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978-0-521-01624-7 - On Nature and Language: Noam Chomsky: With an essay on  
“The Secular Priesthood and the Perils of Democracy”

Edited By Adriana Belletti and Luigi Rizzi

Excerpt

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## Chapter 1

### *Editors' introduction: some concepts and issues in linguistic theory*

#### **1 The study of language in a biological setting**

Dominant linguistics paradigms in the first half of the twentieth century had centered their attention on Saussurean “Langue,” a social object of which individual speakers have only a partial mastery. Ever since the 1950s, generative grammar shifted the focus of linguistic research onto the systems of linguistic knowledge possessed by individual speakers, and onto the “Language Faculty,” the species-specific capacity to master and use a natural language (Chomsky 1959). In this perspective, language is a natural object, a component of the human mind, physically represented in the brain and part of the biological endowment of the species. Within such guidelines, linguistics is part of individual psychology and of the cognitive sciences; its ultimate aim is to characterize a central component of human nature, defined in a biological setting.

The idea of focusing on the Language Faculty was not new; it had its roots in the classical rationalist perspective of studying language as a “mirror of the mind,” as a domain offering a privileged access to the study of human cognition. In order to stress such roots, Chomsky

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refers to the change of perspective in the 1950s as “the second cognitive revolution,” thus paying a tribute to the innovative ideas on language and mind in the philosophy of the seventeenth to early nineteenth centuries, with particular reference to the Cartesian tradition. What is new in the “second cognitive revolution” is that language is studied for the first time, in the second half of the twentieth century, with precise formal models capable of capturing certain fundamental facts about human language.

A very basic fact of language is that speakers are constantly confronted with expressions that they have never encountered in their previous linguistic experience, and that they can nevertheless produce and understand with no effort. In fact, normal linguistic capacities range over unbounded domains: every speaker can produce and understand an unbounded number of linguistic expressions in normal language use. This remarkable capacity, sometimes referred to as a critical component of the “creativity” of ordinary language use, had been noticed at least ever since the first cognitive revolution and had been regarded as a crucial component of human nature. Nevertheless, it had remained fundamentally unexplained in the classical reflection on language. For instance, we find revealing oscillations in Ferdinand de Saussure’s *Cours* on this topic. On the one hand, the *Cours* bluntly states that “la phrase, le type par excellence de syntagme . . . appartient à la parole, non à la langue” (p. 172) [the sentence, the type of phrase par excellence, belongs to *parole*, not to *langue*], and immediately after this passage, the text refers back to the definition of *parole* as “un acte individuel de volonté et d’intelligence . . . [which includes] les combinaisons par lesquelles le sujet parlant utilise le code de la langue en vue d’exprimer sa pensée personnelle . . .” (p. 31) [an individual act of will and intelligence . . . which includes the combinations by which the speaking subject utilizes the code of *langue* in view of expressing

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his personal thought]. The freedom of the combinations of elements which characterizes a sentence is "le propre de la parole." On the other hand, "il faut attribuer à la langue, non à la parole, tous les types de syntagmes construits sur des formes régulières . . . , des groupes de mots construits sur des patrons réguliers, des combinaisons [which] répondent à des types généraux" [it is necessary to attribute to *langue*, not to *parole*, all the types of phrases built on regular forms . . . , groups of words built on regular patterns, combinations which correspond to general types](p. 173). The *Cours*'s conclusion then seems to be that syntax is half way in between *langue* and *parole*: "Mais il faut reconnaître que dans le domaine du syntagme il n'y a pas de limite tranchée entre le fait de langue, marqué de l'usage collectif, et le fait de parole, qui dépend de la liberté individuelle" (p. 173) [but it is necessary to recognize that in the domain of the phrase there is no sharp limit between the facts of *langue*, marked by collective usage, and the facts of *parole*, which depend on individual freedom]. The source of the oscillation is clear: on the one hand, the regular character of syntax is evident; on the other hand, the theoretical linguist at the beginning of the twentieth century does not have at his disposal a precise device to express the astonishing variety of "regular patterns" that natural language syntax allows. See also Graffi (1991: 212–213) for a discussion of this point.

The critical formal contribution of early generative grammar was to show that the regularity and unboundedness of natural language syntax were expressible by precise grammatical models endowed with recursive procedures. Knowing a language amounts to tacitly possessing a recursive generative procedure. When we speak we freely select a structure generated by our recursive procedure and which accords with our communicative intentions; a particular selection in a specific discourse situation is a free act of *parole* in Saussure's sense, but the underlying procedure which specifies the possible "regular patterns"

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is strictly rule-governed. Over the last fifty years, the technical characterization of the recursive property of natural language syntax has considerably evolved, from the assumption of “generalized transformations” forming complex constructions step by step beginning with those underlying the simplest sentences (Chomsky 1957), to recursive phrase structure systems (Katz and Postal 1964, Chomsky 1965) capable of producing deep structures of unbounded length, to a recursive X-bar theory (Chomsky 1970, Jackendoff 1977), to the minimalist idea that the basic syntactic operation, “merge,” recursively strings together two elements forming a third element which is the projection of one of its two subconstituents (Chomsky 1995a, 2000a). Nevertheless, the fundamental intuition has remained constant: natural languages involve recursive generative functions.

The new models built on the basis of this insight quickly permitted analyses with non-trivial deductive depth and which, thanks to their degree of formal explicitness, could make precise predictions and hence could be submitted to various kinds of empirical testing. Deductive depth of the models and experimental controls of their validity: these are among the basic ingredients of what has been called the “Galilean style,” the style of inquiry that established itself in the natural sciences from the time of Galileo Galilei (see chapters 2 and 4 for further discussion of this notion). Showing that the language faculty is amenable to study within the guidelines of the Galilean style, this is then the essence of the second cognitive revolution in the study of language. Initiated by Chomsky’s contributions in the 1950s, this approach has profoundly influenced the study of language and mind ever since, contributing in a critical manner to the rise of modern cognitive science (see, in addition to the references quoted, and among many other publications, Chomsky’s (1955) doctoral dissertation, published in 1975, Chomsky (1957) and various essays in Fodor and Katz (1964)).

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## **2 Universal Grammar and particular grammars**

The modern study of language as a mirror of the mind revolves around a number of basic research questions, two of which have been particularly prominent:

- What is knowledge of language?
- How is it acquired?

The first question turned out to be of critical importance for the program to get started. The first fragments of generative grammar in the 1950s and 1960s showed, on the one hand, that the implicit knowledge of language was amenable to a precise study through models which had their roots in the theory of formal systems, primarily in the theory of recursive functions; on the other hand, they immediately underscored the fact that the intuitive linguistic knowledge that every speaker possesses, and which guides his linguistic behavior, is a system of extraordinary complexity and richness. Every speaker implicitly masters a very detailed and precise system of formal procedures to assemble and interpret linguistic expressions. This system is constantly used, in an automatized and unconscious manner, to produce and understand novel sentences, a normal characteristic of ordinary language use.

The discovery of the richness of the implicit knowledge of language immediately raised the question of acquisition. How can it be that every child succeeds in acquiring such a rich system so early in life, in an apparently unintentional manner, without the need of an explicit teaching? More importantly, the precise study of fragments of adult knowledge of language quickly underscored the existence of “poverty of stimulus” situations: the adult knowledge of language is largely underdetermined by the linguistic data normally available to the child,

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which would be consistent with innumerable generalizations over and above the ones that speakers unerringly converge to. Let us consider a simple example to illustrate this point. Speakers of English intuitively know that the pronoun "he" can be understood as referring to John in (1), but not in (2):

- (1) John said that he was happy  
 (2) \*He said that John was happy

We say that "coreference" between the name and the pronoun is possible in (1), but not in (2) (the star in (2) signals the impossibility of coreference between the underscored elements; the sentence is obviously possible with "he" referring to some other individual mentioned in the previous discourse). It is not a simple matter of linear precedence: there is an unlimited number of English sentences in which the pronoun precedes the name, and still coreference is possible, a property illustrated in the following sentences with subject, object and possessive pronouns:

- (3) When he plays with his children, John is happy  
 (4) The people who saw him playing with his children said that John was happy  
 (5) His mother said that John was happy

The actual generalization involves a sophisticated structural computation. Let us say that the "domain" of an element A is the phrase which immediately contains A (we also say that A c-commands the elements in its domain: Reinhart (1976)). Let us now indicate the domain of the pronoun by a pair of brackets in (1)–(5):

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- (6) John said that [he was happy]
- (7) \* [He said that John was happy]
- (8) When [he plays with his children], John is happy
- (9) The people who saw [him playing with his children] said  
that John was happy
- (10) [His mother] said that John was happy

The formal property which singles out (7) is now clear: only in this structure is the name contained in the domain of the pronoun. So, coreference is excluded when the name is in the domain of the pronoun (this is Lasnik's (1976) Principle of Non-coreference). Speakers of English tacitly possess this principle, and apply it automatically to new sentences to evaluate pronominal interpretation. But how do they come to know that this principle holds? Clearly, the relevant information is not explicitly given by the child's carers, who are totally unaware of it. Why don't language learners make the simplest assumption, i.e. that coreference is optional throughout? Or why don't they assume that coreference is ruled by a simple linear principle, rather than by the hierarchical one referring to the notion of domain? Why do all speakers unerringly converge to postulate a structural principle rather than a simpler linear principle, or even no principle at all?

This is one illustration of a pervasive situation in language acquisition. As the experience is too impoverished to motivate the grammatical knowledge that adult speakers invariably possess, we are led to assume that particular pieces of grammatical knowledge develop because of some pressure internal to the cognitive system of the child. A natural hypothesis is that children are born with a “language faculty” (Saussure), an “instinctive tendency” for language (Darwin); this

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cognitive capacity must involve, in the first place, receptive resources to separate linguistic signals from the rest of the background noise, and then to build, on the basis of other inner resources activated by a limited and fragmentary linguistic experience, the rich system of linguistic knowledge that every speaker possesses. In the case discussed, an innate procedure determining the possibilities of coreference is plausibly to be postulated, a procedure possibly to be deduced from a general module determining the possibilities of referential dependencies among expressions, as in Chomsky's (1981) Theory of Binding, or from even more general principles applying at the interface between syntax and pragmatics, as in the approach of Reinhart (1983). In fact, no normative, pedagogic or (non-theory-based) descriptive grammar ever reports such facts, which are automatically and unconsciously assumed to hold not only in one's native language, but also in the adult acquisition of a second language. So, the underlying principle, whatever its ultimate nature, appears to be part of the inner background of every speaker.

We can now phrase the problem in the terminology used by the modern study of language and mind. Language acquisition can be seen as the transition from the state of the mind at birth, the initial cognitive state, to the stable state that corresponds to the native knowledge of a natural language. Poverty of stimulus considerations support the view that the initial cognitive state, far from being the *tabula rasa* of empiricist models, is already a richly structured system. The theory of the initial cognitive state is called Universal Grammar; the theory of a particular stable state is a particular grammar. Acquiring the tacit knowledge of French, Italian, Chinese, etc., is then made possible by the component of the mind–brain that is explicitly modeled by Universal Grammar, in interaction with a specific course of linguistic experience. In the terms of comparative linguistics, Universal

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Grammar is a theory of linguistic invariance, as it expresses the universal properties of natural languages; in terms of the adopted cognitive perspective, Universal Grammar expresses the biologically necessary universals, the properties that are universal because they are determined by our in-born language faculty, a component of the biological endowment of the species.

As soon as a grammatical property is ascribed to Universal Grammar on the basis of poverty of stimulus considerations, a hypothesis which can be legitimately formulated on the basis of the study of a single language, a comparative verification is immediately invited: we want to know if the property in question indeed holds universally. In the case at issue, we expect no human language to allow coreference in a configuration like (2) (modulo word order and other language specific properties), a conclusion which, to the best of our current knowledge, is correct (Lasnik (1989), Rizzi (1997a) and references quoted there). So, in-depth research on individual languages immediately leads to comparative research, through the logical problem of language acquisition and the notion of Universal Grammar. This approach assumes that the biological endowment for language is constant across the species: we are not specifically predisposed to acquire the language of our biological parents, but to acquire whatever human language is presented to us in childhood. Of course, this is not an a priori truth, but an empirical hypothesis, one which is confirmed by the explanatory success of modern comparative linguistics.

### **3 Descriptive adequacy and explanatory adequacy**

It has been said that language acquisition constitutes “the fundamental empirical problem” of modern linguistic research. In order to underscore the importance of the problem, Chomsky introduced,

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in the 1960s, a technical notion of explanation keyed to acquisition (see Chomsky (1964, 1965) for discussion). An analysis is said to meet "descriptive adequacy" when it correctly describes the linguistic facts that adult speakers tacitly know; it is said to meet the higher requirement of "explanatory adequacy" when it also accounts for how such elements of knowledge are acquired. Descriptive adequacy can be achieved by a fragment of a particular grammar which successfully models a fragment of adult linguistic knowledge; explanatory adequacy is achieved when a descriptively adequate fragment of a particular grammar can be shown to be derivable from two ingredients: Universal Grammar with its internal structure, analytic principles, etc., and a certain course of experience, the linguistic facts which are normally available to the child learning the language during the acquisition period. These are the so-called "primary linguistic data," a limited and individually variable set of utterances whose properties and structural richness can be estimated via corpus studies. If it can be shown that the correct grammar can be derived from UG and a sample of data which can be reasonably assumed to be available to the child, the acquisition process is explained. To go back to our concrete example on coreference, descriptive adequacy would be achieved by a hypothesis correctly capturing the speaker's intuitive judgments on (1)–(5), say a hypothesis referring to a hierarchical principle rather than a linear principle; explanatory adequacy would be achieved by a hypothesis deriving the correct description of facts from general inborn laws, say Chomsky's binding principles, or Reinhart's principles on the syntax–pragmatics interface.

A certain tension arose between the needs of descriptive and explanatory adequacy in the 1960s and 1970s, as the two goals pushed research in opposite directions. On the one hand, the needs of descriptive adequacy seemed to require a constant enrichment of the