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On the Limits of Functionalism: A Reply to Bierl (2025)

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Abstract

Bernd Bierl eloquently proposes an ambitious synthesis towards biological linguistics. This synthesis aims to establish a new bio-ethological linguistics based on 4E cognition. It considers the foundational ethology of authors like Konrad Lorenz and Nikolaas Tinbergen to be its biological basis. Rather than developing the biolinguistics inspired by Noam Chomsky, which also has its roots in early 20th-century European ethology, the author considers it an inadequate naturalization and suggests subsuming it under a conception of language as behavior, within the context of embodied, embedded, enacted, and extended (4E) cognition. This reply presents some critical observations on this proposal, highlighting the inadequate interpretation of the biolinguistic approach and the potential shortcomings of the proposed research program.

Keywords

Biolinguistics, E4 Cognition, Functionalism, Ethology, Generative Grammar

1 Form and Function, Again

A fundamental problem with functionalist explanations (whether in evolutionary biology, historical linguistics, or cognitive science) is the fact that the function performed by an organ or system cannot precede the existence of that organ or system. For example, explaining the existence of eyes as organs that evolved for the purpose of seeing implies that the function of seeing preceded the existence of eyes. However, in the absence of the hypothesis of a supernatural and omniscient designer, this explanation is unsatisfactory. It is the organs (physical or cognitive), given their existence, that make possible the functions they perform.

While the functions that organs perform can influence their development or evolution, this does not explain their origin or nature. As evolutionary theorist Stephen J. Gould explained, "[t]his assumption—the easy slide from current function to reason for origin—is, to my mind, the most serious and widespread fallacy of my profession, for this false inference supports hundreds of conventional tales about pathways of evolution" (Gould, 1991, p. 114). Consequently, Gould suggests identifying such an error in reasoning with the following phrase, which he understands as a motto: "*Current utility may not be equated with historical origin*, or, when you demonstrate that something works well, you have not solved the problem of how, when, or why it arose" (Gould, 1991, p. 114, original emphasis).

Bierl's (2025) proposal for bio-ethological 4E linguistics implies a revitalization of traditional functionalist thinking in more current terms. According to this proposal, the nature and properties of human language are a direct result of its communicative function. However, Gould's caution regarding the possibility that the functionalist explanation is insufficient also applies in the case of language, because it is possible that an organ evolved for a different function or no particular function at all (Gould, 1991, p. 114). In this sense, some authors (e.g. Bickerton, 1995; Berwick & Chomsky, 2016) have hypothesized that components of human language such as recursive syntax may have evolved to enhance thought rather than communication, while other components such as parts of the sensorimotor system could have been adapted to improve communication. A hypothesis of this type does not deny the importance of language for communication. Communication is undoubtedly a crucial phenomenon in human cognitive development. Rather, this hypothesis is motivated by the idea that the communication function does not necessarily explain why some components of human language evolved or why they have the formal properties they do. For instance, the evolution of a recursive (unbounded) syntax makes more adaptive sense for thought than for communication. An unbounded, hierarchical syntax is not essential for efficient communication, which relies on sequential order. However, it is essential for constructing new, complex thoughts, which may be interesting to communicate.

Assuming this were the case, the explanation of human language as a system shaped by communicative function would be incomplete. Apart from Chomsky himself, perhaps Bickerton (1995) has done the best job of explaining why language should not be viewed as a communication system. As he points out, "[p]eople who blithely say 'Language is (a form of) communication' do not confuse cars with driving, scissors with cutting, or forks with eating. If language were a visible tool that you physically used, the confusion could hardly arise. But language is more abstract than cars and scissors, and when thing and use are both abstract the absurdity of conflating them becomes less apparent" (Bickerton, 1995, p. 11).

2 One Ethology, Two Biolinguistics?

An aspect of Bierl's proposal that initially comes as a surprise is that, when considering the integration of language study into biology, a contrast is established between Chomskyan biolinguistics (*classical biolinguistics* from now on) with that which would emerge from the postulates of the founders of modern ethology (mainly Tinbergen and Lorenz), considering Chomsky's a "different naturalization". Bierl thus states that "[m]odern linguistics was born from a deliberate act of separation" (p. 2) from the new ethology.

I find this surprising (and inadequate) because there are many reasons to believe that Chomsky's proposal for the naturalization of the study of language was influenced, at least in part, by these authors, in contrast to the prevailing behaviorism of the time (see Jenkins, 2000, p. 5, pp. 93–94; Boeckx, 2010, p. 20 ff.). In fact, references to the new ethology already appear in Chomsky's influential review of Skinner's book (Chomsky. 1959), or more recently and very explicitly in his *On Nature and Language* (Chomsky, 2002). Chomsky was attracted to the work of authors such as Tinbergen and Lorenz because they had demonstrated that behavior cannot be explained simply by learning through stimuli and responses. Rather, much of behavior is pre-programmed, or 'foreseen' in the biological structure of each species. Each organism appears to have internal mechanisms that select the stimuli necessary for learning how to regulate behavior appropriately. Von Uexküll's notion of *Umwelt*, as referenced by Bierl (p. 4), suggests that organisms 'create their own environment' due to their innate stimulus detectors and information-processing mechanisms, which filter out much of the information and are finely tuned to environmental stimuli relevant to their development. What all this implies for the study of language is precisely that it makes sense to analyze it like any other human instinct or organ, not just as behavior or action.

Similarly, it is surprising that Lenneberg's book is cited as an example of well-addressed biolinguistics, ignoring the close intellectual association between Lenneberg and Chomsky, as well as the fact that the book includes a Chomsky-written appendix on the *formal* nature of language.[1] An uninformed reader might think that there is no relationship between the seminal ideas of the cited ethologists and the emergence of classical biolinguistics (or even that they are in conflict), which is radically false.

In fact, as the author acknowledges by suggestion of an anonymous reviewer (p. 14), Chomsky has used Tinbergen's questions to explain his view of linguistic theory as a part of natural science (biolinguistics) in the form of problems to be solved:

1) For an updated review of the relationship between Lenneberg's book and generative grammar, see Trettenbrein (2017) and the other contributions in the Special Issue of *Biolinguistics* (*50 Years Later: A Tribute to Eric Lenneberg's Biological Foundations of Language*) in which this article appears.

1. What is the structure of the language faculty? (Humboldt's problem).
2. How does it develop in the individual? (Plato's problem).
3. How is it used? (Descartes's problem).
4. How did it evolve in the species? (Darwin's problem).
5. What brain mechanisms support it? (Broca's problem).[2]

As in Tinbergen's seminal work, questions about structure, ontogeny, function, and phylogeny are methodologically separated. This is crucial because explaining the organ, its development or even its evolution by means of its function leaves the essential basis of the whole system we want to understand unexplained. Not only because very different systems can perform the same function, but also because, as I have pointed out, such an explanation must assume that the function comes before the means by which it is implemented, as if the organs (whether physical or cognitive) were tools created by artisans or engineers.

3 Back to Behavior

However, the paper under review proposes a return to an explicitly behaviorist approach: "language is not an abstract code superimposed upon life but a biological behavior that extends the organism's adaptive repertoire of sense-making" (p. 3). Assuming this statement is based on the idea that the classical biolinguistics approach argues that language is an abstract code superimposed on living beings, the tradition the author mentions is not Chomsky's. In any case, it seems that this 'new synthesis' proposes abandoning the study of the knowledge of language in favor of studying communicative behavior: "To reconstruct that continuity is to move beyond the opposition of ethology and internalism toward a genuinely biological linguistics—one that understands language not as code, but as living behavior" (p. 5).

In fact, the functionalist framework proposed by the author literally suggests discarding question 1 (the central one of classical biolinguistics): "the Bio-Ethological 4E framework opens a philosophical horizon. It transforms the question 'what is language?' into 'what does language do in the economy of life?'" (p. 13).

While minimizing the relevance of the structure of the language organ, the paper proposes a quite restrictive notion of biology. In characterizing the approach of classical biolinguistics, it indicates that "[t]he 'biological' in biolinguistics came to mean genetic and neural constraint, not ecological embeddedness or social interaction" (p. 4), and, later

2) The questions are adapted from Chomsky and Lasnik (1993, p. 508). The first four correspond to Tinbergen's program. The fifth is specific to cognitive functions, such as language. In keeping with Chomsky's intention of naming the problems after thinkers of the past to highlight their longstanding nature, some authors have suggested relevant names for the last two problems. For a complete exposition of the origin and development of the five research questions of biolinguistics, see Grohmann (in press).

on, adds that "[t]he ethological dimension—the study of communication as interaction within an ecological niche—remained peripheral. The 'biology' in biolinguistics still referred primarily to the brain" (p. 5).

One might wonder whether the author is suggesting that the study of the biology of language should abandon the study of genes and the brain to focus on social interactions and ecology. Apparently, he does not (Bierl speaks at some point of complementarity), but note that the behaviorist conception of the proposed synthesis encourages interpreting Tinbergen's four dimensions as biological reflections of communication and the regulation of relationships between individuals, which actually leads us to a circular conception: language is the result of the use of language.

4 Using Science to Study the Mind

But, even if we were to accept a functional definition of language like the one proposed in the paper ("Language, from this perspective, functions as a medium of social homeostasis", p. 12), we would still have the other four problems mentioned. According to Bierl, his paper "reconstructs language as an evolved form of biological sense-making rather than an abstract code" (p. 1). However, he does not explain why considering language as both a biological product and an abstract code would be contradictory. The "abstract code" includes symbols and computational processes that recombine them to construct complex meanings not derived from experience, which seems relevant for human "sense-making".

Unless, of course, the proposal is that cognition can be explained without the mind, as if the mind were not a part of life, but rather a construct imposed by the researcher. That is what Bierl seems to imply with his ingenious assertion that Chomsky's proposal "restored language to the mind" but "it simultaneously detached the mind from the living world" (p. 4). However, the essential idea of the Chomskyan program is to integrate the study of the mind into the study of life, in the sense that the study of the mind can inspire the necessary changes in the life sciences to proceed toward unification, just as the integration of chemistry and physics entailed notable changes in physics, not chemistry. On the contrary, what is proposed here is the integration of cognition and biology by suppressing the study of the mind. A reductionist temptation that is not new, although it is currently being revitalized by the success of large language models such as ChatGPT in emulating human language.

I am not qualified to judge whether the reconstruction of classical ethology and Tinbergen's four questions as the prehistory of 4E cognition theory is correct or appropriate, but I can judge as misguided the author's perception of formal linguistics as something incompatible with the study of communication, or as an obstacle to the biological study of the mind. Of course, if what is being implied is that human language is just communi-

cation, behavior, and that biology is only the study of behavior and action, the approach seems to me profoundly insufficient and an impoverishing step backwards.

The suggestive metaphorical expression that language is "life expressing itself through meaning" (p. 1) does not hide the fact that identifying language (as a system of knowledge) and communication (which may or may not include anything like human language) is an obstacle to the advancement of linguistic theory. The intriguing conclusion that communicating using language represents a qualitative leap in life understanding itself (p. 17) or that language is a "collective metabolism of meaning" (p. 16) does not negate the fact that confusing the two concepts is problematic.

For example, at one point, we are told that "[a] bio-ethological perspective dissolves that dichotomy: the mechanisms are the living meanings, enacted in behavior. Once this premise is accepted, the separation between ethology, biolinguistics, and cognitive science collapses. The study of language returns to its rightful place within the study of life" (p 9). But what exactly does it mean that the mechanisms of cognition (Tinbergen's first requirement) are "the living meanings, enacted in behavior"? What format, structure, or restrictions do those meanings enacted in behavior have?

In conclusion, contrary to what is stated ("[f]ormal linguistic theory can continue to describe the structural regularities of language…"), I think Bierl does not actually accept that studying the structure of the faculty of language (the knowledge of language) is complementary to studying its use in communication and thought ("…but those regularities should be treated as stabilized patterns of interaction rather than abstract rules", p. 13). Rather than proposing theoretical integration, the author proposes eliminating the advances and achievements of classical biolinguistics in favor of a traditional functionalist and behaviorist approach. Nihil novum, then.

Meanwhile, if we persist in considering human language as just another form of communicative behavior, the essential questions/problems about human language that we have considered will remain unanswered, including the central part of Descartes' famous problem (or mystery):

> "man has a species-specific capacity, a unique type of intellectual organization which cannot be attributed to peripheral organs or related to general intelligence, and which manifests itself in what we may refer to as the 'creative aspect' of ordinary language use —its property being both unbounded in scope and stimulus-free" (Chomsky, 1966, p. 52).

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