardian frequently encourages active political engagement, granting a voice to those who support candidates who forward policies that mitigate climate change and promote climate justice. The pragmatic, proactive stance of the historical British broadsheet emerges clearly.

Narratives are a constant feature of the Guardian Corpus, but, again, owing to the constraints of length, they are not reported in their entirety in the articles. Here follow excerpts from four separate narratives:[5]

> **(a) What happened to winter? Vanishing ice convulses Alaskans' way of life**
> "All the indications are there will be a very early loss of ice this year, [said Rick Thoman, a Noaa climate scientist based in Fairbanks, Alaska.] In the 1990s they could do whale hunting in Utqiaġvik up until May or even June. There's no real chance of that now – the ice will probably start breaking up by early May. […]
> **Native peoples of Alaska are very resilient**; they've lived here for many millennia for a reason. Some will have to move; hunting will have to change. It can be done but it won't be easy, it won't be cheap. There will be a big cost, both financially and culturally." […]
> "A couple of years ago the ice was rubble, it was just breaking up," said Nagruk Harcharek, who has spent many of his 33 years whaling near

5. Narratives a) b) c) deal with First Nation populations, d) voices a Sidney-based writer perspective on 2019/20 bushfires.

> Utqiaġvik. "It was really late this year and everyone noticed. I'd be lying if I said people aren't worried. […] Some families rely upon whales for their food. It's so central to our culture. The spring hunt is spiritual – sitting out there on the ice edge is pretty quiet. There's the unknown. There's not much going on. You're watching, waiting." […]
> "People are feeling the impacts of climate change, we hear that on a daily basis," said Nikoosh Carlo, the governor's climate adviser. "It's a non-partisan issue here. For some communities, the next storm could wipe out critical infrastructure."
> […] "We are capable of adapting to any changes," said Charlie Hopson, a veteran Utqiaġvik whaler. "We've been around for thousands of years and **we're going to keep living.** We do our own thing here. **The government doesn't know shit. We don't need them."** (Milman 2018, our bold)

> **(b) 'Solastalgia': Arctic inhabitants overwhelmed by new form of climate grief**
> "The ability to use Inuit traditional skills passed down intergenerationally is how we have always adapted to a changing environment, and now it is helping us to do better research and monitoring," says Kigutaq [a researcher]. "The work we do is an opportunity to feel pride in ourselves and our culture and to contribute to something."
> […] Kigutaq says that it is this adaptability in the face of the unknown that has made Inuit leaders in the fight against climate change, learning to recognize what is happening and to **not feel paralyzed by solastalgia**. Above all, he says, it is particularly necessary to realize you are not alone, […] "The term solastalgia helps us to vocalize some of the feelings we are having," Kigutaq says. "It can help **create awareness and conversations – and the ability to connect with others who are experiencing the same thing**." (Michelin 2020, our bold)

In the 2018 narrative (a), voiced by different speakers, the connection between ice thinning and endangered population survival (difficulties in hunting whales, damage to infrastructures) emerges clearly, as does the threat to cultural heritage. Yet, the Utqiaġvik ability to adapt to change and their resilience are proudly stated (see words highlighted in bold). In the same vein, in the 2020 narrative (b), the Inuit heritage is positively and proudly appraised as well as their ability to fight climate change, which is enhanced through the awareness of being part of a community. Interestingly, there is also a positive evaluation of the term solastalgia that can help express and share such an emotional experience.

> **(c) Torres Strait doctors issue call to arms over climate change impact on Indigenous health**
> Dr Sam Jones, who has lived in the Torres Strait for 10 years, said the doctors hold deep worries for their children's future.
> "Will there still be crayfish and turtles, dugong and sardines? These vibrant children of the Pacific, are they the canaries in the coalmine of climate change? Their health, their culture, their future depends upon us taking positive action now, together."

> **The group of doctors is calling for a greater investment in primary preventative healthcare**, and "a plan for rapid transition to a low carbon economy," they said.
> Torres Strait Island regional councillor Ted Nai, who also sits on the Torres and Cape Hospital and Health Service Board, agreed that "courageous, visionary leadership that is of a higher order than the mere party line and politics" is needed.
> "We **must act with moral leadership and create optimism and hope**," Nai said.
> "We islander people, including the people of the Pacific, who are the most at risk of these climate change impacts, must ask how do we ride the crest of the wave of this global conversation, and **showcase how to build resilient and thriving communities** that can live sustainably into the future." (Smith 2019, our bold)

In low-lying islands, such as the Torres Strait islands, the population is vulnerable, owing to both chronic disease and health emergencies caused by climate change, as the group of 23 doctors from the Torres Strait and northern Cape York state in the article from the PubMed sub-corpus quoted above (I). Yet, in this Guardian article, the need and will to create optimism and hope are salient, and resilient attitudes are granted positive evaluation (see the words in bold).

> **(d) The anticipation of moving outdoors at the end of the summer day in Australia has transmuted to dread**
> The summer I experienced when I first moved to Sydney three years ago was full of days spent in a near-sensual anticipation of heading outdoors. I fell in love with the air in all its sickly sweet promise, thick and nourishing with humidity […] This year, that anticipation of moving outdoors at the end of the day has transmuted to dread. I heed health advisory warnings that instruct us to stay indoors. I cancel classes and appointments. I notice the subtle tightening in my chest. […]
> We in the cities are experiencing now what those in areas afflicted by drought, floods and fire have felt for some time: solastalgia.
> […] Indigenous people have long argued of the responsibility we humans have to the land. **The sense of connection we feel to the natural world is vital**, and it is no less so for those of us living in cities and built-up environments. […] It has become clear to me that going forward, **nothing will be more important than sensitivity and hope – and nothing will be more dangerous than resignation.**
> […] My hope is that I have a few ways of **pushing against this sense of resignation** within myself, the first of which is to remain aware of the ways in which politicians and mining corporations benefit from these exact feelings of hopelessness. (Antigny 2019, our bold)

This extended narrative on the devastating 2019 bushfires by the Sydney-based writer and opinion columnist Léa Antigny would deserve to be read in its complete version, since it effectively and concisely conveys the feelings and moods of the population and enshrines examples of nature writing. The appraisal patterns are

predictably negative when the environmental damage and the emotional reactions to that dire, disconcerting situation are described, whereas the author's sensory connection to the natural world and the longing to reestablish it are conveyed through highly positive sensorial patterns. The issue of the salience of land is amplified to include not only indigenous people but also people living in cities and the emotion of solastalgia is foregrounded, but, rather than resulting in existential pain or distress, it becomes an awareness-raising feeling that leads to an overcoming of the sense of resignation and raises the level of hope and the will to fight against the present situation (see the words in bold).

COMMENT. The fear of losing the connection to land and heritage, the physical dread, the perplexity, i.e. the complex emotion of solastalgia, are salient in the Eco-Guardian corpus too and, accordingly, negative evaluation patterns abound. However, unlike the PubMed corpus, hope, resilience, courage and the convictions that shape the communities are foregrounded here. Against the backdrop of the so-called 'learned helplessness' of neoliberalism, in the Guardian articles, political engagement is promoted, further informed by the SDGs, which include Goal 13 ('Take urgent action to combat climate change and its impacts'), with its focus on 'Small Island Developing States'.

We can observe how Albrecht's 2005 definition of solastalgia as encompassing 'a profound sense of isolation about their inability to have a meaningful say and impact on the state of affairs' seems to have been overcome by the proactive attitude of the communities stricken by climate distress yet engaged in mitigating its effects and promoting change. It therefore emerges from these narratives, that solastalgia can be considered not only past-oriented, but also aligned with future horizons of hope.

4. Discussion

As both our quantitative and qualitative analyses show, the term 'solastalgia' has only reached mainstream communication to a limited extent – (31 Pubmed articles vs 17 Guardian articles). This may be due to its lexical-conceptual complexity and to the relatively recent emergence of the term.

We expected the mainstream news media language (namely the Eco-Guardian dataset) to be more intrinsically empathetic with a higher occurrence of terms relating to pain and distress, but the PubMed articles have in fact shown a similar semantic preference for 'pain'. When pondering this finding, we inferred that since the scientific domain involved is Mental Health Care, the attitude is necessarily compassionate.

A significant difference can, however, be found along the dimension of engagement. Indeed, in the Eco-Guardian sub-corpus, the journalistic voices also convey feelings of hope, resilience and courage, as well as positive convictions leading to political engagement vs. forms of helplessness. This is clearly due to the active political engagement and the pragmatic attitude of The Guardian, which

constantly promotes climate justice as a node of socio-economic, race, gender and justice issues.

As regards the definitional dimension, it is strong in both corpora, for the reasons listed previously. The word solastalgia becomes progressively normalized within the language, gradually fitting into the established linguistic and discursive practices.

Through the lens of ecolinguistics, we noticed how not only differences (engagement) but also similarities (empathy, pain) emerged in the way both journalistic and scientific voices convey the complex notions implied in the word 'solastalgia'. Indeed, the focus of the ecolinguistic approach on stories allows for a deeper understanding of the attitudes and emotions at play, with their nuances, as expressed in the diverse contexts.

5. Conclusions

The integrated methodological approach we have adopted throughout this study has provided a twofold analytical perspective which has proved useful both for measuring the growing impact of 'solastalgia' in the two different contexts (mainstream communication, scientific dissemination) and, at the same time, investigating the subtler nuances of this neologism as they unfold across the journalistic narratives and in the scientific articles.

A further consideration concerns the way in which language is strongly related to the ecosystem, in particular to the climate-related changes in flora, fauna and physical features of an area, and can express/react to the forces that have altered the living conditions of speakers and their communities. The spread of 'solastalgia' has helped build a new awareness of ecosystem changes, to the effect of encouraging flexible and adaptive behaviours, and survival strategies.

Broadly, we can say that since discourse is intended as a set of "context-dependent semiotic practices" which are "socially constituted and socially constitutive" (Reisigl & Wodak 2009: 89), the meaning and connotations of a new word are negotiated through its usage in different contexts; power dynamics, societal values, and ideological stances subsequently influence the way in which the word is understood and used. More specifically, ecolinguistics has turned the spotlight on the fertile ground of human activity, and on how it advances in the existing environment and ecosystem through the transformative power of language.

Indeed, a major feature of ecolinguistics is its interventionist stance, aimed at reversing consumerist habits and promoting healthy interaction with the ecosystem. This makes ecolinguistics a useful critical approach to observe the emergence of new environment-related terms, especially as regards the narratives under consideration. Terms such as 'solastalgia', which fill the gap between existing words and new notions, are, therefore, crucial to the way knowledge of social reality develops in our interesting, ever-mutating Anthropocene, and are better understood through an ecological approach to language.

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Research article / Научная статья

Metaphors of resistance in the counter-discourse of Spanish, English and Dutch cycling activists

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Abstract

There is a current need for exploring new mobility systems — and related narratives — that could help in addressing the challenges caused by climate change. As such, this paper aims to unveil the counter-discourses that promote cycling as a sustainable means of transport and an ecological solution to the current climate crisis. It identifies the main conceptual metaphors of contemporary emerging mobility as framed by Spanish, English and Dutch-speaking cycling advocates. The data, which includes 95 metaphors, were retrieved from X (Twitter), and analyzed qualitatively. Expanding upon the established strategies for challenging dominant metaphors (Gibbs & Siman 2021, Van Poppel & Pilgram 2023), we investigated the workings of *resistance metaphors* in the discourse of cycling activists. The study showed that *partial resistance metaphors* elaborate on the source domains of institutionalized mappings (CITY IS A BODY, TRAFFIC IS A CIRCULATORY SYSTEM). They profile motorized mobility as an agent of disease (e.g., blood clot, drug, virus), which negatively affects the city as a whole; alternatively, they also foreground cycling as a potential healer (e.g., cycling infrastructure as band-aids or surgery). Additionally, *complete resistance metaphors* expose the drawbacks of motorized mobility and envisage alternative urban mobility designs through the introduction of new source domains (CITIES ARE ECOSYSTEMS, CITIES ARE HOUSES). The contribution of these metaphors to the current discourse on urban mobility ranges from an opposition to motonormativity to emphasizing cycling as a solution and promoting new kinds of urban co-existence. The underlying reconceptualization of the city from its perception as a (mechanized) body to that of a house or ecosystem also reveals a shift in its function from being a space for moving to being a space for living.

Key words: *sustainable urban mobility, emerging mobility, ecolinguistics, cognitive linguistics, discourse of cycling activists, conceptual metaphor*

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Антимоторные метафоры в дискурсе испанских, английских и голландских велоактивистов

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Аннотация
В настоящее время существует потребность в изучении новых систем мобильности и связанных с ними нарративов, которые могли бы помочь в решении проблем, вызванных изменением климата. Цель данной статьи — выявить дискурсивные средства, продвигающие велосипед как устойчивый вид транспорта и экологичное решение текущего климатического кризиса. В ней определяются основные концептуальные метафоры современной развивающейся мобильности, создаваемые испано-, англо- и голландскоязычными сторонниками велосипедного движения. Данные, включающие 95 метафор, были получены из X (Twitter) и подвергнуты качественному анализу. Развивая известные стратегии оспаривания доминирующих метафор (Gibbs & Siman 2021, Van Poppel & Pilgram 2023), мы исследовали употребление *антимоторных метафор* в дискурсе активистов велодвижения. Исследование показало, что *частичные антимоторные метафоры* развивают исходные области институционализированных изображений (ГОРОД — ЭТО ТЕЛО, ТРАНСПОРТ — ЭТО СИСТЕМА КРОВООБРАЩЕНИЯ). В них моторизованная мобильность представляется как возбудитель болезни (например, тромб, наркотики, вирус), которая негативно влияет на город в целом. Сдругой стороны, они также выдвигают на первый план велосипед как потенциального целителя (например, велосипедная инфраструктура как пластырь или операция). Кроме того, *полные антимоторные метафоры* раскрывают недостатки моторизованной мобильности и предлагают альтернативные варианты городской мобильности путем введения новых исходных доменов (ГОРОД — ЭТО ЭКОСИСТЕМА, ГОРОД — ЭТО ДОМА). Вклад этих метафор в современный дискурс о городской мобильности варьируется от отрицания мотонормативности до провозглашения велосипеда как средства решения проблемы и продвижения новых видов сосуществования в городе. Концептуализация города не как (механизированного) тела, а как дома или экосистемы также показывает изменение его функции от пространства для перемещения к пространству для жизни.
Ключевые слова: *устойчивая городская мобильность, развивающаяся мобильность, эколингвистика, когнитивная лингвистика, дискурс велоактивистов, концептуальная метафора*

Вклад авторов. Автор 1 и автор 2 в равной степени внесли свой вклад в эту исследовательскую работу, и поэтому их обоих следует считать соавторами.

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1. Introduction

The need to address climate change, as one of the Sustainable Development Goals (SDG) established by the United Nations, implies, amongst other policies, promoting sustainable transport (UN 202: vi). In this context, cycling shall be highlighted as an accessible, inclusive, affordable, healthy and ecological solution which could help reduce direct emissions while also improving citizens' health and well-being (UN 2021). The European Declaration of Cycling (October 2023) views its development as essential for achieving the EU's climate, zero pollution and energy efficiency objectives. Promoting cycling as a sustainable means of transport, however, does not come without challenges as "it presents a classic case of the conflict between individual preferences and choices, as opposed to the wider needs of society to protect the environment and future generations" (Banister 2011: 1545).

Any transformative action requires not only individual changes in means of transport use for moving, but also innovations in governance and at the institutional and policy levels (UN 2021: viii). The present research aims at unveiling environmental counter-discourses which could help to mobilize people and promote new policies that highlight the role of cycling as an ecological solution to the current climate crisis. This appearance of 'new' discourses aligns with the growing role of Ecolinguistics as a scientific discipline, and the need to identify how mental models, usually instantiated by language, influence our perception of the world and our "behaviour and lie at the heart of the ecological challenges we are facing" (Stibbe 2015: 1–2). One such model is conceptual metaphor (Lakoff & Johnson 1980), which previous studies have already shown to be useful as a reasoning (Thibodeau & Boroditsky 2011), persuasive (Brugman et al. 2019), and performative (Te Brömmestroet 2020) mechanism that can help to avoid climate *doomism* (i.e., perceiving climate change as unavoidable (Johnstone & Stickels 2024)). Studies on metaphorical mobility frames, however, are scarce (Caviola 2020, Caviola & Reisgl 2020, Caimotto 2020, 2023ab, Filardo-Llamas & Pérez-Hernández 2023).

In our study of metaphors used by cycling advocates, we align with the central principles of Ecolinguistics (Stibbe 2015) and make use of the specific theoretical tools of Critical Metaphor Analysis (CMA) (Charteris-Black 2004, Wodak & Meyer 2009, Hart 2010, Goatly 2017, Musolff 2019). In a further development of the collection of mechanisms for resisting metaphors (Gibbs & Siman 2021, Van Poppel & Pilgram 2023), we propose the notion of *resistance metaphor* as a means of unveiling and questioning the metaphorical stories of mobility that we live by. As noted by Stibbe (2014: 217), "these are not stories in the traditional sense of a narrative, however, but rather discourses, frames, metaphors and, in general,

clusters of linguistic features that come together to covey particular worldviews." As such, we propose that institutionalized metaphorical frames can be resisted not only by performing particular moves (Van Poppel & Pilgram 2023) or through argumentative exposure of their inappropriateness (Wackers, Plug & Steen 2020, Bilstrup Finsen, Steen & Wagemans 2021), but also via metaphorical reframing processes.

The general objective of this study is to identify the resistance metaphors that structure the discourse of Spanish, English, and Dutch-speaking cycling advocates, understood as the counter-discourse of a new discourse coalition aimed at changing conventional approaches to (motorized) mobility. As such, the analysis will serve a double objective: i. unveiling how counter-discourses successfully elaborate on previous institutionalized metaphors (e.g., cities as bodies) to expose and resist the biases of already solidified conceptualizations of urban mobility which promote *motonormavity* (i.e., *partial resistance metaphors*), ii. unveiling the framing effects of alternative metaphorical narratives of the city and of urban mobility pertaining to peripheric, not yet institutionalized discourses of cycling advocates, which promote a positive, engaging and socially acceptable conceptualization of cycling (i.e., *complete resistance metaphors*). Ultimately, the results of the analysis aim to offer informed criteria upon which policy makers can rely for selecting metaphors that may encourage the development of sustainable mobility systems in urban contexts (as suggested by the United Nation's report on transport (UN 2021)).

To meet these objectives, we will address the following research questions: RQ1. which metaphors structure the discourse of pro-cycling advocates and activists? and RQ2. to what extent do the metaphors used by the activists in our data elaborate on previous metaphors about the city and about mobility or present new conceptualizations of the urban space and its mobility system? To answer these research questions, we have adopted an ad-hoc qualitative method for the analysis of metaphor on social media. This method follows the general principles of CMA (Charteris-Black 2004, Hart 2010) with small adaptations aimed at guiding the identification procedure and acknowledging the multimodal nature of communication in social media.

The contents of the article are organized as follows. Section 2 introduces our theoretical framework and offers a critical revision of previous studies on the metaphorical conceptualization of cycling and urban mobility. Section 3 describes the data and methodological decisions that guide the analysis. Section 4 presents and discusses the results of the study and Section 5 offers conclusions and suggestions for future research.

2. Literature review

2.1. Conceptual metaphor and critical metaphor analysis

Conceptual metaphor is a multifunctional cognitive tool that allows speakers to use their knowledge of familiar, concrete domains (source) to understand, talk,

and reason about more abstract, target notions (Lakoff 1987, Lakoff & Johnson 1980). Despite its usefulness, it also displays potential risks both as a conceptualization tool and as a communicative strategy. The selection of source domains may lead to biased representations of reality, influencing our perceptions, actions, and even memories (Sontag 1978, Thibodeau & Boroditsky 2011), as has been amply attested in connection with a varied typology of discourses, such as politics or advertising (Charteris-Black 2011, Pérez-Hernández 2019).

The ability of conceptual metaphor to trigger different emotional reactions and logical conclusions about a topic has also been closely studied within Critical Metaphor Analysis (CMA) (Charteris-Black 2004, 2011, Wodak & Meyer 2009, Hart 2010). Studies on the identification of ideologically loaded metaphors and the exposure of their biases have been carried out on a variety of discourse topics, including racist immigration metaphors (Santa Ana 2002, Hart 2021), misleading science mappings (Nerlich & Hellsten 2004), ineffective medical metaphors (Hendricks et al. 2018), or more recently, war metaphors of the COVID pandemic (Olza et al. 2021).

As observed in Gibbs & Siman (2021) and Van Poppel & Pilgram (2023), resistance to prejudiced metaphorical frames may take many forms. It can be individual (e.g., Sontag's (1978) initial resistance of cancer metaphors being a prominent example) or collective (e.g., IMMIGRATION IS FLOWING WATER metaphor; Hart 2010). It can range from *complete resistance* based on lack of situational acceptability to *partial rejection* of only some aspects of the metaphorical mapping or the same metaphor being rejected in some settings, but not others. Strategies to resist ineffective or inappropriate metaphors often involve the exposure of their biases through argumentation and explanation (Wackers, Plug & Steen 2020, Bilstrup Finsen, Steen & Wagemans 2021).

We shall argue that institutionalized metaphorical frames can also be resisted through their partial elaboration or complete substitution by new metaphors, which thus may function as vehicles of social contestation, and/or political action. A fully-fledged definition of the notion of *resistance metaphor* is offered in Section 4.

2.2. Metaphors of mobility and cycling

The conceptualization of the city as a human body stems from the work of the French urbanist Christian Patte, who envisioned mobility through the imagery of the human circulatory system, with arteries and veins as the source domains for the current system of one-way streets (Sennet 2018: 23) and cars metaphorically conceptualized as the (life) blood running through them. Effective mobility is linked to their well-functioning and traffic jams are seen as blockages of the circulatory system with an evil effect on the overall health of the city. Similarly, Caimotto (2023a: 194) has shown how recent attempts to cut down motorized traffic have been metaphorically conceptualized as restrictions on the life blood of

a city (i.e., motorized traffic) and, therefore, as the origin of a coronary disease (i.e., lack of efficiency of the traffic system).

Te Brömmelstroet (2020) argues that the metaphor of the city as a body interacts with well-established metaphorical mappings stemming from the realm of contemporary neoliberal economics, such as (TRAVEL) TIME IS MONEY. This metaphor blinds us to the conceptualization of a journey as a goal in itself, full of subjective experiences and memories. Cavola & Sedlaczek (2020) identified the conceptual metaphor MOBILITY IS A CONSUMER GOOD, which highlights the nature of mobility as yet another consumer service, while silencing its material conditions (i.e., infrastructure or energy needs), and negative consequences (e.g., energy consumption or pollution).

City traffic has also been metaphorically conceptualized as flowing water, and streets as pipes that should have "free flow" conditions (Te Brömmelstroet 2020: 43). As a result "the street shifted from a multi-dimensional space used for a variety of functions to a **mono-functional space** where transit dominated" (Peters 2006: 130–131, our emphasis). This also led to the division and segregation of space between different types of mobility agents, such as cars, bicycles, or pedestrians. Similarly, Cavoli & Sedlaczek (2020) explain how the related metaphor TRAFFIC IS A RIVER assimilates the flow of cars with a natural phenomenon, ignoring its artificial origin, silencing its negative consequences, and minimizing individuals' responsibility.

Metaphorical conceptualizations of cities as bodies or rivers have become solidified in common everyday-life discourse and institutionalized in mobility policies, contributing to the promotion of *motonormativity,* defined by Walker, Tapp & Davies (2023) as the unconscious biases about the role of private cars that permeate our society. The blood and river metaphors activate the connectivity and efficiency frames by which mobility has been understood throughout the 20th and 21st centuries and lead to an understanding of the city streets as subservient to the general purpose of motorized mobility, highlighting the need of keeping traffic flowing, while hiding its negative side effects (i.e., fuel consumption and environmental pollution). However, this conceptualization of the city has not always been predominant. As Norton (2011: 46) points out, before the arrival of the motor vehicle in the 1920s streets had had a long-standing function as a place for daily life where people walked, met, played, and traded.

Peripheral discourse coalitions, however, have attempted to overcome the mainstream motonormativity by metaphorically foregrounding different forms of urban coexistence. The city is sometimes conceptualized as an ecosystem, i.e., a spatial, organic area with its own metabolism and feedback systems (Hagan 2015), thus profiling the existence of multiple entities as an essential trait of a living landscape (Schliephake 2020: 7). A similar foregrounding of the co-existence of diverse entities can be observed in the notion of *automulticulturalism* (Dawson, Day & Ashmore 2020), which conceives the street as a multi-vehicular space akin

to a multicultural world. In it, there are 'natural' vehicles (cars) — perceived as the most rightful users of the roads-, ethnic minorities (pedestrians and cyclists), as well as cases of vehicular marginalization and infrastructural apartheid (segregated car and bicycle lanes). This metaphor opens the path to an appreciation of "the unique affordances of particular vehicles, and thereby, [to] sustain the road as an integrated multiautocultural space" (Dawson, Day & Ashmore 2020).

Following our proposal above, these alternative non-institutionalized metaphors are examples of complete resistance metaphors against the institutionalized discourse of *motonormativity* (Walker 2024). They do not only reject the original mainstream metaphorical frames (i.e., city as a body or a river) but also attempt to propose new stories by which to interpret urban space and mobility.

Motonormativity has also been questioned by means of partial resistance metaphors, which elaborate on the original frames to expose their biases and promote a critical view about them. Caimotto (2020, 2023ab) has shown how cycling activists elaborate on the city as a body mapping by envisaging motorized mobility as a drug addiction and cars as drugs. Additionally, drivers are seen as victims (car dependent) of a mobility planning system that offers them no other alternative (2023b: 58). This strategy avoids offering a negative image of car drivers and confronting them with other road users (e.g., cyclists and pedestrians), while still exposing the negative consequences of motonormativity. Unfortunately, the relationship between the actors of the different types of mobility has often been metaphorically framed in terms of war. As Caimotto (2023b: 58) argues "the creation of a narrative of 'cyclists' at war with 'drivers' and in conflict with 'pedestrians' generates reified identities that become part of a 'destructive story we live by' (Stibbe 2014)." These war metaphors fuel narratives of conflict and discourses of violence which lead to polarization, and which have amply been shown to lack long-term efficiency (Olza et al. 2021).

3. Data and methodology

This study seeks to identify the conceptual metaphors activated by cycling advocates (RQ1) and to explain how these resist institutionalised conceptual metaphors (RQ2). For this purpose, we have identified cycling activists as those who send messages aimed at bringing policy changes in urban mobility (cf. Collins Dictionary). Thus, they represent an example of a peripheral discourse coalition, which is organised on social media. For this study, X (formerly Twitter) has been selected as our source of data.

For collecting data, we identified cycling advocates on X on two grounds: i. they included a reference to "bike" or "pro-bike" on their name and/or their bio profile, or ii. they systematically posted messages aimed at promoting the use of bikes as a means of urban transport. Because preliminary observations showed that these users are globally interrelated, we have selected accounts from Dutch, Spanish

and English-speaking activists. The selection of these contexts is mostly motivated by the identified difference in the frequency of use of bicycles and cars as means of transport (see Haustein & Nielsen 2016). As such, a total number of 45 accounts have been identified. These accounts were followed between 1 November 2023 and 31 May 2024 and posts were manually selected and copied onto an Excel sheet.

Our selection of data, which contains 95 instances of metaphors, followed two main criteria. First, all the selected accounts can be considered members of the cycling advocates group. Second, all were determined by an intertwined selection of language and geographical anchorage. These criteria can result in loss of knowledge about the situational context in which messages are produced and an inability to explain interaction between users. Still, the data fulfils the main exploratory aim of the article (Herring 2004): identifying how resistance metaphors are used by cycling advocates.

After compilation, each post was analysed along three dimensions, with the goal of identifying systematic patterns of metaphor use and the type of resistance that was exercised in the posts: partial (i.e., reframing aspects of institutionalised cognitive metaphors) or complete (producing new conceptual metaphors that challenge motonormativity). The first stage has been the *identification* of such metaphors, for which we have loosely adapted MIP (Metaphor Identification Procedure) (Pragglejaz Group 2017) by checking the contextual meaning of potential metaphorical expressions against their basic meaning. In cases where metaphoricity was identified, these posts became part of the data sample, and the source and target domains were then coded in the Excel table. Source domain is understood here as the dimension upon which contrast is established to refer to mobility. Target domains have been identified as the subdimension of mobility which is foregrounded in discourse. This identification method allowed us to create a list of potential expressions and to explore how they are used in discourse (Semino 2008).

Table 1. **Dimensions in the analysis**

Dimension		
1. METAPHORICITY	Metaphor present	Domain
2. TYPE OF RESISTANCE	Partial	Complete
3. SEMIOTIC MODE	Textual	Visual

The second dimension in our procedure is aimed at guiding our answer to RQ2 and relates to the type of resistance exercised by the metaphorical expressions. As such, it can be considered a part of the second stage in CMA: *interpretation* (Charteris-Black 2004). To understand the notion of *resistance metaphor*, a further conceptual distinction shall be made between conceptual metaphor — as a cognitive operation which guides our thought — and metaphor in discourse — i.e., its forms and functions when used in authentic language (Semino et al. 2018: 626). With this

distinction in mind, we can define resistance metaphors as those systematic patterns of metaphorical language used in context to resist solidified metaphorical thoughts about mobility (as described in section 2). Following Gibbs & Siman (2021), we have considered *partial resistance metaphors* those that depart from the institutionalized conceptual metaphors that reproduce motonormative thinking. They retain the concept but switch "roles and valence" (Gibbs & Siman 2021: 689). Partial resistance metaphors are the materialization of Santa Ana's (2002) urge to create insurgent extensions of existing metaphors to contest dominant and conventional frames. We have considered *complete resistance metaphors* those that provide alternative ways of thinking about mobility and do so by providing alternative source domains. A similar distinction is proposed by Burgers (2016) in terms of *incremental* (partial) and *fundamental* (complete) replacement of old metaphors by new ones.

The final dimension in the procedure is related to the semiotic mode in which metaphorical concepts have been identified. Therefore, we annotated whether metaphoricity was found in the textual mode (i.e., in the posts, hashtags or textual components (if any) of videos and/or images) or in the visual one (i.e., in videos or figures).

The results of the analysis are organised along the type of resistance dimension, thus answering RQ2. In each sub-section of the analysis a list of metaphorical conceptualizations is provided so as to answer RQ1.

4. Analysis

This section describes the resistance metaphors, both partial (section 4.1) and complete (section 4.2) found in our data of Spanish, English and Dutch-speaking cycling activists.

4.1. Metaphors of partial resistance: cycling in cities that are a space for moving

As will be made apparent in this section, partial resistance metaphors in our data are mostly metaphors that challenge motonormativity both by exposing its drawbacks and/or by presenting cycling as a solution to them. The contemporary configuration of streets as "motor thoroughfares" (Norton 2011) is closely related to their metaphorical conceptualization as a circulatory system. In the dominant metaphor, cities are conceptualized as bodies and motorized traffic as the life blood of a city running through its veins and arteries (i.e., streets). Activists contest this conventional view of urban mobility by reframing cars as blood clots obstructing arteries, as can be observed in examples (1) and (2).

(1) Nuestras ciudades están en un **estado continuo de trombosis**. [Our cities are in a **permanent state of thrombosis**.] [ES_41]

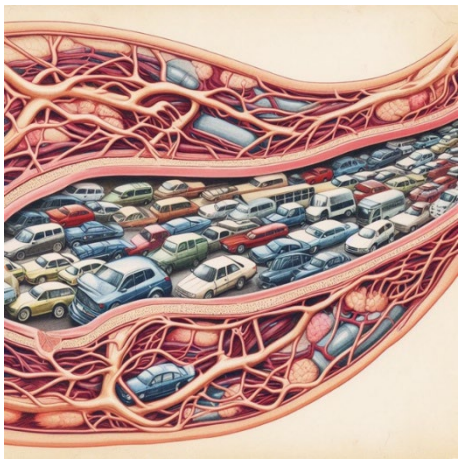

Figure 1. CARS ARE BLOOD CLOTS
Source: Alejandro Cencerrado @ AlejandroCence2

(2) Intentar resolver el problema de circulación de nuestras ciudades poniéndoselo más fácil a los coches es como **tratar una embolia quitándole la verdura al paciente**. [Trying to solve the traffic problem in our cities by making it easier for cars is like **treating a stroke by taking vegetables away from the patient.**] [ES_40]

Lack of efficiency of the traffic system is traditionally blamed on poor or insufficient infrastructure. In contrast to this, cycling advocates present excessive motorized traffic as the cause of traffic infarction, thus highlighting its negative consequences for the health of the city, which, as stated in example (1), finds itself "in a permanent state of thrombosis." Additionally, they reject solutions based on the building of new or wider roads by metaphorically pointing out that this would be an inefficient treatment for the health issues caused by cars (example 2) and would, in fact, make the condition worse.

Motorized mobility as an agent of disease travelling through the circulatory system and affecting the health of the city as a body takes other alternative metaphorical forms. In example (3) the image of a car surrounded by a brick wall and the word "confinados" (locked down) metaphorically foregrounds cars as virus or virus carriers, which, therefore, may have adverse effects on the health of city dwellers. This elaboration of the original metaphorical frame is contextualized in the recent COVID-19 health crisis and provokes a deep emotional response. This may also be useful in justifying public policies that aim to restrict motorized traffic while promoting a more sustainable reorganization of the urban space.

(3) **CONFINADOS**. Los coches quedarán fijos hasta la retirada del vehículo para el desguace. [**LOCKED DOWN**. Cars will remain fixed until the vehicle is removed for scrapping. (ES_012)

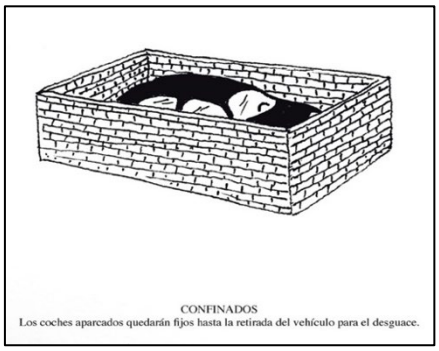

Figure 2. CARS ARE VIRUS CARRIERS
Source: Genís @bicicletabcn

Examples (4) and (5) illustrate yet another variation on the conceptualization of cars as agents of disease. As noted in a previous study by Caimotto (2023b), traditional motorized mobility is often conceptualized as a drug addiction by the discourse coalition of cycling advocates. This idea is suggested in example (4) by the image of the baby smoking from the exhaust pipe of a car. The specific choice of tobacco as the drug depicted in the image allows the activist to resist the metaphors of traditional mobility under consideration: cars run through the arteries and veins of the city (i.e., streets), but cars are drugs, and their negative health impact (i.e., pollution) cannot be avoided because we are dependent on them. The representation of the baby as the drug addict further increases the emotional impact of the metaphor. Additionally, in line with Norton (2011: 4), the X post also questions Madrid city council's current mobility policies for favoring the "rhetoric of freedom" used by the automobile industry since the beginning of the 20th century over the health of the citizens.

(4) Es una auténtica pena que el alcalde de nuestra ciudad haya decidido que la **salud** de nuestros hijos importa menos que la "libertad". [It is a real shame that the mayor of our city has decided that the **health** of our children matters less than "freedom".] [ES_031]

Figure 3. CARS ARE DRUGS
Source: Alejandro Cencerrado @ AlejandroCence2

Example (5) foregrounds alternative attempts of city administrations to overcome this addiction as processes of "deautoxification" from car-dependency. As Caimotto (2023b: 58) explains, this metaphor highlights the negative consequences of motonormativity, such as the lack of an alternative mobility system, while presenting car users as victims (car-dependent) of the institutionalized mobility system. The metaphor is therefore useful in resisting the dominant positive view of cars as the life blood of cities while avoiding a narrative of confrontation between street users.

(5) Las ciudades han emprendido un proceso de **desautoxicación**… [Cities have started a process of **deautoxification**…] [ES_018]

Within the frame of the mainstream metaphors of cities as bodies and traffic infrastructure as circulatory systems, cycling activists sometimes turn to the notion of obesity to expose the drawbacks of motorized mobility and to resist the dominant metaphors that support it. To this end, both cars and traffic infrastructure are metaphorically rendered as obese people, as illustrated by examples (6) and (7):

(6) **Auto-obesidad**: ¿Qué hacer con los SUV en las ciudades? [**Auto-obesity**: What to do with SUV in cities?] [ES_009]
(7) By creating a **road diet** that narrows traffic to one lane while simultaneously adding rain gardens […] [ENG_006]

Example (6) presents large vehicles, especially SUVs, as analogous to obese individuals. They take up more urban space and consume more resources (i.e., excessive amounts of fuel). Their overconsumption is detrimental to the environment and socially unsustainable just like obesity is bad for human health and costly for healthcare systems. An obese person may also struggle with mobility and efficiency, mirroring how large cars, especially in congested cities, make a higher contribution to slowing up and blocking the smooth flow of traffic. Far from being the life blood of the city, cars are presented as yet another agent of discomfort.

Traffic infrastructure itself, corresponding to the circulatory system in the dominant metaphor of cities as bodies, can also suffer from obesity. Example (7) suggests that current roads are too large (i.e., obese) hence resulting in an unbalanced distribution of the urban space. Therefore, just as a diet helps to reduce excess weight while bringing along important health benefits, a "road diet" can reduce the space dedicated to cars and allow for a more balanced ("healthy") urban mobility design, as well as improving traffic flow and reducing pollution, with the effect of making urban areas more livable and enjoyable. The notion of "road diet" signals a shift on the perception of the city from being a space for moving from A to B, a view that has solidified in its metaphorical conceptualization as a circulatory system, to being a space for living (Te Brömmestroet 2020), as is reflected in the complete resistance metaphors analyzed in section 4.2.

The above partial resistance metaphors foreground motorized mobility as either a sick individual (i.e., CARS/TRAFFIC INFRASTRUCTURE ARE OBESE PEOPLE) or an agent of disease (i.e., CARS ARE BLOOD CLOTS/VIRUSES/DRUGS). In addition to

challenging dominant metaphors of traditional mobility, some of these contesting metaphors are aimed at highlighting the benefits of alternative sustainable types of mobility. As can be seen in example [8], cycling and cycling infrastructure are often metaphorically portrayed as potential healers of the present-day mobility system, which suffers from the conditions spelled out above.

(8) …Un cambio es **cirugía**, no **tiritas**. [Change is **surgery**, not **bandaids.**] [ES_024]

While cycling is presented as a solution, how it is implemented also influences the configuration of the urban space. Example (8) evaluates two opposing stances on cycling infrastructure by Spanish cycling activists: "carrilbicistas" — those who advocate for different means of transport using separate paths within the city — and "calzadistas" — who claim that space shall be shared in the road between different means of transport. These diverse views underlie the use of the words "cirugía" (surgery), which refers to the calzadistas' desire of a radical reconceptualization of the city as a shared space for all types of mobility; and "tiritas" (band-aid), a derogatory way of referring to the carrilbicistas' shyer move of asking for segregated bike lanes. Despite the differences, both terms point to the healing nature of cycling infrastructure on the current unhealthy configuration of cities stemming from the dictates of motonormativity.

Opposition to traditional motorized mobility is also carried out by challenging dominant metaphors that conceptualize traffic infrastructure as a pipe rather than as a circulatory system, as is the case in example (9):

(9) I'm not a regular visitor to Leeds, but **many of these roads I remember as being real traffic sewers**. [ENG_009]

In the mono-functional conceptualization of the city as a place for transit, traffic has also been envisaged as flowing water and streets as pipes (Te Brömmelstroet 2020: 43). Example (9) illustrates how British cycling activists resist this metaphorical conceptualization of streets through the choice of an axiologically negative type of pipe (i.e., sewers), which triggers unpleasant inferences about the nature of the entities (i.e., cars) that flow through it.

All the examples shown in this section rely on a partial resistance to the mappings of the metaphorical conceptualizations that guide institutionalized and conventional thinking about mobility in the urban space. Still, this motonormative view of the city can be metaphorically challenged through the adoption of other metaphorical narratives.

4.2. Metaphors of complete resistance: cycling in cities that are a space for living

As noted above, metaphors of complete resistance are those that challenge motonormativity by using alternative source domains for conceptualizing urban mobility. Two types of such metaphors have been identified in our data. First,

metaphors of opposition, which expose the prevalence of the car as the dominating means of transport (Stibbe 2014). These metaphors mainly construct a narrative in which a violent or asymmetrical relation is established between users of different means of transport, usually relying on a contested view of freedom of movement within the city. Second, metaphors of co-existence, which not only implicitly expose the existence of a car-infused discourse coalition, but which explicitly construct a metaphorical narrative in which the urban space can be effectively shared by all the people inhabiting it. The comparison between both types of metaphors shows how the discourse of cycling activists reflects the gradual changes in urban mobility. As noted above, this aligns with understandings of urban mobility shifting from segregationist approaches towards *multiautoculturalism* (Dawson, Day & Ashmore 2020).

4.2.1. Opposition-related metaphors of complete resistance

Opposition metaphors in our data can be grouped along two parameters: (1) those that expose the prevalence of cars as the main (if not only) means of transport in the urban space and (2) those that challenge the pervasiveness of cars by advocating for other means of transport. Both types reframe metaphorical thinking about mobility by (implicitly) exposing the existence of motonormative thinking. As such, cycling activists frequently present cars as a ruling entity that "dominates" space as if it were their kingdom, as in (10). The use of such metaphor exposes the existence of an "automentality" (Walks 2015, cited in Caimotto 2023a) and attempts to reframe urban mobility by foregrounding the existence of a "dominant" discourse — and way of thinking — which reflects values ('a car reign') opposed to the ones held by cycling activists. As noted by Te Brömmelstroet (2000: 27) this is one of the possible strategies that can be used by peripheral discourses to oppose the dominant thinking of discourse coalitions. Only if such symbolic car rule is exposed, will people be able to challenge it.

> (10) ... una vía lenta cedida total y absolutamente al **dominio** del coche […] Y donde solo hay coches, donde **reinan** las cuatro ruedas... [a slow way yielded in its entirety to **car dominance.** […] And where there is only cars, where four wheels **reign**...] [ES_008]

Example (11) relies on the same metaphorical conceptualization of cars as a ruling entity whose mandate is to be unquestionably followed. This example shows an interesting combination of two types of figurative framing: metaphor and irony (Burgers, Konijn & Steen 2016). While the activist metaphorically conceptualizes cars as God (both textually and visually), the negative evaluation of cars as a means of transport is emphasized by contrasting social beliefs about the positive outcome of being penitent (in "sagradas penitencias") with social beliefs about the actual penitence endured by car users. These are subsequently explained in the thread following (11): traffic jams; expenditure on traffic fines, taxes, car reparation and gas; lack of parking spaces; environmental effects and sedentarism. Ironic

metaphorical reframing proves to be an interesting strategy for attacking "established expectancies or norms" (Burgers, Konijn & Steen 2016: 416). It presents automentality as a defective type of thinking and inferentially stresses the need for alternative conceptualizations and configurations of the urban space, which is desirably to be occupied by means of transport other than cars.

(11) En el principio de los tiempos modernos el coche nos fue entregado y con él vinieron las **sagradas penitencias** a las que nosotros, **fieles seguidores del culto al coche**, nos sometemos con orgullo. [At the beginning of modern times, the car was given to us and with it all the **holy penitence** to which we, **faithful followers of the cult of car**, are proudly subjugated.] [ES_07]

Figure 4. CARS ARE GOD.
Source: Alejandro Cencerrado @ AlejandroCence2

In the first group of opposition metaphors the need for new means of transport inferentially stems from the opposition to motonormative thinking. In contrast, there is a second group of metaphors which explicitly foregrounds the existing opposition between car mobility and users of other means of transport, most notably cyclists. Previous studies have identified "bikelash" — i.e., the hostile reaction to cycling infrastructure and cyclists — as a common (discursive) process which results from asymmetric power relations between users of different means of transport (Caimotto 2023b: 54). When used by cycling advocates, opposition metaphors of this type reframe such power relations by rejecting car dominance and contrasting it to reconceptualized understandings of the notion of "freedom". In (12), the textual opposition between "hostage" and "freedom" foregrounds the prototypical attributes of the latter: if car users understand freedom as an individual's ability to go from A to B when and as desired (Te Brömmelstroet 2020: 30–32), cycling advocates connect freedom to the human ability of experiencing life.

(12) In car-free cities, residents are no longer held **hostage** by cars. They are given *the freedom* to experience the city on a human scale. [NL_01]

War-like metaphors, as the one in the example, construct the city as being dominated by an adversarial relationship between two sides (Caimotto 2023b). This power relation is asymmetrical, with cars metaphorically depicted as privileged people [NL_008], stalkers [ES_019], dictators and oppressors [ES_011]; and cyclists as their victims. This justifies the call for segregated spaces, traditionally organized around the dominance of the car. Example (13) foregrounds the need for cycle tracks to protect cyclists from the violence exerted upon them by drivers.

(13) In Amsterdam last week me and my young daughter were able to cycle side by side on **protected cycle** tracks all over the city. Many of these did not exist even a few years ago, as Amsterdam has a policy to *remove space from cars and reallocate it to cycling and walking* [ENG_005]

The metaphorical war-like scenario of urban mobility also allows activists to offer a negative representation of conventional motorized mobility. Thus, traffic is personified as an angry, aggressive person that needs to be calmed, as in (14).

(14) La habitabilidad urbana está en los detalles. Ejemplo de las aceras continuas y puertas de entrada a las calles tranquilas del modelo de accesibilidad y **pacificación** de tráfico holandés. El coche es un invitado en estas calles, no el protagonista. [Urban livability is in the details. Example of the *continuous sidewalks and gateways to the quiet streets* of the Dutch model of accessibility and traffic **calming**. *The car is a guest in these streets, not the protagonist*.] [ES_031]

As illustrated by the words in bold type in (13) and (14), activists point to the reorganization of the urban space as a solution to end this adversarial relationship between different mobility types. Such reshaping of the urban space involves new forms of co-existence that also find a metaphorical expression as will be shown in the next section.

4.2.2. Metaphors of complete resistance advocating for a shared use of space

Advocating for cycling as a means of sustainable mobility does not only reflect the core beliefs of a peripheral discourse coalition but it also reveals changes in conceptualizations of the city. In (15) and (16) the use of the words “monocultivo” (single crop farming), or “lush” foreground the existence of a natural system in which multiple species co-exist and an urban landscape in which multiple uses of space are integrated. This idea is not only textually enhanced, but such a worldview is frequently supported by photographs of cities where transportation paths are surrounded by green (leafy) areas.

(15) ...necesita una ciudad para abandonar el **monocultivo del coche privado**. [which a city needs so as to abandon **private-car single crop farming**]. [ES_030]

(16) ...it began a **metamorphasis** *(sic)* **into a lush** and leafy multi-modal corridor, with dedicated bus and cycle lanes, and space for walking and seating. [NL_022]

The use of the word "metamorphosis" in (16) highlights the idea of change in the city by relating it to the natural and rapid change undergone by some animals. This reflects an alternative means of thinking that considers the existence of species other than humans (as is advocated for in ecolinguistics research (Stibbe 2015)). It also presents it as the "natural" shape of the city, implicitly comparing it to the "artificial ecosystem" (Schliephake 2020: 6) which characterizes contemporary cities. A similar idea can be seen in (17) where a political call is made for (human) social actors to revert the artificial spatial configuration of cities and return to the natural ecosystem.

(17) We're witness the *deliberate* construction of a great cycling city [...] but this is *created* by political intent, not somehow **'indigenous'**. [ENG_007]

(18) Su enfermiza obsesión por meter a todos sus iguales en **rediles-bici**, le impide tener una visión más amplia de la Movilidad. [Their unhealthy obsession for putting all their equal peers in **bike-sheepfold** does not allow them to have a wider vision of Mobility] [ES_025]

Criticism of the artificial organization of urban spaces can be also observed in the use of the word "redil" (sheepfold) in (18). This word triggers an implicit comparison between the open, free space that should be the city, and the constrained "unnatural" means of mobility presented by separate roads and lanes within a city. This metaphor, together with a call for a wider vision of mobility, reflects the need to go beyond the spatial battle and this advocate's attempt to move away from segregation of lanes as the only possible solution. It shall be noted that this metaphor closely reflects the opposing worldviews of the two groups of Spanish cycling activists (i.e., "carrilbicistas" and "calzadistas"). Metaphorically presenting cycling lanes as sheepfolds stresses the artificial nature of such spaces and the need for a different pattern of space allocation in the city.

Likewise, conceptualizations of the city as an ecosystem allow us to metaphorically signal problems in how cities are organized and possible solutions to such problems. As can be seen in (19), the framing of cars as an "invasive species" not only highlights its artificial and fake status as the prototypical means of moving in a city, but it also stresses the need to look for alternative solutions when promoting sustainable mobility. Amongst such possible solutions, the use of the word *Bicienjambre* (bike swarm) in (20) can be mentioned. This word is frequently used to refer to a type of protest organized by cycling advocates, and it encapsulates a view of the city in which multiple species can co-exist[1]. The choice of the word "swarm" to refer to cyclists also stresses their perception of being

[1] Further information about what a Bicienjambre is can be found in the following entry of their blog: https://bicienjambre.blogspot.com/2012/10/que-es-bicienjambre.html

"small" compared to motorized means of transport, the difficulty of seeing individual bees/cyclists on their role, and the important function of each of those individual cyclists in achieving the goal of sustainable mobility. These ideas are foregrounded in the video that accompanies the post and in the poster used to advertise the protest (in Figure 5). The image of a honeycomb stresses the individual existence of cyclists — one in each six-sided space — and their inextricable and necessary role in the configuration of the honeycomb (protest) as a unit.

(19) Testament that even to the keen eye, car-free feels like the natural state of cities. It just takes courage to push **the invasive species out.** [NL_005]

(20) Así fue el **Bicienjambre** que hicimos junto @murciaenbici. Más de 100 bicicletas desde distintos puntos de la ciudad para terminar apoyando al evento de "Street for kids" [The bikeswarm organized with @murciabybike was like that. More than 100 bicycles from different places in the city ended up showing support for the event "Street for kids"] [ES_043]

Figure 5. Bicienjambre. MurciaLab (@murcia_lab) and Murcia en bici (@murciaenbici)

A similar focus on the existence of shared spaces where multiple means of transport could co-exist can be seen in metaphorical conceptualizations of the city as a house. As in most complete resistance metaphors, through the lexical metaphor "guests" a new type of relationship is established between various means of transport. As seen in (21), discourse in the Netherlands has evolved, reversing the

former relationship between cars as owners of a city which bikes could visit to the current understandings of "fietsstraaten" (cycle-streets), usually painted in red, which are conceived as being mainly allocated to bikes but in which cars can move by adapting their behavior to that of bikes.

(21) Bicycles used to be the **guests** on this street in Utrecht. Nowadays, as seen in the 2nd photo, *the prominent red asphalt* highlights the role of the *'fietsstraat'* (cycle-street): cars are **guests**, and bikes have priority. [NL_023]

The use of the lexical metaphor "guest" to describe behavior in the streets also ties in with conceptualizations of the city as a house. Interestingly, this conceptualization not only reflects the activists' view on mobility, but it also raises broader questions about what cities are and how they are to be conceptualized (Varzi 2021). As can be seen in (22) and (23), cycling advocates foreground different parts of the house to indicate the desired functions of the city. Metaphorically describing a parking space as a "trastero de coches" (storage room for cars) stresses the absurdity of using the urban space for leaving unused things — cars. In contrast, in (23) the city is presented as a "living room", i.e., the place in the house where people sit, relax and have a good time.

(22) Esto también es #Amsterdam. Los 80 trajeron una ciudad pro-coche y aquí siguen los resquicios. Por fortuna, este "**trastero de coches**" es el único de todo mi barrio. [This is also #Amsterdam. The 80s brought a pro-car city and here are the traces. Luckily, this "car storage room" is the only one in my neighbourhood.] [NL_025]

(23) Now, the deafening noise and choking fumes have been replaced with humans young and old—the space transformed into the **living room** of the city. [NL_020]

This last example focuses on the human traits of cities by inferentially singling out that cities are inhabited by people — humans — that live in them. As such, metaphorical choices are related to metonymy by highlighting the importance of different components (people vs. means of transportation) of the city.

5. Discussion

The discourse coalition of Spanish, English and Dutch-speaking cycling activists displays a rich collection of partial and complete resistance metaphors to communicate their core beliefs about urban mobility. These metaphors also reflect a shift in the notion of the *city*, including its purpose and its internal spatial organization. Such changes go from conceptualizations of the city as a place for moving to a place for living.

Partial resistance metaphors re-contextualize conventional cognitive mechanisms, and they contest the traditional conceptualization of the city as a place designed for people to move from one place to another. Thus, they resist the dominant metaphors of motonormativity (i.e., city as a body, traffic as its

circulatory system, or streets as pipes) by elaborating on their source domains to negatively depict motorized mobility as a metaphorical agent of disease (virus, drug), a health condition (obesity), or sewer. To address these mobility problems, cycling is metaphorically rendered as a potential solution (i.e., cycling infrastructure as band-aids/surgery). Partial resistance metaphors are designed to provoke negative emotional reactions towards traditional mobility (as shown in examples 3 and 4). As such, these metaphors present sustainable alternatives that can lead the way to new ecological narratives. Such changes in public discourse can cause a positive impact on public opinion and eventually result in an increase in the acceptance of pro-cycling policies.

The elaboration of the original metaphor (traffic as a circulatory system) opens new mental paths to the search of mobility solutions. The traditional metaphor promoted the development of infrastructure and the building of wider roads to solve current traffic jams; however, as the activist in example (2) points out, this will only make the condition worse, being paramount to giving the wrong diet to a patient with a stroke. On the contrary, cutting down on motorized traffic appears as a more effective move as it removes the cause of the coronary blockage. This new ecological narrative can help justify public policies directed at reducing motorized traffic, which will no longer be negatively framed as restrictions on the "life blood of the city" -with the subsequent risk of popular opposition (Caimotto 2023a: 194), but rather as a possible solution to the "coronary disease" (i.e., lack of traffic efficiency) that cars themselves cause.

In line with previous findings by Caimotto (2023b), the new pro-cycling narratives stemming from the partial resistance metaphors are also effective in avoiding a sterile confrontation between the different users of the street. This is achieved by presenting car drivers as (dependency) victims of traditional mobility rather than responsible agents for the current unsustainable situation (as shown in examples 4 and 5). Partial resistance metaphors contribute to creating alternative narratives whose focus is on justifying new public policies favoring the use of bikes, and presenting them as an improvement for all users. Such narratives also construct agentless drivers who just suffer from illnesses caused by motonormativity. This makes it possible to discursively justify drivers also benefitting from public policies promoting cycling, as this can help them in their *deautoxification* process (example 5). Adopting this perspective may help to increase public acceptance of the necessary changes in urban mobility that will eventually result in more sustainable and livable cities.

Complete resistance metaphors can be of two types. First, opposition metaphors which challenge motonormativity by conceptualizing the city as a place where multiple users are opposed. By relying on cultural frames, they expose the existence of motonormative thinking (i.e. CARS ARE GODS, in example 11) or they explicitly foreground an adversary relation between drivers and cyclists (i.e., war metaphors). Such opposition metaphors are mainly aimed at showing the existence

of "bikelash" (Caimotto 2023b) and at exposing the asymmetric relations that exist in our cities.

A second type of complete resistance metaphors has been also found. These go beyond resisting old conceptualizations of the city and its mobility, and they propose alternatives by reconceptualizing the city as a place for living (i.e., ecosystem, house). Additionally, its internal organization can be observed to develop from initial segregationist designs (protected cycle tracks) to an *automulticultural* space where different types of mobility can co-exist.

Complete resistance metaphors are more critical in that they fully reject previous narratives and propose alternative ecological conceptualizations of the city and its mobility systems. They do not try to parch the problems of traditional mobility, as was the case with partial resistance metaphors, but rather offer visions of a new urban structure that is free from those weaknesses from scratch. Also, in contrast to partial resistance metaphors, opposition-related complete resistance metaphors do not even attempt to avoid confrontation between users of different means of transport. Alternatively, the reorganization of urban space is proposed as a solution to this adversarial relationship by creating new conceptualizations of the city. These new metaphorical narratives are related to what is known as "ecological urbanism" (Hagan 2015, Schliephake 2020) and to its view of the city as a literal and metaphorical ecosystem.

The metaphorical conceptualizations of the city as an ecosystem, a multicultural space or a house reflect wider changes in how urban space is understood. When trying to define what a city is, Varzi (2021: 405) argues that these are not enduring objects, but processes. As such, a clear shift can be seen from the city as space for moving — i.e., efficiently going from A to B — to a space for living. While the narratives stemming from partial resistance metaphors offer justifications for and promote acceptance of pro-cycling mobility policies within the existing urban configurations, complete resistance metaphors provide us with brand new stories of more sustainable and ecological cities that we can bike and live by.

6. Conclusion

This paper has identified a collection of metaphors used by Spanish, Dutch and UK cycling advocates to resist current unsustainable urban models and mobility systems. For centuries, traditional motorized mobility has weaved its own beneficial metaphorical narrative. We have lived by this harmful motonormative story, whose deep linguistic and conceptual roots make it almost unquestionable. Unveiling the resistance metaphors that articulate the counter-discourse of cycling activists may be useful to draw attention to the lack of ecological awareness in motonormative thinking, to mobilize people, and to ease the development and implementation of new urban mobility policies. Wackers and Plug (2022) share the view that preserving and extending the source domain of the dominant metaphor is an effective strategy to reveal its biases, as supported by some experimental studies

(Mio 1996, Landau et al. 2017). Further experimental research, however, is needed to compare the effectiveness of partial versus complete resistance metaphors in new sustainable mobility policy campaigns. However, it is beyond the scope of the present study to investigate the extent to which cycling advocates in different countries use a variety of metaphors and how these relate and are adapted to prominent social attitudes towards urban mobility in those contexts. Such an approach would also help to design tailored-made narratives with a higher likelihood of success in the implementation of sustainable mobility policies. Our study is a first, identificatory, step in the search for more ecological narratives to be used in public discourse. Likewise, this work raises questions of a more theoretical nature about the type of figurative language that is used to frame the relationship between mobility and the urban space, and it opens further avenues for research on the interaction between metaphor and metonymy and metaphor and irony.

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Net zero and *protection*: Framing environmental action in Corporate Social Responsibility reports of rail companies

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Abstract
Transport companies face the dual challenge of addressing transparency issues in communicating their potential role in environmental disasters while cultivating trust with stakeholders. Set against this background, this paper explores how Corporate Social Responsibility (CSR) reports showcase companies' awareness of both their role as social actors and their impact on the planet and the community. More specifically, it aims to investigate how environmental issues have been framed and described by companies operating in the rail sector from a linguistic and discursive perspective. From an eco-linguistics perspective, this paper examines trigger words that are used to frame issues related to the environment in CSR reports of rail companies. Specifically, we avail ourselves of a corpus consisting of CSR reports published in English between 2021 and 2022 by rail companies of both English-speaking and non-English speaking countries. An analysis of our corpus highlights recurrent phraseological units related to *zero* and *protection,* suggesting some basic frames of corporate environmental action. A close study of the lexico-grammatical patterns linked to such words shows different trends in the disclosure of reports from both a linguistic and discursive perspective. Results shed light not only on how companies represent themselves through the genre of CSR reports, but also on cross-cultural differences. Specifically, countries using *net zero* as their main objective present themselves as efficient while those preferring *climate protection* as caring. The study contributes to the further understanding of the role of corporate social responsibility in environmental action. By framing environmental protection and net zero not only as a mission but also as a corporate strategy, rail companies seem to reinforce their public image in an increasingly eco-conscious market.
Keywords: *environmental action, climate protection, genre of CSR reports, lexico-grammatical patterns, discursive strategies*

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Углеродная нейтральность и защита природы: экологические мероприятия в социальных отчетах железнодорожных компаний

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Аннотация
Перед транспортными компаниями стоит двойная задача — решать вопросы прозрачности, сообщая о своей потенциальной роли в экологических катастрофах, и одновременно укреплять доверие со стороны заинтересованных сторон. В связи с этим в данной статье рассматриваются отчеты о корпоративной социальной ответственности (КСО), которые демонстрируют осознание компаниями своей роли как социальных субъектов и своего влияния на планету и общество. Цель статьи — показать, как компании, работающие в железнодорожном секторе, формулируют и описывают экологические проблемы с лексической и дискурсивной точек зрения. С позиций эколингвистики в статье анализируются слова-триггеры, которые употребляются для трактовки вопросов, связанных с окружающей средой, в социальных отчетах железнодорожных компаний. Исследуется корпус отчетов о КСО, опубликованных на английском языке в период с 2021 по 2022 год железнодорожными компаниями как англоязычных, так и неанглоязычных стран. Анализ корпуса позволил выделить повторяющиеся фразеологические единицы, связанные с углеродной нейтральностью и защитой природы, предлагая некоторые рамки корпоративной экологической деятельности. Исследование лексико-грамматических моделей, связанных со словами-триггерами, выявило различные тенденции в раскрытии информации как с лексической, так и с дискурсивной точки зрения. Результаты показали, как компании представляют себя через жанр отчетов по КСО, и выявили некоторые кросс-культурные различия. В частности, страны, использующие углеродную нейтральность в качестве основной цели, позиционируют себя как эффективные, в то время как страны, предпочитающие защиту климата, — как демонстрирующие заботу об окружающей среде. Данное исследование вносит вклад в дальнейшее понимание роли корпоративной социальной ответственности в экологической деятельности. Формулируя защиту окружающей среды и углеродную нейтральность не только как миссию, но и как корпоративную стратегию, железнодорожные компании пытаются укрепить свой общественный имидж на рынке, который становится все более чувствительным к экологическим проблемам.

Ключевые слова: *экологическая деятельность, защита климата, углеродная нейтральность, жанр отчета о КСО, лексико-грамматические модели, дискурсивные стратегии*

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1. Introduction and background

Over the years environmental discourse has gained much interest in discourse analysis (Harré et al. 1999, Mühlhäusler & Peace 2006, Alexander 2009) with researchers investigating various thematic subdomains belonging to the broader umbrella term of ecolinguistics (Stibbe 2015). The growth in interest in this topic is certainly due to an increasing attention to the climate crisis, with 77% of the global greenhouse gas emissions being produced by the G20, namely the group of the world's largest twenty economies [1]. United Nations (UN) climate change conferences have also grown in size and impact, becoming the key global forums for discussion of climate change matters. Following the increasing awareness of the rise in the Earth's temperature (which is 1.2 °C warmer than it was in the late 1800s), in 2015 world leaders signed the Paris Agreement, aiming to limit the global temperature to 1.5°C above pre-industrial levels, reduce emissions, and prevent the impacts of climate change [2]. In 2019, European countries further strengthened the goals of the Paris Agreement by launching the European Green Deal with the aim of achieving carbon neutrality by 2050. This means an economy with no greenhouse gas emissions — also known as net-zero. National plans specifically address five dimensions of the energy union, namely decarbonization, energy efficiency, energy security, internal energy market research, and innovation and competitiveness. Moreover, at the beginning of 2020, EU countries submitted a long-term strategy to the United Nations Framework Convention on Climate Change (UNFCCC) on how they intend to achieve carbon neutrality from 2021 to 2030.

Within this context, corporations are under increasing pressure to reduce their carbon footprint. The transport industry is perhaps one of the greatest 'villains' listed as one of the main producers of carbon emissions. The industry responds to the needs of the modern economy and satisfies the growing demands for moving people and products across the globe, but in doing so, it contributes heavily to gas emissions and dramatically impacts the environment both directly and indirectly. Transport companies thus face the dual challenge of addressing transparency issues in communicating their potential role in environmental disasters (Peeters 2007, Becken & Hay 2012) while cultivating trust with stakeholders. Although rail is recognized as the most environmentally friendly form of transport compared to air or road, its extensive networks still exert enormous pressure on the environment, as for example with the construction and maintenance of infrastructures, the supply of

[1] These include Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States, and the European Union.
[2] https://www.un.org/en/climatechange/what-is-climate-change

energy, and habitat damage. Railway corporations are therefore subject to the same need as other corporations to provide increasing information on the strategies they adopt to reduce their environmental impact.

Set against this background, the present study focuses on how environmental issues are represented in the CSR (Corporate Social Responsibility) or sustainability reports of a selection of rail companies operating in two different geographical areas, namely Europe and North America. CSR reports are meant to disclose information on practices and results, while at the same time promoting a positive image of the company in the eyes of its stakeholders. They represent a shop window for corporations to highlight their contribution towards society, as well as the positive impact on their activities, specifically on the planet and on communities, and are therefore a key discourse resource to explore. These also come under ESG (Environmental Social Governance) reports, highlighting again the environmental and social commitment, as well as their governance and management aspects (Elkington 1994, Lee et al. 2016, Gao et al. 2021). Such reports abide by GRI (Global Report Initiatives) standards, which focus on economic, environmental and social categories (Jaworska & Nanda 2018). As shown by Fuoli and Beelitz (2023), however, they are also arguably influenced by landmark deals, such as the Paris agreement or the European Green Deal.

The present paper examines salient trigger words that are used to frame (Catenaccio, Garzone & Reisigl 2023, Hart 2023) issues related to the environment in CSR reports of rail companies. The analysis of environmental discourse has often brought to light discursive strategies that are used to frame (Entman 1993) issues surrounding the environment, so as to support specific interpretations or inferences. These interpretations play a pivotal role in shaping the construction of arguments within the debate. Framing involves selecting and drawing attention to particular aspects, whilst directing attention away from others. Ways of framing environmental issues can help identify common themes that operate across group boundaries or highlight how the different positions inevitably involved are actually negotiated in discourse Through a combination of quantitative and qualitative approaches, we aim to identify the lexical choices, the phraseological patterns and the frames adopted by railway companies in representing environmental action and practices. In particular, we will answer the following research questions:

— RQ1: Which are the trigger words used by companies operating in the rail sector to describe environmental issues in CSR reports?

— RQ2: How are environmental issues framed through lexical choice?

— RQ3: How are lexical choice and framing related to the regional dynamics that shape corporate environmental policies?

The paper continues as follows: Section 2 provides a brief literature review, while Section 3 presents materials and methods adopted in this study. In Section 4.1 we provide an overview of the quantitative results which will be then followed by a lexical and phraseological analysis of the most relevant items (4.2, 4.3 and 4.4). In 4.3 and 4.4 we look in particular at the frames activated by the

phraseological patterns of two lexical items (*protection* and *zero*) that characterize — quantitatively and qualitatively — the discourse of companies operating in different institutional contexts. The paper will close with discussions (5) followed by conclusions (6).

2. Literature review

As corporate discourse on environmental issues has grown exponentially, a burgeoning number of studies on its features and functions have also been conducted under different theoretical and methodological frameworks. While the accounting literature often uses content analysis to assess the quantity and quality of disclosures (e.g. Pitrakkos & Maroun 2019), studies in the field of applied linguistics and communication have mostly privileged discourse and corpus approaches (e.g. Fuoli 2012, 2018, Lischinky 2015, Bondi 2016, Jaworska 2018). Discourse studies have often concentrated on issues regarding media discussions and narratives on climate change (Fløttum 2017, Norton & Hulme 2019) and ecology (Ponton 2023), but also on specific corporate genres like ESG/CSR/sustainability reports (Zappettini & Unerman 2016, Fuoli & Beelitz 2023, Fernández-Vázquez & Sancho-Rodríguez 2020).

In a recent systematic review of applied linguistic studies on sustainability discourse, Nervino Cheung and Chen (2024) highlight the centrality of environmental sustainability in the field and the salience of studies on keywords, concordances and collocations in language research, with somewhat greater emphasis on the analysis of metaphors in communication studies. The review also maps research traditions around the main frameworks of corpus linguistics, (critical) discourse analysis, multimodality, ecolinguistics and rhetoric, while noting that ecolinguistics has not been adapted as much as expected (Nervino, Cheung & Chen 2024: 877), given the centrality of environmental issues in ecolinguistics.

Approaches to ecolinguistics, on the other hand, are not limited to discourse on the environment or environmental issues: they rather represent an approach to the study of language and its use that is informed by ecology. They therefore vary widely, including both studies on the ecology of languages and studies on discourse in an ecological perspective (e.g., Ponton 2023). Discourse approaches — which Penz and Fill (2022: 234) denominate Ecological Discourse Analysis (EDA) — emphasize "the role of language in dealing with (aggravating or solving) environmental problems by pointing out the connection between language and ideologies". This, in turn, includes both an analysis of ecological discourse and an ecological analysis of discourse: the text-critical and the system-critical perspectives, as defined by Fill and Mühlhäusler (2001).

Lexical and phraseological choices often play a major role in studies that combine discourse and corpus approaches, as well as in explicitly ecolinguistics studies. Seminal work by Halliday (1990, later published as 2001) has shown that the lexico-grammatical features of language (and scientific discourse in particular)

can be related to specific ideologies: the presence of mass nouns in the language system may for example suggest that resources are not limited; using *growth* as the positive term and *shrink* as the negative may support a philosophy of 'growthism'. In a revisitation of Halliday's work, Law and Matthiessen (2023) account for the various changes in expressions referring to global warming, such as *climate change, climate emergency, climate crisis*, or even *climate breakdown*, with their different implications. Researchers have shown keen interest in the way keywords such as *climate* and *net zero* have been framed (Pollach 2018), for instance, through an analysis of the discourses surrounding "climate change" and "climate emissions".

Lexico-grammatical choices are thus often studied in corporate discourse to explore the ideology behind them, with critical perspectives often focusing on how companies use marketing and greenwashing strategies (Alexander 2010, 2018) to legitimate their action, by framing environmentalism in terms of market economics. Special attention has been paid to how issues of climate change are framed. Jaworska (2018), for example, shows how the use of hedging strategies and forward-looking expressions frame the ideology of climate change in corporate communication, by increasingly emphasising the notion of risk in ways that portray climate change as an unpredictable agent. Furthermore, through a topic-modelling corpus-based discourse analysis, Jaworska and Nanda observe the shift from climate change as "an object" to a "destructive and uncontrollable agent" (2018: 395). By concentrating on a case study of three major energy companies and their lexico-semantic choices surrounding climate, Dahl and Fløttum (2019) show how climate change is framed as a business responsibility, a business risk, and a business opportunity. Finally, qualitative frame analysis has been used to uncover how companies juggle the need to prove their contribution to sustainability and their actual responsibility for carbon emissions (Megura & Gunderson 2022).

The role of the sociocultural context has also proved to be essential. Fuoli and Beelitz (2023) examine how corporate discourse has evolved following the Paris Agreement, showing that the expression 'net zero' is used to promote "a 'green' corporate ethos and safeguard corporate legitimacy while largely practicing business as usual" (382). In line with previous studies (Levy & Egan 2003, Kolk, Levy & Pinkse 2008), they also highlight the different roles that European countries and the US have played since the Paris Agreement, showing that while the US has a more moderate position towards carbon reduction, European countries are more decisive in reaching reduction goals.

Our own study aims to combine attention to lexico-grammatical analysis, frame analysis, and different institutional contexts.

3. Materials and methods

In order to investigate and compare how climate discourse is framed in the rail sector, we created two corpora consisting of Corporate Social Responsibility (CSR) reports issued between 2021 and 2022. As visible from Table 1, in order to carry out a comparative analysis, the first corpus consists of European Union rail

companies that have issued their report in English, while the second one groups together the CSR reports of companies operating in English-speaking countries outside the European Union.

Table 1. **Rail companies and number of tokens of the corpora**

EU countries		**NON-EU English-speaking countries**	
Companies	**Tokens**	**No. texts**	**Tokens**
– České dráhy (Czech Republic) – DSB (Denmark) – SNCF (France) – Deutsche Bahn (Germany) – Trenitalia (Italy) – Italo (Italy) – Latvijas dzelzceļš (Latvia) – Vy (Norway)	322,282	– NSW (Australia) – Via Rail (Canada) – Kiwi Rail (New Zealand) – Amtrak (USA) – GTR (UK) – GWR (UK) – LNER (UK) – SWR (UK)	149,713

Despite not being part of the European Union, Norway was included in the EU corpus for its Green Alliance with EU countries and its commitment to reinforce climate action and its environmental protection efforts, as well as its cooperation on clean energy and industrial transition.

For the first step of our analysis, we availed ourselves of AntConc Software tool (3.5.9) where we could generate two separate wordlists from the two corpora and select the first ten lexical items related to the environment and to environmental issues. A brief analysis of the convergences and divergences of the two corpora in the most frequent lexical items led us to focus on the word forms that distinguished the two corpora, paying particular attention to two words of interest: *protection* and *zero*.

We then carried out a concordance analysis of the selected words in a phraseological perspective (Sinclair 2004), paying attention to collocations, semantic preference (the tendency of the word to co-occur with words sharing some elements of meaning) and recurrent phraseological patterns. Attention to co-text and co-textual lexico-semantic patterns provides a solid basis for an analysis of how environmental issues are framed in the corpus and in the two corpora.

In the second stage of our analysis, we further explored the phraseology of the selected node words following Stibbe's (2015) environmental framing approach. In order to do so, we started with the definition of framing proposed by Stibbe (2015), namely "the use of a story from one area of life (a frame) to structure how another area of life is conceptualized" (47). Specifically, when exploring framing one needs to consider two aspects, the first is the so-called "source frame", which is the resource frame that is triggered by words belonging to another semantic field (e.g., *capital*, *stocks*, *resources*, *commodities* and *assets*). The second is the "target domain", which is what is being talked about: in this case, words related to environmental measures (Stibbe 2015: 53).

4. Results

In this section we explore our results first from a quantitative perspective (4.1), then from a qualitative one (4.2 and 4.3). The qualitative analysis moves from an observation of the phraseological patterns attested in the corpus, to an interpretation of their implications and rhetorical functions.

4.1. Wordlists

Table 2 shows separate wordlists for the two corpora [substitute comma with semicolon], specifically, for each corpus we selected the first ten lexical items related to the environment.

Table 2. **The 10 most frequent lexical items related to the environment in the two corpora**

EU corpus			Non-EU corpus		
Rank	**Raw Frequency (pttw)**	**Lexical items**	**Rank**	**Raw Frequency (pttw)**	**Lexical items**
56	587 (18.21)	*energy*	47	288 (19.23)	*sustainability*
64	526 (16.63)	*sustainability*	75	218 (14.56)	*emissions*
69	482 (14.95)	*emissions*	87	201 (13.82)	*sustainable*
76	433 (13.43)	*climate*	88	198 (13.22)	*environmental*
93	358 (11.10)	*sustainable*	117	158 (10.55)	*climate*
107	333 (10.33)	*environmental*	133	139 (9.28)	*energy*
140	287 (8.9)	***protection***	174	118 (7.88)	***carbon***
179	280 (8.68)	***green***	178	117 (7.81)	*environment*
184	235 (7.29)	*environment*	187	117 (7.81)	*waste*
342	143 (4.44)	*waste*	205	105 (7.01)	***zero***

As can be seen from Table 2, the two corpora have many lexical items in common, such as nouns and adjectives related to the environment (*environment* and *environmental*), sustainability (*sustainability* and *sustainable*), climate (*climate*), and emissions (*emissions, energy,* and *waste*). However, in the European corpus, we see the presence of *protection* and *green*, which are not present in the non-EU corpus. Conversely, non-EU companies seem also to pay attention to elements such as *carbon* and *zero*.

It is worth paying attention to the different frequencies of these words, to explore the extent and nature of their difference. As shown in Table 3 below there seems to be significative difference among these items. For instance, in the EU corpus *green* and *protection* appear to be around 7 times more frequent than in the non-EU one, while in the non-EU corpus *zero* and *carbon* are respectively around three and two times more frequent than in the EU one.

In the EU corpus, *green* refers mostly to the Green Bond programme or to the institutional principles recommended by EU policies (i.e., *Green Deal*), while *protection* seems to be the key aim of CSR discourse. In both the EU and non-EU corpus, *carbon* identifies a key problem that companies are facing, while *zero*

(referred to carbon emissions) identifies the main aim through a specific target: *net zero* is a global initiative[3] whose aim is to achieve climate-neutrality by 2050, meaning that all countries are involved in the creation of a no greenhouse gas emissions' economy.

Table 3. **Raw frequencies (pttw) of specific environment-related items in each corpus**

Lexical items	EU corpus	Non-EU corpus
Carbon	120 (3.72)	118 (7.88)
green	280 (8.68)	18 (1.2)
protection	287 (8.9)	19 (1.27)
Zero	62 (1.92)	105 (7.01)

Despite some similarities in the two wordlists, it is thus worth pointing out that each list presents a different measure or approach to solve the environmental crisis, namely the general approach of (environmental/climate) *protection* for the EU and the specific target of *zero* emissions for the non-EU wordlist. We will therefore explore the use of these two words in more detail in sections 4.3 and 4.4. However, before doing this, it is worth providing the reader with a qualitative overview of *green* and *carbon*.

4.2. A brief overview of green *and carbon*

Looking closely at other uses of *green* in the EU corpus, we notice that when referring to Green Bond, *green* also collocates with business-related terms (i.e., *green investments, green loans, green(-bond) finance*) where the pre-modifier seems to be used as a substitute for the whole concept that lies behind this specific type of investment. In other cases, *green* is used a clear synonym for 'sustainable' and it precedes nouns referring to products such as, *ammonia, energy, fuels*, *hydrogen*, and *power*. It is interesting to point out that in some of these cases, *green* is followed by a further explanation: for instance, DB provides more detail on the *green sponge iron*: "an intermediate product for climate-neutral steel production". When used as a synonym for 'sustainable' or 'environmental' *green* also precedes nouns referring to strategies adopted to resolve climate problems such as *solutions*, *project*, and *logistics*.

Moreover, *green* appears in the slogans of the Norwegian and German rail companies, which respectively self-promote their trains with "Vy makes choosing *green* easy" and "This is *green*", highlighting their ethical choice. Here, *green* is used again as a synonym for 'sustainable', but with a more self-promotional tone, emphasizing their choice towards a more environmental-friendly transition. The Italian rail companies Trenitalia and Italo also use *green* in a self-promotional way to advertise their new types of trains: *Green* Intercity (in Italian 'Intercity Green'),

[3] https://www.un.org/en/climatechange/net-zero-coalition

the *Green* Alps service, and EVO trains. In these cases, they are followed by further information which justifies and explains the use of *green:*

(1) In the summer, the new *Green Intercity* started running. This train has been refurbished with a *special* external film and a *special* carriage with six bike spaces, recharging points, separate waste collection, family area and vending machine. *What is more*, the walls of carriage 3 display *messages on sustainability*, with details on the CO2 savings of travelling by train. (FS_Italy)

(2) The award was assigned by Assologistica for the "*Green* Alps" service, an *environmentally-friendly* Italy-France link that carries by train a quantity of bottles of water equivalent to approximately 5,000 trucks a year, with *no CO2 emissions*. (FS_Italy)

(3) The EVO trains are also "*green*", as they are manufactured with *recyclable* materials and are designed in accordance with *eco-sustainability* criteria to reduce CO2 emissions. (Italo_Italy)

Despite the use of specific self-promotional language (e.g., *special*), both companies emphasize the sustainable features of their trains. Moreover, given that these two reports are a translation from the Italian one, it is likely that *green* is also used in the source language as a loanword and that it requires further explanation — which is why it is kept in the target text.

Promotion of sustainability is also achieved by Denmark and Germany with their *green mobility* and *green transitions* projects. In this case, *green* is preceded by verbs that indicate a journey towards sustainability, such as *contribute* and *promote*, and that are associated with areas of actions such as *climate protection* and *nature conservation*. Example 4 below shows how the use of the progressive form further corroborates the idea of transition towards an environmental-friendly solution.

(4) DB is required to focus continuously *on reducing* the environmental impact so as to strengthen the train's position further and thus contribute towards society's *green* transition. (DB Germany)

Looking at the very few occurrences of *green* in the non-EU corpus, we notice that in 11 out of 18 cases they refer to community and social projects, such as *Green Building, Green Wall, Green Team*. In the remaining 7 cases, UK and Canadian companies use *green* as a synonym for 'sustainable', such *as green station*, *green travel*, and *green advantages*. The Australian company instead, uses *green* either to specify endangered species that need to be protected (e.g., *green frogs*), or to report their initiative of planting and increasing the number of trees.

The use of *carbon* is quite similar in both corpora. In the EU corpus it mostly used to indicate companies' mission to contribute to a more sustainable environment or to report their impact (e.g., *carbon accounting*, *carbon disclosure*). With regards to sustainability goals, we find *carbon neutrality* preceded by verbs such as *become* and *achieve* or phrases such as *the path/the goal towards*, thus highlighting their mission. This is further confirmed by the use of *low(er) carbon*

alternatives/economy/footprints, preceded by *transition* or *create.* When *carbon*, on the other hand, is reported as a problem that needs to be solved, we find elements such as *carbon footprints* or *carbon emissions* preceded by quantitative verbs of reduction (i.e., *reduce*). Methods and practices related to the *carbon impact* are also visible from how companies report measures to monitor this, with elements such as *assessment, calculation, measure*, emphasizing their transparency on such issue.

Despite being relatively more frequent, in the non-EU corpus collocations of *carbon* are quite similar to the those in the EU one, but with less variation. Again, there is some emphasis on the process towards *lower carbon emissions,* which is anticipated by phrases such as *shift towards, transition towards*, and on its reduction (e.g., *reduce, decrease*). *Carbon neutral goals* and *carbon neutrality* are again preceded by verbs such as *achieve* and *pursue*. Moreover, companies operating in New Zealand, Australia, and the USA also report their *carbon footprint* through data and graphs with verbs showing trends (e.g., *Carbon footprint has fluctuated*), percentages on their *contribution,* and on their *performance*.

4.3. Focus on protection

When looking for the term *protection* in the EU corpus we found that of the 287 (8.9 pttw) raw concordances, only 117 were related to climate, environmental and biodiversity protection. On the other hand, in the non-EU corpus *protection* only appears 19 times, 14 of which are related to the environment and only present in the New Zealand, Australian and Canadian reports. This might be due to the fact that in these countries there seems to be a higher attention towards biodiversity, nature protection, and preservation.

While the few cases of *protection* in the non-EU corpus are related to nature (e.g., *protection and restoration of biodiversity and ecosystems/protection of biodiversity, ongoing protection of the natural environments, and sustainable protection of our natural environments, Environment Protection Authority*), in the EU corpus collocations and colligations of *protection* appear to be more varied. In the EU corpus, the word is mostly followed or preceded by environmental specifications: in the first case it is followed by the preposition *of* (e.g., *protection of water, protection of healthy ecosystems*), while in the latter it is preceded by nouns or adjectives specifying the nature of the protection (e.g., *greenhouse protection, climate protection, environmental protection*). In this case, protection issues are also used to provide further specifications of wider approaches to environmental issues (e.g., *sustainable management of environmental protection and energy resources*). The occurrences of *protection* within the environmental field also appear in combination with binomials, some of which combine different elements of environmental responsibility (e.g., *sustainable water and protection of water*, *environmental protection and emergency efficiency*), while others combine environmental with social issues or values (e.g., *social inclusion and environmental protection, safe rail operations and environmental protection, human rights and*

environmental protection, environmental protection and safety). This highlights the close link between environment, community and safety issues.

Climate protection, which appears 56 times and only in the German Deutsche Bahn report, is presented as an object that needs to be monitored (e.g., *measure our progress in climate protection*), as a means of defense (e.g., *climate protection measure*), or as something to be achieved (e.g., *climate protection goals/target/object*). Similarly to *environmental protection*, it also appears both in lists associated with analogous issues (e.g., *climate protection, nature conservation, resources conservation and noise reduction*) as well as with elements from different fields (e.g., *to tackle setting new standards for speed of construction, innovation, energy consumption and climate protection*). Additionally, *climate protection* is also preceded by *importance of*, highlighting its prominence.

Moreover, both *environmental* and *climate protection* collocate with nouns indicating something to reach, such as *goals* and *targets,* and are preceded by verbs and phrases of achievement (e.g., *achieve, meet, in compliance with, in line with, succeed*) or by verbs indicating the active role of the company in achieving such objectives (e.g., *contribute to* …). Furthermore, *protection* is also preceded by action verbs (e.g., *provide protection against fluctuations*, *implement*) showing how companies are actively engaging in environmental issues.

Now, when it comes to the framing of protection in the European Union corpus, we notice the key role of ENVIRONMENTAL PROTECTION AS A SHIELD, a strategic defense against climate change (Example 5). Biofuel becomes an immediate *measure* to achieve *climate neutrality*: the target domain belonging to the environment is associated to the source domain of defense.

(5) The use of biofuel is an immediate climate *protection measure* and an *important step towards the phase-out* of diesel and *achieving* climate neutrality. [DB_Germany]

Another frame, which has already emerged from the collocation analysis, is that of PROTECTION AS BUSINESS (Example 6–8). In this case, we have the target domain of *climate* and *environmental protection* linked to the source domain belonging to the economic field (e.g., *prerequisite*, *target, achieve, pursue*). Climate protection is addressed as a technical issue that needs to abide by certain regulations (i.e., *Federal Government and the EU*) and a *code* with certain *principles*. However, the use of *believe* in Example 7 also suggests that environmental protection is a positive value — listed among others — and an objective that can be achieved by following good praxis.

(6) A strong rail system is therefore an essential prerequisite for *meeting the climate protection targets of the Federal Government and the EU*, because a *reduction in* emissions in the transport sector *cannot be achieved without a massive shift* in the mode of transport towards the climate-friendly rail system. [DB_Germany]

(7) We believe that economic development, social inclusion and environmental protection *can be pursued* only through good sustainability governance. [FS_Italy]
(8) Also, the code describes the basic principles of the Company in *environmental protection* and use of natural resources, *principles of fair business*, basic principles of information protection, as well as cooperation with customers, suppliers, and society. [LDZ_Latvia]

Overall, the presence of the use of 'protection' in the EU corpus shows attention paid to both climate and environmental issues. The collocation analysis highlighted a more varied use of 'protection' among the various EU companies under analysis, in contrast with non-EU companies where its use is mostly limited to Australian and New Zealander reports and in relation to the environment. The frame analysis of what seemed to be the most recurrent patterns shows some consistency with Dahl and Fløttum's (2019) study presenting climate protection as business, which is also in line with the corporate move of "stating methods and practices" (Yu & Bondi 2017) that becomes an opportunity to prove stakeholders how well railway companies are able to face an event.

4.4. Focus on Zero

When looking at *zero* in both corpora, we notice that its frequency is much higher in the non-EU corpus with 105 hits (7.01 pttw) than in the EU corpus (62 hits, 1.92 pttw).

Starting from the EU collocations of *zero,* we notice that it mostly appears in combination with *emissions*, *CO2 emissions*, and is preceded by verbs indicating movements and transition (e.g., *drive towards, moving to zero by, switch to*) as well as by quantitative assessment verbs (e.g., *reduce, increase the usage of low/zero emissions*), and qualitative assessment ones (e.g., *improve*). In some cases, verbs are embedded within a commissive form of future, hence as a promise towards a zero-emission means of transport network. This is further corroborated by other modal verbs indicating the deontic aspect of this objective (e.g., *shall be, must*). The EU corpus thus shares an interest in the global net-zero target, even in a context that privileges the general aim of environmental protection.

The phrase *net-zero* itself appears only 6 times and collocates with the word *standard*, in line with the EU regulations, while it is preceded by verbs of compliance (e.g., *achieve carbon neutrality by 2040 with zero net emissions comply with the net zero standard*). *Net zero* also appears in noun phrases as a further specification of pollution reduction aims (e.g., *with a long-term zero-target set for 2050*). Additionally, it appears in an adjectival position, collocating with *emissions* through the use of hyphens (e.g., *net zero-emissions*), which altogether precede specifying nouns, referring to means of transport (e.g., *net zero-emission vehicles*), specific parts or elements of vehicles (e.g., *kilometers, lifting gear, technology, machinery, fuel*) and *local communities*. Moreover, *net zero* also appears in the

name of formal institutions created to regulate emissions, such as the case of Norway (e.g., *Zero Emission Institute*).

When exploring significant framings of *zero emissions/net zero*, we notice that, once more, the expressions are mostly related to business and to urgency. Example 9 shows how *zero emissions* are addressed as an *important* and *urgent initiative* which can lead to an actual result (*impact*).

(9) *Few businesses* have *unlimited time and resources at their disposal* and it is therefore *important* that we first focus on the *initiatives* that have the greatest *impact — zero emissions* are *urgent*! [Vy_Norway]

ZERO EMISSIONS AS A BUSINESS STRATEGY is also visible in examples 10 and 11. Zero emissions are a target (*objective*) to be achieved within a certain deadline (*by 2030*) and through certain strategies (*via the*…, *methodologies*) which are presented through nominalizations of the procedures to be implemented (e.g., *the deployment of*…, *the electrification*) or in compliance with standards and regulations (e.g., *in accordance with*), highlighting a technical approach to the issue.

(10) DSB's *objective* is *zero particle emission* from train engines *by 2030*. *This is to be achieved via* the deployment of electric trains and *requires* that Banedanmark continues the electrification work on the rail network. [DSB_Denmark]

(11) *It defines methodologies* for defining science based *targets in accordance with* the latest findings in climate science, *and defines and promotes best practice for emissions reductions and net zero targets.* [DE_Germany]

With regards to the use of *zero* outside the European Union, there are 87 occurrences related to climate and environmental issues, as we discarded those regarding harm and fatalities. In most cases (60 hits), it collocates with *net*, where *net zero* appears as an important objective, as something that needs to be achieved and a top priority for countries (e.g., *our goal to become net zero business by…/ambition to reach net zero by 2050/reach our ambitious goal of net zero by 2045/to be net zero by 2050/goal of net zero carbon economy by/we drive for net zero carbon emissions*). *Net-zero* is also followed by nouns like *operations* and *projects* which give the idea that net-zero is part of an ecological strategy. This is further strengthened by the use of verb *develop* followed by *net zero commitment* and *net-zero guidelines* or by the phrase *our approach to net zero*, reinforcing the idea of a strategy and plan. *Net zero* also collocates with other expressions referring to environmental issues such as *climate resilience, decarbonization* and *climate commitment*. Phrases indicating a transition towards net-zero are also present in the corpus (e.g., *steps towards/path to net zero*), indicating a shift and work in progress towards the ultimate goal of carbon-zero emissions.

In a few cases, *zero* collocates with *waste, carbon, pollution*, and *emissions*. These are preceded by expressions of quantitative assessment (e.g., *reduce*

consumption to zero, maintain zero waste), or by phrases indicating a shift towards green emissions (e.g., *provide zero air pollutants, transition to zero-emissions vehicles*).

Looking at the recurrent phraseology of *net-zero*, we notice that it is often framed as a BUSINESS AND A SOCIAL MISSION. Example 12 shows how the New Zealand rail company aligns with government standards to achieve a *net zero carbon economy* by a certain deadline (*by 2050*). In this case, there seems to be a business collaboration between the private and the public sectors for a common mission and strategy. Example 13 shows how *net-zero* is framed as a STRATEGY, as something that the rail company is addressing according to existing *practices*, *codes*, and *standards*, in order to improve the inaccurate current regulatory codes. Net zero framed as a BUSINESS STRATEGY is also visible from examples 14 and 15 with the two UK rail companies taking *actions* to deliver and set their *goals* and launching strategies to become an actual *net-zero business*.

(12) KiwiRail is committed to *supporting* New Zealand's *goal of achieving a net zero carbon economy by 2050*. [KIWI RAIL_NZ]

(13) *We are reviewing* existing internal engineering practices, *third-party codes and design standards and developing* Climate Resilient and *Net-Zero* Design Guidelines, because *current regulatory codes* that govern rail infrastructure design incorporate historical data that *does not accurately reflect future climate challenges*. [AMTRAK_USA]

(14) It drives the *actions* to *deliver on our goals* and KPIs including *net zero* and *strengthening* our equality, diversity, and inclusion across the business [LNER_UK]

(15) In 2021, Go-Ahead *Group launched its Climate Change Strategy* and *set a goal to become a net-zero business by 2045*. [GWR_UK]

Overall, net zero seems to have similar uses in both the EU and non EU corpora, where it is framed as a strategy. This might be due to the fact that the UN is a global coalition and that UN policies are something that involves all countries. However, while EU countries highlight the transition towards net zero as a process and aim to achieve stakeholders' trust by underscoring how they abide to regulations, non-EU countries mostly frame net zero as an object and target to achieve while emphasizing their own image of business efficiency.

5. Discussion

Results of this examination suggest some cross-cultural (or cross-regional) differences in the framing of environmental discourse. A first look at the two wordlists reveals a distinct attention to different elements adopted in the EU rail companies versus the non-EU ones, such as *green* and *protection* in the former, and *carbon* and *zero* in the latter.

The use of *green* in the EU corpus seems to be particularly interesting as it ranges from a financial/business field (e.g., Green Bond) to a more self-promotional one through which companies emphasize their sustainable and eco-friendly

approach towards the environment. On the other hand, both EU and non-EU companies show similar attitudes towards issues regarding *carbon*, which is mostly addressed as a problem that needs to be solved. Moreover, the two wordlists show different attention to the environmental measures to be adopted, namely an emphasis on the general aim of *protection* in the EU corpus and an emphasis on the specific objective of *zero* emissions in non-EU one.

Collocation and frame analysis of *protection* reveals a strong connection between CSR reports and EU regulatory frameworks, mentioning both environmental and climate protection. In this context, the framing of environmental protection often emphasizes the company's active role in mitigating climate change, positioning the company as an essential player in the larger political and economic effort to reduce emissions. This is also probably connected to why protection is frequently tied to regulatory goals, highlighting a commitment to achieve specific environmental targets in compliance with EU directives. From a rhetorical point of view, the emphasis on *protection* thus favours the image of a caring and compliant corporation.

The phrase *net-zero* emerges in both corpora but is particularly frequent in the non-EU corpus compared to the EU one. While European companies often present *net-zero* in terms of regulatory alignment and compliance with global and EU standards, non-EU companies frame it as more business-oriented goal. Net-zero is presented primarily as a corporate strategy aimed at long-term competitiveness, which needs to be achieved within specific deadlines. This framing emphasizes the role of corporate strategy and the competitive advantages associated with reaching sustainability targets, underscoring the importance of aligning with global environmental trends while also capitalizing on potential business opportunities. For these companies, environmental goals are framed not just as compliance issues but also as critical components of business resilience and innovation.

6. Conclusions

The study has explored how rail companies operating within and outside the European Union frame measures regarding environmental issues in their CSR reports. The procedures adopted for the analysis have moved from a lexical focus to a wider phraseological perspective, paying attention to collocations and semantic preferences. The combination of quantitative and qualitative methods has provided a useful sequence leading to the interpretation of how environmental measures are framed in corporate discourse. A comparative analysis of the data has then revealed regional similarities and differences among the companies, highlighting how they align with broader sustainability goals.

Overall, this small case study might contribute to the ongoing discourse surrounding the role of corporate social responsibility in environmental action. By framing environmental protection and net zero not only as a regulatory mission but also as a corporate strategy, rail companies seek to enhance their public image and legitimacy in an increasingly eco-conscious market. This rhetorical framing serves

to align corporate actions with the global climate agenda while reinforcing their legitimacy among stakeholders, including investors, consumers, and regulators.

The differences in framing between European and non-European companies, however, also underscore the distinct regional dynamics that shape corporate environmental policies. European rail companies, operating within the framework of the EU's ambitious environmental policies, tend to emphasize compliance and the urgency of achieving carbon neutrality. On the other hand, non-European companies, particularly those in English-speaking countries, frame environmental action as a competitive strategy and a business imperative that aligns with global climate goals. Ultimately, the different ways of framing environmental issues also construct different corporate identities that may characterize the expectations of stakeholders in the different regional contexts: corporations using *net zero* as their main objective present themselves as efficient while those preferring *climate protection* highlight their caring identity.

This analysis also suggests that the framing of "climate and environmental protection" and "net zero" is not merely a matter of linguistic choice but is deeply linked to corporate strategy, regional regulatory environments, and public perceptions of corporate responsibility. As such, future research could explore how these frames evolve over time, especially in response to changes in climate policy and corporate sustainability commitments. It would also be valuable to examine how companies in other sectors, particularly those outside the transport industry, use similar framing strategies to engage with the global sustainability agenda.

In conclusion, the study highlights how framing might play a significant role in corporate communication. The differences between European and non-European companies underscore the broader geopolitical and economic forces at play in shaping corporate environmental strategies, pointing to the need for ongoing dialogue and alignment between corporate goals and global environmental initiatives.

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Research article / Научная статья

Imagining a post-crisis society through generative conversation

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Abstract
Realizing a sustainable and equitable world requires a shared vision of what that world should look like. Given the scale and complexity of the climate crisis, conceptualizing necessary societal transformations can be challenging for individuals, resulting in fatalism and disempowerment. In this work, I look at the ways in which generative conversations that center embodiment may help individuals move through this challenge to reclaim hope and agency around the climate crisis. The goal of this study is to better understand what conceptual and communicative strategies individuals use to imagine transformational change. Using Mental Spaces Theory and conceptual blending, I analyze 11 interviews with climate-concerned adults tasked with imagining a "post-crisis world". Post-crisis world descriptions were assessed for detail and the degree to which their structure diverged from the input space(s). I show that imagined worlds that incorporate diverse embodied experiences are more generative according to these metrics. This work adds a new theoretical approach to our Positive Discourse Analysis toolkit by demonstrating the utility of mental spaces and conceptual blending to critical analysis and the creation of new beneficial narratives.
Keywords: *climate crisis, generative discourse, Positive Discourse Analysis, Mental Spaces, cognitive linguistics*

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Посткризисное общество в генеративном дискурсе

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Аннотация
Для построения устойчивого и справедливого мира необходимо иметь общее видение того, как этот мир должен выглядеть. Учитывая масштаб и сложность климатического кризиса, концептуализация необходимых общественных преобразований может быть сложной задачей для человека и приводить к фатализму и бессилию. В данной работе рассматривается, как генеративный дискурс может помочь преодолеть этот вызов и вернуть надежду и уверенность в борьбе с климатическим кризисом. Цель исследования — определить концептуальные и коммуникативные стратегии, используемые для генерации трансформационных изменений. На основе теории ментальных пространств и концептуального смешения в работе проанализировано 11 интервью с экологическими активистами, которым было предложено представить себе «посткризисный мир». Описания посткризисного мира оценивались на предмет детализации и степени расхождения с исходным пространством. Результаты показали, что в соответствии с этими критериями воображаемый мир, включающий разнообразный опыт, является более генеративным. Данная работа вносит теоретический вклад в существующий инструментарий позитивного дискурс-анализа, демонстрируя полезность ментальных пространств и концептуального смешения для критического анализа и создания новых позитивных нарративов.
Ключевые слова: *климатический кризис, генеративный дискурс, позитивный дискурс-анализ, ментальные пространства, когнитивная лингвистика*

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1. Introduction

As of 2023, we have crossed six of the nine ‘planetary boundaries’ that set the parameters of a safe continued existence on Earth (Richardson et al. 2023). To recover from this overstep and stay within these boundaries would require a fundamental reworking of how we use resources, especially if an equitable distribution of “the good life” is to be realized (O’Neill et al. 2018). In order to meet the challenges of the climate crisis and avoid its most catastrophic effects, transformative coordinated change will have to occur in every sector of society, from how we produce food, to how we power our homes, to how we govern (Beddoe et al. 2009, O’Brien & Sygna 2013), and the available time frame for achieving these changes is quickly diminishing (IPCC 2023). The discipline of ecolinguistics holds that the achievement of such changes is necessarily shaped and bound by the language we use in talking about the climate crisis and in defining our relationship to wider ecological systems (e.g. Couto 2014, Penz & Fill 2022, Steffensen & Fill 2014, Stibbe 2015, Zhou 2022). The growing field of Positive Discourse Analysis then directs us to both critique the discourses that contribute to

perpetuating these crises and identify beneficial alternative narratives (e.g. Ponton 2022, Stibbe 2017).

Through the "crisification" of climate change discourse (Paglia 2018), talk of transformative change has moved from radical activist spaces into the mainstream (O'Brien & Sygna 2013). At first, this discursive shift might appear hopeful — with institutions, governments, and corporations accepting the framing of "crisis" and the urgent transformative change it entails, we may begin seeing change at the scale and speed at which it needs to occur. Instead of increasing hope, however, we see a growing epidemic of eco-anxiety, grief, and hopelessness, especially among children and young adults (Ágoston et al. 2022, Cianconi et al. 2020, Lawrance et al. 2022, Léger-Goodes et al. 2022, Ogunbode et al. 2021, Ojala et al. 2021, Pihkala 2020). As "transformation" shifts from a radical discourse to an institutional one, its definition becomes determined by those in power. Instead of imagining different systems, "transformation" comes to refer to the maintenance of current systems under different, more severe, and more unstable conditions (Anderson 2010, Jeffrey & Dyson 2021). Under this analysis, hopelessness arises not just from an increasing awareness of ecological crises, but also from a decrease in the ability to imagine past those crises to something truly different.

To better understand the relationship between this specialist understanding of "transformation" and everyday folk understanding, I look at how climate-concerned adults reason and talk about the transformational changes that need to take place in order to achieve a "post-crisis" future. Using data from 11 semi-structured interviews, I analyze how participants' descriptions of imagined worlds conform with or diverge from dominant social, political, and economic narratives. Formulated as a research question, this work addresses the following:

What communicative and cognitive strategies do individuals use when imagining new worlds, and how can these imaginings help us to identify and construct new beneficial narratives?

I show that participants tended to organize their descriptions of imagined post-crisis worlds in two ways, which I call *anticipatory* and *prefigurative* strategies in analogy to work on futuring in political geography (Anderson 2010). Using an *anticipatory strategy* resulted in world descriptions structured around one-to-one contrasts between the current world and the new one (e.g. "there will be electric stoves rather than gas stoves"). Using a *prefigurative* strategy resulted in world descriptions embedded in a particular situation. Rather than bouncing between two worlds, as in *anticipatory* descriptions, *prefigurative* descriptions elaborated on the features of one world without repeated reference to another. These prefigurative descriptions tended to be more detailed, more systems-oriented, and more divergent from dominant narratives.

To understand why this is, I use critical variants of mental spaces theory (Fauconnier 1994) and conceptual blending (Fauconnier & Turner 2008). Modelling imagined *worlds* as imagined *mental spaces*, I argue that using embodied experience as the focus of imagining provides access to richer "input spaces", which

can be more creatively reconfigured in the creation of imagined spaces. This work thus suggests that centering embodiment in climate-related conversations should be prioritized at least as much as talking about "the facts" of the crisis. Doing so can increase the ability of individuals to engage in imagining new "stories to live by" (Stibbe 2017) beyond the socio-political conditions in which they find themselves. By doing so, we turn *informative* climate conversations into *generative* ones, allowing knowledge about transformational change to not only be exchanged, but also created.

I begin, somewhat atypically, by introducing my participants and interview procedure in Section 3. To reflect the collaborative meaning-making processes that motivate my methodology, I then incorporate participant responses into my theoretical background (Section 4), which focuses on (i) (not) defining the climate crisis, (ii) re-centering our definitions around individual embodied experience (i.e. semantic *frames*; Fillmore 1976), and (iii) the use of embodied experience in imagining new worlds (i.e. future and hypothetical *mental spaces*; Fauconnier 1994). In my analysis (Section 5), I provide critical mental space analyses of four of my participants' imagined worlds, highlighting the differences between *anticipatory* and *prefigurative* communicative strategies for mental space building and expression. Section 6 concludes.

This work contributes to the critical turn in cognitive linguistics (Hart 2007), first advanced by Critical Metaphor Analysis (Charteris-Black 2004), which calls for cognitive linguistic theories to be applied in better understanding how existing power structures shape both discourse and thought. The work also contributes to a practical and interpersonal turn in ecolinguistics, pointing toward the ways in which ecolinguistic approaches can be used to inform everyday communicative practices by non-experts, in addition to critical textual analysis.

2. Conversational data collection

2.1. Participants

This study reports on 11 recorded climate conversations between the author and climate-concerned adults aged 25–44, where "climate-concerned" refers to a belief that climate change is a real, severe, and immediate threat. All interviews were conducted in English, though English was not the first language of two participants. Five participants self-identified as women, five as men, and one as gender non-conforming. Though 'climate-concerned', none of the participants were practicing radical alternative lifestyles, such as homesteading or squatting, at the time of the interview. These are individuals living within the 'mainstream' as academics, educators, and entrepreneurs, which is to say these individuals are working within the sociopolitical conditions that have thus far prevented meaningful progress in the face of the crisis.

Climate conversations were conducted as semi-structured interviews lasting between 25 and 72 minutes, resulting in just over 8 hours of recordings. Interviews

were conducted via zoom and audio recorded using the computers' internal recording software. Recordings were then transcribed using Microsoft's dictation feature, the output of which was manually checked. Any names of individuals or specific places were changed during this manual checking process to ensure anonymity of the transcripts.

All interviews were 'acquaintance-interviews' (Garton & Copland 2010) in that all participants were known to the author in some capacity prior to interviewing. The nature of existing relationships varied and included close friends and their partners, former mentors, and former students. Acquaintance-interviews were chosen to facilitate an intimate and casual atmosphere similar to that which may occur outside of the research context. This is important because I am primarily interested in the everyday practices of non-experts in talking about the climate crisis and reasoning about their position within it. At least as important, the pre-existing relationships with participants enabled 'check-ins' after what were, at times, difficult and emotional conversations.

Because of the proximity of the author to participants, as well as the political sensitivity of the data, extra care is given to maintain anonymity. Participants are thus given gender-neutral pseudonyms and no demographic information is provided for individual participants. I refer to participants by pseudonyms rather than, say, participant number, as a reminder to the reader that the answers given are by individuals with unique histories, motivations, and desires that shape their responses.

2.2. Interview procedure

Interviews were 'semi-structured' into three main phases. The first dealt with habits of participants in regard to talking and thinking about the climate crisis in their daily lives. The second phase targeted individual lived experiences of the climate crisis. The third, which is the primary focus of the present work, consisted of two imaginative exercises and one reflection. In the first exercise, participants were asked to describe what a "post-crisis" world would look like in general. In the second exercise, participants were asked to imagine what a day in their personal life would be like were a post-crisis world achieved. Finally, participants were asked to reflect on challenges preventing their imagined world from being realized. Once the main interview questions had been completed, participants were invited to share any additional thoughts they had related to the climate crisis.

The general structure and central topics were kept consistent across all participants but room was given for divergences from pre-planned questions. This increased the conversational validity of the interactions, allowing the participant to collaboratively determine with me, the interviewer, what topics were most interesting and constructive to focus on. Written consent was given by participants prior to starting the interview. Follow-up verbal consent was also elicited when starting, stopping, and storing the recording. All participants consented to the

sharing of anonymized transcripts in a semi-private archive for research purposes. As such, access to full interview transcripts can be granted upon request.

2.3. Data presentation

The main analysis consists of four close readings of participants' imagined post-crisis futures, modeling each as a process of mental space creation. After providing a mental space analysis of each, I reflect on the degree to which the future space aligns with or challenges existing power structures, borrowing from critical pedagogy (Shudak et al. 2015) and work on prefigurative politics (Jeffrey & Dyson 2021) to do so. In the spirit of *co-creating* meaning and democratizing climate discourse (Yusoff & Gabrys 2011), I also incorporate participant responses into the (co-)articulation of my arguments throughout the background and discussion sections. This serves to use 'everyday' voices not only as data to be analyzed, but also as direct contributions to academic discourse.

3. Navigating a complex crisis

3.1. Understanding the problem

In order to imagine a "post-crisis" future, we must first understand the nature of the "crisis" we intend to move past. Dominant approaches to climate discourse (and, as a result, climate policy) center a 'science-first' understanding of *climate change* as a precondition for understanding the *climate crisis* and possible solutions to it (Szerszynski & Urry 2010). The sociopolitical conditions underlying the crisis are peripheralized, even when the very same science recognizes human behavior as the driver of the crisis. As an illustration of this, consider the opening of Chapter 1 'What is climate change' from Oxford's 'very short introduction' of climate change.

> Future climate change is one of the defining challenges of the 21st century, along with global inequality, environmental degradation, and global insecurity. The problem is that 'climate change' is *no longer just a scientific concern*, but encompasses economics, sociology, geopolitics, national and local politics, law, and health, just to name a few. (Maslin 2014: 1; emphasis added)

Climate change is framed here as *first* being a scientific problem that then *became* a socio-economic and geopolitical problem. The centrality of scientific processes is reinforced by the structure of the book, which begins by focusing on greenhouse gases, proceeds through a science-oriented history of climate change, and only gets to the 'politics' in chapter 7 (the third to last chapter). This pattern is echoed throughout institutional climate communication material (i.e. in formal education, governmental campaigns, and the press), as *climate* literacy is framed as a type of *science* literacy (Azevedo & Marques 2017).

The effect of this framing is a "deficit" approach to climate communication and education (Hanson-Easey et al. 2015), such that people outside of immediate climate science and policy making circles are perceived as lacking the expertise to actively participate in climate discourse. This effect was apparent in my conversations, as participants cited a lack of knowledge as limiting their ability to imagine a post-crisis world. Jamie, for example, despite having academic training, cited a lack of "science-y" knowledge as preventing a full understanding of climate change.

> I studied sociology. I was not like a science-y person. And so there's some aspects of it that are like- like ≪*silly voice*> greenhouse gas emission> like, it gets very big, and I don't fully understand. (Jamie)

This points to a perception of "science-y" people as having epistemic authority in climate discourse, to the exclusion of other modes of thought, including socially-oriented ones. Importantly, I do not mean to deny the scientific relationship between climate change and greenhouse gases. Indeed, Jamie cannot *fully* understand climate change without understanding this relationship. What is lost in a science-first approach to climate communication is the realization that climate change also cannot be *fully* understood without understanding underlying sociological conditions. And still, because of the dominance of the science-first framing, Jamie does not seem to take ownership of this expertise, an expertise that many "science-y" people may very well lack.

The science-first framing of climate change has been extensively critiqued in environmental humanities literature, not only for excluding voices from decision-making processes, but also for distracting from the underlying socio-political causes of the crisis (e.g. Crist 2007, Hanson-Easey et al. 2015, Jasanoff 2010, Kahn 2008, Pepermans & Maeseele 2016, Szerszynski & Urry 2010, Urry 2011, Wright et al. 2013, Yusoff & Gabrys 2011). 'Democratizing' climate discourse addresses both critiques by recognizing the importance of different forms of expertise for understanding climate change and the approaches we take in addressing it (Yusoff & Gabrys 2011). As argued by Gladwin & Ellis (2024), reframing climate literacy as a type of *systems* literacy, enables individuals to discover and engage their existing expertise — as 'systems-beings' existing *with* and *in* the crisis, we all have intimate knowledge of the crisis and the sociopolitical systems that underlie it. Jamie, despite voicing insecurity about not knowing the *science* of climate change, ended our conversation by highlighting the importance of including diverse voices in climate discourse:

> it's just interesting because your, yeah, your project is really important, because we all have a lot to say about it, whether we have expertise or not, and there's not a lot of, like, there's not a lot of room to really really talk about it. (Jamie)

The remaining challenge then, identified both by my participants and academic critiques, is to empower individuals outside of current decision-making circles to

recognize both their *right* and their *ability* to contribute meaningfully to climate discourse, especially in discussions of transformational change. This requires recognizing the climate crisis an essentially contested concept (Gallie 1955), meaning that a central feature of "the" crisis is that it is defined differently at different times depending on the interests and experiences of the people involved, and that all of these definitions are in some way or another legitimate. As I discuss in the next section, this can be effectively achieved by centering lived experiences in climate conversations in line with embodied approaches to meaning-making.

3.2. Embodied complexity

We make meaning through our interactions with the world. We know what a chair is by sitting on one, we know what a pencil is by using one to write, and we know what a conversation is by having one with another person. A cognitive *frame semantic* approach to meaning holds that concepts, and their linguistic expression, are built from experience in this way (Fillmore 1976). That meaning is *experiential* also makes meaning informationally dense — a chair is not *just* something you sit on, it is also something that gives you reprieve when you're tired; it is something you use when having dinner, playing a board game, or writing a paper; it is something that can come in a variety of shapes, sizes, and colors, some of which are more comfortable, or ergonomic, or stylish than others; it is your favorite chair that you bought from an antique store, as well as your friend's chair that you accidentally spilled wine on. The concept *chair* is a bundle of all of your experiences with things that resemble the things we call "chairs". From this perspective, the meaning of "climate change" or "climate crisis" is determined by our experiences of it.

There is significant concern that, especially in the Global North, individuals lack sufficient first-hand experience of the crisis to understand and relate to the crisis in ways that would motivate meaningful behavioral and social change (Keller et al. 2022, Maiella et al. 2020, McDonald et al. 2015, Spence et al. 2012, Van Lange & Huckelba 2021). Rather than experiencing it first hand, we, in the Global North, experience climate change by reading and hearing *about* climate-related crises. This makes our concept of climate change relatively informationally poor — we may know facts and hear stories, but we lack the psychological, social, and sensorial richness that comes with direct embodied experience.

These concerns, however, emerge from a science-first understanding of climate change which centers the immediate physical causes and effects of the crisis (i.e. accumulation of greenhouse gases and the resulting destabilization of Earth's weather systems). Under this framing, what is considered a 'direct' experience of the climate crisis is restricted to direct experiences of physical climatic events. A more systems-oriented understanding of climate change which values understanding underlying sociopolitical causes and wider sociopolitical effects leads to a contestation of the distinction between 'direct' and 'indirect' experiences.

To illustrate this tension, consider Alex's reflection on climate discourse at the end of our conversation:

> I think it's hard to know exactly what climate change is and isn't. Um, besides, y'know, global warming, rising tides, hot days. Um, so yeah, so then, y'know the- how- the way that we filter down that meta-narrative to the finite narrative is where I lose some kind of comprehension of is this something that's about climate change? Is it about something else? Like, I'm not sure that a bike lane is exactly about climate change. Maybe. (Alex)

Alex spent a lot of time during our conversation discussing the ideological divides in their city that prevented even relatively small improvements to the city's 'green' infrastructure, such as adding bike lanes to help reduce car traffic. However, they still question whether or not that discussion was really about climate change as such. As prescribed by the science-first understanding of climate change, they list climatic events as definitely being about climate change, but question the relevance of the issue that they felt most driven to discuss. For Alex, their climate expertise lies in their lived experience of a lack of green infrastructure and hostility toward its development. Under an open and contested definition of climate change, this expertise emerges from a 'direct' experience of the sociopolitical conditions that contribute to the perpetuation of the crisis.

In addition to being *embodied*, semantic frames are also *embedded* in relevant linguistic, psychological, and cultural contexts. This embeddedness leads to one concept *evoking* related ones. For instance, the concept of *coffee* likely evokes the concept of *work* for many people, as the embodied experience of preparing and drinking coffee is embedded in morning routines and preparing for the workday. This aligns with the calls discussed above to center the sociopolitical, ideological, and ecological systems intertwined with narrow conceptions of climate change (Crist 2007, Manuel-Navarrete et al. 2012, Urry 2011). All aspects of lived experience become analyzable as embedded within the crisis (Gladwin & Ellis 2024), and thus become relevant to climate discourse once the connection is recognized. As an illustration, consider how another participant, Dylan, discusses the ways in which growing up within the climate crisis has directly shaped their psychological experience of the world, as well as their social practices:

> I don't have an option to opt out of uncertainty. Like, I just like- it's with me always in every-. And like, I think that that's informed, and like made possible, by the fact that like I'm living- I'm like coming of age at a time when like everything is changing around us. And like, so, like, I have no experience of the world other than like random shit happening. [...] that reality that I just like happened to be alive in, and happened to have, y'know, like become an adult in, is something that has informed the way that I navigate like mundane things, which is like, "oh, yeah! Like, I would love to see you this weekend. Like let's make- Let's have dinner on Friday or whatever, like OK, like let's y'know, like let's confirm on Thursday. And then like on Friday afternoon, like let's confirm again". And like, "oh, actually", y'know, and- and then also,

> like, something happens, and, y'know, like plans change. I'm like, "yeah, I thought that they would". <*laughs*> Y'know, like I'm not like, "oh no, this didn't happen". I'm like, "yeah, okay. Like we'll find another way". (Dylan)

Here, Dylan expresses a psychological and social expertise of the climate crisis by recognizing the effects that living in an unstable and rapidly changing environment has on their daily lives. This expertise is not directly related to particular events or particular scientific facts, but rather to how being embedded in the crisis entails a particular *way of being* in our social world.

Even when participants did reflect on particular climatic events, the emerging expertise pointed to the value of an embedded conception of climate change. A particularly good example of this was expressed by Cameron while telling a story of when the climate crisis felt particularly immediate to them. In their retelling, they noted the interactions between different effects and causes of climate disasters, as well as experiencing these disasters in the context of a larger polycrisis.

> We were contending with like the perfect storm of, um, among the worst droughts that we've experienced for a long time, which is climate change related. And also one of the worst heat waves we've experienced in a long time, which is climate change related. And then also, um, y'know, subsequently terrible wildfires, which are climate change and also like human mismanagement related. And yeah, we were trapped inside because it was smoky for five days straight. And it was also like the pandemic. So it was like you're literally just inside your own house. Like you can't go anywhere. [...] I had my birthday, tha- like during that time, and my friend and I- I went to my friend's house who, she had like a backyard with a pool, and we sat 6 feet apart and each ate like a piece of cake that I had bought like 6 feet apart. But it was like, the sky was still orange, and it was like raining ash into the pool, like the pool was turning black. And I was just like "happy birthday to me". (Cameron)

The richness of this lived experience does not only reflect Cameron's particular scientific expertise, in knowing the connection between individual climate related disasters and climate change more generally, but also their lived psychological and social expertise of the crisis. Their birthday as a social and cultural practice became inseparable from the crises in which it was embedded.

Both examples demonstrate how experiences of "climate change" can be re-centered around everyday lived social practices that are inherently embedded within the crisis. Climate communication literature may be right in pointing out that many of us lack rich embodied experiences of "climate change" when it is narrowly defined as a scientific ecological phenomenon. However, we all have rich embodied experiences of the social, economic, and political systems that interface with "climate change". Rather than thinking of climate change as, say, increasing the severity of storms, which *is* relatively abstract and removed from lived experience, we can think about it very concretely as decreasing out ability to plan, travel, and celebrate.

3.3. Embodied imagining

Frame Semantics (Fillmore 1976) gives us a way to think about abstract conceptual knowledge as being grounded in *embodied* physical experience and *embedded* in a social world. Mental Spaces (Fauconnier 1994) then serves to situate those experiences in a time and place. Very simply put, a *mental space* is a representation of the state of a possible world, populated by conceptual frames that represent the information we wish to talk and think about. There is a *base* space, which is the world as it is in the 'here and now'. This space tends to be the focus of conversation when we talk "facts" about the "real world". There are also an indefinite number of *target* spaces, other possible worlds that we can talk about to express, for example, memories of the past, hopes for the future, and hypotheses about alternative presences. To think and talk about these other worlds, we reason outward from our base space, relying on what we know in the here and now to reason about what has been and could be. This process, called *projection*, is mediated by a middle *generic space* which schematizes information. This schematized information is then specified for new features and projected into the other world, or *target space*.

Consider, for example, the statement "the future of cars is electric". Using our world knowledge, we know that the prototypical semantic frame for a *car* in the present day involves a *gas-powered car*. To imagine a "future car", we first reduce the details of the present car frame, projecting it to the generic space, in order to then replace those details with new desired ones. This process can be represented as the diagram in Figure 1.

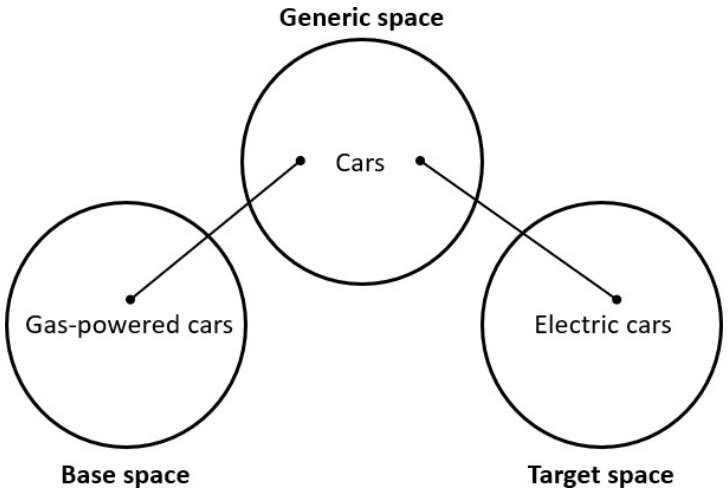

Figure 1. Basic projection from Base space to Target space

Once all elements have been projected into the target space, there is then a process of *completion*, in which details that were not specified during projection are "filled in" based on our world knowledge (Fauconnier & Turner 1994). This process

is inherently conservative; by default, we assume things do not change between the base space and the new space. In the car example above, only the car's power system is directly at issue. During the process of completion, the frame of a *future* car is filled in, likely maintaining the other features of a present day car and associated infrastructure (e.g. a driver, four wheels, paved roads).

The process of mental space creation and navigation is signaled linguistically via *space-builders*. These include obvious references to alternative worlds, such as the "future" in the example above, but also more subtle cues such as tense-shifting (Cutrer 1994) to signal navigation between a *base* space and *past* and *future* spaces, and negation to signal navigation between *alternative* spaces (Sweetser 2006).

It is also possible, if not the default, for a target space to inherit elements from multiple input spaces, creating a *blended space* (Fauconnier & Turner 2008). This is often associated with metaphor (Brandt & Brandt 2005, Dancygier 2016, Fauconnier & Lakoff 2009), but can be considered more broadly applicable to different varieties of analogical reasoning (Fauconnier & Turner 1994). In this work, I present several *non*-metaphoric blends, in which a future space is constructed by integrating conceptual structure and frame elements from different input spaces in a literal, but nonetheless highly creative, way.

3.4. A critical approach to mental spaces

The conservation of elements from the base space through *completion* offers a particularly helpful mechanism for thinking about generativity. The more the process of completion is disrupted or questioned, the more room is given for genuinely new structure in the imagined space. To integrate *criticality* into this mental space approach, I employ the concept of 'limit-situations' from critical pedagogy, as introduced by Paulo Freire (1970a, 1970b) and elaborated on through critical and emancipatory pedagogical traditions (Giroux 1997, Nouri & Sajjadi 2014, Shudak et al. 2015).

Freire (1970b) introduces the notion of a *limit-situation* to understand the ways in which existing power structures and dominant cultural narratives interfere with the knowledge-creation process. The limit-situation in of a given problem, like the climate crisis, is the sociopolitical conditions that mediate an individual's interaction with the problem. When individuals fail to confront the limit-situation, they are prevented from realizing their full potential as creative agents (Shudak et al. 2015). A focus on limit-situations redirects attention from a surface level problem, such as the presence of gas-powered cars, to underlying causes of the problem, such as car-centric infrastructure and an over-emphasis on private ownership.

I argue that a useful analogy can be drawn between realizing limit-situations and the process of mental space creation, especially at the completion stage of processing. By antagonizing what information is 'taken for granted' during the imagining process, existing conceptual (and by extension cultural) structures can be more effectively challenged. For example, consider the somewhat humorous

statement “the future of cars is trains”. The projection of *cars* and assumptions that follow from their presence (e.g. drivers, roads) gets disrupted somewhere between the middle space and the future space. There is a forced reassessment of the elements being projected, requiring a late employment of another more schematic frame, *transportation*. The joke arises out of this “lateness”; we thought we would see a restructuring of the frame *car*, but instead had to abandon the frame in favor of another. The presence of drivers and roads is no longer assumed, challenging one to imagine *something else*, and the very existence of cars is brought into question. I will represent this kind of disruption as shown in Figure 2.

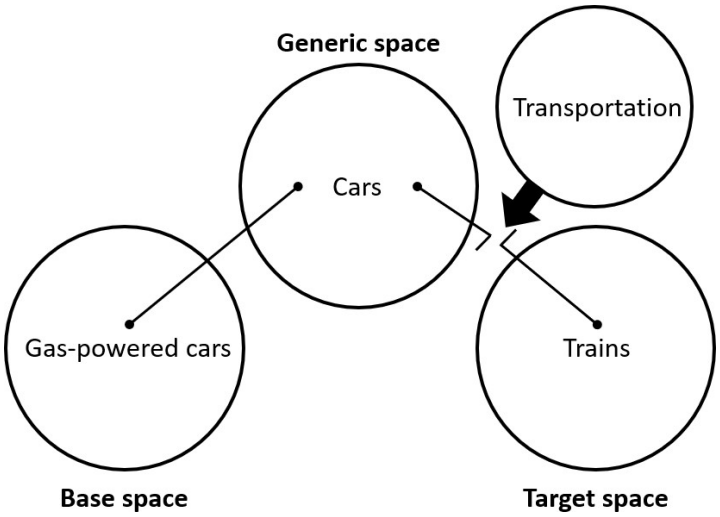

Figure 2. Disrupted projection from Base space to Target space

Because of the complexity of many of the mental spaces discussed in the following two sections, I will not include middle/generic spaces in the diagrams. Instead, projection (and disruption) will be shown directly between input and target spaces. This is for the sake of clarity, but one can assume in all cases that schematization via a middle space does occur.

4. Strategies for imagining new worlds

4.1. Dimensions of generativity

Participants’ imagined worlds will be analyzed for ‘generativity’, that is the degree to which imagined worlds demonstrate *new* conceptual structure. Modeled with mental spaces, this generativity surfaces as structural divergences between the input and target spaces. Generativity can vary along two dimensions: number of input spaces and number of disrupted projections.

When an imagined space can be reasonably constructed from just one input space, I consider the imaginative process ‘anticipatory’. This naming is an analogy to *anticipatory political logics* which construct the future by imagining changes to

elements of the present, and seeking to in some way counteract or avoid change that would fundamentally transform present structures (Anderson 2010). This logic is dominant in policy-making circles in which a complex 'wicked' problem, like the climate crisis (Lazarus 2008, Levin et al. 2012), is broken into discreet smaller problems that can be addressed through independently employable technological solutions (Gilligan & Vandenbergh 2020). I consider this strategy to be relatively *non*-generative as it leads to a replication of the structure of the present. Because an anticipatory strategy involves identifying specific problems in the present and *anticipating* their potential solutions in the future, it is expressed through, for example, comparative syntactic structures and negation, as well as overt references to specific differences between the present and imagined world.

Prefiguration is held as an alternative to this logic, focusing on an explicit imagining of new social structures (Jeffrey & Dyson 2021). I take imagined worlds that diverge in conceptual structure from that of any single input space to employ a *prefigurative* imaginative strategy. A prefigurative strategy is marked by creative and elaborative description from *within* the target space. Instead of iteratively jumping between an input and target space, which encourages a conservation of conceptual structure, prefiguration involves continuous occupation of the target space. This means that prefiguration is marked by a maintenance of grammatical tense and subject as the communicator *narrates* the new world, instead of *deriving* it through one-to-one comparisons with the old.

The second dimension of generativity is the number of disrupted projections that occur while describing the imagined world. A projection from the base space to the imagined future space is considered "disrupted" when there is some overt indication that conceptual structure which may otherwise be taken for granted is, in fact, at issue. In the present data, disrupted projections are communicated through epistemic expressions of *not* knowing.

4.2. Structuring the future from the present

First, I will contrast the imagined *society* and *day* of one participant, Jordan. Though the two worlds differ in expressions of agency and descriptions of embodied experience, there is minimal disruption during the processes of projection and completion. This results in imagined worlds that maintain the overall structure of the base space.

Jordan was first tasked with imagining a post-crisis society. As seen in the text below, Jordan provided a detailed imagining by listing changes that would occur across different sectors of society, including transportation, energy, city planning, work, and economic systems. I consider this imagining to be a prototypical case of *anticipatory* reasoning, as Jordan focuses on individual problems and corresponding individual solutions.

> I think there'll be much more green space and just like focus on integrating plants and trees into the places where humans live. Um, I think there'll be a lot of, um, I mean I think there'll be basically like fully electric mobility. Um.

> Transportation will be quieter and zero emissions. Um. I think that electricity will be, primarily, like solar, wind, and- and maybe nuclear, and some other, um, hydrogen and other, um, kinda energy innovations that are either like regenerative or, uh, zero emissions. So not fossil fuel based I guess. Um, I think people will work less and they'll care more about their community, and will have, yeah, healthier lifestyles. They w- they- I think there'll need to be a transition from like consumerism and like a sense of individuality and wanting to be kinda like better than the next person to more like feeling connected, curious about how you can serve your community and- and be neighborly. Um, I think, um, there'll be a tremendous amount of like respect for nature-based solutions and like the people who understand how to integrate those, whereas today, y'know I think people are mostly interested in kinda like "techy" type like innovation, um, so I would imagine a change there. And, um, I would imagine in our financial systems are like quite different [...] I think we will need to move toward companies not being binded to fiduciary responsibility and having a more wholistic look- outlook on why to exist, as a company, and like what your purpose should be. (Jordan)

There are two particularly important linguistic patterns in Jordan's response. First, comparative structures are frequently used; there will be "*much more* green space", "quiet*er*" transportation, "*less*" work, "*more*" feelings of connection, and "*more* wholistic" approaches to corporate priorities. The second pattern of note is the use of negation; "*not* fossil fuel based" and "*not* being binded to fiduciary responsibility". By negating or changing the degree of elements in the base space, Jordan maintains the overall structure of the base space in the imagined future. Modeled as a mental space diagram, this imagining can be thought of as creating one-to-one mappings between the two spaces, as depicted in Figure 3.

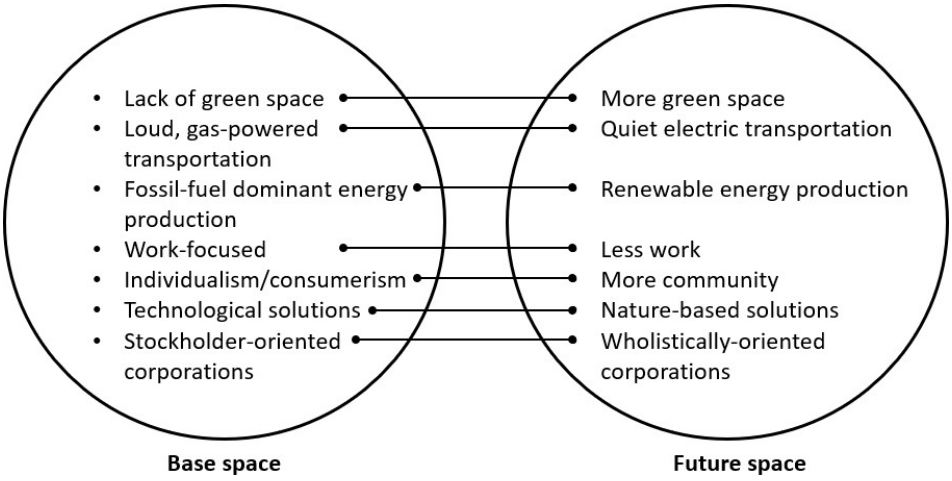

Figure 3.Basic anticipatory mental space building

Jordan is clearly well-informed about the constituent issues of the climate crisis and proposals for resolving them individually, demonstrating a technological

expertise. However, this first imagined future space lacks two important features of an embodied transformative world. First, because the space is structured by iteratively identifying a problem in the base space and projecting it into the future space as fixed or improved, connections between the different issues and different possible solutions are not considered. This limits the ways in which each change can be considered *embedded* in a world of interlocking systems. Second, agents are only mentioned for three of the mappings. Otherwise, changes are presented using existential constructions (e.g. "there will be") or with non-agentive grammatical subjects (e.g. "transportation will be"). This limits the ways in which each change can be *enacted* by embodied agents, including Jordan themselves.

Jordan's imagined future day, on the other hand, incorporates changes that are both *embedded* within lived complex systems and *enacted* by embodied agents. Their imagined future day also incorporates sensorial and psychological features that were largely missing from their previous response.

> Yeah, I would wake up to kind of like the room, kind of like glowing with sunshine. Um, and there would be like sounds of nature, like in the distance. Um, yeah, I would live in a place where there was, like, small gardens, and y'know things that we could like harvest for, y'know, meals and, um, the breakfast that I would eat would, y'know I would know kinda like where things came from [...] And then yeah maybe- maybe I'll be able to like walk to work and most of my walk is y'know on like, grass, and, y'know, s- not everything's like paved over. There's not a lot of traffic. Um, I would say I go to work, and there are like colleagues at work. Um, and people, y'know, seem like, at ease, and- and comfortable, and it's like well lit, and there's a lot of, y'know greenery, like in the space. And, um, there's like a- healthy balance of time kind of like spent in front of a screen versus time spent, um, y'know, working with people in person, or, using like other means of, um, yeah capturing ideas or sharing ideas. Um. And yeah, there's like a sense of like both satisfaction of like the work that I did. And I feel fulfilled, um, in terms of also had a- having had an opportunity to like socialize. (Jordan)

For each step in their day, Jordan provides an informationally-dense embodied elaboration. For example, in their description of their workplace, Jordan combines physical descriptions of light and color with psychological descriptions of people "at ease and comfortable" and social descriptions of different work tasks. This detailed and multifaceted description contrasts with the description of work in their first response, in which they only specified that people would "work less". Agentivity is also centered throughout with "I" statements, directly embedding Jordan within a world they both experience and enact. In contrast with their first description, there are no comparative structures and only two instances of negation, which are immediately adjacent to one another ("*not* everything's like paved over. There's *not* a lot of traffic").

Modeling this imagined future requires a more complex mental space network. This can be considered a blend, as elements are projected from two mental spaces (the base day and the previously imagined future space). However, the roles of the

two input spaces are markedly different, as the base day provides the overall structure of the future day, and the previously imagined future space provides elaborative details.

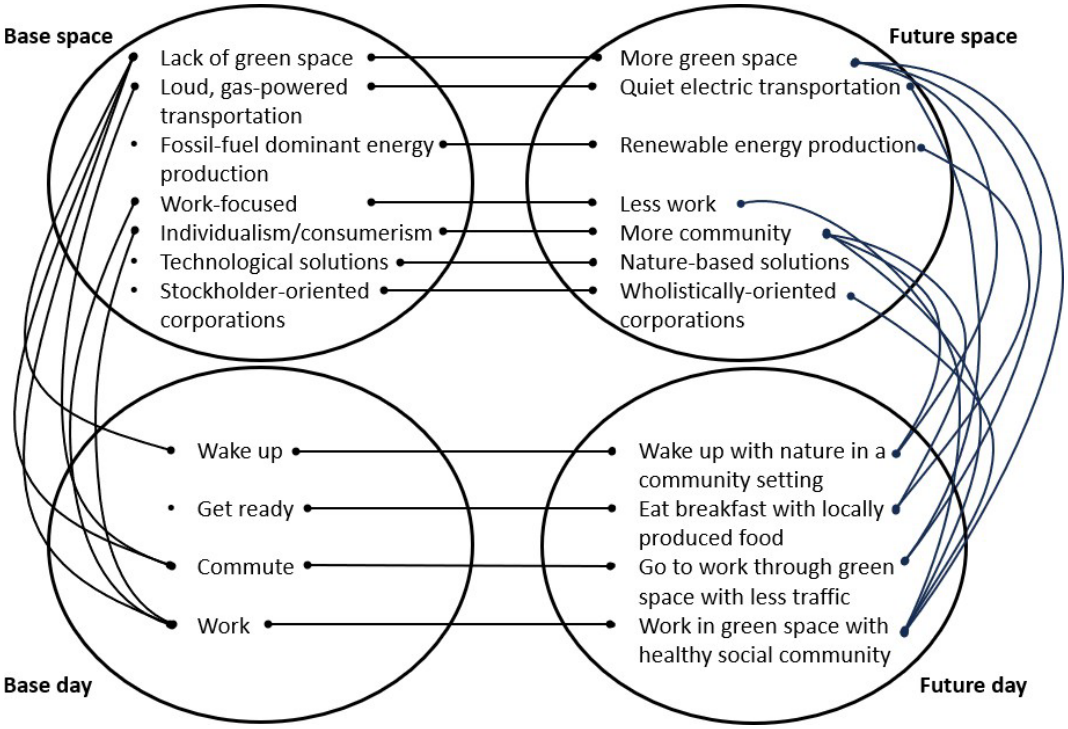

Figure 4. Complex anticipatory mental space building

With two spaces contributing to the articulation of the target space, relatively infrequent markers of mental space switching (i.e. the relative lack of comparative structures and negation), and the maintenance of "I" as subject, this second world description reflects more of a *prefigurative* strategy. However, because both input spaces are based on the structure of the present, the imagined day still lacks generativity — the components of the imagined space are *adjusted* from the present rather than *created anew*. For example, even when a post-crisis job was described as sensorily, socially, and psychologically satisfying, the presence of the job itself went unquestioned. Imagining an embodied *day,* rather than an entire abstract *world,* led to a relatively informationally-dense and systems-oriented description, but it did not lead to a questioning or disruption of the present.

4.3. Prefiguring new futures

In this section, I discuss the description of an imagined post-crisis day that is both *prefigurative,* as it borrows from multiple spaces to create a structurally novel target space, and *disruptive* in that projections from input spaces are brought into question.

Blair's imagined day shares certain themes with Jordan's, such as the presence of gardens near the home and the importance of community. The most important differences arise in the order of described events and in a consistent openness to things "maybe" being different. Relationships are prioritized, as Blair interacts first with human and non-human members of their village and their family *before* engaging in "work". When pressed for more detail on their work, Blair describes something quite different from a typical Western *job* to which you *commute*. Rather, this work seems to be labor within and for their community, incorporating more typical "productive" labor with less typical social activity.

> **Blair:** <*laughs*> Well, in my ideal world I have a donkey. So, I would wake up and say hi to my donkey. <*laughs*> I would grab a cup of coffee <*laughs*> Is this what you want me to tell you?
>
> **Interviewer:** Yeah, exactly
>
> **Blair:** Um, maybe I would either- I would wake up very early in the morning, and I would either go to my own like crop and grab something from there. Um, or, just walk around, uh, my village and, uh, say hi to a couple people. Uh, and maybe have, uh, exchange some vegetables, uh, instead of buying them. Um, and then I would, um, go back to my house and, um, spend some time with my family, whatever my family is, in the morning, and then, uh, maybe, after that, work for about four or five hours, tops.
>
> **Interviewer:** What would your work be?
>
> **Blair:** I think my work would entail a mix of, um, physical active work in, um, y'know, either, um, producing something that I, y'know, uh, have in my own, um, community or house or whatever that is, um, environment. Um. And, uh, a mix of, um, either sharing something with somebody else, uh, whether that is like teaching or, um, uh, just- just having a conversation or, um, or having like a moment of like, I don't know, meaningful discussion.

It is not possible to model Blair's imagined day as a product of mental space projection from a typical Western workday. Some events appear to be out of order, such as work and leisure time. Other events, like a commute, do not appear at all. There are two contextual cues that point toward additional input spaces that Blair may be employing. First, though Blair currently lives in an urban setting, they also have lived experience in rural communities. Second, Blair previously mentioned Sultana's Dream (1905), an early eco-feminist short story by Bengali writer Rokeya Sakhawat Hossain, as one of the first things that comes to mind when trying to imagine a post-crisis world. Though we cannot know what, if anything, is being projected from these spaces into Blair's imagined day, we do know they are at least available to them for projection and completion processes. Blair also marks two disruptions with the construction "whatever X is", bringing the nature of *family* and the relationship between *work* and *home* directly into question, and one disruption by saying "I don't know" regarding what activities they may consider work.

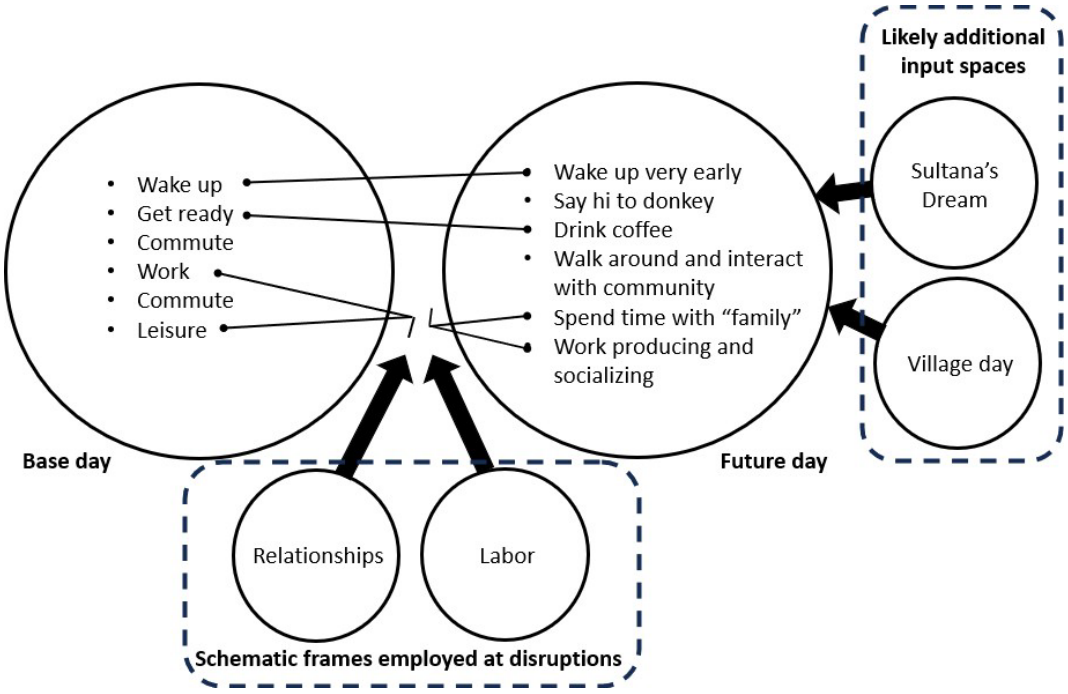

Figure 5. Disrupted and incomplete projection in prefiguration

Blair's response demonstrates a high degree of generativity by diverging from the structure of the base space, overtly disrupting projection and completion processes, and indicating a flexibility for current 'unknowns' (e.g. what a family might look like). This is in line with the 'trying out' of futures and 'openness to experimentation' that is associated with prefigurative political practice (Maeckelbergh 2011). It also shows how these imaginings may provide opportunities for exposing and analyzing limit situations, as the moments of Blair's disruption could become the topic of further conversation.

4.4. Blending presents into new futures

In the final analysis, I consider an imagined world that is very consciously created from multiple input spaces. The two input spaces, the *Isle of Eigg* and a present-day *university*, are described overtly and in detail by the participant, Hayden, who then uses the structural differences between them to construct an entirely new space — a future *distributed university*. Given the complexity of this mental space construction, I will discuss it in three parts.

When asked to describe a post-crisis world, Hayden decided to focus on a particular part of the world, the university, which they know well. After identifying perceived issues with the university as it is, summarized as "basically everything", Hayden offers an extended description of a recent trip to an island community which they found "quite provocative, but also quite reasonable". Their initial description frames Eigg as an exemplar of a sustainable community.

> I was on, um, an island off the West coast of Scotland called Eigg, um, a month ago. And Eigg has a population of about a hundred. And, um, it's traditionally a crofting community- a series of crofting communities, so, small scale, kind of, semi-subsistence farming kind of thing. Um, but, um, it's got- it's been transformed over the past kind of thirty years or so, twenty-five years, because, firstly, they bought the island. So, the people- the residents now own their own island which is very un-Scottish thing to do, where, y'know, so much land is concentrated in the hands of so few people in Scotland. And then they, um, installed, um, a series of, kind of, sustainable, y'know, renewable electricity generation devices. So they have, um, thanks to PV cells, and wind turbines, and they're looking at wave turbines now, and, um, they've gone from like every house having a diesel generator to, y'know, have a really reliable, y'know, electricity grid, which, y'know, is almost completely sustainable and so on. And the third thing is that they got really good broadband. And so, now, the kinds of job you can do on Eigg, uh, like people run a record label from Eigg, people do all sorts of like, y'know, very, kind of intensive creative things, which are about as far from crofting as you can get in the grand scheme of things. (Hayden)

This initial description can be modeled as two mental spaces, Eigg as Hayden experienced it and Eigg as it was in the past.

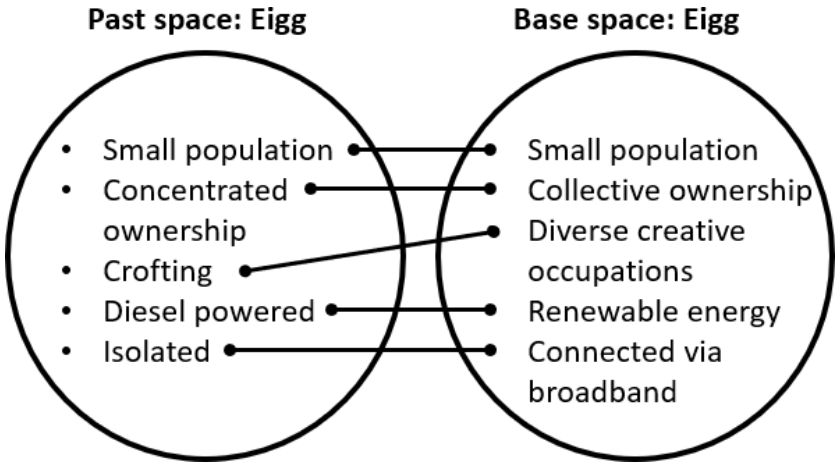

Figure 6. Eigg now and in the past

Hayden then focuses on a single character on the island, a council worker, who serves as an exemplar of how communities can be served both locally and at a distance.

> And one of the people who lives on Eigg, um, works in some kind of managerial r-role for Perth and Kinross council. And Perth and Kinross council is in central Scotland, and has no coastline, and definitely doesn't have Eigg in it. And, y'know, it turns out that this is now absolutely fine for, y'know, sort of working in a council to be in a region where it's not only like

> you're not in the council region, but it would take you a day to get there. Like it's absolutely impractical to commute there for one meeting, or anything like that, and that seems to be fine. (Hayden)

This introduces a second pair of mental spaces detailing council work as it is made possible by the Eigg community and council work as traditionally conceived. The dotted lines in the diagram below indicate that the description of the council worker is embedded *within* the Eigg base space.

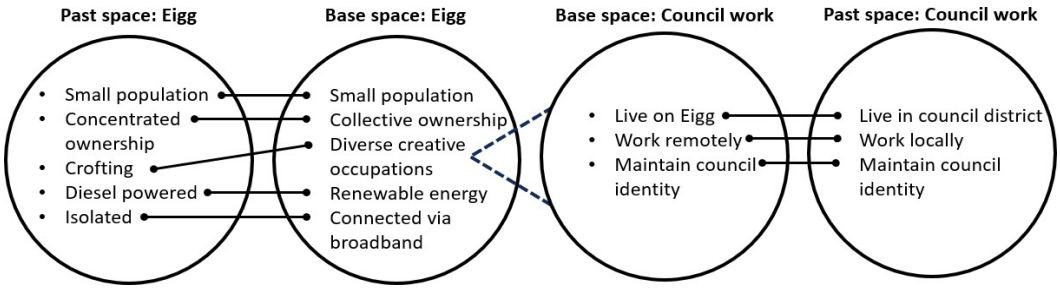

Figure 7: Eigg as enabling new career structures

After this, Hayden returns to the issue at hand and suggests how the community structure of Eigg can be used to re-imagine the centralized structure of the university.

> Um, so, one kind of infrastructural change would have to be that the idea that the university is the center of gravity for university business would have to change, y'know. We'd have to get used to this idea that, y'know, we can be much more distributed as a organization, and still have some kind of identity, and some kind of um, uh, common purpose. (Hayden)

Modeled as a mental space network, Hayden's new distributed university structure is a blended space, inheriting structure and elements from both the Isle of Eigg and the university as it is in the present day. The council worker on Eigg serves as the immediate legitimizing analogy — if a council can maintain its identity despite its members being in different places, so too can a university. The structure of the distributed university more broadly is then 'completed' using the conceptual structure of Eigg.

Hayden's process incorporates both *anticipatory* and *prefigurative* strategies. An anticipatory strategy is especially apparent in Hayden's initial description of Eigg where they highlight particular individually achievable changes that occurred on the island (e.g. switching from diesel generators to local renewable energy). The ultimate imagined university, however, employs a more prefigurative strategy as some elements of the university (e.g. a "common purpose") are maintained, while others, like a single centralized campus, are not.

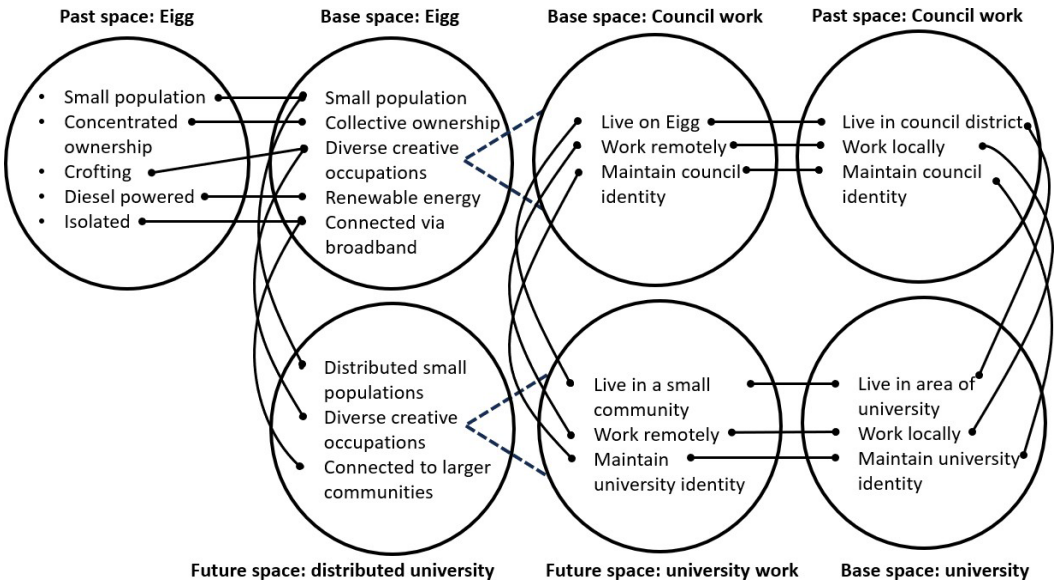

Figure 8. A distributed university as a blended space

5. Discussion

This paper has used a critical approach to mental spaces and conceptual blending to consider how the descriptions of imagined post-crisis worlds expose different imaginative strategies that disrupt and transform the present to different degrees. I identified two primary strategies which I analogized to *anticipatory* and *prefigurative* political logics (Jeffrey & Dyson 2021). Anticipatory strategies are relatively non-generative; by negating and changing the degree of individual elements of the present, the underlying sociopolitical structures of the present are maintained in the imagined world. Prefigurative strategies are more generative, as individuals embed themselves in the future space, offering extended multisensory descriptions of a world. These detailed elaborations provide more opportunities for divergences from the structures of the present. I also discussed how disruption at the point of projection and completion can further structural divergence from the present (e.g. by questioning the nature of "family") and facilitates reflections on possible limit-situations underlying the crisis.

In all cases, embodied experience seemed to aid in imaginative and descriptive processes. Imagining an embodied day, full of sensorial and psychological detail, led to a more interconnected future space for Jordan, where economic structures of their job were overtly connected to spatial configurations (e.g. the incorporation of greenery in the workspace) and social relations. A particularly moving vacation provided Hayden with the input spaces for a re-imagined university structure. The generative potential of embodied experience was demonstrated throughout my climate conversations, as participants drew from memories of their "best days" (Dylan), favorite places (e.g. the Conservatory of Flowers in San Francisco for Jamie), games played with friends (Cameron), and different texts (e.g. *Sultana's*

Dream for Blair and *Ministry for the Future* for Rowan) to imagine otherwise unimaginable post-crisis worlds. This highlights how focusing not just on scientific facts but also on informationally-dense and personally important embodied experience can empower individuals to engage in discussions of what the future should look like.

6. Conclusion

Contrary to common concerns about the abstractness and psychological distance of climate change (Keller et al. 2022), every individual has direct embodied experience of the climate crisis, as long as we admit contestation of what constitutes the crisis. Specializing in climate science and directly experiencing acute climate-related disasters (e.g. unprecedented wild fires and floods) grant individuals "expertise" in the climate crisis as popularly understood. Once we open up "the" crisis to also include the underlying conditions that cause and perpetuate it (Crist 2007), we begin to see more diverse forms of climate expertise. The family who has experienced water scarcity for generations has expertise in alternative human-nature relations that could aid in resolving the climate crisis; the young writer has expertise in the challenges of socializing within the crisis; and the worker, who is too exhausted to think about climate change, has expertise in the socioeconomic conditions that prevent us from addressing it.

The approach laid out in this work is not only helpful for comparing the relative generativity of responses during *analysis*, it also points toward a way to move theory into practice. Through an analytical understanding of the process of imagining and expressing possible futures, we can identify communicative strategies to encourage more disruptive and generative imaginings. In climate conversations with friends and in the classroom, we can facilitate more generative conversation by encouraging a focus on embodied experience and the individual expertise it grants. In the resulting detailed imaginings, we then have more opportunities to identify and push-back on the limit-situations that may prevent the creation of new narratives to live by; when people describe going to a job in their imagined world, we can encourage reflection on what that job should look like.

There is growing interest in ecolinguistic work to move past *critical* discourse analysis, which focuses on the critique of dominant narratives, in order to also include *positive* discourse analysis, which can be used to identify and uplift beneficial alternative framings (e.g. Ponton 2022, Stibbe 2017). I advocate moving further still, past the critical discourse analysis and positive discourse analysis of existing texts, to develop and explore *generative* discourse *practices*, new ways to talk and think about ecological crises and post-crisis futures. Doing so will be a fundamentally interdisciplinary endeavor, requiring insights from scholarship on radical pedagogical and political practices in addition to those from analytical linguistic traditions. This work has offered a modest contribution to this endeavor.

Conflicts of interest

The author declares no conflict of interest.

Ethical review

The study was conducted in accordance with Dutch regulations, and was approved by the Research Ethics and Data Management Committee of Tilburg School of Humanities and Digital Sciences (protocol code REDC 2023.18, approved 24 April 2023). Informed consent was obtained from all participants involved in the study. Participants were asked to approve both the storage of the anonymized data in a semi-public archive and the publication of conversation excepts for research purposes.

Data availability

At the time of writing, transcripts of interviews are available via direct request to the author.

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Research article / Научная статья

Nonverbal communication at the ecolinguistic grassroots

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Abstract
In the Lebenswelt of everyday communication, meaning emerges from the interplay of verbal and nonverbal semiosis. While textual discourse analysis offers valuable insights, the richness and complexity of human communication come to the fore when considering communication in its entirety, including nonverbal elements. This paper aims to move beyond theoretical analysis and support real-world organizing efforts, offering a more comprehensive understanding of the human-environment relationship and its implications for environmental justice. It argues for integrating nonverbal analysis into ecolinguistic praxis, particularly in engagement with communities and civil society, or the ecolinguistic 'grassroots.' However, there is a gap in existing ecolinguistic scholarship regarding frameworks for this integration. To address this, the paper presents a multilevel methodology based on eight hours of audio and video recordings, which capture different perspectives on mining operations and proposed developments. These include interviews, documentaries, and recordings from 'town hall' meetings from YouTube recordings uploaded between approximately 2007 and 2018. Analysis of facial expressions and gestures reveals distinct cognitive responses at different thematic levels of discourse (ecological, cultural, socioeconomic). This paper demonstrates how such findings have important implications for practitioners engaging with working-class communities impacted by environmental change. As nonverbal research increasingly focuses on human-computer interaction and artificial intelligence, this study advocates for nonverbal analysis as humanistic inquiry, emphasizing meaning-centered approaches that draw from the embodied nature of human interaction to foster empathic understanding and more effective organizing within communities.
Keywords: *ecolinguistics, discourse analysis, nonverbal communication, environmental communication, body language*

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Эколингвистика невербальной коммуникации

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Аннотация
В повседневном общении смысл возникает в результате семиозиса вербального и невербального. Хотя текстовый анализ дискурса дает ценную информацию, богатство и сложность человеческого общения выходят на первый план, только если рассматривать коммуникацию во всей ее полноте, включая невербальные элементы. Цель данной работы – выйти за рамки теоретического анализа и привлечь внимание к практическим мерам, направленным на более полное понимание отношений между человеком и окружающей средой, а также их последствий для экологии. В ней приводятся аргументы в пользу интеграции невербального анализа в эколингвистическую практику, особенно при взаимодействии с населением и гражданским обществом. Однако в современной эколингвистике заметен пробел в отношении подходов к такой интеграции. Для решения этой проблемы в статье использована многоуровневая методология. Материалом послужили аудио- и видеозаписи (8 часов), загруженные на YouTube в период с 2007 по 2018 гг., в которых отражены различные точки зрения на горнодобывающие работы и предлагаемые проекты. Они включают интервью, документальные фильмы и встречи с общественностью. Анализ мимики и жестов позволил выявить различные когнитивные реакции на разных тематических уровнях дискурса (экологическом, культурном, социально-экономическом). В статье показано, как полученные результаты могут помочь специалистам-практикам, работающим с представителями рабочих поселков, подверженных влиянию экологических изменений. В то время как исследования невербальных реакций все больше фокусируются на взаимодействии человека с компьютером и на искусственном интеллекте, данная работа выступает за невербальный анализ как гуманистическое направление, опирающееся на смыслоориентированные подходы и естественную природу человеческого взаимодействия.
Ключевые слова: *эколингвистика, дискурсивный анализ, невербальная коммуникация, экологическая коммуникация, язык тела*

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1. Introduction

Ecolinguistics explores the intricate relationships between language, culture, and the natural world, emerging from Haugen's (1972) foundational concept of the "ecology of language." The field critically examines how language shapes—and is shaped by—human interactions with the environment, with applications ranging from environmental discourse analysis to linguistic diversity and sustainability (Stibbe 2015). Halliday (2001) argued that linguistic patterns often reflect anthropocentric ideologies that contribute to environmental harm.

While much of ecolinguistics focuses on verbal language, this paper proposes the integration of nonverbal communication into ecolinguistic praxis, specifically in engagements with grassroots communities and civil society. Nonverbal

communication—encompassing gestures, facial expressions, posture, prosody, and other embodied forms of interaction—plays a crucial role in how humans connect with their surroundings. By incorporating nonverbal analysis into ecolinguistic frameworks, this study seeks to present a more holistic understanding of how meaning is constructed and expressed in ecological contexts, advancing empathic understanding and promoting more effective organizing for environmental justice.

Traditional ecolinguistic research, which has predominantly focused on verbal discourse, has largely overlooked the embodied dimensions of communication. This gap limits the field's ability to account for the full range of human semiotic practices in ecological contexts. This paper proposes that integrating nonverbal communication into ecolinguistics can offer new insights into how individuals perceive, interpret, and respond to their environments. The observed patterns in nonverbal behaviors from this study underscore the need for methodological frameworks that adopt multimodal approaches to ecological meaning making.

The relationship between nonverbal communication and ecological perception is bidirectional. On one hand, environmental factors shape the form and function of nonverbal behaviors. For example, the prevalence of eye contact and spatial distancing in communication is influenced by habitat density and visibility (Eibl-Eibesfeldt 1970). On the other hand, nonverbal behaviors influence how individuals perceive and relate to their environments.

At a time when nonverbal research is increasingly driven by human computer interaction and artificial intelligence, this paper advocates for nonverbal analysis as humanistic inquiry. Meaning centered approaches, which draw from the rich, embodied nature of human interaction, can advance empathic understanding and create more inclusive methodologies for engaging with communities and civil society. By incorporating nonverbal communication into ecolinguistics, this paper aims to move beyond theoretical analysis and support real-world organizing efforts, offering a more comprehensive understanding of the human-environment relationship and its implications for environmental justice.

The following research questions guide this study:

- How do nonverbal behaviors, such as facial expressions and gestures, vary in response to ecological, cultural, and socioeconomic themes during community engagements on environmental issues?
- In what ways can the integration of nonverbal communication into ecolinguistic methodologies enhance the empathic understanding and effectiveness of environmental justice organizing?
- What implications do nonverbal patterns have for practitioners engaging with working-class communities affected by environmental change, and how can these insights inform more inclusive and culturally sensitive organizing strategies?

2. Theoretical background: Nonverbal communication

Nonverbal communication is a fundamental aspect of human interaction, often complementing or even surpassing verbal language in its capacity to convey meaning. Research in sociolinguistics, anthropology, and cognitive science demonstrates that nonverbals are profoundly influenced by cultural and environmental factors (Argyle 1988, Kendon 2004). For example, gestures vary significantly across cultures, reflecting different ecological and social contexts (McNeill 1992). This idea is further supported by the work of Leonteva, Cienki, and Agafonova (2023), which explores the metaphoric gestures in simultaneous interpreting, highlighting how embodied gestures can convey complex meanings that transcend verbal language. Cienki (2024) also emphasizes the self-focused versus dialogic features of gesturing, shedding light on how gestures in communication influence interpersonal dynamics in ecological discussions.

Moreover, nonverbal practices play a key role in shaping human relationships with the natural world. Indigenous communities, for instance, utilize embodied practices such as dance, ritual gestures, and spatial orientation to communicate ecological knowledge and values (Ingold 2000). Similarly, urban environments influence the rhythm and dynamics of bodily movement, as demonstrated in studies of proxemics and territoriality (Hall 1966). Ponton (2023) discusses the role of language and embodied gestures in ecolinguistics, particularly in response to the felling of 'Hadrian's tree,' reflecting how embodied communication is not only a means of environmental expression but also a way to navigate ecological destruction.

Nonverbal communication is also central to environmental activism. Protest movements often rely on embodied practices—such as marches, silent vigils, and symbolic gestures—to communicate their messages. An ecolinguistic analysis of these practices can reveal how nonverbal behaviors contribute to framing environmental issues and mobilizing public support (Johnston 2014). The concept of the *gaze* as a tool of power and oppression, as developed by bell hooks (1992), can deepen our understanding of how nonverbal practices in activism reclaim visibility and challenge systems of domination. Nonverbal communication in environmental movements is not only a means of dissent but also a form of asserting solidarity, promoting collective action, and resisting dehumanization in the face of environmental injustice.

By examining how these embodied forms of communication manifest in grassroots communities, this paper aims to provide more nuanced and culturally sensitive methodologies for engaging with civil society, particularly working-class communities affected by environmental change.

3. Materials and methods

This study focuses on the analysis of nonverbal, multimodal communication, including gestures, facial expressions, and paralanguage, which often occur within

and between spoken words. The analysis is situated within a multilevel framework, emphasizing the cognitive underpinnings of communication. The premise underlying this approach is that communication largely consists of unconscious nonverbal elements (e.g., body language, facial expressions, eye movements) that are integral to meaning and interpretation (Massaro 1987). Gestures are essential not only to communication but also to cognitive processes (McNeill 1992, McNeill 2005). Consequently, this analysis aims to interpret meaning beyond explicitly spoken words while considering nonverbal and verbal elements as complementary.

The analysis draws on a multimodal corpus of audio and video recordings of interviews, documentaries, and "town hall" type meetings related to mining operations and proposed developments. The multilevel methodology examines nonverbal communication in the recordings across ecological, cultural, and socioeconomic dimensions. Observed trends in facial expressions and gestures reveal that different cognitive responses are exhibited at distinct thematic levels of discourse (ecological, cultural, socioeconomic).

These analyses aim to uncover how nonverbal communication embodies and transmits ecological knowledge and values, reflecting the perspectives and priorities of specific communities.

3.1. Multimodal corpus

Multimodal communication is understood as an integrated process drawing on textual, aural, linguistic, spatial, and visual modes (Murray 2013). From a corpus linguistics and discourse analysis perspective, multimodal analysis involves a broader range of media, such as audio, video, and images, and incorporates nonverbal behaviors and paralanguage. Specifically, a multimodal corpus is defined as an annotated collection of communication data, including channels such as speech, gaze, gestures, and body language, typically based on recorded human behavior. Annotation is a key feature of multimodal corpus research, though it poses challenges due to time demands and the lack of standardized annotation methods (Abuczki & Esfandiari Baiat 2013).

3.2. Data collection and corpus description

The data for this study consists of approximately eight hours of audio and video recordings related to mining and natural resource development. These recordings include interviews, documentaries, and 'town hall' style meetings, which were collected manually using search engines, with results sourced from YouTube videos uploaded between approximately 2007 and 2018. Videos were searched using keywords such as "mining debates", "natural resource projects", and "ecological debates". A date range was applied to acquire results over a recent 10-year time span. The main criteria for video selection were the presence of a variety of speakers with sufficient video frames that could be analyzed for nonverbals. Emphasis was

placed on obtaining segments with a mix of professional and civil society actors with a balance of pro and anti-mining perspectives. An attempt was also made to gather videos from various geographic locations. The videos cover locations in the US, UK, Canada, Australia, South Africa, New Zealand, Afghanistan, and Honduras. 25 videos were collected (13 of which are analyzed in the present paper); 12 of those analyzed are in English, and one is in Spanish. Transcripts were generated for each media item and saved as individual text files, with timestamps (e.g., 05:45) included to facilitate reference. The corpus comprises 25 files, each linked to the original media via a URL. The total runtime of the media is 7 hours and 46 minutes, with an average runtime of approximately 18 minutes per recording.

3.3. Segment selection

Rather than annotating the entire corpus, a combination of top-down and bottom-up approaches was employed to select segments for detailed analysis:

- **Top-Down Approach**: The media recordings were manually reviewed, with attention given to gestures, body language, and other nonverbal expressions. Timestamps corresponding to distinctive nonverbal behaviors were marked for further annotation.
- **Bottom-Up Approach**: Keywords and phrases related to analytical themes (i.e. ecology, culture, socioeconomic issues) were searched within the transcripts. Segments associated with these themes were then identified for further analysis and annotation.

3.4. Annotation and analysis

The selected segments were annotated using an adapted version of Jefferson's (2004) transcription scheme, as summarized in Table 1. Annotations included visual, auditory, and verbal elements to capture the multimodal nature of communication. Each annotated segment was accompanied by descriptive narratives that integrate nonverbal and verbal components, addressing the following interpretive questions:

- What does the nonverbal communication reveal about the emotional state of the speaker?
- How does the nonverbal communication complement or contrast with the verbal communication?
- Does the nonverbal communication provide insights into the speaker's thought processes?

For presentation in this paper, image frames from the video segments were included to support interpretation along with the location, language, and a hyperlink to the relevant segment in the source video. To enable readability, footnotes were added to describe notable gestures, as in the example below.

Example Annotation
You *pray* before you go to bed... and >you just ask God to protect (you and) your family, that's all you *can* do,< because (.) [*man* has done the damage to the earth (.) and man][1] (.) [I don't see how <man can correct what's been done>][2]. [*God* can handle this (.) and he will. When the right time comes][3], he will do what needs to be done.

1. Right hand motions forward; palm up.
2. Right hand motions forward, fingers and thumbs curled inward; head shaking.
3. Hand waves outward, stops at thigh; gaze upwards to sky; nodding.

Figure 1. Example; USA (English)
Source: https://www.youtube.com/embed/UvKe2LYy5pk?start=1198&end=1220

Table 1. **Adaptation of Jefferson's (2004) Annotation Scheme**

Symbol	Description
(.)	Micropause (< 0.2 seconds)
. or ↓	Falling pitch or intonation
? or ↑	Rising pitch or intonation
,	Temporary rise or fall in intonation
!-	Abrupt halt or interruption in utterance
>text<	Rapidly delivered speech
<text>	Slowly delivered speech
°	Whispered or reduced volume speech ALL CAPS Shouted or increased volume speech underline Emphasized speech
:::	Prolongation of a sound
hhh	Audible exhalation
.hhh	Audible inhalation
(text)	Unclear or doubtful speech
[text]	Gesture accompanying speech

3.5. Analytical considerations

Multimodal corpora present unique challenges compared to textual corpora due to the integration of both verbal and nonverbal elements. While textual corpora allow for clear segmentation of topics at the sentence level, multimodal data often blend themes (e.g., cultural, socioeconomic, and ecological) within single phrases, complicating the segmentation process. Furthermore, spoken language in

multimodal corpora typically features shorter sentences, reduced lexical diversity, and higher contextualization than written language. These characteristics shift the analytical focus from lexical items to moments of "highest communicative dynamism"—instances where speech and nonverbal expressions combine to underscore meaning (McNeill 2005).

The spoken language in the multimodal corpus is more conversational, with keywords like *know*, *people*, *right*, *mining*, and *think* emerging as top terms, reflecting the contextual nature of communication. In this analysis, rather than focusing solely on lexical items, attention is given to segments where nonverbal cues, such as gestures and facial expressions, intensify or complement verbal content. These moments of heightened communicative dynamism are key to understanding how speech and nonverbal behaviors interact to convey meaning.

3.6. Data annotation and interpretation

From the eight hours of video data, 13 clips were selected for detailed annotation and analysis. These clips share a common theme of mining and natural resource development. The descriptive analysis includes annotated video transcripts with accompanying physical descriptions of nonverbal behaviors. The annotation scheme, as summarized in Table 1, captures features such as pauses, pitch, intonation, and gesture integration. Interpretive narratives contextualize these annotations within broader communicative acts. Analysis was done for each thematic level (ecological, cultural, and socioeconomic) with 4–6 examples for each.

Following the individual segment analyses, a comparative analysis was conducted across all segments to identify patterns and overarching themes.

4. Analysis

4.1. Ecological level

4.1.1. Examples and analysis

For the ecological level, excerpts were selected wherein speakers are explicitly discussing ecological issues. These excerpts were selected manually, from a qualitative survey of the data. Despite the nearly 8 hours of video on the topic of natural resource development, there are relatively few cases where the speech segments clearly fell into the ecological level.

Below there are four examples of ecological level communication. Three of these excerpts feature subject matter experts who employ technical and scientific concepts. The final example features a citizen protester. Example 1 below consists of an excerpt and accompanying gestures in Figure 1. In this segment, a researcher is discussing impacts of deep-sea mining.

Example 1
(the) [*direct* impact][1] will likely result in biodiversity loss that will be very difficult to [recover from,][2] but we *really* don't understand if any of the [*wider* impacts][3] as well, so outside the [area of][4] mining itself <how will this> [affect the ecosystem at large how will this feedback into the oceans][5] we think that the deep sea...

1. Hand downward in swift movement, fingers pointed outward.
2. Hands in cycling motion forward.
3. Hands expanding outwards.
4. Hand in wide circular movement with palm down.
5. Hands in cycling movement with palms inwards.

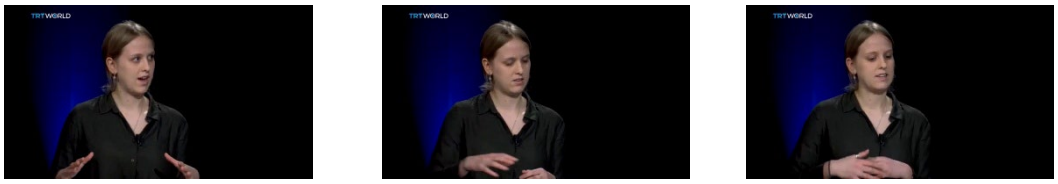

Figure 2. Example 1; UK (English)
***Left*: hands open palms down gesture with fingers extended to emphasize direct ecological impacts. Middle, *Right*: Hands loosened, palms inward/down in a cycling motion to reflect less certain long term ecological processes and feedback mechanisms.**
Source: https://youtu.be/-UPjsuuyvD4?si=ltFHWbaV3LTNd2RI&t=624

Noticeable in Example 1 are the controlled hand gestures. The hands reflect the physical and ecological processes taking place. For instance, "direct impact" of mining is accompanied by a swift downward movement or arms and hands. The fingers and thumbs extended with palms facing downward are indicative of impact and gravity in a short time frame. When speaking of the "area of mining" the palm is similarly facing downward with a circular motion of the hand, indicating surety of the impacts in the mining area. By contrast, the cycling motions of the hands indicate a longer time frame of "feedback" and wider impacts. The palms shift to face inwards with more relaxed (non-extended) fingers and thumbs, suggesting less certainty about these long-term impacts. So, in this excerpt we see how the direction of palms and extension of fingers/thumbs reflect degrees of certainty and uncertainty.

Beyond hand gestures, other nonverbals are noticeable. For much of the segment the head is tilted to the side, which has been interpreted as a sign of interest, curiosity, and uncertainty (Lewis 2012: 94). There are moments where the eye gaze shifts upwards which, in European/North American cultures is commonly seen as a sign that someone is thinking (McCarthy et al. 2006). Finally, it should be noted that facial expressions in Example 1 are minimal and do not convey any apparent emotions.

Example 2 features a researcher talking about concerns associated with coal mining near a nature reserve.

Example 2
Where our [concern lies is with respect to dust because there's no analysis of the dust in terms of the toxic components in that dust][1] given the coal mining and the blasting and that sort of thing. Now, you can feel [this wind. <This wind>][2] is blowing across us [right into the game reserve][3], so [if] they mine here, this southeasterly wind will carry the dust and the fallout will be in the park, >in the wilderness area<.
1. Hand in front facing inwards palms open thumbs up.
2. Hands pointing left hand to left.
3. Hand (right) pointing to the right.

Figure 3. Example 2; South Africa (English)
Hand and arm points to left (*Left image*) and then to right (*Right image*)
to reflect the physical movement of dust
Source: https://www.youtube.com/embed/Sh0_Wf8F4RM?start=857&end=888)

Though difficult to see in the frame, when the man in Example 2 is speaking about "our concern," the palms are inward. The fingers and thumbs are extended and the hands motioning up and down with speech emphasis. This cluster of hand gestures suggests possession (palms inward to express *our* concern) as well as a confidence that this is serious (thumbs up) perhaps with a degree of uncertainty (palms inward). Also, as in the previous excerpt, the hands and arms are used to describe physical and ecological processes which, in this case, is the directional transfer of dust.

Compared with Example 1, there are several indicators in Example 2 suggesting the speaker's emotions are at play. In the first excerpt, hand movements are used to complement and reiterate the verbal communication. On the second, however, the nonverbals give more of an indication about what is not explicit verbally. For instance, the furrowed eyebrows indicate stress and concern, as do stress lines on the forehead. The swift, agitated up and down movement of hands also convey a sense of urgency. The speaker places stress on certain words (e.g. "dust", "wind") and changes the speed and cadence.

In Example 3, an engineer or industry representative is facing questioning on contamination of groundwater due to coal mining.

Example 3
People don't understand that <you have to> >maintain a well just like you do your car<.[1] A lot of people just [turn on the spigot,][2] and they think [it's going

to work for them][3] (.) when they have <things like iron hydroxide precipitate> (.) and other metals built up in [their wells (and) every time I go out on a well complaint, I tell people][4] you [need to have a friend at the local (.) volunteer fire department come out and flush your well (out)][5]....

1. Index finger and thumb together in precision.
2. Turning of index finger and thumb.
3. Hand out palm up.
4. Hand out palm up.
5. Nodding.

Figure 4. Example 3; US (English)
***Left and Middle*: the index finger and thumb join to create a precision movement. *Right*: the open hand palm up gesture functions as a suppliant offer of an idea.**
Source: https://www.youtube.com/embed/UvKe2LYy5pk?start=920&end=945

In the context of the segment, the speaker is on the defensive, since he is trying to convince listeners that the coal industry is not responsible for water quality issues. A noticeable gesture is the touching of the thumb and index finger, which is accompanied by a turning motion when describing well operation. Like in the previous examples, hand gestures complement and emphasize the verbal communication by mimicking physical processes. Touching the index finger and thumb together can be interpreted as precision, or a focus on technical details, while the turning motion emphasizes the mechanical nature of the process.

Similarly, the gesture that accompanies the phrase "you have to maintain a well," in which the palm is facing up, has the same interpretation. This suggests an offer of information to the listener, extending an idea to them. The body and facial gestures, such as nodding and brief pauses between phrases, suggest that this is an attempt to connect the audience with the practical aspects of well maintenance.

Example 4 features a protester, and it contrasts sharply with the previous three, as this excerpt is not at all technical.

Example 4
[We've got to build a whole new energy infrastructure for this country, and if we don't we're going to have (.) climate chaos and our kids are going to not thank us for that].[1]

1. Continuous shaking of HEAD.

Figure 5. Example 4; US (English)
The left hand gesture consists of hands raised upwards with wide arms signaling to the surrounding.
Source: https://youtu.be/vBhvFWRLiOs?si=6nCKIunurXSxJAsz&t=821

With the hands immobilized, gestures in Example 4 are confined largely to the head. In this segment, the speaker is expressing the need to build new energy infrastructure in the face of climate change. The words are accompanied by continuous shaking of the head. This head gesture might be interpreted as disapproval and condemnation. However, it can also be considered that this head shaking functions as a verbal intensifier with the negation carrying the meaning of "unbelievable" (McClave 2000: 861). Also noticeable in this clip is the slight head tilt (also seen in Example 1). The facial expression might be interpreted as serious and somber, but does not display a high degree of emotion.

4.1.2. Summary of ecological level

The four examples above feature speakers from different points of view with respect to the ecological issues at hand. Of the four speakers, two are researchers, one is a company representative, and another is a protester. In all cases, the level of emotion expressed through nonverbal communication is minimal. While the second speaker does appear to convey some agitation or urgency through facial expressions and paralanguage, the overall segment is more a rational argumentation than an emotional expression. The last speaker, despite the context of being arrested, comes across as somber and earnest, but not particularly emotional.

In the first three examples, gestures are predominantly iconic speech illustrators, meaning they display a close relationship with the content of the speech (Beattie 2016: 60); (Matsumoto & H. C. Hwang 2012: 76). For instance, the first speaker uses deliberate and measured hand movements that reflect biophysical processes (ecological impact, recovery) expressed in speech. Also in Example 2, hand gestures reflect physical processes of dust transfer. The third speaker uses nonverbal hand movements to reflect the process of inspecting a well, but also employs what could be described as rhetorical gestures to convince listeners.

4.2. Cultural level

4.2.1. Examples and analysis

The cultural level of communication often involves expressing aspects of one's identity, including national, subnational, ethnic, and religious affiliations. The

following examples illustrate how nonverbal cues and speech convey these cultural identities in different contexts, including resource development, indigenous rights, religion, and regional identity.

In this segment about extractive mining in Afghanistan, an Afghan archaeologist speaks about the loss of cultural identity due to prolonged wars. The phrase "our identity" signifies a strong connection to Afghan culture and the belief that cultural preservation is the key to reclaiming it. The speaker uses both speech and gestures to emphasize this message.

Example 5
...with [all these wars (over) 30, 40 years][1], (.) what the Afghan has lost we lost [our identity][2]! and [I *believe*][3] to give (them) *back* that identity is only through [*culture*][4] ! because when it [*comes*][5] to culture, all Afghans are united.

1. Left hand forward palm up; lateral sweep of head and hand.
2. Right hand motion to side; index finger extended; eyebrows raised.
3. Right hand motion to side; index finger extended; head tilts to one side.
4. Right hand motion forward; index finger extended.
5. Right hand motion forward; index finger extended; intonation on "comes."

The hand gestures highlight the importance of the speaker's message, transitioning from a broad, open gesture to a pointed one to stress the significance of identity and culture. The use of metaphoric gestures, like the sweeping motion to represent the passage of time, contrasts with literal gestures that typically indicate object references. The pointing gesture emphasizes the central idea of culture and identity, which the speaker feels is at the core of Afghan unity.

Figure 6. Example 5; Afghanistan (English)
Source: https://www.youtube.com/embed/z6ewpjWYfYo?start=535&end=555

The next example discusses the proposed mining near sacred indigenous burial sites. The speaker's nonverbal communication underscores the emotional weight of this topic, reflecting both personal and collective cultural connections to the land.

Example 6
(It's) [my prehistoric ancestors][1] (.) that are right within this mining area and [I don't want (.) .hhh hhh you know][2] [any *mine*][3] near them, >I don't want any equipment near them.< We have <three known *burial* > (mound) groups that are there.

1. Nodding head on beat.

2. Shaking head.
3. Left lip tightened and raised; slight raising of shoulders.

The head movements serve to emphasize key points: the nod signifies agreement with the significance of the ancestors, while the shaking head expresses disapproval of the proposed mining. The facial expression during "any mine" conveys contempt, echoing Darwin's observations on expressions of antagonism. The combination of these movements with vocal stress enhances the emotional tone of the message.

Figure 7. Example 6; US (English)
Source: https://www.youtube.com/embed/10FrfEa0Xck?start=33&end=45

In this example, the speaker reflects on the loss of sacred indigenous lands and the need to reclaim cultural dignity. The speaker's gestures—emphasized hand movements, clenched fists, and eye movements—reinforce the emotional and cultural significance of the message.

Example 7
<[They crushed out sacred site]>.[1] They never [listened to aboriginal people, <elders, female elders>][2] (.) you know they've been [*stomped* on].[3] So it's time for them to *stand* up and say [hey you're not doing this to me anymore].[4]
1. Right hand motion forward on beat; palm up; index finger and thumb touching.
2. Right hand motion forward on beat; palm up; fingers and thumb open; high blink rate.
3. Head swipe, left to right with emphasis.
4. Head motion with clenched fist.

The hand gestures punctuate key phrases, particularly the clenched fist, which conveys frustration and the resolve to fight back. The eye movements and facial expressions provide additional emotional depth, reflecting stress and determination. High blink rate and narrowed eyes indicate emotional tension, possibly linked to fear or frustration about the desecration of sacred lands.

Figure 8. Example 7; New Zealand (English)
Source: https://www.youtube.com/embed/awnLI4pRnUM?start=42&end=58

In this example, the speaker discusses the impact of mountaintop coal mining on the environment, expressing religious faith as a way to cope with the damage caused by human actions. The combination of gestures and gaze emphasizes the spiritual perspective on the issue.

Example 8
You *pray* before you go to bed... and >you just ask God to protect (you and) your family, that's all you *can* do, < because (.) [*man* has done the damage to the earth (.) and man][1] (.) [I don't see how <man can correct what's been done>][2]. [*God* can handle this (.) and he will. When the right time comes][3], he will do what needs to be done.
1. Right hand motions forward; palm up.
2. Right hand motions forward, fingers and thumbs curled inward; head shaking.
3. Hand waves outward, stops at thigh; gaze upwards to sky; nodding.

The contrast between the downward motions when discussing "man" and the upward motion when referencing "God" visually reinforces the distinction between human responsibility and divine intervention. The nodding and upward gaze serve as an affirmation of faith and trust in God's will.

Figure 9. Example 8; US (English)
Source: https://www.youtube.com/embed/UvKe2LYy5pk?start=1198&end=1220

The speaker in this example discusses their deep connection to the region, emphasizing that regional pride is integral to their personal identity. Nonverbal cues reinforce their personal and regional connections, showing an implicit ingroup/outgroup dynamic.

Example 9
If [they're for us][1], that's good. If they're [against us, get out][2] of the state.
1. Hand motion down towards ground, index finger extended.
2. Thumb up; hand motion back over left shoulder.

Figure 10. Example 9; US (English)
Source: https://youtu.be/vBhvFWRLiOs?si=vcPRnhRR8-fs1DfX&t=467

This example shows how ingroup/outgroup dynamics are embodied in gesture. The words "if they're for us..." is accompanied by a pointing downwards in front. When referring to those "against us," the speaker gestures with his thumb over the left shoulder. Using the thumb to point in this way is considered a sign of ridicule and disrespect (Lewis 2012: 140). Thumb displays in general are also associated with expressions of power and authority. Here, the thumb display might be seen as an embodiment of the confidence associated with ingroup association.

4.2.2. Summary of cultural level

At the cultural level, there is a noticeable increase in the animation of nonverbal communication. Hand movements appear more spontaneous and forceful than in the previous ecological level examples. Facial expressions and eye movements also become more apparent. Hand movements include markers of emphasis, such as pointing and onbeat motions. Clenched fists and thumb displays signal stronger, more emotive communication. Head movements are more pronounced compared to the ecological level, including negative shaking and affirmative nodding. Facial expressions also show increased blink rates, and in one case, the well-known indicator of contempt by raising one side of the lip.

The cultural level examples also exhibit a high degree of confidence and affirmation. Pointing, fist clenching, and nodding are signals that speakers believe in their message and affirm it. Similarly, the thumb display in the final example is a gesture of high confidence.

4.3. Socioeconomic level

4.3.1. Examples and analysis

The socioeconomic level features four examples, where speakers refer to issues of justice, economics, and social institutions. These include a woman speaking about violence surrounding mining projects in Honduras; a woman addressing an audience regarding the need for economic opportunities in their community; a retired miner talking about the lack of institutional regulation toward the coal industry; and a woman stressing the importance of coal mining to her family's livelihood.

Example 10 below is a segment from an interview with a Lenca indigenous woman in Honduras.

> Example 10
> (Translated from Spanish-only gesture annotation) The worst impacts have been state violence. Why? Because we have comrades who have been killed following military harassment. [We've already lost one person].[1]
> 1. Raised eyebrows; wide eyes; extenuated blinks.

Figure 11. Example 10; Honduras (Spanish)
Source: https://www.youtube.com/embed/gU7PBoywFE?start=10&end=21
(video no longer available)

In this example (10), the analysis is largely limited to facial expressions. As she discusses violence and harassment from mining and hydroelectric projects, the eyes and face are strong nonverbal indicators. Particularly in the final frames, the

eyebrows are pulled up and together, and the eyes are widened. The raised eyebrows are characteristic of what's often claimed as a universal facial expression denoting fear (Matsumoto & H. S. Hwang 2013: 28–30).

Example 11 is unique in that we are able to view body language of listeners as well as the speaker. In this clip, a woman is talking about economic hardships in the community in the context of a debate around proposed uranium mining.

Example 11
<*Five years* (we've been trying to keep our doors open,) *thinking* (.) any day now> those jobs were going to be here. >These are the only people that have come in and offered us jobs↑< If *any* (of the people here who are against it had come in and [said they had jobs to match it, we'd be behind that too. But right now this is all we've got) [1]. Everyone one of you who has stood up against this could have brought in jobs [for *us*].[2]

1. Raised and upward slanted eyebrows, stressed blink.
2. Hand points inwards toward chest; index finger extended.

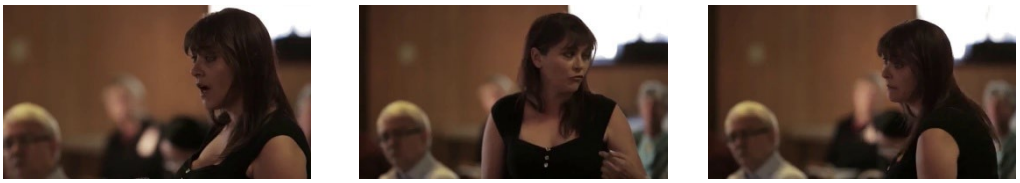

Figure 12: Example 11; US (English)
Source: https://www.youtube.com/embed/Sh0_Wf8F4RM?start=390&end=420

Figure 13. Socioeconomic level, listener reactions

Here we observe an extended blink as well as upward slanted eyebrows. The eyes show concern, worry, and sadness. These expressions are mirrored among listeners. In 13 (bottom left), we see a woman with a similar worried and sad expression along with pursed lips. The emotional intensity is apparent, given that tearing eyes can be observed, both in the speaker and one of the audience members.

Audience members are shown with their hands clenched in front of their faces (Figure 12, top left and top right), another indicator of a negative or anxious attitude. On the bottom right of Figure 12, we see a man with an obvious expression of sadness, as well as a woman behind him with her hand placed on the sternum, a nonverbal expression of empathy.

In this segment, stress and intonation are used more emphatically than in any of the previous segments. For example, in the beginning of the segment, the stress on "five years" emphasizes the time duration of hardship. The intonation in the second sentence also conveys a sense of urgency and exasperation. Finally, the stress on the word "us," together with pointing toward the chest, indicates the personal feelings and emotions at play.

The next example (12) is an interview with a former coal miner on the topic of mountain top removal coal mining.

Example 12
[They're fighting][1] a losing battle I feel (.) myself I feel like they're just fighting a losing battle, because the <[politicians and the] big coal companies and things they're going to win hands down> because the judges and arbitrators are just going to go their way.<][3]

1. Both hands extend outward, palms up.
2. Both hands motion forward/downward, palms down.
3. Both hands extend outward, palms up, with emphasis.

Figure 14. Example 12; US (English)
Source: https://youtu.be/vBhvFWRLiOs?si=rRPDh2OZwAQFhIi5&t=1298

Example 12 exhibits the open hand palm up gesture at various points. At the beginning of the segment, the speaker displays an open hands gesture. This open palm gesture, commonly referred to as a "pleading" or "begging" gesture (Lewis 2012: 149), depicts a sense of helplessness and resignation. The words "fighting a losing battle" complement this sense. The palms-open gesture repeats several times on the stressed words, adding to the sense of futility the speaker is conveying. Briefly, the palm shifts downward to stress the word "politicians," indicating that the speaker is making a strong, assertive point. However, the palms quickly shift upwards for the remainder of the segment. Looking to the facial expressions, we can see eyebrows pinched at the center and sloping downwards. This "knit brow" can be interpreted as an expression of worry or concern (Hartley & Karinch 2017).

The final example is from the same piece on mountain top removal coal mining. The speaker is defending the coal miners and stressing the importance of the industry for her community and family.

Example 13
If you choose to live in West Virginia, [this is (.) this is the best paying job there is↑][1]. *Interviewer* : What happens if mountain top removal goes away, what happens to you and your family? WE GO HUNGRY![2]
1. Shoulders raise; nodding.
2. Eyebrows raise.

Figure 15. Example 13; US (English)
Source: https://youtu.be/vBhvFWRLiOs?si=0ryNRaZzeK-FAPR0&t=58

Like in the previous example, the facial expression is one of worry and concern. Coinciding with "this is the best paying job there is," is a subtle raising of the shoulders. Additionally, a strong emphasis on "WE GO HUNGRY," combined with the shoulders' dramatic rise and lowering, emphasizes the desperation felt in such moments. The facial expression also seems to convey exasperation and a heavy burden.

These four examples highlight how bodily gestures, facial expressions, and stress are key indicators of socioeconomic concerns within the context of these discussions. They emphasize both the economic struggles and personal stakes tied to industry and policy, as well as the emotional toll taken on the individuals and communities involved.

5. Discussion

5.1. Nonverbal communication and the unconscious

The notion that nonverbal communication is closely linked to the limbic system, which governs emotions and instinctive social responses. Sensory information is first processed by the thalamus, which directs it to different brain regions, including the amygdala for rapid emotional evaluation. Further interpretation occurs in the cortex, particularly in regions responsible for higher-order cognitive and social processing.

> Human cognition is mostly unconscious (about 98%) and is inseparable from emotion. Moreover, cognition is embodied, meaning that ideas, language, and even thought are mediated by the body (Lakoff 2010).
> Human needs, emotions, and intentions are processed by the limbic brain. Nonverbal communication, and particularly body language, is largely the expression of unconscious limbic processing (Navarro 2008, Lamendella 1977). Gestures are expressions of embodied cognition (Kinsbourne 2006).

> In contrast to nonverbal communication, human verbal language abilities are more consciously driven and concentrated in the frontal lobe, which is responsible for thinking, planning, and judgment.

In essence, cognition is mostly unconscious, inseparable from the body, and is expressed through embodied communication. This implies that nonverbal cues convey thoughts, feelings, and emotions in ways that speech alone cannot. Nonverbals are often not as inhibited and regulated as speech, which is managed by the cortical and frontal lobe areas of the brain. While this explanation is a simplification, it is grounded in the understanding that nonverbal communication is essential to comprehending the full communicative intent, encompassing emotions and reactions, as well as cognition and judgment.

While nonverbals can be deliberate and intentional, they often occur without our conscious awareness and are therefore explicable in terms of the limbic system. For instance, involuntary facial expressions originate in subcortical brain areas (Matsumoto & H. S. Hwang 2013). There is also evidence that head movements encode emotional intent (Livingstone & Palmer 2016). In fact, gestures, as opposed to sign language or emblems, are defined as being produced without conscious awareness (Beattie 2016).

5.2. Emotional expression

Another key point is that nonverbal communication is closely linked to the site of emotional processing, the limbic system. Sensory information is first processed by the amygdala, which is part of the limbic system, before further processing by the cortex. As LeDoux explains:

Visual information is first processed by the thalamus, which passes rough, almost archetypal, information directly to the amygdala. This quick transmission allows the brain to start responding to possible danger (LeDoux 1994: 56).

In this way, emotions serve a crucial cognitive evolutionary function by enabling rapid information processing with minimal deliberation (Tooby & Cosmides 2008). In contrast to the classical Enlightenment ideal of rational thinking, emotions are inseparable from cognition (Lakoff 2010).

It should be noted that there is not universal agreement that nonverbal communication merely reflects internal emotions. With regard to facial expressions, Crivelli and Fridlund (2018) note that the behavioral ecology view of facial displays (BECV) sees these expressions as tools for social influence, contrasting with the basic emotions theory (BET), which holds that facial expressions reflect internal emotions. However, the behavioral ecology view offers an alternative explanation for what we perceive as emotions but remains compatible with the idea that facial expressions often occur without conscious awareness (Lakin 2006: 65).

5.3. Cognitive level interpretation of facial expressions

Psychological research has suggested that there are universal facial expressions (UEs), which correspond to the "six basic emotions" proposed by Paul Ekman and Friesen (1971) and P. Ekman (1972): happiness, surprise, disgust, sadness, anger, and fear. This early research also highlighted cross cultural variability in facial expressions, attributed to "display rules" that are learned in a cultural context. Recent research has challenged the universality hypothesis by finding distinct differences in how people from Western and Eastern cultures display and recognize the six basic emotions. Jack et al. (2012) also found cultural variability in the parts of the face used to express emotion, with East Asian models of emotion attributing greater intensity to the eyes. This supports the hypothesis that East Asian cultures learn to be more inhibited in expressing emotion, with the eyes (which are less under voluntary control than the mouth) becoming more prominent indicators of emotional expression (Mai et al. 2011).

Interpretation of facial expressions, therefore, is not always straightforward. While there may be some general, possibly universal characteristics, the expression and interpretation of emotion are also influenced by the culture of the speaker and observer. Paying particular attention to the eyes can help account for cultural variability.

In the examples presented, the facial expressions can be interpreted as indicating varying degrees of emotion depending on the level of analysis. For instance, in a professional context, a "neutral face" may indicate minimal emotion or an expression whose emotional meaning is context dependent. The speaker's engagement with nonbinary thinking also suggests that there is emotional modulation via the cortex, which enables exploration of multiple perspectives rather than a reflexive emotional response from the amygdala (Wood & Petriglieri 2005).

5.4. Cognitive level interpretation of gestures

In addition to facial expressions, the three levels of analysis (ecological, cultural, and socioeconomic) also exhibit differences in the gestures displayed. As mentioned, in ecological contexts, gestures tend to be iconic, reflecting literal spoken words, often at the interface of imagistic and linguistic representation (Özyürek 2010). As speakers begin to address cultural and socioeconomic topics, their gestures become more metaphorical. At these levels, emotional intensity increases.

Kinsbourne (2006) describes how gestures driven by emotion become less discrete, often occurring alongside postural shifts and facial expressions, which collectively emphasize and clarify the communicated meaning:

> When gestures are driven by emotion, they become less discrete, and may occur in concert with postural shifts and facial expressions that incidentally emphasize and clarify the meaning being communicated (Kinsbourne 2006: 208).

Thus, when a speaker is more emotional, their gestures often increase in amplitude, pace, or frequency. However, gestures alone do not convey emotion; they must be interpreted in conjunction with other nonverbal signals.

6. Conclusions

Nonverbals are not merely an important part of communication to consider alongside speech; they are inseparable from the message itself. This paper aimed to look at communication in a holistic sense, with verbal and nonverbal communication as part of an integrated flow. However, if there is a point at which we can distinguish nonverbals from verbal communication, it is with respect to their relation to cognition and emotions. As Beattie (2016) points out, with nonverbal communication, "meaning has not been controlled and self-edited by the speaker" (16). In other words, the nonverbal messages are reflective of mental processes and emotions, in ways that words alone are not.

The most notable conclusion is that different discursive levels corresponded to different types of nonverbal displays, as outlined in Table 2 below. These differences can be summarized as follows:

- Speakers at the ecological level generally show less facial expression. Gestures are predominantly iconic and depict physical/spatial processes. Compared to the other levels of analysis, intonation and stress are less pronounced.
- Speakers at the cultural level display more power and confidence gestures, including pointing (to add emphasis), thumb displays, and fist pumping. Gestures are more metaphoric than in the ecological level, depicting abstract concepts such as God, culture, identity, and fighting back. Contempt and agitation are displayed, at one point by the contempt expression (raised side of mouth) as well as the backwards thumb gesture on another occasion.

Table 2. **Summary of nonverbal communication observations**

Level	Gestures	Facial Expression	Paralanguage
Ecological	Iconic; depicting physical processes (directional pointing, hand motions)	Minimal emotional expression; some eyes looking up wards (thinking expression)	Minimal stress and intonation
Cultural	Metaphoric; depicting power, confidence, and assertion (palm down, pointing, fist pump, thumb displays)	Contempt displays; anger; agitation (sneer, higher blink rate, audible inhalation/exhalation)	Stress on key points; more variation in speed of speech
Socioeconomic	Hopelessness and innocence (palm open, shoulder shrug; hand on chest)	Sadness, concern, worry, fear (raised eyebrows, teary eyes, eyebrows pulled together)	Stress; intonation; more changes in pitch

- The socioeconomic level displays a high degree of emotion, often expressed in the eyes. Universal facial expressions of fear and sadness can be seen in the speakers and, in one case, among listeners. Gestures also indicate hopelessness and innocence, such as the palm open "pleading" gesture as well as the shoulder shrug.

It appears that emotions and unconscious attitudes vary when it comes to environmental issues. Specifically, when one's cultural identity or socioeconomic status are at stake, these attitudes intensify. When ecological issues are decontextualized from identities or livelihoods, the opposite seems to occur. Beattie (2016) discusses similar observations in terms of implicit and explicit attitudes towards environmental issues:

> The vast majority of people say that they really do care about environmental issues...yet... *sometimes* there is something about the form and nature of their hand movements...which might suggest otherwise. (19, original emphasis)

In other words, there is a discrepancy between what people consciously know they *should* care about, and how they unconsciously feel.

This discrepancy has great relevance when it comes to raising awareness about, and addressing, ecological issues. The implication is that mobilizing people to address ecological issues will depend on framing these issues in a way that speaks to their implicit, unconscious attitudes. From a cognitive science perspective, Lakoff (2010) makes this point and advances some implications for environmental communication, namely:

- The importance of discussing environmental issues in terms of moral values.
- The efficacy of stories and narratives as opposed to statistics and bland facts.
- The necessity to address everyday concerns and avoid technical jargon. (79–80)

The observations in this paper support these points. However, the point about "moral values" might be expanded to encompass cultural identity and worldviews. The examples in this paper show multiple ways in which culture emerges in environmental debates, and how issues become impassioned when this occurs. Also, the necessity to address "everyday issues" is underscored by the importance of framing issues in terms of economic livelihoods.

This study proposes an integrated methodology for analyzing nonverbal communication in environmental discourse. While many insights can be derived from textual discourse analysis, this research underscores the richness of human communication when verbal and nonverbal elements are analyzed together. Nonverbal communication, observed in interviews, documentaries, and town hall meetings, reveals important cognitive and emotional insights that textual analysis alone may miss. The observed patterns of facial expressions, gestures, and

paralanguage provide valuable data on the emotional and cognitive states of speakers, offering a more holistic understanding of their attitudes toward environmental change.

This approach is particularly useful in engaging with communities that are directly impacted by environmental issues, especially working-class communities whose livelihoods may depend on or be threatened by primary or extractive industries. By integrating nonverbal analysis into ecolinguistic praxis, this research highlights the potential for enhancing empathic understanding and supporting meaningful engagement between practitioners and civil society.

As the field of nonverbal communication increasingly intersects with human computer interaction and artificial intelligence, it is essential to remember that nonverbal communication is not merely a tool for technological application, but a profound element of humanistic inquiry. This study argues that by recognizing and valuing the embodied nature of human interaction, we can foster deeper understanding and empathy in addressing critical environmental and economic challenges.

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Review of Sune Vork Steffensen, Martin Doring and Stephen J. Cowley (eds.). 2024. *Language as an Ecological Phenomenon. Languaging and Bioecologies in Human-Environment Relationships.* London: Bloomsbury

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Due to its transversal perspective, crossing other sub disciplines, ecolinguistics provide a theoretical frame that allows including analytical tools from different nature. Ecolinguistics makes possible to think language as a better contextualised phenomena, considering a broad spectrum of implications that not only includes the enunciation context and linguistic resources. This wide range of possibilities is what makes ecolinguistics a relevant and growing field in the second decade of the 21th century. As Chomskyan and Saussurean perspectives on language are getting out-dated (Perniss 2018), the need for a bigger vision about language pushes the boundaries of linguistics towards new scientific paradigms in the context of the anthropocene deconstruction (Haraway 2016).

The relevance of ecolinguistics as a current growing field is nowadays becoming more evident not just in the quantity and quality of publications but in the topics addressed and the theoretical approaches presented; and the Bloomsbury Advances in Ecolinguistics constitute an excellent example of this multiplicity of themes and analytical devices currently in progress. At first glance it may be though that the collection of articles edited by Sune Vork Steffensen, Martin Doring and Stephen J. Cowley, *Language as an Ecological Phenomenon. Languaging and Bioecologies in Human-Environment Relationships* offers a set of unified eco-perspectives and analytical approaches for a better understanding of the discursive role of humans and their impact in the global ecosystem. But in itself, this book is

much more than that; it is aimed at the linguistic, discursive and social practices in which language is imbued; and therefore, it constitutes a handbook for rethinking our human role in a multispecies environment and to reformulate it through language, discursive and social practices.

The book is divided in two parts with an introduction that serves as theoretical statement. In the introduction, titled "Ecolinguistics: Living and Languaging United" the editors introduce their perspective about the discipline and establish axes that cross and connect all the works in the heterogeneous volume, remarking the importance of the languaging perspective while aiming to re-establish the innovative thinking in the field. The introduction takes a quick tour through the history of ecolinguistics and the relations with other sub disciplines considering how languages shape human experience as they are embedded in how practices change lives and geophysical systems.

The first part focuses on theoretical issues and conceptual gaps; opening paths for future lines of research. The second part approaches empirically the issues presented in part one evidencing the material impact of ecolinguistics in discursive and social practices and vice versa.

In chapter one, Leonie Cornips investigates languaging between cows and human beings. In an interspecies languaging study, Cornips discusses a conceptual shift that can modify profoundly work on the field. The chapter starts with an elaboration of the multispecies turn in sociolinguistics stating a view of language as a continuum interspecies with no separation between humans and non-humans. The main contributions Cornips does concern the impact of human languaging on the environment and evidences the way in which companion species (Haraway 2003) are linguistically decontextualized and socially othered. The ethnographic methodology adopted allows contextualizing cow-human languaging in dairy farming practices and, thus, presenting a major area of ecolinguistic research currently in development.

The second chapter, by Sune Vork Steffensen and Edwards Baggs, approaches climate change as hyperoject (Morton 2013), linking the construction of a collective problem with a perceptual challenge. Locating ecolinguistics at the intersection of culture, cognition and behaviour, the authors emphasize the need for working for climate-friendly action or lifestyles turning to temporalities that place global change in heteroscalar and homoscalar perspectives.

In Chapter 3, Stephen J. Cowley describes how a transition from a language-use to a languaging perspective can contribute to securing life-sustaining relations. According to Cowley, languaging play an essential role in material effects that unite society, individuals and the ecosphere. The author offers a grounded constructivism where situated and embodied practices draw on languaging. Thus, language as a whole becomes a device that emerges at the intersections of practices and the ecology as humans participate in bioecologies. This entanglement places human-non-human-formations in lived-in places (Latour 1993, 2017) and leaves behind spectatorial views of the ecology.

Chapter 4, by Alexander Kravchenko, is based on the premise that human beings differ from other animals because they rely on language in doing what they do. According to Kravchenko, only humans engage in coordinations of coordinations of cooperative interactions, and by so doing, they inhabit civilizations. This position which may confront with other authors' views is justified by Kravchenko arguing that while humans have developed enlanguaged destructive social practices, they have failed to learn from them, and hence the current environmental situation. This situation calls for a re-disciplinization that treats the foundation of language as biological and, being the basis whereby brains, languages and environments co-regulate. As a result, languaging would be an adaptation to open up new ecological niches.

The first part of the volume ends with a chapter by Rasmus Gahrn-Andersenin, focused on research in traditional ecolinguistics. Acknowledging problematic dichotomies such as language and environment, Gahrn-Adersenin broaches the seldom discussed issue of sense-making in ecolinguistics. The author introduces the work of Felix Guattari to discuss how the notion of enunciative assemblage can replace Saussurian ways of analysing semantic content.

Arran Stibbe's chapter opens the second part of the volume discussing Ecolinguistics and Ethical Leadership. In considering world action, Stibbe uses the coronavirus as a starting point for reflection on the possibilities of overcoming the past pre-corona normal. He invokes effective use of words and stories that can contribute to ethical leadership and how leadership can draw on ecolinguistics. Language arises in interactions between humans and non-humans whose bio-socio-ecological relations are informed by subcutaneous ecosophies. Hitherto, the philosophical grounding has not generated a conceptual reflection on how ethical leadership can use this normative frame. In addressing the issue, he suggests that creating stories can derive their normative grounding from life-sustaining relationships.

The following chapter, by Elizabeth Oriel, Deepta Sateesh and Amal Dissanayaka, also explores social and ethical consequences of enlanguaging the world. Exploring the contexts of Sri Lanka and India, authors address problematic relationships that arise between humans and elephants. In colonial times and through later Western styles of governance, there was a loss of ancient dialogues and ways of worlding with the land's non-human inhabitants. This essentialized idea of 'land' has historically impacted negatively in many bioecologies. Separation into nature (elephants and the surrounding land) and culture (human beings and 'their' landscape) has proved detrimental to humans and elephants alike, according to the authors. Oriel, Sateesh and Dissanayaka take a multispecies or hybrid approach (Whatmore 1998) that revives lost vocabularies and allow the enlanguaging of the landscape (Mark et al. 2011) to become a place of both elephants and humans. Thus, rather than focus on symbolic framings, the authors point out how new ways of telling stories can contribute much to a symbiosis of humans and non-humans.

Alison Moore explores relationality between humans and animals in the dairy industry. She highlights the industry's use of discourses about the production of milk and other dairy products. Considering languaging as essential to humans and non-human relations, Moore tracks the environmental damage caused by the industry in terms of greenhouse emissions, health issues, and social inequalities in farming environments, genetic cow-breeding and animal welfare. Moreover, she documents the detrimental impact of dairy production for all species and many bioecologies. Adopting a systemic-functional framework, Moore offers an eco-critical deconstruction of public relation campaigns to reveal blind spots in ways that inform conversations about human and non-human relations. Extending her ecolinguistic analysis, the author proposes an ecocivilization in which not only are cows part of the worlding, but they contribute to multispecies sense making for dairy production.

Closing the volume, Chris Sinha and Vera da Silva Sinha present a way of investigating endangered languages. They take a practice-theoretical perspective by making the case for using research on endangered and local languages to benefit communities that speak those languages. Hence, protection of language or its documentation for heritage purposes should begin with attempts to understand the languaging and its linguistic life-worlds. In prioritizing ontology over epistemology, they draw on work by the anthropologist Philippe Descola (2014) which converges with ecolinguistic research. On this view, research is not about communities, ecology and languages, but about learning with communities in bioecologies. Sinha and da Silva Sinha frame this integrated perspective in terms of socioecological and political work where languages are living elements in the context of community practices.

The global concept of the volume is to empirically explore and provide new theoretical foundations for engaging with and doing ecolinguistics. Such approach emphasizes languaging rather than language, bioecologies rather than metaphorically conceived ecologies, and practice rather than representation. Editors explicitly declare that their intention is productively enhance the theoretical, methodological, and empirical scope of the discipline in terms of languaging, language practices and articulation with the more-than-human world in practical terms rather that theoretical, shifting the scope away from human and linguistic exceptionalism towards a perspective that might bring a way forward that is able to deal with the shifting materialities, livingness, vitalities and dynamics of life in what we humans reify as the environment. This way, the volume constructs a very strong bond between language and social change in terms of social practices, becoming an essential reference for linguists, discourse analysts and social scientists in general but also for activists and everyone concerned with social change in ecological terms and new ways to think the climate crisis.

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Review of Douglas Mark Ponton. 2024. *Exploring Ecolinguistics : Ecological Principles and Narrative Practices.* Bloomsbury

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The book 'Exploring Ecolinguistics: Ecological Principles and Narrative Practices', authored by Professor Douglas Mark Ponton of the University of Catania and published in 2024 under the esteemed banner of Bloomsbury, constitutes a work of profound significance within the field of ecolinguistics, elucidating the intricate interplay between language and ecology. The author delves deeply into a series of pivotal issues concerning how language influences environmental perception and subsequent human actions, as previously addressed by renowned authors such as Fairclough (2015), Stibbe (2015), Fill and Penz (2018), Ross (2019), and Thompson (2019). This review aims to scrutinize the principal themes presented by the author and emphasize their relevance in linguistic and environmental research.

The publication begins with a citation from David Suzuki, renowned for his program 'The Nature of Things'[1]. This citation emphasises the urgency for an honest assessment of the economic system's adverse impact on the environment. Ponton employs this citation as a point of departure to explore the relationship between language and the environment, accentuating how the way we narrate stories about the environment can sway our perceptions and actions. This aspect is necessary within the realm of ecolinguistic studies as it proves the potency of environmental narratives in shaping environmental policies and human actions.

A focal element of the book involves an analysis of the roots of modernity, encompassing industrial, technological, and informational revolutions. Ponton

[1] "The Nature of Things" is a Canadian television series featuring documentary programs. It first aired on CBC Television on November 6, 1960. Most of the programs focus on nature and the impact of human activities on it, but the series also covers documentaries on various scientific subjects.

emphasizes the role of these revolutions in shaping contemporary society. However, the author also acknowledges the adverse aspects of these advancements, including environmental devastation, the loss of traditions, and an increasing sense of alienation in modern cities. This historical context is essential for understanding how language has contributed to perpetuating the dominant economic paradigm and the importance of critically examining this narrative.

The concept of "growthism," coined by Umair Haque (2021), is another crucial aspect addressed in the book. This concept highlights the obsession with economic growth as the supreme value in modern societies. Ponton employs this notion to highlight the significance of critically reflecting on policies of boundless growth and the use of language to rationalize them.

Another relevant point in the book is the role of language in defining the relationship between human beings and nature. The author examines how language can reflect an anthropocentric view of the world, in which only humans are considered conscious agents. The present perspective is corroborated by Mark A.K. Halliday (1992), a pioneer in the field of ecolinguistics. Halliday underlines how language mirrors this view, such as using pronouns distinguishing conscious beings ("he/she") from inanimate objects ("it"). The analysis demonstrates the potential impact of language on environmental policies and the perception of nature as a mere object. The author advocates for ecolinguistics as a principal tool for analysing the words and concepts used to describe the natural world. The following calls for contemplation of the requisite efforts to reshape environmental narratives and cultivate a more balanced understanding of the relationship between humanity and nature. Ecolinguistics emerges as an interdisciplinary field capable of significantly contributing to the comprehension and resolution of contemporary environmental challenges.

The book offers a comprehensive exploration of the dynamics between language and the environment. This text is structured into several chapters, each contributing to the construction of a detailed framework regarding this field and its role in the analysis of ecology and the associated narratives. The introductory chapter lays the foundation for the ensuing discussion. Within it, the author introduces the central themes of the book, emphasizing the link between language and the environment as the focal point of his inquiry. Ponton asserts, "It is an interdisciplinary field of study that explores how language reflects and influences the relationship between humanity and the environment." This statement encapsulates the interconnected nature of these two central elements and anticipates the multifaceted approach that will characterize the text.

The introduction also references the influence of George Orwell's book, renowned for his critical work on language and power. Ponton highlights how Orwell's reflections, as expounded in works such as '1984' and 'Animal Farm', are intrinsically linked to the dynamics of language manipulation and narrative. These themes are relevant to ecolinguistics as they suggest that language can be instrumentalized to manipulate the perception of the environment and related

issues. The author highlights the importance of a critical analysis of language in this context, asserting that Orwell's reflections are pertinent to "the ecology of language and environmental communication."

The second chapter represents a substantive exploration of ecolinguistics, linking ecological concepts to the environment and environmental metaphors. The author examines the distinction between shallow and deep ecology, necessary for understanding the linguistic ecosystem of the environment. Shallow ecology is tied to a more direct and observable perspective of the environment, focusing on tangible aspects such as flora, fauna, and climatic changes. In contrast, deep ecology delves into the philosophical and spiritual implications of ecology, highlighting the connection between the natural world and the human conceptual world. A highlight of this chapter is the analysis of environmental metaphors. Ponton demonstrates how metaphors are potent tools in shaping perceptions of ecological issues and motivating concrete actions. Metaphors, such as "the planet is boiling," create vivid and engaging imagery that elicits an emotional response. The author illustrates how metaphors are used in environmental discourse to persuade the public of the urgency of environmental issues, thus showing the crucial role of language in promoting environmental action. He delves into the natural imagination, highlighting how mental representations of the environment can influence human behaviour. The writer suggests that environmental narratives should inspire a positive and engaging view of the environment, a concept that connects to the analysis of "Positive Discourse" (e.g., Ponton 2023). This method focuses on the characteristics of environmental discourse that incite positive actions. Word choice and overall tone can influence perceptions and engagement regarding ecological issues.

The third chapter represents a crucial exposition of the methodologies employed in ecolinguistics. Ponton meticulously analyses narration, discourse pragmatics, and speaker appraisal. Narration plays a significant role in ecolinguistics as it is through narratives that people construct meanings and relationships with the environment. Discourse pragmatics elucidates how context and social relations influence communication and interpretation. The analysis of speaker appraisals deepens the understanding of how people judge and evaluate environmental issues based on the language used in discourse. Media analysis, including films, constitutes another crucial aspect of this chapter. The way environmentalism is portrayed in the media can significantly influence the public. This serves as a reminder that language and environmental narrative are not confined solely to written texts but extend to a wide array of media, each of which may have a unique impact on perception and environmental action.

The book then immerses us in specific case studies, providing concrete examples of the analytical practices discussed previously. In Chapter 4, narratives related to "High Ash Farm" and "The Countryside Hour" are examined. The author highlights how these narratives are anchored in specific contexts and how language can influence the perception of these contexts. For instance, narratives concerning

modern agricultural practices and environmental conservation shed light on how language can reflect and guide relationships between humanity and nature in rural settings. Chapter 5 explores narratives related to the "Priolo Saltpans" in Sicily and flamingos. This case shows how narratives can be employed for specific purposes, such as "pinkwashing," a practice that leverages the symbolism of flamingos for marketing purposes (Ponton 2022). The author certifies how narratives are potent vehicles for the manipulation of public opinion and the management of dynamics between industry and conservation. The section provides evidence of how language and narrative are instruments of persuasion and influence, especially in contexts where economic interests may conflict with environmental protection.

The concluding chapter constitutes a significant synthesis of the entire book. The writer invokes the concept of "global boiling" to emphasize the urgency of contemporary climate change and environmental challenges. This evocative imagery highlights the power of language in eliciting an emotional response and prompting reflection. "Global boiling" serves as a perfect example of how metaphors can create vivid and engaging images, transforming abstract concepts into tangible realities. In this manner, Ponton demonstrates the importance of effective communication in promoting environmental action. The choice of the term "global boiling" accentuates the idea of an impending and irreversible catastrophe, thereby contributing to shaping the public's perception of the gravity of climate change. Nevertheless, the author criticizes this approach, highlighting how exaggerated language can lead to a distorted perception of the environmental reality.

In this way, the author underlines the importance of considering the social and cultural implications of the language used in environmental discourse. The use of religious and messianic references to describe figures like António Guterres is a key element of his argument. For example, terms like "secular god" and "neo-papal bull" are employed to present Guterres as a messianic figure. This rhetorical strategy aims to portray the climate change movement as a dogmatic ideology and to challenge the scientific consensus on climate change. The writer highlights how this rhetorical strategy can influence public perceptions and further polarize the debate.

The researcher emphasizes the importance of grounding discussions in scientific evidence and objective data. While critical of the overuse of sensationalist language, he recognizes the need to address environmental issues in a science-based manner. The author suggests that a constructive and data-driven dialogue may be more effective in promoting real engagement in the fight against climate change. To support his arguments, the writer uses a series of examples drawn directly from the text "Boiling Planet." These examples show how emotional and captivating language can be used to influence the public and promote a specific view of climate change. For instance, references to the term "global boiling" and expressions like "delusional visions" and "apocalyptic superlatives" show how the text strongly criticizes Guterres and the media for their use of sensationalist language. A crucial

aspect of Ponton's analysis pertains to the use of religious and messianic terms to describe climate change and the key figures involved in the debate. This aspect is reinforced by the frequent presence of biblical and apocalyptic references in the text, creating an atmosphere of fear and catastrophe. The writer emphasizes how this rhetoric can influence the public, leading them to view climate change as a kind of religious prophecy. This strategy can further polarize the debate and hinder a discussion based on scientific data.

Finally, Professor Ponton encourages readers to be aware of the power of language in shaping perceptions and to carefully consider the cultural context in which environmental discourses take place. The author highlights how language can reflect and shape cultural beliefs and perceptions, urging readers to examine how deep cultural beliefs can influence the perception of environmental issues. This call to attention regarding the importance of cultural context highlights that language does not exist in a vacuum but is rooted in stories, values, and beliefs that differ among cultures and communities. He emphasizes that understanding the cultural context is essential for communicating effectively about environmental issues. For example, how climate change is perceived in a rural community may differ from how it is perceived in an urban community. Therefore, environmental activists, journalists, and policymakers must adapt their language and rhetoric to reflect specific cultural perspectives. This requires sensitivity and openness to intercultural dialogue, thereby creating common ground for addressing global environmental challenges.

Ponton's book reminds us that language is a powerful tool for communication and influence (Lakoff & Johnson 2003, Lakoff 2010). While contemporary environmental discourses often strive to capture the public's attention and advocate for decisive action on climate change, it is crucial to balance the persuasive use of language with accuracy and responsibility. This balance can help build broader and enduring consensus on addressing environmental challenges.

The writer offers a profound and critical analysis of the role of language in modern environmental discourses. Through the examination of the “Boiling Planet” text, he highlights how language can be used persuasively and, at times, manipulatively to influence the public’s perceptions of climate change. The use of exaggerated terms, religious references, and cultural context accentuates how language plays a crucial role in environmental communication. He urges us to reflect on the power of language and to carefully consider the cultural context when addressing environmental issues. He advocates for a science-based approach and emphasizes the importance of constructive and responsible dialogue. In the context of a world facing increasingly urgent environmental challenges, Ponton’s analysis invites us to use language consciously and effectively to build a sustainable future. Ponton’s book serves as a reminder of the importance of communication in the fight against climate change and global environmental issues.

The book concludes with a sense of urgency and hope. The author emphasizes the power of small actions and alludes to the idea of saving ants as a symbol of the

significance of individual and communal efforts in building a more sustainable world. This reference to ants serves as an example of how language can create symbols and metaphors that inspire positive environmental actions.

In summary, 'Exploring Ecolinguistics: Ecological Principles and Narrative Practices' is a profound and well-structured text that explores the intricate interconnections between language, environment, and narrative. Through careful and in-depth analysis, the author demonstrates how language both reflects and influences the perception and management of environmental issues. This book is of particular interest to academics, linguists, and scholars of the ecology of language, offering a clear and detailed insight into ecolinguistics and its role in understanding and addressing contemporary ecological challenges. Its combination of theory and case studies makes this text a valuable resource for anyone seeking to deepen their understanding of the dynamics between language and the environment.

Its reflective conclusion inspires the reader to consider their role in creating a more sustainable world, emphasizing the power of language in shaping perception and inciting action. In an era where environmental issues are of paramount importance, 'Exploring Ecolinguistics: Ecological Principles and Narrative Practices provides an essential guide for addressing environmental challenges through the power of language.

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