AFTER UNIVERSAL GRAMMAR:
THE ECOLOGICAL TURN IN LINGUISTICS

Noah RODERICK

ABSTRACT: Of all the human sciences, linguistics has had perhaps the most success in pivoting itself towards the physical sciences, particularly in the past fifty years with the dominance of Universal Grammar, which is most closely associated with the work of Noam Chomsky. One of the most important implications of Universal Grammar has been that language production in its most natural and optimal state is organized analytically, and thus shares the same organizational logic of other knowledge systems in Western science, such as the binomial taxonomization of nature and analytic geometry. This essay argues that recent challenges to Universal Grammar represent more than just a theoretical dispute within a single discipline; they threaten to undermine the hegemony of analytical knowledge systems in general. While analytical logic has served Western science well, analogical knowledge systems may be able to address problems that analytical logic cannot, such as ecological crises, the limitations of artificial intelligence, and the problems of complex systems. Instead of studying languages as a means of modeling human thought in general, languages should also be studied and preserved as heteronomous knowledge systems which themselves exist as embodied objects within particular ecologies. Rethinking language as existing on a univocal plane with other ecological objects will provide us with new insight on the ethics and epistemology of analogical knowledge production.

KEYWORDS: Universal Grammar, linguistics, Noam Chomsky, Daniel Everett, ecology, artificial intelligence, taxonomy

1. Introduction

Chomsky's program of Universal Grammar (UG) has had remarkable staying power. It has survived a few major revisions by Chomsky himself,[1] and serious challenges to the program over the years are too numerous to list. After UG, the studies driving knowledge in linguistics would no longer come out of the deserts of the American Southwest or from the Siberian tundra, but rather from computer terminals and libraries in Massachusetts. It is therefore ironic that the most

---

[1] Chomsky's original Standard Theory was revised by other scholars into the Extended Standard Theory, which Chomsky again reformulated into the Revised Extended Standard Theory in the late 1970's (Martin Edwardes, *The Origins of Grammar: An Anthropological Perspective* (London: Continuum, 2010), 29). Universal Grammar's most recent, stripped down (and therefore, highly defensible) system is the aptly named *Minimalist Program*.

notable challenge to the nativist position (into which UG is incorporated) in recent years has come out of an isolated pocket of the Amazonian rainforest.

Daniel Everett has been generating controversy in the linguistics community since 2005, when he published an article in *Current Anthropology* in which he argued that the language of the Pirahã people provides clear exceptions to what was supposed to be *universal* about UG. Everett claimed that "Pirahã culture severely constrains Pirahã grammar in several ways, producing an array of otherwise inexplicable 'gaps' in Pirahã morphosyntax."[2] Everett has a deep, almost romantic attachment to the Pirahã way of life, and so some of his specific claims about cultural constraints upon the Pirahã grammar and lexicon evoke a visceral response to the grammatical universalist and the multiculturalist alike. His observation that the Pirahã have a spatial-experiential rather than an abstract concept of time[3] reminds one, for instance, of deeply entrenched claims that the Romani language has no future tense or words for time or future because Gypsies are naturally fancy-free.[4,5] But the point on which Everett makes his stand against Chomsky is the argument that Pirahã grammar lacks recursion. Under Chomsky's *Minimalist Program*, recursion is the most visible imprint of UG left in the adult speaker, and it is also the clearest manifestation of the language organ which humans alone possess. Recursion, for one, is part of the same function that allows for a counting system in which postliminary numbers can exist in reference to previous numbers.[6] It is also what allows noun phrases to be embedded into other noun phrases *ad infinitum*. Pirahã, Everett argues, contains neither a counting system nor embedded noun phrases.[7]

There are a few reasons why Everett's challenge to UG has garnered so much more public attention than other challenges over the past few decades. For

---

[2] Daniel Everett, "Cultural Constraints on Grammar and Cognition in Pirahã: Another Look at the Design Features of Human Language," *Current Anthropology* 46, 4 (2005): 622.

[3] Everett, "Cultural Constraints," 631

[4] The persistence of this language ⊃ culture myth about Romani is truly astonishing. The major branches Romani in Europe and the Americas have a most unambiguous term for 'tomorrow' (some variation of *tehara*). And although the future tense is often expressed analytically rather than inflectionally, it is hard to miss even in a superficial study of the language. In this respect, Vlax Romani follows the conventions of other Balkan regional grammars, such as Romanian, Albanian, and Serbian (each of which are part of different language families).

[5] Ian Hancock, "Duty and Beauty, Possession and Truth: Lexical Impoverishment as Control," in *Gypsies: An Interdisciplinary Reader*, ed. Diane Tong (New York: Garland, 2008), 121-122.

[6] Under the Minimalist Program, the ability to count is not strictly a part of the language faculty, but arises out of Merge operations, which the language faculty also draws upon to embed phrases (Noam Chomsky, "Of Minds and Language," *Biolinguistics* 1 (2007): 5).

[7] Everett, "Cultural Constraints," 623-627; 628-631.

one, it's a great David and Goliath story. Chomsky stands as a giant at MIT, and Everett developed his argument while teaching at Illinois State University, a mid-tier public school in the American Midwest. This fact alone speaks to Everett's rhetorical acumen, which is at least a match for Chomsky's own. Secondly, while understanding and dissecting the finer points of UG requires at least some training in linguistics, the idea of recursion is fairly easy for the public to grasp. Most importantly, the notion that one towering scientific theory can be toppled by a single inconsistency or superior idea supports a whiggish view of science that the public and the academy alike tend to favor.

My guess is that Everett's argument will not overturn UG, but it might supersede it.[8] Certainly, a study of the cultural constraints on one language would find fellow travelers in contemporary Functional Linguistics without necessarily having to confront the most important tenets of Generative Linguistics. Furthermore, UG advocates might accept Everett's findings but absorb the punch of his argument by retreating to the split between language and communication, arguing that Everett has provided an instance of cultural constraints on narrative structure. I therefore argue that the impact of Everett's claim must be understood within the context of a larger epistemic shift in which grammar-as-system and language-as-object are becoming increasingly bifurcated. In this essay, I shall argue that the epistemology of language is moving away from the path of internalization to the mind that it has been on since the seventeenth century. Instead of being either a cultural or cognitive resource, language is now being objectified as an ecological resource. This shift has profound implications not only for particular scientific projects, such as modeling artificial intelligence, but also for how scientific knowledge is invented, justified, and argued for in language.

---

[8] Everett's argument that Pirahã lacks recursion would seem pretty easily falsifiable, but subsequent challenges to Everett have shown just how rhetorical the problem is. Uli Sauerland, who has also worked with the Pirahã, believes he has found evidence of embedded clauses within single sentences; however, Everett examined those same sentences and interpreted them as separate sentences (Eugenie Samuel Reich, "War of words over tribal tongue," *Nature* 485, 7397 (2012): 155-156). The argument where utterances end and where sentences begin cannot, of course, be resolved outside of the framework of a formal writing system. And since it is orthodoxy in Linguistics to downplay the importance of writing, and since Pirahã does not have a formal writing system in the first place, I suspect this particular argument about recursion will remain unresolved.

2. Grammar as a Cultural Exoskeleton

Everett claims that the Pirahã express time grammatically as being either "in experience" or "out of experience."[9] For example:

> Pirahã's (*sic*) excitement at seeing a canoe go around a river bend is hard to describe; they see this almost as traveling into another dimension. It is interesting, in light of the postulated cultural constraint on grammar, that there is an important Pirahã term and cultural value for crossing the border between experience and nonexperience.[10]

And the few words the Pirahã have for time are mostly approximations to specific objects and events. For instance, night (*ahoái*) translates to "be at fire," and specific times of the day can be marked by either "low water" or "high water."[11] Such fundamental connections between environment, language, and the way speakers inhabit the world are consistent with the kind of linguistic relativity associated with the Sapir-Whorf Hypothesis which dominated the study of language in the first part of the twentieth century. The connection between experience and language genesis was first assumed by seventeenth century scholars of General Grammar; however, the connection between cultural experience and particular linguistic variation was formalized by Wilhelm von Humboldt in the early nineteenth century, though von Humboldt was more interested in how certain classes of grammar differently shape rational modalities than he was in the specific connections between physical environment, language, and culture. It was only in the wake of Darwinian science that scholars, such as Benjamin Lee Whorf, had epistemic permission to systematize the environment-language-culture effect. Unfortunately, linguistic relativism became shorthand for the idea that Eskimos have a whole range of words for snow.[12] However, the most important and controversial arguments of linguistic relativity are about the connection between environment and grammatical categories, specifically the descriptive-taxonomic binary.[13] But since the Universal Grammar revolution,

---

[9] Everett, "Cultural Constraints," 631.

[10] Everett, "Cultural Constraints," 632.

[11] Everett, "Cultural Constraints," 631.

[12] After Boas and then Whorf made their initial observations about how many words 'Eskimos' have for snow, the idea took on the status of urban legend for the public and an object of ridicule for linguists. In fact, as Harrison points out (K. David Harrison, *When Languages Die: The Extinction of the World's Languages and the Erosion of Human Knowledge* (Cary: Oxford University Press, 2008), the Yupik people do have 99 words for sea ice, which, crucially, help them to identify weather patterns (10).

[13] Benjamin Whorf, "Grammatical Categories," *Language* 21, 1 (1945): 1-2.

linguistic relativitism has been, until recently, largely relegated to theories about metaphor and cognition in socio- and cognitive linguistics.

There are really two reasons why a neo-relativist argument such as Everett's might supersede UG. Firstly, while UG has been an enormously productive theory for linguistics and the computational sciences, it still faces an empirical hurdle which its own methods appear not to be able to jump: the question of origins. Chomsky maintains that UG happened about 50,000 years ago as a single mutation, and as a completely separate event from communication.[14] While others, such as Bickerton, argue for a more gradualist approach in which communication and grammar evolved dialectically in a series of events.[15] I cannot in the space of this essay review the important nuances to this argument which other scholars have contributed, but the problem remains that if UG really is both universal and unique to human beings, then there is no adequate way to study its development in non-humans. Stages of grammatical competence can be observed in children, second-language learners, neurologically impaired individuals, and neurological mapping, but such studies only demonstrate the fact of its existence and what it looks like – its origins must still be inferred from theoretical or simulated reconstruction. Secondly, while other means of observing the development of language are promising, they prove problematic for the argument that language capacity appeared as a single mutation in modern humans. For instance, the forkhead box protein P2 (FOXP2 gene) appears to be partially responsible for the motor skills necessary for human language.[16] However, Krause et al.,[17] working from remains at the El Sidrón site in Spain have detected two amino acid substitutions in FOXP2 in Neanderthals which were previously thought only to be present in modern humans.[18] While few are seriously suggesting that this particular mutation in FOXP2 constitutes the nebulous

---

[14] Chomsky, "Of Minds," 24.

[15] Edwardes, *The Origins of Grammar*, 34.

[16] Wolfgang Enard, Molly Przeworski, Simon E. Fisher, Cecilia S. L. Lai, Victor Wiebe, Takashi Kitano, Anthony P. Monaco, and Svante Pääbo, "Molecular evolution of FOXP2, a gene involved in speech and language," *Nature* 418 (2002): 869-872.

[17] Johannes Krause, Carles Lalueza-Fox, Ludovic Orlando, Wolfgang Enard, Richard E. Green, Hernán A. Burbano, Jean-Jacques Hublin, Catherine Hänni, Javier Fortea, Marco de la Rasilla, Jaume Bertranpetit, Antonio Rosas, and Svante Pääbo, "The Derived FOXP2 Variant of Modern. Humans Was Shared with Neandertals," *Current Biology* 17 (2007): 1908–12.

[18] Antonio Rosas, Almudena Estalrricha, Antonio García-Taberneroa, Markus Bastira, Samuel García-Vargasa, Andrea Sánchez-Meseguera, Rosa Huguetb, Carles Lalueza-Foxc, Ángel Peña-Meliánd, Elena F. Kraniotia, David Santamaríae, Marco de la Rasillae, and Javier Forteae, "Les Néandertaliens d'El Sidrón (Asturies, Espagne): Actualisation d'un nouvel échantillon," *L'anthropologie* 116 (2012): 65.

'language organ' of UG, it does blur the divisions between communication in non-modern humans and language in modern humans. And it further indicates that a program of study which takes language a uniquely human trait as its *sine quo non* may find itself increasingly isolated from the activities of other sciences.

The corollary argument to Everett's refutation of UG vis-à-vis Pirahã is that endangered languages must be preserved, not just because it would be a pity to see them go or because of postcolonial regret, but because languages are discrete systems bearing special knowledge about the environments from which they emerge, both in their grammars as well as in their lexicons. Instead of a cognitive resource out of which we can better understand ourselves as humans and productively circumscribe computational languages, language is an object of ecology whose genesis, behavior, and fate are absolutely tied to other ecological objects. The shared fate of biodiversity and linguistic diversity is indeed quantifiable.[19] Furthermore, linguistic diversity is now being measured in the same terms of genetic diversity by which biodiversity is also measured. For example, the National Geographic's *Enduring Voices Project* identifies several "language hotspots," which are measured by combining the concentration of phylogenetically distinct languages, the number of speakers relative to age, and the level of existing documentation on those languages.[20]

From a UG perspective, endangered languages are interesting variants of the same human language, and the value of studying them would be to analyze them according to a pre-existing schema of linguistic parameters. Such studies operate well within the Kuhnian description of *normal science*, in which the dominant theory acts as a cup into which continuous successions of data are poured – though it is impossible to imagine the cup overflowing. By contrast, the neo-relativist view of language is characterized by singularity and excess. Here, grammar exceeds the boundaries of the mind. Instead of being a finite structure that can combine and recombine linguistic elements to express an infinite amount of concepts, neo-relativist grammar follows from the infinite realm of experience. Grammar, in other words, is a cultural exoskeleton.

Thus, included in the epistemology of neo-relativistic grammar are heterogeneous knowledge systems, such as folk taxonomies. Folk taxonomies are not merely a collection of metaphors or prepositional systems; they are complex interplays of grammatical genders and embodied temporalities. In contrast to the binomial taxonomic system used by Western science, folk taxonomies contain a

---

[19] Nicholas Ostler, "A Loss for Words," *Foreign Policy* 139 (2003): 30.

[20] "Disappearing Languages," *Enduring Voices Project.* National Geographic Society, n.d. http://travel.nationalgeographic.com/travel/enduring-voices (Accessed May 7, 2012).

low level of analytic engagement and a high level of analogy. Western binomial taxonomy has a high level of analytic engagement because the identity of each species is taken from an abstract and regular system of units (kingdom, phylum, class, etc.), not unlike the way in which analytic geometry applies imaginary straight lines to measure curves. The analytics of binomial taxonomy are also similar to the analytical engagement in UG, which will be discussed later on in depth, wherein sentences are divided up into micro-phrases, each of which becomes a subset of the phrase above it. Folk taxonomies, I would argue, are often characterized by low analytical engagement because the phenomena they describe need not make sense within an abstract and regular framework.

Take, for instance, the Golden spot hogfish. Its binomial classification is *Bodianus perditio*. The species is *perditio*; the genus is *Bodianus*; its family is *Labridae*, and so on. The fish's name for West Nggela speakers of the Solomon Islands, however, is *Roso taranggua*.[21] *Roso* means "young coconut with soft meat," and *taranggau* is the name for a "fish-eating bird of prey."[22] Thus, "The name refers to the soft flesh of these fishes, which may also be the favorite prey item for the taranggau."[23] Latin names in binomial classification may be similarly evocative (just think of the Grizzly bear's *Ursus arctos horribilis*), but the West Nggela name for the Golden spot hogfish is not derived from the combination of regular units. It is classified according to the speakers' collective experience of it. And embedded within that experience are analogies to other experiences, such as that of eating a young coconut. Such experiential classifications may or may not say much about genetic relations, but they may contain vital information about breeding, behavior, edibility, and environment which only people who have interacted with those animals, plants or things for generations can access.

The distinction I make regarding analytical/analogical levels in different knowledge systems, however, should not be seen in terms of a Western/non-Western binary. Analytic/analogical levels amongst knowledge systems are always relative. For example, even within binomial Western taxonomy, such distinctions exist which biologists have not yet fully resolved. Phenetic taxonomy, which is the true descendant of the Linnaean system, relies heavily on similarities in physical characteristics and ecological niches, whereas cladistic taxonomy requires that species be clustered as monophyletic groups (i.e. groups that descend from a common ancestor). Thus, relative to cladistic taxonomy, phenetic taxonomy contains a high level of analogical engagement. The emergence of DNA

---

[21] Harrison, *When Languages Die*, 43.

[22] Harrison, *When Languages Die*, 43.

[23] Harrison, *When Languages Die*, 43.

sequencing technologies is largely responsible for the dominance of cladistic taxonomy over the past fifty years, and such developments can give the impression that as observational technologies proliferate, science becomes increasingly analytical. That is to say that what we know about the world becomes ever more encoded into discrete and regular systems of order. Yet, the social reality of science, or that which we determine we *need to know* about the world, does not follow such a neat trajectory. Laws regarding the protection of species may rise and fall according to the genetic distance that can be placed between one type of animal and another. Zimmer reports, for example, that according to genetic analysis, the red wolf (*Canis rufus*) in the southeastern United States, which is currently protected, cannot be considered a separate species from the wolves in Canada and the northeastern United States (*C. lycaon*).[24] In fact, because of the enormous amount of interbreeding with coyotes, red wolves might not even be rightfully called 'wolves' at all. However, with their physical traits and the position they occupy in their local ecosystem, red wolves could be considered an *ecotype*, which does not conform to binomial taxonomy, but which may be more relevant information if we are trying to preserve biodiversity within an ecosystem instead within individual genetic pools. Furthermore, organizing flora and fauna according to ecotype lends itself better to the kind of local knowledge generated by experiential, analogical systems such as folk taxonomies. Thus, the study of endangered languages is one crucial place where ecology as a political exigency meets ecology as an epistemological mode.

3. Out of the Mind and into History

Despite the connection Chomsky's one-time debating partner, Michel Foucault, made between the emergence of modern grammatical study and the taxonomization of nature, a UG advocate might object to any real connection between the two on the grounds that human interactions in nature are of a completely different substance from that which undergirds the faculty of language, which emerged as a single genetic mutation.[25] And although Chomsky explicitly rejects mind/body dualism,[26] there still exists in UG a Cartesian problem regarding the difference nature and culture. Chomsky's earlier work on syntax restored Descartes' distinction between Private and Public language (under the

---

[24] Carl Zimmer, "What is a Species?" *Scientific American* 298, 6 (2008): 72.

[25] Chomsky, "Of Minds," 22-23.

[26] Noam Chomsky, "Language, Politics, and Composition: A Conversation with Noam Chomsky," in *(Inter)views: Cross-Disciplinary Perspectives on Rhetoric and Literacy*, eds. Gary A. Olson and Irene Gale (Carbondale: Southern Illinois University Press, 1991): 77.

guise of competence and performance) which philosophers such as Wittgenstein had since dissolved. For Descartes, Private Language consisted of representations of mental states, which were transcendent to knowledge of those states as external objects. Something similar happens in Chomsky's famous construction, "Colorless green ideas sleep furiously," which is meant to demonstrate that a sentence can be meaningful on a syntactic level, while nearly void of content on a semantic level.[27] The native English speaker need not objectify the sentence in metagrammatical terms (for instance, describing the verb phrase's relationship to the noun phrase) to know that the sentence is correct. Here we get into the murky territory of a priori synthetic knowledge. Thus, I need to intuit that 'colorless' and 'green' form an adjectival phrase connected to the noun 'ideas,' which form a noun phrase, and that 'furiously,' is an adverb connected to the verb, 'sleep,' which in turn exists in a necessary order with the noun phrase. Although, for instance, 'sleep' can be represented as a noun as well as a verb, within this context, it must be intuited as a verb, just as 'ideas' must be intuited as a noun, and so on. Thus, we know the qualities of the construct's constituents a priori, just as if we know what the numbers 5 and 7 represent, we can combine them into a true statement: 5+7=12.[28] Knowledge of the construct is synthetic because we know the sentence is true as a combination of the noun phrase and the verb phrase in a given order.

Chomsky seems to have doubled-down the aprioristic claims for language, indeed arguing that much of what is traditionally thought of as semantics is really just syntax.[29] Thus, the fact that there can be a verb, 'sleep,' and a noun, 'sleep,' arises from the possibility of a sentence like "Sleep sleeps." Contrary to the ideas of 18th century general grammarians, such as Joseph Priestly, the functional shift between, for instance, sleep and sleeps, is not a process that can be traced to Ø-point derivation from either a referent or an interjection,[30] nor is it a historical constant of grammaticalization as it was for the 19th century philologists,[31] but innate and presupposed under UG. A chimpanzee, for example, can learn the symbol for *sleep*, but cannot derive the relationship between *sleep* and *sleeps*. UG presumes that meaning is ultimately dependent upon neither phonology nor morphology. Chomsky cites the fact that

---

[27] Noam Chomsky, *Syntactic Structures* (Berlin: Mouton de Gruyter, 1957), 15.

[28] Immanuel Kant, *Critique of Pure Reason*, trans. Max Müller (New York: Doubleday, 1966), 137.

[29] Chomsky, "Language, Politics," 93.

[30] Joseph Priestley, *English Grammar: Lectures on the Theory of Language and Universal Grammar* (London: G. Smallfield, Hackney, 1883), 151.

[31] Michel Foucault, *The Order of Things: An Archeology of the Human Sciences* (New York: Vintage, 1994), 252.

> … [E]ven the simplest words in many languages have phonological and morphological elements that are silent. The elements that constitute lexical items find their place in the generative procedures that yield the expression, but cannot be detected in the physical signal. For that reason … it seems … that the language acquired must have the basic properties of an internalized explanatory theory.[32]

What is present syntactically may not be expressed outwardly, at the level of sensorimotor systems. For example, the phrase, "John ate what" is interpreted at the syntactic level as the object, "what John ate what," or separately, "for which thing x, John ate the thing x."[33] This is an example of the internal Merge function, and its existence presumes that the language of thought produces objects of a different substance from the objects which communication produces. Thus, "[c]omplexity, variety, effects of historical accident, and so on, are overwhelmingly restricted to morphology and phonology, the mapping to the sensorimotor interface."[34] Once again, while the mind/body problem is resolved, the metaphysical split between nature and culture would seem to be left as a remainder.

Yet, research on the borders of syntax and semantics within UG has yielded at least one example in which there exists logical parity between the natural computational structure of the mind and contingent products of culture. In the 1970s, Joseph Greenburg, considered as one of the founders modern linguistic typology, pioneered work in classifying languages according to certain structural elements rather than by historical relationships. Perhaps the most basic way of doing this is to observe the orders which subjects, objects, and verbs take in different languages. For instance, English works in an SVO order: "He read the book." By contrast, Japanese goes by SOV:

> Kare-wa hon-o   yonde
>
> He-SUBJ book-OBJ read

It is natural to expect that English and Japanese word orders would be radically different, given that historically and geographically, they're about as far apart as two languages can be. However, a closely related language, such as German often uses the SOV order as well:

> Er hat das Buch gelesen
>
> He has the book read

---

[32] Chomsky, "Of Minds," 17.
[33] Chomsky, "Of Minds," 21.
[34] Chomsky, "Of Minds," 22.

Technically, this could be said in English, but of course that would mean that 'read' would be an adverb. And a distantly related, but geographically proximate language, such as Irish, can have a totally different (and much rarer) word order altogether:

> Léigh sé an leabhar
>
> Read he the book

Such radical differences in syntax, even amongst genetically related and geographically proximate languages points to the notion that languages might be classified according to more abstract criteria than historical relationships or eco-social conditions (as per Whorfian analysis).

In the early 1980s, Chomsky began to integrate this ahistorical classification into the logic of UG. Known as Principles and Parameters theory, it holds that while there are certain universal principles that constrain language generation in general, there are also parameters that shape and constrain particular linguistic expression. Indeed, in recent years, linguists, such as Mark C. Baker[35] have attempted to create a typology of all known languages based upon a hierarchy of linguistic parameters. According to Principles and Parameters, rather than simply learning vocabulary and word order through whole phrases, children learn to build phrases from the bottom up, using a set of ingredients provided by the linguistic data they receive. For example, in response to a question like "Where did he go?" an English speaker is obliged to answer either with a simple prepositional phrase, such as 'into town,' or with a sentence containing a subject: "He went into town." A child learning Kalderash Romani (Kalderashstika[36]), however, becomes aware that she can respond by saying either

> *Wov gêlo and'o foro.*
>
> He went into(the) town

or simply

> *Gêlo and'o foro.*

---

[35] Mark C. Baker, *The Atoms of Language: The Mind's Hidden Rules of Grammar* (New York: Basic Books, 2001).

[36] Here, I treat Kalderashstika as a separate language, rather than a dialect of Romani. Romani should be considered a language family (just as English is part of the Germanic family) rather than one language with several dialects.

This is known as the *pro-drop* or *null subject* parameter. It can be said to be 'switched off' in English and 'switched on' in Kalderashstika. But linguistic parameters do not simply compare languages by a series of absent-present distinctions. For instance, the fact that English uses particles and Russian does not is not significant enough to put English and Russian on separate parametric tables. If all known languages were grouped by such small distinctions, there would be quite a bit of clutter. Parametric typology instead works as a binary system, with a regular 'if-then' logic (the kind of which one would find in computer programming language). For example, the parametric difference between English and Kalderashstika involves a couple more degrees of difference than the fact that the latter has the pro-drop parameter switched on and the former does not. A language like Kalderashstika has its pro-drop parameter switched on because it also has what is called the *verb attraction* parameter switched on. Baker defines the verb attraction parameter by the following opposition:

Tense auxiliaries attract the verb to their position.

or

Verbs attract tense auxiliaries to their position.[37]

The verb attraction parameter thus affects the positions of verbs and adverbs relative to the subject. Thus, in English, it is possible to say 'He strongly agrees.' However, in Kalderashstika, one is obliged to say:

Wov pristanil zurales.

He agrees strongly.

English has its verb attraction parameter turned off, thereby making it impossible to drop its pronouns. Each parametric binary acts as a subset of another binary opposition (See figure 1).

Notice again that most of the language pairs Baker places on the same branches are historically and geographically unrelated. We get the impression that even as the speakers of those languages develop cultures within various ecological spaces and historical configurations, language itself occupies a separate metaphysical plane.

We find the same binary logic in UG when we move from typology of particular languages to phrase-structure analysis of language in general. Formal linguistics employs several different ways of analyzing syntactic structure, including dependency grammar analysis, which places the predicate verb on top

---

[37] Baker, *The Atoms of Language*, 132.

of its nodal structure. All other words in the clause relate back to that predicate verb (figure 2).
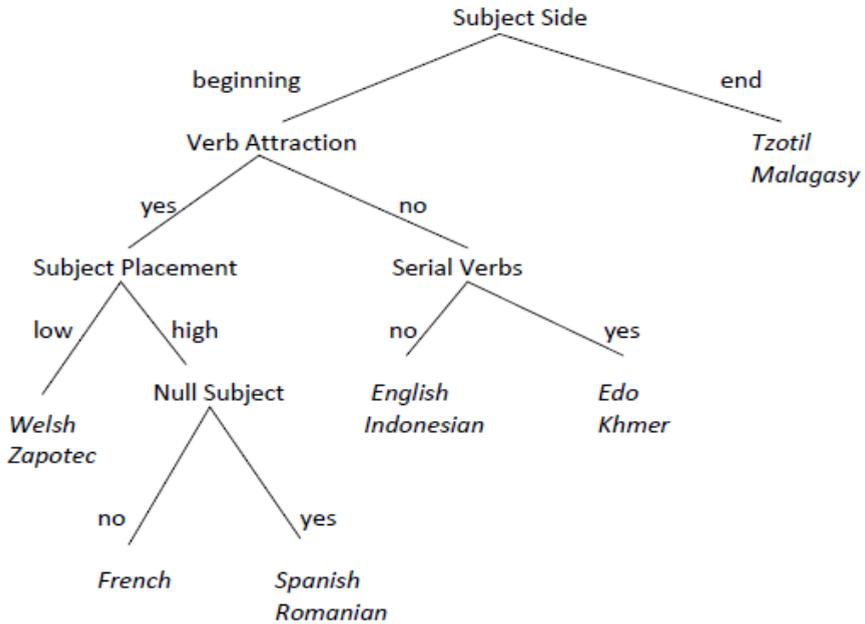
Figure 1: 'The Parametric Hierarchy' adapted from Baker[38]
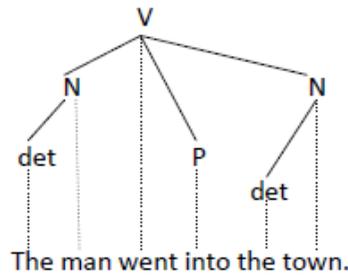
Figure 2: Dependency Grammar Diagram

The man went into the town.

---

[38] Baker, *The Atoms of Language*, 183.

Dependency grammar analysis is a somewhat holistic approach in which syntax is driven by lexical elements, taking intentionality as formative. In other words, all other elements in a clause proceed from one focal point, the predicate verb. Chomskyan UG, however, utilizes variants of constituency grammar, specifically the X-Bar approach. In X-Bar theory, clauses and sentences are analyzed in terms of phrasal structure. Functionally, noun phrases, verb phrases, prepositional phrases and so on, are iterations of the same 'X' phrase.[39] X-Bar analysis thus takes on a combinatory and binary structure similar to the parametric typological structure used to classify particular languages:
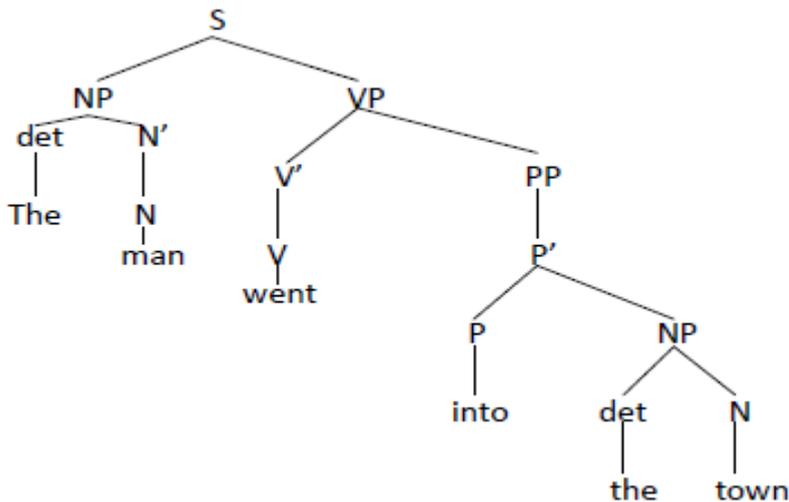
Figure 3: X-Bar Diagram

Despite increasing evidence to the contrary from more sophisticated methods of neural mapping which show that cognitive operations are nodal rather than modal, UG holds to (necessarily so) the idea that mental tasks, such as language are discrete processes. That is not only to say that there is a 'language organ' (even if it is not so easily circumscribable, like the liver), but it is also to say that the interfaces that constitute the module for language create an operation that is unique to the language function. That is why Everett's argument that language is an adaptive tool, similar to the conception and construction of bows and arrows[40] is so abhorrent to UG. Yet, as I have demonstrated with regards to the

---

[39] Michael Haley and Ronald Lunsford, *Noam Chomsky* (Woodbridge: Twayne, 1994), 144.
[40] Daniel Everett, *Language: The Cultural Tool* (New York: Pantheon Books, 2012), 20.

application of Principles and Parameters to linguistic typology, the same structures that generate individual linguistic expression also govern things in the world: particular languages, such as Polish or Japanese. This is an important step because it crosses an a priori/a posteriori threshold that generative linguistics, by its own theoretical goals, should not cross. The primary divide between generative linguistics and other approaches, such as functional linguistics or relativist linguistics is that the latter describe language as it is actually used, whereas the former describes the existing rules and structures behind the potential for linguistic expression. In functionalist and relativist linguistics, language is already interpellated into the history of material and institutional culture. For instance, in an approach he calls *Sociolinguistic Typology*, Trudgill proposes that grammars move back and forth between simplicity (e.g. increase in morphological transparency) and complexification (e.g. increase in syntagmatic redundancy) through the historical processes of language contact.[41] Grammars, *ceteris paribus*, simplify as a result of contact and complexify in isolation. By contrast, there is no theory of culture in generative linguistics beyond the more abstract implication that humans share discrete instincts for language, morality, and so on. But the parametric theory of how existing languages relate to each other necessarily enters UG into the field of history because the movement of a language from one form to another must pass through certain stages of transformation. Again, if English is to drop its pronouns, then it must also switch its verb attraction parameter on and have its *subject placement* parameter switch to high.[42] That is not to say that parametric typology takes a Hegelian dialectic view of history wherein languages with their *subject side* parameter switched to 'beginning' are moving *towards* dropping their pronouns. But parametric typology nevertheless does offer a theoretical explanation for why certain historical phenomena look the way they do and how they differ from one another.

4. The Mind-Body Split Relocated

It is widely assumed that the difference between nativist and relativist positions is that relativists believe that our worldviews, and thus our particular cultures are shaped by language. For nativists, it is assumed that particular languages do not shape our worldviews. Yet, when it comes to the question of how new knowledge about the world is made, the situation is somewhat reversed. For neo-relativists in particular, language, and thus knowledge, are emergent, following the logic of

---

[41] Peter Trudgill, *Sociolinguistic Typology: Social Determinants of Linguistic Complexity* (Oxford: Oxford University Press, 2011), 21-22.

[42] Baker, *The Atoms of Language*, 183.

complex adaptive systems. An approach such as Trudgill's, for instance, wherein languages oscillate between grammatical simplification and complexification, follows the logic of thermodynamics. Knowledge creation for nativists, on the other hand, follows the same analytical logic as linguistic creation. Knowledge systems, such as binomial taxonomy, natural language generation, particular languages, and information technologies all begin with a simple set of elements that combine and recombine in a regular way until complexity is achieved. Here, innate reasoning precedes knowledge, and all knowledge is structured like linguistic knowledge.

Again, it is hard to miss the common thread of binary logic that runs through the generation of natural language at the micro-syntactic level to the formation and organization of particular languages to the creation of artificial computational languages. For Chomsky, this is a cause for optimism because it shows that cultural phenomena such as particular languages, as well as advances in human technology, such as information technologies, are reflective of internal and innate reasoning. It's one of the rare places where one might catch a glimpse of the overlap between Chomsky's scientific work and his radical politics. Indeed, his belief that human reason governs linguistic production (and not the other way around) is behind his continued skepticism about the possibility of true artificial intelligence, or at least of our ability to recognize it as such. Here, he cites Alan Turing's own doubts:

> Turing seems to have agreed with Wittgenstein as to the pointlessness of the discussion and debate [over artificial intelligence], until today, over whether machines can (in principle) think, play chess, understand Chinese, do long division, etc., and about how we could 'empirically' establish that they do;…I think Turing's stand was correct.[43]

Chomsky does believe that AI has explanatory uses in terms of modeling thought, but thinks it has no real potential to produce thought in a way we understand it.[44] His stance, like Turing's, is that our notion of autonomous intelligence or thought might change in time, but such a change in definition will not make the phenomenon any more real or accessible to us. The properties that constitute autonomous intelligence would have to be dreamed up as concepts that already correspond to our ideas of intelligence, and so no mind-independent facts could exist to prove or disprove the claim. In other words, we would be making a cultural decision about something which is natural, which, for Chomsky, is unscientific and not worth pursuing. It's a recognizably Cartesian stance.

---

[43] Noam Chomsky, *Language and Thought* (Wakefield: Moyer Bell, 1993), 30.

[44] Chomsky, *Language and Thought*, 92.

It is at this point that the difference between nativists and neo-relativists over how knowledge is produced can be put into the more general context of Giambattista Vico's critique of Descartes' metaphysics. In Descartes' foundationalist philosophy, the goal of all sciences is to be reduced to the analytical truths of mathematics, which are mind-independent: "all the thoughts which can come into the human mind must be arranged in an order like the natural order of numbers."[45] Thus, biology is on its way to becoming chemistry; chemistry is on its way to physics; physics is on its way to geometry; and of course, Descartes himself developed the means to translate geometry to algebra. Vico, in a strikingly Foucauldian fashion, argues instead that "sciences must begin at the point when their subject matter begins."[46] That is to say that knowledge is not already out there waiting to be abstracted from appearance to analytical truth. One cannot, therefore, go in reverse and predict new kinds of knowledge from analytical foundations, just as for Kant, there can be no a posteriori analytic truth. Vico asserts that new kinds of knowledge arise when we encounter things in the world. Further on, new knowledge is created when concepts which formed out of initial contact with things in the world are again encountered in new contexts. Vico's theory of knowledge, in other words, is analogical rather than analytical. In the case of artificial intelligence, then, Vico might argue that our encounter with the concept of artificial intelligence changes our very knowledge of intelligence; we are not just using 'intelligence' as shallow metaphorical cover for something may or may not exist independently, as Chomsky would have it. Beyond that which God himself knows, as far as Vico is concerned, there is no reality underlying our knowledge of something like 'intelligence' outside of our historical development of that knowledge. It's not that Vico can be claimed as an 18th century postmodernist. He still holds that language can mediate collective experiences; it's just that those collective experiences are recorded in language change, which is itself historically and culturally variable.

Underlying Vico's departure from Descartes is the claim that "the mind does not make itself as it gets to know itself, and since it does not make itself, it does not know the genus or mode by which it makes itself."[47] What is more interesting then than to show whether or not it is possible to prove the existence of artificial intelligence is to go back in language to the moments in which the concept of intelligence was abstracted from another concept, to see when and why

---

[45] René Decartes, *Philosophical Letters*, trans. Anthony Kenny (Oxford: Clarendon Press, 1970), 5.

[46] Giambattista Vico, *New Science*, trans. Anthony Grafton (New York: Penguin Classics, 1999), 9.

[47] Giambattista Vico, *On the Most Ancient Wisdom of the Italians: Unearthed from the Origins of the Latin Language*, trans. Lucia M. Palmer (Ithaca: Cornell University Press, 1988), 52.

it became a subject for a science. This is why philology is key to Vico's method. Not only do abstract concepts (which become subjects for science) become analogized from concrete lexical items, but abstract concepts are also analogized out of grammatical relationships. For example, Vico claims that the Latin *anima* (soul) arises from the concept of air.[48] But since Latin obliges its speakers to make a nominal gender distinction, there also exists *animo* (spirit). Since, it was supposed (and Vico, of course, agrees) that the masculine agent is active and the feminine agent is passive, the more abstract concept of the Will must result from the male *animo* acting on the female *anima*.[49] The spirit acts upon the soul. Furthermore, since it was supposed that the spirit was the agent of neural matter, the soul was the agent of the veins and blood, neural matter must act on the rest of the body.[50] Thus, the systems of atmosphere, gender, and physiology act analogously. For Vico, the evolution of language precedes our knowledge of the physical relationship between the nervous system and the circulatory system.

After spending years traveling around China and studying the development of Chinese technology, Joseph Needham famously posed the question of why European science had so suddenly outpaced Chinese science since the dawn of Modernity. It was, after all, clear that the Chinese had invented so many crucial technologies, such printing and gun powder, well before the Europeans did. His answer was that the modern Europeans managed to create a culture of science around a single set of metaphysical assumptions. The homogeneity of analytical logic allowed disparate sciences to work under the same truth conditions, regardless of their subject matter. Underlying reality in the physical world mirrored the mind's own ordering processes. This is much more efficient than discovering analogies in an infinite world of signs. However, analogy as a mode of knowledge-making is once again coming into prominence with the rise of complex systems sciences. The idea that, for instance, the difference between ant colonies and traffic patterns[51] is a matter of scale rather than substance opens the door for analogies about any number of systems with emergent properties. Such analogies could be used to understand difficult social problems like urban sprawl, but they could also be used to naturalize the inequalities produced by markets in information economies or, as Sagarin et al propose, deal with people deemed

---

[48] Vico, *New Science*, 313.
[49] Vico, *New Science*, 313.
[50] Vico, *New Science*, 313.
[51] Melanie Mitchell, *Complexity: A Guided Tour* (New York: Oxford University Press, 2009), 3.

'terrorists' in the same way the immune system deals with viruses.[52] Analogical knowledge-making therefore brings with it a whole new set of ethical and political questions which may or may not apply to analytical knowledge-making.

It is here, I argue, that neo-relativist linguistics can make some of its greatest contributions to science and society. With an expanded concept of grammar, languages can be studied as situated objects within a given ecology in order to learn things that analytical knowledge systems cannot. But also, as we expand our notions of intelligence and fellowship to other beings (e.g. animals, artificial intelligence, virtual relationships), the means by which things are classed (grammatical gender) and related (e.g. terms of kinship) may provide insight into the possibilities and problems of making analogies between objects and systems. Indeed, there is a growing area of study known as *morphological computation*, which suggests that advances in artificial intelligence may not come from attempting to deduce and replicate human reason from UG, but by replicating the kind of intelligence that octopuses possess, which is analogical, decentralized and embodied.[53] Studying language as a similarly embodied system may radically alter our conception of human subjectivity, just as the Cartesian Revolution did for the moderns.

A physicist friend of mine once explained to me the difference between the practical applications of Newtonian gravity and those of Einsteinian relativity. He told me somewhat hyperbolically that we got to the moon on Newton but that we need Einstein to get us to the grocery store (referring to GPS gadgets). Something similar might be said about UG and neo-relativist grammar. The major science media outlets are spoiling for a fight between the nativists and the neo-relativists because it makes a great story and it conforms to the still dominant narrative of progressive scientific truth. But the truth is that the competing theories are not going to cancel each other out on the same epistemological plane because, as I have argued, they are working from very different metaphysical boundaries and have very different social agendas. In other words, the different approaches to language will not do each other in; they will do different things.

---

[52] Rafe Sagarin, Candice Alcorta, Scott Atran, "Decentralize, adapt and cooperate," *Nature* 465 (2010): 293.

[53] Cecilia Laschi, Matteo Cianchetti, Barbara Mazzolai, Laura Margheri, Maurizio Follador, Paolo Dario, "Soft Robot Arm Inspired by the Octopus," *Advanced Robotics* 26, 7 (2012): 709-710.