



Bio-ecology and language: a necessary unity



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A B S T R A C T

The paper asks how languaging and language influence the world of the living. Extending [Clements and Shelford \(1939\)](#), the *bio-ecology* is redefined as the *domain of plant–animal–human–culture formations*. The move places what people do as a *result of languaging* into a reciprocal relation with the bio-ecology. While shaped by discourse and beliefs about language-systems (and representations), the language and actions of human organism–environment systems change the world. As [Garner \(2004\)](#) argues, ecolinguistics can do more than invoke ‘interaction’ between language and ecology. While ‘realities’ are partly shared, much is biophysical. Living subjects link language and languaging with experience and technologies that have transformed the bio-ecology. Once these dynamics are subject to investigation, macrosocial issues can be reconnected with biological, human and linguistic concerns. Ecolinguistics can thus illuminate the dynamics which enmesh the bio-ecology, human evolution, local histories, and language. In short, part of the field’s agenda becomes that of clarifying how languaging and language affect *plant–animal–human–culture formations*. If the approach can be used to forge a unified perspective on the bio-ecology, it will have non-negligible economic and political implications.

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1. Introduction

As we participate in language, we live in and through an ecology that prompts us to become the people that we are. My argument is therefore anchored by this central theme of the Special Issue. Of course, to become who we are, we draw on the continuous fluctuations of physics, our bodies and the biological world: we depend on the dynamics of the living. Accordingly, much stands to be gained from an ecolinguistics that shows how language shapes the reciprocal relations between humans and other living things. In presenting a personal view, I write as a sympathiser to ecolinguistics who is puzzled that many in the field have taken so long to overthrow models from mainstream linguistics.

To conceptualise language as part of the living world one needs a broader view than in work that builds on Saussure. Instead of conceptualising language (and discourse) as autonomous entities, one must ask how they contribute to the world of the living. In Sune Steffensen’s watchword, “If you want to learn about language, forget about language” ([Steffensen, 2011: 204](#)). In short, language does not reduce to phenomenal experience, words, and relations between such constructs because it is *also* part of the living world. While inseparable from forms, it allows us to co-ordinate human activity and appears (to us) in material entities. This is incontrovertible since, as shown by the natural sciences, there is a sense in which physics is all there is (see [Ladyman and Ross, 2007](#)). As physics is complete ([Spurrett, 1999](#)), the *materiality* of language cannot be ignored. Further, since physics underpins biology, biology is necessary to language. This, however, is not to endorse ontological reduction. For, surprisingly perhaps, human biology has a co-evolutionary history (e.g. [Deacon, 1997](#)) that is inseparable from the rise of culture ([Donald, 1991, 2001](#)). Nor is this a purely academic claim: for those concerned with the survival of species (including *Homo sapiens*), it matters that language impacts on both the life-world, or reality, and the planet’s fragile ecosystems. As a

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result we are prompted to form collectivities that sustain semi-autonomous human agency. The language sciences are faced with clarifying not only how language contributes to discourses but also its role in the human life-world and, more generally, the domain of the living.

2. The problem with dichotomies

Western thought depends on dichotomies: just as we separate mind from body, we divide animals from the environment and scientific from humanistic knowledge. Indeed, this bewitches us. It shapes lay views of the living and, of course, the interests of power. It is, for instance, expedient to treat ‘climate change’ as a *scientific* matter: without even seeking to understand the dynamics, political groupings offer competing ‘solutions’ to the issue. The planet’s future is discussed in the same breath as, for example, punishing bankers, criminals and terrorists. The alternative, as Steffensen suggests (2008a,b), is to follow Timo Järvillehto (1998, 2009) in moving to *one system views*. The reader, like the writer, becomes an organism–environment system. Neither your nor my grasp of what is before our eyes depends on an inner agent but, rather, what matters is how, as persons, we create/construe entities that we see as written signs. This is rather like kicking a ball during a football match in that, on each occasion, we co-ordinate by orienting to an environment that constrains bodily action. The result is *cognition* or, by definition, processes and activities that give rise to flexible, adaptive behaviour.¹ Cognition arises as brain, body and selective parts of the environment, together, influence action. In humans, much intelligent behaviour results from how we engage with aspects of the world. Just as kicking a ball depends on co-ordinating experience in leg movements with thinking, seeing opponents and teammates, running and so on, reading or writing draws on experience with inscriptional patterns that evoke ‘ideas’ as we look, think and move. In both modes of action “subjective experience is realised, and psychological concepts describe only different aspects of the system” (Järvillehto, 2009: 116). This idea is *not* common-sense. It implies that controlling what we do (whether kicking a ball or creating/construing text) depends on a subject who is both “the system in action” and an object that “emerges as the result of this action” (Järvillehto, 2009: 116). In challenging the belief that linguistic ‘potential’ is realised by the brain, language becomes a phenomenon that arose from a history of organism–environment relations. Indeed, its own past must be traced to living beings that came to differentiate themselves from the processes of inorganic nature.

A one-system view has implications for how we conceptualise. For example, the science of ecology, in Hoffmeyer’s terms, “remains true to the dualist tradition and thus is primarily preoccupied with the purely physicochemical interplay of animals and plants” (1996: 143). While *ecology* can be used loosely, caution is wise. As explained below, it matters that language has little use for ecological features like biomass, currents of energy, nutrient types and even ecosystems. In tracing how the living is enmeshed with language – Bateson’s (1979) necessary unity of mind and nature – I focus on how living beings see, smell, hear, touch, feel and, generally, engage with each other. In so doing, they typically depend on what lies outside the boundaries of the epidermis. In humans, of course, this is further complicated by the fact that we inhabit a shared life-world or ‘reality’. To come to terms with this, therefore, we need to look beyond standard dichotomies. In 1939, Clements and Shelford applied the term *bio-ecology*. This excludes the non-living environment (or the ecological niche) and overthrows the individual/population dichotomy. For Clements and Shelford (1939), *bio-ecology* refers to a microscale of “plant animal formations”. Below, application of the term is extended to plant–animal–human–culture formations: the bio-ecology is affected not just by geophysical factors but also by human impact on its interactions. Just as for Clements and Shelford (1939), it becomes crucial that development makes much of life into an inherently cyclic dynamical system. Human organism–environment systems act and talk within fluctuating cycles of development. Given language, they gain some modicum of awareness of – not just the life world – but also the domain of the living (and, indeed, aspects of nature that resist ordinary perception).

To be sceptical about dichotomies is not, of course, to deny the importance of multiple processes (or mechanisms). However, as argued in Section 3, there are reasons to reject any conception of language that separates words and rules from activity. And this applies not just to behaviourist and mentalist thought but also to ecological linguistics that develops the work of Haugen and Halliday. This is because, to the extent that language and languages are seen as systems that are available for ‘use’, the logic gets caught between 20th century behaviourism and mentalism. Unless one speaks against any free-will (cf. Skinner, 1971), language is removed to an autonomous domain of linguistic form. However, freeing language from biomechanics erroneously suggests that, “the most significant events in the explanation of behaviour are located within the organism” (Järvillehto, 2009: 115). The radical one-system view rejects this option. First, since all living things are organism–environment systems, one is bound to concede that DNA alone cannot guarantee an interconnected bio-ecology. While humans influence this, on the scale of the biosphere, our doings are petty affairs.² However in the bio-ecology, things are otherwise. The planet’s surface was largely transformed with the emergence of, not hominids, but human culture. Though constrained by the physico-chemical dynamics that constitute the universe, language (and its social underpinnings) may have a constitutive role in all our futures. As part of the bio-ecology, it impacts on what we do and, thus, eco-systems, the ecology, the semiosphere, and the semiotic and cognitive niche. In the bio-ecology, language shapes the contemporary living world. This matters to those alive today – and to their potential and actual offspring. It also matters that the dynamics of language are

¹ Wheeler (2005) defines cognition as enabling organisms to engage in flexible, adaptive behaviour.

² One referee points out that complexity theory shows that even the movement of a butterfly’s wing or the rise and fall of a civilization can have large effects. While true, in the scale of the biosphere, such events are trivial.

affected by both language-machines (e.g. printing presses, televisions, telephones, computers and robots) and their products. Even the inscriptions that lie before our eyes are mediated by computers, alphabets and habits based on singular ways of using language-machines. Recently, skills in acting with language-machines and their products have come to exert a powerful influence on the organism–environment systems that constitute human beings. Through the rise of theoretical culture (Donald, 1991), artifacts, expression, and language have had an increasing impact on the living. The semiotic niche of a single species (*H. sapiens*) gives rise to traditions and ways of creating and construing actions that affect many biosystems. Where are we to focus? In ecolinguistics, it has generally been assumed that what matters is the life-world, or Halliday's (1990) 'reality'. However, in contrasting the life-world with the bio-ecology, we find ourselves bound to look beyond the said to consider not only the unsaid but also what, in our space–time, remains unsayable. *Reality* as perceived and construed is a small part of even the human semiotic niche: it is just a fraction of the bio-ecology. In what follows, I scrutinise the strengths and weaknesses of ecolinguistic tradition and, later, raise questions that can extend the agenda.

3. A brief look at ecolinguistics

Ecolinguists have been diligent in showing how *language* and *ecology* (and translation equivalents) can be applied to overlapping concerns. While tracing the link to, for example, Sapir – but not, Malinowski (1935) – Fill (1998) draws on two major sources. First, Einer Haugen published a well-known paper called 'The Ecology of Language' (2001/1972). Though taking the mentalist view of the time, he makes a modest proposal for extending the scope of sociolinguistics. Then, during the boom in applied linguistics, Michael Halliday (1990) gave endorsement to the field. Using a framework of systemic-functional linguistics, he raised the question of how language and, above all, *discourse* contribute to the construction and degradation of reality through 'classism, growthism, destruction of species, pollution and the like'.³ Thus, sociolinguistics became linked with discourse analysis and, as Bundsgaard and Steffensen (2000) generously suggest, ecolinguistics came to encompass a rich diversity of theoretical resources. In short, the field linked enquiry into linguistic analysis with constructs that are used in discursive production of the life-world.

As illustrated by this Special Issue, those beginnings have produced rich fruits. Working in the tradition that can be traced to Haugen (2001), Nash and Mühlehäusler (2013) show that linguistic objects – languages – vary in how densely they are intertwined with a life-world. In work closer to Halliday (1990), Alexander and Stibbe (2013) advocate *ecological analysis of discourse* that traces the impact of language on relationships with humans and other life forms. In pursuing such an approach, Uryu et al. (2013) analyse how inter-human relationships play out, reject competence models, and advocate *complex systems theory*. In the global world, they argue, it is increasingly unclear that people mean what they say, that the words are theirs, or that the memories the words evoke are shared. Given the historical nature of language whatever is said is always an enrichment of the speaking subject's awareness. Even if such approaches remain disunited – and the bio-ecology is absent – the field has generated interesting work. Why, in view of the current environmental crisis, has ecolinguistics not become well established in the language sciences?

Naturally enough, this requires one to step back from the official narrative. As Lechevrel (2009) shows, in spite of a 'vast body of research and propositions', the approach has 'failed to lead to a unified field of research' (p. 2). Its dual foundation is, naturally enough, part of the problem (see Steffensen, 2007: 8). While Haugen's claims are often said to be 'metaphorical', the discourse tradition can do no more than relate what is said to the life-world. There is no easy way to reconcile concerns with how languages contribute to cultural ecologies with a 'critical' current that addresses a social and political 'reality'. Further, neither approach argues for ecological critique as opposed to, say, emphasis on class struggle, feminism or other anti-capitalist analysis. Its rhetoric can suggest, as Lechevrel notes, that it is 'warped by ideology and political claims' and the aspiration to 'submit science to society's needs' (2009: p. 3). Suspicion of political bandwagons is not helped by, for example, Fill's (2000) classification of texts in relation to "ecological and *unecological* features (my italics)" (pp. 70–71). While practices and accidents can reduce diversity in the environment, it is sloppy to call this 'unecological'. Further, while an attractive label in the 1970s and 1980s, *ecology* became associated with 'alternative' lifestyle and, in the English speaking world, lost its allure. In science, ecologies were found to be embedded in ecosystems that could only be modelled using nonlinear dynamics. Use of complex systems theory leads to models that have little common ground with the linear units used in analysis of 'language' and 'discourse'.

The current of *dialectical linguistics* seeks to link the domain of the macrosocial with investigations of languages and discourse. As Steffensen (2007) sees, this shifts attention away from words and rules to variation, complex wholes and interaction. Though seemingly marginal within ecolinguistics, emphasis shifts from 'mind' to the dynamics of contradictory social relations. Human populations become a biotope and language traced to, not exchange, but (broadly) a mode of sharing. Turning from science – and, especially the study of behaviour – emphasis falls on social praxis (Bang and Døør, 2007: 204ff).⁴ However, its logic invokes, not observations, but an unanalysed kind of materialism. Given failure to scrutinise human activity, the approach is open to the dual objections that it is 'political' and underplays what we do and say (let alone how and why this is done!). While linking ecolinguistics with the macrosocial, it leaves aside microsocial, affective or behavioural activity.

³ Halliday opened his speech by stressing that such problems matter not just to physicists and biologists but also to applied linguists (Fill, 2000).

⁴ Rather than argue that science is social praxis, they treat it as part of a particular cultural and social order. To bring it in line with their concerns, they challenge non-democratic (mainstream) science.

Another reason why ecolinguistics has failed to flourish may lie in the field's 'applied' origins where the environment was viewed as a discursive topic. Further, for historical reasons, it produced a large literature in German and Danish (rather than languages like English) that may have discouraged scrutiny of its structuralist and systemic-functionalist foundations. Focus on 'language' and 'discourse' opened up how these relate to the life-world (or culture) but led to lack of consideration of how, in prompting use to construe and create verbal patterns, language impacts on the bio-ecology. In leaving aside how people feel, think and act, the focus falls on the socially constructed. True to 20th century traditions, ecolinguists tend to separate nature from participating in language. It has to be concluded, therefore, that the field risks gaining the reputation of bringing together dedicated but disunited scholars. To allay this threat, new modes of critique are required.

4. Within and beyond the life-world

The linguistic turn and, later, postmodernism isolated language from the natural world. In ecolinguistics, most focus on the variability of languages and language (in the Haugen tradition) or analysis of ecological discourse (under Halliday's influence). Such approaches ask how language contributes to 'shared reality' and the discourses of a life-world. In Halliday's vision, there is a reciprocal (or circular) relation between wordings and the life-world in that language enables us to use experience in 'construing' meaning. While of value in raising awareness about political issues, the construct of *meaning* is detached from what people do, think and feel. As with much postmodern thought, it can be objected that a focus on texts and construals impoverishes lived experience. Reality (and, especially, cultural tradition) is so deeply historical that, when our focus falls here, we lose sight of how we realise values. To focus on what can be *shown* tends to hide events in the bio-ecology. For living beings the role of discourse and subjective experience is itself dependent on more direct experience of both others and the world. As organism–environment systems, we learn by coordinating our bodies while also using instruments, artefacts and using the results to construct social institutions (including languages). Further, just as there is more to experience than construal, there is more to the nature than social constructs or macro-reality. Indeed, for those who reject postmodernism, structuralism and post-structuralism show a pernicious tendency to dichotomise (e.g. form/function; essentialism/postmodernism). Not only do abstract notions get drawn into arid debate but this can prevent theorists from looking either further or deeper. In the light of such remarks it is striking that, in ecolinguistics, there is little discussion of biology or even of biological terms. Further, given mentalist tradition, there is also a tendency to treat mind as a product of constructing/participating in discourse (and language learning/acquisition). When emphasising language, it is easy to overlook the import of Gregory Bateson's (1979) impassioned case for recognising that, together, mind and nature constitute a necessary unity.

Even if choosing not to examine how the biosphere evolves, it is crucial that biological change is non-linear. Not only is this characteristic of the living but, as Peirce argued, human habit-taking also engenders increasing complexity.⁵ Thus just as physics is simpler than biophysics, what we do with language may be more complex than the signalling of, say, bees, fish or even wolves. While this may seem obvious, even relatively simple bio-systems (e.g. fish) use organic memory to deal with circumstances. Further, once learning comes into play, they gradually come to perceive events, situations and episodes. Yet, if meaning is defined in terms of verbal construals, this complexity is lost. It is forgotten that organic memories are reconstructive and that we use interactions in shaping what is likely to be perceived. Not only do we develop expectations of each other but, given a history of interactions, a tradition, we can change future behaviour. However, since ecolinguists typically focus on patterns below and above the sentence, they often overlook how expressive dynamics contribute to these rich resources (but, see Steffensen et al., 2010). Though recognising the *archaeology of knowledge*, evolution, development and natural cycles are often overlooked. The focus, moreover, often falls on what is deemed to be of *current* relevance. For example, in spite of occasional mention of Lovelock's Gaia hypothesis (e.g. Fill, 2000), ecolinguists rarely stress that the most complex known self-sustaining system is what Hoffmeyer (2008) calls the semiosphere or, indeed the bio-ecology as a whole. Indeed, in a larger scale, humans and cultural reality are mere perturbations. Thus, if we are understand reciprocal relations between language and the bio-ecology, we face new questions. First, however, let us consider how ecolinguists conceptualise *language*.

Ecolinguistic description is often linguistically conservative. Like Haugen and Halliday, most appear to accept what Mark Garner (2004) identifies as the main assumptions that have shaped the field since its beginnings in ancient Greece. What remains unsaid is that human language is:

- a unique and
- rule-governed phenomenon, that is
- best studied independently of other human behaviour.

(Garner, 2004: 48)

In separating language from behaviour, form is taken to be separable from movement. Accordingly, theorists emphasise system over use and, as a result, often conclude that language can be localised in a brain or body. This two-system view separates language (and culture) from the world in which it is taken to exert its effects. As in much Western thought, language becomes, not part of experience, but an instrument with a crucial referential function. Like a man-made code, it is independent of experience and living bodies. Though the most famous challenge to this view is Heidegger's (1975), the orthodoxy

⁵ This idea is influential among biosemioticians such as Barbieri (2008) and Hoffmeyer (2008).

has recently met determined resistance from Roy Harris (1981, 1991, 1998, 2005). Challenging what he appropriately calls 'segregational' views, he argues that language is made up on the fly. If this is so, it follows that appeal to rules and units can do no justice to the activity that shapes language flow. Although language can be described in terms of verbal patterns, we are not (like) language machines (Harris, 1987). Pursuing contrasts with *codes* like Morse, there is a new consensus that language is grounded in real-time dynamics (e.g. Love, 2004; Kravchenko, 2007). Before pursuing this alternative, I stress that code models dominate *American descriptivist* tradition (Matthews, 1993). Thus Leonard Bloomfield and Zelig Harris language defined language by utterance-types and their parts ('forms'). These were separated from meaning and, as a result, utterance-acts came to be compared with computer like output. Public language became performance and, by implication, *competence* was ascribed to a system that generated an infinite set of formal-strings (Chomsky, 1965). Given program-like output, language could be compared to a product of design (Universal Grammar). Performance was ignored because of an ungrounded view that it depends on putative workings of a rule governed mental medium. Language was autonomous or independent of behaviour, circumstances and individual history. Its *cognitive architecture* was so organism-like that grammar was conceptualised as *growing* in the mind. If one adopts this rhetoric, one can hypothesise a mutual influence between a community's characteristics and individual language *potential* (i.e. programming). It is as if free will (in something like a religious sense) exploits a mild Sapir–Whorfism. Or, in other terms, the 'reality' construed by discourse comes to seem like a surrogate for experience. The view is so familiar that many are unwilling to challenge its assumptions.

The danger of treating language as code-like appears, above all, in Garner's (2004) delicate critique of Haugen's (2001) view of the *ecology of language*. In this, he challenges Haugen's focus on 'the interactions' between a language and its environment. True to the linguistic mainstream (and American descriptivism), Haugen ignores observables (materiality) by privileging languages over language-behaviour. Placing system before human activity, he sees what Garner terms, 'some sort of analogy with the natural world' (2004: 187). Though sometimes called *metaphorical* (e.g. Fill, 1998), Garner rejects Haugen's vague claim that languages 'interact' with a sociocultural environment. If they do anything at all, this depends on *living beings*. And that, Garner believes, is the price paid by treating language as a code-like system. Further, as shown below, the same fact undermines the view that language is represented in the mind (or brain). Of course, in the 1970s, however, Haugen had no such qualms:

The true environment of a language is the society that uses it as one of its codes. Language exists only in the minds of its users, and it only functions in relating these users to one another and to nature i.e. their social and natural environment. (Haugen, 2001: 57)

In his two-system model, individuals are connected by a language code that characterises an environment. In short, this ecological discourse opposes the natural to the cultural. Far from invoking organism–environment systems, Haugen follows Saussure and Chomsky in tracing language to the 'use' of a language system. In proposing that this be compared to an 'ecology', the object of study becomes "the study of interactions between any given language and its environment" (2001: 57). The language-system (or given language) is thus separable from human activity. By implication, neither its dynamics nor its materiality matter. In support of his kind of code-view, language is said to appear "in action like all behaviour, but it exists in the mind as a potential, which can be treated as a thing, a thing that implies the possibility of action" (2001: 58). In short, language is program-like. Writing as if *performance* were external, language nonetheless resembles a living thing. The medium, like a body, *really* impacts on the environment (i.e. human society).⁶ In Garner's terms, the *mental* aspect of language, a potential that (allegedly) exists within the skull, affects "how we make sense of the self and the world; its interaction with other languages in the mind; and the speaker's attitudes towards and beliefs about language" (2004: 190). Conversely, the *sociological* component deals with language in the speech community: "the circumstances in which it is used or not used, and the reasons for use and non-use, as well as the patterns of social behaviour among the community of speakers" (2004: 190). For Haugen (2001/1972), there is an *actual* (not metaphorical) relation between community and language. Garner sees this as a conceptual problem that undermines the ecology of language:

On the one hand there is a metaphorical entity: 'language-as-organism', and, on the other, a literal entity: what we might call the environment itself. What is the ontological status of the third element – interaction? If it is to be conceived of as a literal process, how does one describe an interaction between a metaphorical entity (language-organism) and a real entity (environment)? What specifically happens in the language–society interaction, and what are the mechanisms by which it takes place? It is relatively straightforward to show how the characteristics of a community (its history, sociology, demography, cultural values, religion and so on) influence language use. But is the influence mutual: in other words ecological? [...] These questions would be no more than philosophical quibbling if the object of study of the proposed science were easily defined, but it is not. [...] This conceptual problem has prevented language ecology from developing from a rather vague idea into a coherent theoretical perspective.

(Garner, 2004: 190–191)

While Lechevrel (2009) sees him as an *insider*, Garner's opponents merely invoke principles like *interaction* and *diversity*.⁷ Even when Steffensen (2008a,b) introduces Järvilehto's one-system view, he leaves aside how language constitutes and stabilises the

⁶ Even if this belief motivates many in the language sciences, as one referee claims, I regard the belief is false: languaging falls under verbal constraints. Causal powers depend on physics and living bodies (not a 'medium' or code).

⁷ A referee points out that ideas such as these are emphasized in work by Fill (1998) and are intended to counter the sorts of challenge posed by Garner.

system. Yet, without establishing how languages impact on action – how people language – this undermines ecolinguistics. It is important, therefore, to understand that a challenge to ‘words and rules’ models all schools of linguistics based on *American descriptivist* mainstream. It challenges not just Haugen (and Halliday) but also other models of conversations and discourse and, indeed, ones claiming to model language in the brain. All these two-system views separate the world of language from the world of nature. Next, therefore, I consider why many deny that language-systems come to be localised in a brain (or mind).

4.1. Competence models and their problems

Though ecolinguists adopt two-system models of language, they have challenged related assumptions in mainstream science. Rejecting neutral investigation of objective data, Bang and Døør (2007) offer dialectical theory as the basis for persuading people to change how they act. However, rather than challenge mentalism or reduction of language to form, they attack the value-free assumptions of Chomsky’s (1965) classic work (Bang and Døør, 2007: 34). Whereas Haugen and Halliday posit that individuals use community language-systems, Bang and Døør model diversity in ‘individuality’ (2007: 19). Each agent is a relatively stable part, a holon, that responds to situations that often include “a structured sequence of texts” (2007: 62). Humans respond, not to stimuli (or input), but to situations that set off dialectical relations. These can be described by a semantic matrix whose dialectics link social sense, social import, individual meaning and personal signification. Each is separable from action: individuality is already *in* a situation (which can be perceived). To their credit, therefore, Bang and Døør do not allow languages to be localised. However, given their macrosocial interests, they retain the dichotomy between language and non-language. They ignore the fact that, in biology, even simple organisms (e.g. bacteria) simultaneously move and perceive. Thus, while right to emphasise interconnectedness, interdependence and resistance to the machine, they still conceptualise language as “a set of discourses” (2007: 47). They fail to ask how these connect with physics, bio-ecology and lived experience. Underplaying the microsocial and affective, bodies lose their role in linguistic ontology. Sharing Haugen’s (1974) failure to clarify interaction, their models do not show how living beings language to engage with the macro-social world.

Chomsky’s (1965) classic model posits that a human mind/brain (sic) can know a language perfectly. This implies (without argument) that rule governed behaviour is driven by what how a brain encodes what a person wants to say. While this internalist view of intentions was conceptualised around symbol processing models, it is compatible with all mentalist views. In principle, bundles of neural networks might *represent* verbal patterns. It is therefore striking that Uryu et al. (2013) reject such views using phenomenologically informed analysis of multicultural discourse. In conclusion they echo Butler: “The historicity of language exceeds in all directions the historicity of the speaking subject” (1997: 28, cited in this issue: XX). On macrosocial grounds, therefore, they deny that what we say and mean is controlled by an individuality (or ‘mind’). They too, however, say nothing about how biological individuals draw on languaging to become living subjects. However, work such as that cited in this section does show a move away from the thin view of interaction (and reality) that underpins much of ecolinguistics. It offers social and linguistic reasons to doubt that languages can even be localised (or ‘known’). In recent work Steffensen (2012) stresses that this is also consistent with what he calls *third wave cognitive science*. Far from reducing to mental processes, cognition is embedded and situated because biological systems enact relations with the world. What Lyon (2006) calls *biogenic* views treat mentalism as anthropocentric. In other words, Haugen is correct that language “appears in action like all behaviour” (2001: 58). His error, I suggest, is that of ascribing linguistic potential to what lies *within* the mind. In fact, organism–environment systems are open to Haugen’s possibility of action (2001: 58). Humans are *moved* to co-ordinate in circumstances shaped by the past. On this view, it follows that competence models mistakenly oppose language to not-language, mind to body, and reality to the changing universe. Worse, this applies not only to mentalist models that posit that language is to be explained by inner rules and representations but also to their behaviourist predecessors. In their two-system view of nature, one posits a gap between the life-world and the living. Let us now see how the necessary unity can be restored to these domains.

5. The principle of non-localisability

If physics is complete, we are bound to reject a classical view of the ‘material world’. While macro-reality is construed in terms of objects and events, these presuppose human observation. They are the life-world’s biophysically based constructs – not nature’s processes. Given its dynamics, nature spills out across the universe – beyond perception. The world of the living is not ‘out there’ or like that captured, in Austin’s (1961) phrase, by dry, middle-sized goods. In parallel, language does not reduce to verbal units that depend on a ‘system’ that implements rules. While non-local views gained respectability with subatomic physics, they are coming to the fore only today. If the most developed is ‘structural realism’ (see Ross and Ladyman, 2007), many now adopt a *process ontology*. While argued by, among others, Mark Bickhard (2012), Whitehead (1926) offers a beautiful challenge to Western tradition:

The Ionian philosophers asked, What is nature made of? The answer is couched in terms of stuff, or matter, or material,—the particular name chosen is indifferent—which has the property of simple location in space and time, or, if you adopt the more modern ideas, in space–time. [...] The characteristic common both to space and time is that material can be said to be *here* in space and *here* in time, or *here* in space–time, in a perfectly definite sense which does not require for its explanation any reference to other regions of space–time.

(Whitehead, 1926: 61f)

Mentalists place languages (and their parts) at a *simple location*. For Haugen, a language-system exists in the skull or, mysteriously, the ‘mind of a user’. In classic cognitive science, theories posited an ‘encapsulated’ module in a mind/brain that relied on central processing unit.⁸ This allegedly generated and processed input and output: the model separates a processor from the not-here and, by extension, the language-system from the world. Though no-one thinks that the brain really works like this, in what Makkai (1993) dubs the *crooked game of generative linguistics*, no other view was acknowledged. Any challenge to code views was said to have failed to understand the progress made by modern linguistics or, in other terminology, to focus on E-language. Challenging this, Steffensen and Cowley (2010) argue that neither states nor processes ‘occupy’ a determinate space–time zone. Even objects like stones exist in a state of change – however slow this change may be. While not confined to a specific space–time, such processes nevertheless have a high density in some phases while, in others, processual density becomes indefinitely small. What applies to physical objects also characterises language. Since its potential unites individual and collective history, it evades space–time localisation. While this inscription will appear on a page (or screen) as long as the page (or screening) lasts, *what it says* lacks any location. The density of the ‘said’ will vary across readers and, within a reader, over time. Indeed, if the said is repeated (as here), its form too will mutate. It is therefore a methodological error to ascribe inviolable boundaries to objects. Since the non-local cannot be localised, Steffensen and Cowley (2010) make an epistemological move. The *principle of non-localisability* allows language to be contrasted with artificial media (and inscriptions). Far from resembling physical shapes or a digital code, it depends on patterns that exploit different time-domains. Once this is recognised, theory leaves behind the assumptions to which Garner (2004) objects. By extension, the ecology of language ceases to depend on how a mind (or brain) sets up events in an ill-defined interactional domain. Rather, humans become living beings who act within a bio-physical world. Language is intrinsic to what we do and, for that reason, part of the bio-ecology: it arises as organism–environment systems engage with each other in what is increasingly called *linguaging* (Becker, 1988; Maturana, 1988; Kravchenko, 2008; Linell, 2009; Steffensen, 2009; Thibault, 2011). Far from being reducible to form, language is grounded in materiality or dynamics (Maturana’s *structural coupling*).

6. Language: nowhere and everywhere

It is not strictly true that language is everywhere: at times people undertake entirely non-verbal activities such as swimming or, perhaps, making music. However, the hyperbole captures a tendency to view language around a restricted class of cases that include, typically, mundane conversations and texts. Once we see how language saturates human lives, we turn to how it spreads across our activities. We language as we hunt, prepare food, or go into battle; we language when we speak to our pets, to ourselves and as we dream. In our world, we even language with books and machines. Indeed, in its computational forms, language increasingly manages without us: it controls systems that dominate our lives. Our challenge, then, is to understand how diversity develops and, importantly, how it affects both the life-world and that which lies beyond. While I return to this below, first I clarify new emphasis on dynamics.

Paradigmatic cases of *linguaging* occur in face-to-face interactions between adults who live in the same community (for discussion, see Linell, 2009). The results are used in at least three ways. First, as people co-ordinate, they find suitable ways of *going on*.⁹ Given its affective aspect, this differs from merely creating coherent discourse or conversation. Second, especially when warned in advance, parties can repeat ‘the words actually spoken’. This draws on phenomenological experience or, in the terms of cognitive psychology, *working memory* (see Baddeley, 2003). Third, with varying accuracy, people can paraphrase what may have been *meant*. Skills of coming up with something, repeating and paraphrasing are central to linguaging or dialogical forms of what Love (2004) terms *first-order language*. This is defined as the “making and interpreting linguistic signs, which in turn is a real-time, contextually determined process of investing behaviour or the products of behaviour (vocal, gestural or other) with semiotic significance” (2004: 530). Importantly, unlike verbal patterns, behaviour and its products are measurable. First order language is not restricted to conversations between familiars but occurs, for example, when we deal with inscriptions (and language-machines). In paradigm cases, however, linguaging is other-directed and depends on how, in real-time, each monitors the other’s doings. It is invested with significance as we speak and hear: given instruments, the results can be recorded and even measured. When this is done, it becomes clear that all full-bodied expression can be integrated with concurrent activity. Far from being autonomous, there is no *a priori* way of separating the linguistic from the non-linguistic. However, it is crucial not to overlook the principle of non-localisation. Indeed, it would be mistaken to think that linguaging is behaviour or what can be recorded. Let us turn to why this matters.

Face-to-face interaction relies on phenomenological experience. Maturana and Varela (1987) argue that while wild parrots, bonobos and wolves *language* (sic), humans alone develop a special phenomenology.¹⁰ Simply said, we alone hear *wordings*. In the terms of cognitive psychology, working memory enables us to hold onto something of what we hear. In this way gestural and expressive moves, together with acoustic pulses evoke organic memories that bear on ongoing events. Individual history and behavioural products (viz. what I may say that I have heard) drive real-time interpretation. In literate traditions, wordings may parallel what is inscribed: language comes to be identified with ‘verbal patterns’. This, however, misleads. For, given the principle of non-localisability, far from relying on ‘the words actually spoken’ we also draw on dynamics that give

⁸ In classic form, this view appears in Fodor (1983).

⁹ This concept is from Wittgenstein’s (1958) *Philosophical Investigations* (for discussion, see Shotter, 1996).

¹⁰ For Maturana (1978) all species develop a consensual domain: humans depend, to an extent, on verbal patterns. For discussion of *wordings*, see Cowley (2011).

voice to wordings (and other movements). While the origins are evolutionary, the ability to hear wordings emerges in ontogenesis. For Love (2004), children come to hear utterances as utterances of something (viz. as verbal patterns). Taylor (1997) regards this as the basis for linguistic reflexivity – talking about what is said (e.g. what's that? What did you say? How do you say 'linguaging' in Italian). Finally, Cowley (2007) argues that by focusing on wordings we gain a new orientation to speech. Later childhood is transformed by treating linguaging as if it really consisted in entities that are used to talk about language: we take a language stance (Cowley, 2007, 2011). In other words, while language flow continues to accompany our doings as we talk, think and dream, we also learn to treat utterances (and sentences) as expressions of something. We ascribe forms and meanings to the words that we actually perceive. Taking a language stance shapes all characteristically human abilities: we use it to ask questions, construct reasons, use autobiographical memory, discover literacies and think to ourselves. By recognising that first-order dynamics evoke *heard* second order patterns – wordings – no appeal is made to competence. One can thus reject the ancient Greek assumptions challenged by Garner (2004). Far from being unique to humans or rule-governed, linguaging is entangled with both action and phenomenological experience. We anticipate and respond to what we *perceive*. This, however, cannot be identified with expressive energy. What is said is non-local: situated action is enriched by organic memory. However, what is said can be so salient that verbal patterns come to be regarded as separate from behaviour and, if dazzled by computers, likened to machine output. In fact, these second-order constructs resemble the moves and rules of a child's game. They are virtual but, for the player, quite real. Just as in play, they are movements which are created on the fly, draw on traditions and, in certain circumstances, can be altered.

From a human perspective, language is nowhere and (almost) everywhere. It is thus a non-local or distributed phenomenon which depends both on first-order activity and phonetic, textual and theoretical products. Even if we are only reading a single word, what we construe depends on first-order activity. Thus, far from occupying space, linguaging varies in processual density. As we speak and hear, we experience a high density peak as wordings flow through time. While having a half-life in working-memory, unless struck by what is said, utterance-acts often leave no trace at all. Though embodied, linguaging links communities or, as Garner (2004) sees it, history, sociology, demography, cultural values, religion and so on. Plainly, there is a more to language than to linguaging. Given the principle of non-localisability, we can regard language as functioning, simultaneously, in different time-domains. Using our bodies it links the bio-ecology with the life-world and, as a result of interactions, we gradually build our cognitive powers (e.g. human modes of articulation, working memory). Language thus transforms human agency as we cease to be human infants and, over time, become particular characters. This dual foundation – in both nature and how the life-world is perceived is what gives us our unusual flexibility: it enables us to adapt to cultural circumstances. It applies even in lives dominated by linguaging and rituals whose counterparts appear in pre-modern cultures. However, with the rise of new external resources, as Donald (1991, 2001) argues, scripts expanded human potential. In China, India and Greece, theoretical culture arose and, a couple of thousand years, led us helter-skelter into a world of technologies and what Harris (1989) terms increasingly 'autoglottic' writing. As language insinuated itself into electronic systems, we developed a dazzling range of language machines. While its transformations appear beyond the skull, the basis of language lies in bodily dynamics. Even modern (and postmodern) life depends on making and remaking linguistic signs as we engage with both each other and the external resources. Language is thus dynamic and symbolic; equally, it is both material and virtual. Having sketched the distributed view, let us return to the issue of how language contributes to the bio-ecology.

7. Assessing and managing change

Since nature shows the appearance of design, many have argued for the existence of God, natural intelligence or a blind watchmaker that uses DNA. Design can be read into – not just the living – but even the physical universe. It is manifest in how living systems appear, what they do and, as has been emphasised since Darwin, how they evolved. It can seem to be a truism to say that living systems have an extraordinary capacity to explore the adjacent possible by linking evolutionary history with unpredictable changes in the bio-sphere. Recently, Anton Markoš et al. (2009) have suggested that life be viewed as its own designer. On the distributed view, it appears likely that this also applies to language. Accordingly, far from being a *medium*, language depends on how we use embodiment and, above all, phonetic and other gestures. As we do so, we participate in cultural traditions and, with everything we do, exercise our powers of judgement. Language is thus inseparable from the many ways in which each of us learns to manage, assess and reject change. By bringing home its non-localisability, we begin to see how language fits the bio-ecology as a whole.

The use of tools preceded even rudimentary linguaging by hundreds of thousands, perhaps, millions of years (Donald, 1991; Cowley, 2012). In prehistory, natural design came to exert a powerful influence on human doings. Following Deacon's (1997) broad account, this happened long before the rise of language and, while it may have led to the expansion of the brain, technology advanced slowly. After perhaps 4 million years, language developed – perhaps, less than 100 000 years ago. Indeed, some believe it co-occurred with an 'explosion' in using pottery 40 000 years ago. Whatever the facts of the matter, change became central to not only our lives but, later, also to the planet as a whole. Indeed, it seems that linguaging and its derivatives function to manage and assess change. While the main function of organic memory is that of allowing animals to notice and anticipate change (see Glenberg, 1997), this occurs in a species-specific equivalent to a life-world. Without human language, however, other species neither plan nor draw on tales and artifacts. While engaged with the world and each other, their organic memories are independent of cultural tradition. They lack the verbal patterns and external artifacts that preserve past successes or, in Tomasello's (1999) metaphor, ratchet up best practices. They lack Haugen's *language organism*

or what Halliday pictures as a *social semiotic*. These are obvious points: however if second-order constructs depend on phenomenology, we can embrace nature while eschewing two-system views. Rather than choosing between mentalism and behaviourism, languages can be traced to how ‘shared’ sound-patterns came to constrain action. As virtual constructs, their main role was probably that of managing and assessing change in the bio-ecology (including human relations). They would have shaped practices as varied as making fire, hunting, managing sexual relations and the planting, harvesting, storing and cooking of food. Gradually, virtual patterns gave us what we call objects (e.g. Heidegger, 1971; Gadamer, 2004). Now, as then, these emerged from hearing *virtual* constructs. Living beings are, in phenomenological terms, already engaged with the environment. While motivated by how we feel act and think, human doings are also ‘conditioned’ by resources described in history, sociology, demography, cultural values, religion and languages. Language–society interaction connects living beings through their complex projects. In paradigmatic form, it is mediated by languaging – dialogical activity between bodies that deal with each other (and their worlds) while engaging with ‘objects’. This has real effects on the physical environment, the bio-ecology and other human beings. The relationships are mutual and deeply ecological. However, crucially, we can capture these effects in repeatable and interpretable terms: we can bring the past and the possible to bear on our doings. In *Tulving’s* (1983) phrase, we engage in *mental time travel*. We use its consequences to construct a macro-reality as we language and thus assess, manage and close our eyes to changes in the world. We imagine.

While first conceptualised in the 19th century,¹¹ ecology came to general attention when some in Western countries challenged talk of ‘progress’. This led to recognition of environmental damage and, in science, the study of ecosystems and the biosphere. However, we struggle to identify mechanisms of change. In part, this is because of a frenzy about the neo-Darwinian fiction that the bio-ecology depends entirely on genes and careful management. In part, it is because code views of language separate language from the bio-ecology. Yet, on the distributed view, language is symbiotic: while based in felt bodily dynamics, its repeatable patterns generate the 2nd order constructs. As a result, what we do (and, inseparably, say) shapes not only the macro-social world but also the life world and, to some extent, the bio-ecology. Once populations coordinate second-order constructs with first-order languaging, the latter permit the rise of inscriptions (and supporting institutions). Later, these are automatised as programs. At each stage, language influences individuals and populations and, by so doing, impacts on both humans and other kinds of living beings. Language is crucial to the bio-ecology – indeed can be seen as our first technology (as opposed to tool). There is nothing metaphorical about saying that, as we language, we hone skills in managing, assessing – and seeking to resist – all forms of change.

8. Conclusion

Proponents of ecolinguistics have, until recently, been surprisingly reluctant to challenge 20th century linguistics. Both Halliday and Haugen saw language as fundamentally ‘about’ things – they traced it to a language-system which construed experience as (socially constructed) meaning. It was limited to the life-world of texts, interactions and constructed macro-reality. Taking a segregational view, they emphasised common ground and, by so doing, overlooked how language spreads across human organism–environment systems. They failed to see that a focus on macro-reality separates language and minds from how people act, feel and think. Worse still, such views tend to distract us by focusing on consequences for, not the wider bio-ecology, but merely the life-world. Thus, appeal to discourse and the ways of words blind us to *how* language impacts on many processes that constitute the world of the living. Far from being causal or representational, it can be seen to depend on living beings who language and, at the same time, draw on lexicogrammatical constraints that act as attractors or future causes (see Thibault, 2011). By giving emphasis to the hybrid or symbiotic nature of language, it becomes part of the bio-ecology. It is both action and, given its cultural aspect, the key to how, as individuals, we draw on history; as noted above, it is a means of managing, assessing and resisting change. As we language, we engage with traditions, make observations and develop skills that depend on a world that stretches far beyond ‘macro-reality’. Pragmatically at least, there is power in the principle of non-localisability.

First-order languaging unites us as we link history with thinking and acting. Typically, actions depend on making and construing second-order patterns and using, or resisting, modes of languaging and practices based on language-machines. For ecolinguistics, this points towards a new goal. There is a need to establish the place of language in the life sciences. By so doing, and purged of mentalism (and dualism), its leading threads can be reunited in a single theoretical picture:

- Work in the sociolinguistic tradition focuses on how virtual (not mental) constructs link a life-world with the bio-ecology.
- Ecological discourse analysis pursues how, in various genres, verbal patterns constrain languaging, decision making and human projects.

Both focus on practical consequences of what results from languaging. If done diligently, investigation can help with how to assess and manage change in the bio-ecology, the life-world, first-order language and, in longer time scales, second order languages. This, however, depends on dynamics – materiality – the often forgotten aspect of language that binds the cognitive (or mental) to the social. However, by advocating unification, we also find ourselves facing a general question: *How do languaging and language (reciprocally) interact with the bio-ecology?*

¹¹ The term was coined by Haeckel in the middle of the 19th century (see Garner, 2004; Kramsch and Steffensen, 2008).

To answer this question heed must be paid to the organism–environment view. In parallel to Järvilehto's comments on a living subject, the bio-ecology is both “the system in action” and an object that “emerges as the result of this action” (2009: 116). This throws light on how we manage and assess past, present and future changes. While not based in *a priori* dialectics, as far as I can see, the principle reconnects mainstream science with emphasis on praxis. It allows that, as we live in and through the ecosphere, language makes us what we are. Since we are already in the world of the living, activity unites tradition, history and language. Not only is this of academic interest but, perhaps, it opens up new arguments for prioritising the planet's future over that of humans, nations or sub-populations. In short, we can ask how languaging shapes the world and, just as urgently, how reliance on lexico-grammatical resources both give stability to our lives and function to brake (sometimes necessary) change. The future is not based on things that are separate from us – science, technology, genes and brains. Rather, we can contribute to science by investigating how language and languaging impact on our plant–animal–human–cultural formation. Just as crucially, new attention can be given to why these matter for human subjects. If ecolinguists can pursue this agenda, others may awaken to ‘realities’ outside the fly-bottle studied by structuralism, generativism, post-structuralism and their like. Let us hope, therefore, that we can move beyond reducing language, languages and their parts to the little things and processes reified by American descriptivism and its theoretical successors. Instead, one goal is that of seeking to understand the reciprocal coupling that links the bio-ecology with language.

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