

Phonotax, morphotax and semantax or syntaxity in natural languages

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Abstract :

This paper aims at advocating a transversal approach to syntax which has hitherto been exclusively confined to the sentence. The rules which underlie the combining of words do not make up the whole of language as there are constraints at the level of sounds and meaning too. If syntax is to be understood as “the rules governing the combination of sequences” in linguistic structures, we can then admit that **everything is syntax in language.**

As language is a system (of systems), the phonological level, the morphological level and the semantic level are not independent components. Should there exist any thread connecting the three components, it would be through the syntax underlying the structuring of sounds, forms and meaning in any language.

Key words: Syntax, phonemes, morphemes, sememes

Résumé :

Cet article préconise une approche transversale du concept de syntaxe qui, jusqu'à maintenant et dans la plupart des théories linguistiques, est exclusivement abordée dans le cadre de la phrase. Les règles qui régissent la combinaison des mots ne constituent pas l'essentiel dans les phénomènes langagiers. Il existe aussi des contraintes déterminant la combinaison des sons et du sens. Si la syntaxe doit être définie comme « les règles régissant la combinaison des suites » dans toute structure linguistique, nous pouvons alors poser **que tout est syntaxique dans la langue.**

La langue étant un système (de systèmes), les niveaux phonologique, morphologique et sémantique ne constituent pas des composantes autonomes. S'il existe un fil connecteur entre ces trois niveaux, ce serait certainement à travers la syntaxe qui régit la structuration des sons, des formes et des sens dans toute langue.

Mots clés: Syntaxe, phonèmes, morphèmes, sémèmes

Introduction

Syntax, originating from the Greek words *συν* (*syn*), meaning "co-" or "together," and *τάξις* (*táxis*), meaning "sequence, order, or arrangement" is defined as the “study of the **rules** or **patterns** governing the way words combine to form phrases and phrases combine to form sentences”. As a discipline of linguistics, works on syntax have been central in the study of language structures since antiquity. Even though they were largely based on Greek and Latin grammar, they have influenced modern syntactic theories to such an extent that the grammatical categories coined by the first age philosophers are still in use today; besides, the study field has not been revisited and spread¹ despite the findings of modern linguistics.

Our attempt here is to show that from the very definition of the word syntax as “the arrangement of words in sentences, clauses, and phrases, and the study of the formation of sentences and the relationship of their component parts” (**Encyclopædia Britannica**), we cannot confine the field itself to the exclusive study of the arrangement of words into sentences. After reviewing the major syntactic theories (traditional and modern), we will underline that a grammatical² sentence in any language should be understood as a sentence which abides by its *phonotax* (or syntax of sounds), its *morphotax* (or syntax of words) and its *semantax* (or syntax or meaning).

1- Brief history of syntax

The history of syntax is not to be parted from the history of grammar and linguistics insofar as the early works on syntax were carried out since Classical Antiquity by Greek and Roman philosophers and grammarians, such as Dionysios Thrax (2nd c. BC.) and Apollonius Dyscolus (2nd c. AD, *Peri Syntaxeos*). The first is said to have written “*the first comprehensive and systematic grammatical description to be published in the western world*” (Lyons, 1968:12). But even before Dionysios Thrax, one should not overlook Panini in the Indian tradition, whose outstanding works on Sanskrit dates back from before (4th c. BC.).

Works on syntax have been central in the study of language starting back from Antiquity down to the Medieval Renaissance Era. However, the mentalistic and

¹Note that the term *syntax* is used in such formal languages as logic, in which it is defined as “the rules governing the behavior of mathematical systems” and *informatics*.

² The notion of grammatical sentence from Chomskian’s perspective.

psychologicistic approach to language in general and to syntax in particular carried out mainly by the Port Royal grammarians was to sink into oblivion, hence making room for rather positivistic methods of analysis. The advent Historical-comparative linguistics relegated syntactic studies to a quite marginal importance since the stress was then laid on sounds and morphology. Even the early structuralist theories (Saussure) did not give syntax a very special emphasis in the field. Nevertheless, the late twentieth century is very often thought as ‘the century of syntactic theories’ because of outstanding works on syntax by such linguists as Chomsky, Tesnière and many others.

2- Review of major syntactic theories

Syntactic theories are very often divided, like linguistics, into traditional and modern. Does the shift from the former to the latter prove a major change in the method of analysis?

2-1-Traditional syntax

Traditional syntax covers the syntactic studies carried out throughout antiquity up to the “Grammaire of Port Royal” at the renaissance Era. But the study of sentence structures by Greek and Roman grammarians was different in method and scope from that of Arnauld and Lancelot inasmuch as the former was strongly positivist whereas the latter, heavily influenced by logic and Cartesian principles, would focus their analysis on universal mental³ processes underlying thought and speech. Nevertheless the influence of traditional grammar has outlived its pioneers and advocates down to the modern times.

Two main fields of grammar were clearly delineated: morphology and syntax; morphology as “*the branch of grammar which studies the structure or forms of words, primarily through the use of the morpheme construct*” and syntax as a “*traditional term for the study of the rules governing the way words are combined to form sentences in a language*”⁴. Many linguists (Jespersen (1924), Saussure⁵ (1916), Guillaume (1964)) stand firmly against this traditional division of grammar arguing that various language phenomena falling in the field of morphology are very often to do with syntax and vice-versa.

³ It is well-known how Chomsky has been influenced by the principles set forth in the *Regulae* of René Descartes (cf *Cartesian Linguistics*).

⁴ A *Dictionary of Linguistics and Phonetics* pp 340 & 497

⁵ Saussure (1916 :187) sets forth that « [...] *tout mot qui n'est pas une unité simple et irréductible ne se distingue pas essentiellement d'un membre de phrase, d'un fait de syntaxe* ».

A Traditional syntactic analysis would concentrate mainly on the rules and constraints governing the combination of words into sentences with a particular focus on syntactic categories such as phrases (noun, verb, adjective) , clauses (co-ordinate and subordinate) and types of sentences (simple, compound and complex).

- Word order SVO / VOS / SOV
- Parts of speech
- Grammatical functions Subject, object, NP, VP, phrase, clause etc.

As traditional syntactic analysis based its works on speech and writing, both of which were “ruled out” from linguistics in the early phase of structuralism, modern linguistic theories gave a new impetus to syntactic studies by taking them back to the level of ‘langue/competence”, thus making works on syntax more abstract.

2-2- Some modern syntactic theories

Modern syntactic theories encompass attempts, with more or less success, by various linguists to formalize works on syntax. Though the scope and methods may diverge, the ultimate objective is still the same: build an intelligible theory of syntax capable of accounting for all types of combination found in actual speech production.

2-2-1- Transformational-Generative Grammar by Chomsky

From the Standard Theory (1957) to the Government and Binding (1980) and the Minimalist Program (1990), Chomsky was singleminded in the attempt to find “*a set of rules or principles that will correctly predict which combinations of words will form grammatical sentences in a natural language.*” This was to lead him, in the early stage of his theory, to set a deep structure which he opposed to a surface structure, both linked by a transformational cycle, all of which were represented through tree-diagrams. But Chomsky has constantly been revisiting his generative theory having in mind to reduce the number of rules in the transformational cycle to a single movement rule, **Move- α** (move alpha), which is stated as a simple rule basically allowing any lexical or phrasal category to move from part of the sentence to another. These syntactic principles were led forth in the Government and Binding theory (1981, 1982). Chomsky held the view that a large part of the grammar of any particular

language (parameters) is common to all languages, and is therefore part of Universal Grammar (principles).

Above all, Chomsky's generative theory works like an algorithm which aims at specifying, or generating, all and only the grammatical sentences in a language. As such it is considered as one of the most formal syntactic theories.

2-2-2- Dependency Grammar

Dependency Grammar (DG) refers to modern syntactic theories based on the works of Lucien Tesnière⁶, the author of *Éléments de syntaxe structural* (1959). The category of the verb plays a fundamental role in this approach as it works as the structural center determining the place of all other constituents. This is referred to as the valency of the verb which specifies the number of complement it is likely to admit.

Lucien Tesnière (1959) argues that the sentence is an organized whole, the constituent elements of which are words. Every word that is part of a sentence ceases by itself to be isolated as in the lexicon. There are connections among words in any sentence structure. The structural connections create dependency relations between the words. Each connection in principle unites a superior term (head, governor, regent) and an inferior term (subordinate, dependent, modifier).

Thus, in the sentence like *Jake drinks water*, the verb "drinks" is the governor as both "Jake" and "water" are dependent upon it. It is the verb which specifies syntactic functions such as subject and the object.

However, DG is far from being a single coherent set of ideas since we find quite a wide range of linguistic approaches, like in Generative Grammar, identifying themselves with DG.

2-2-3- Other syntactic theories

Various syntactic models exist which also try to formalize the constraints that underlie the combination of syntactic categories.

⁶ But the first works on Dependency syntax rather originates from the Middle Ages grammarians.

We have Categorical Grammar which is an approach that attributes syntactic structures not to grammatical rules, but to the intrinsic properties of the syntactic categories. In this approach, the principles of sentence construction are embedded in the category of the word that is considered as the head. For example, the transitive verb is a category that requires two noun phrases (NPs) (subject and direct object) to form a sentence. This is formalized as $(NP/(NP \setminus S))$ which means that "a category that requires to the right (indicated by /) for an NP (the object), and generates a function (equivalent to the VP) which is $(NP \setminus S)$, which in turn represents a function that searches to the left for an NP and produces a sentence".

We also have Functional theories of grammar which consider the functions of language as the basic elements in analyzing linguistic structures. They are then different from such formal approaches as Generative Grammar and Categorical Grammar in that Functional Grammar first takes into account the functions performed by language before seeking to grasp the linguistic tools assigned to carry out those functions.

To round up this part devoted to some modern syntactic models, we cannot but underline that these approaches are not so much different from traditional syntactic works in that the works are essentially based on traditional syntactic categories (Subject, verb, phrase, clause etc.) with a particular focus on formalism. Moreover, the method is exclusively carried out in the analysis of sentence structures. As we mention above, there is "*taxis*" at every level of language structure.

3- System, structure, and syntax

This part is meant to show that language as a whole is a network of patterned relationship between linguistic units, be it at the level of sounds, syllables, forms and meaning.

One word which is very often used to refer to language is "system". According to David Chrystal (1980: 472):

"The term 'system' may be applied to any finite set of formally or semantically connected units [...], where the interrelationships are mutually exclusive (i.e. two members of the same system cannot co-occur) and mutually defining

(i.e. the meaning of one member is specifiable only with reference to others).

He also holds the view that :” Language as a whole is [...] characterized as a system [...] and often as a hierarchically ordered arrangement of systems. In one view, the ‘language system’ is constituted by the phonological, grammatical and semantic systems” (Idem). In that sense, “system” and “structure” are often equated in the field. But the word “structure” is also used to refer to subparts or to the functioning of parts of the system, like in syllabic structure, phrase structure, clause structure sentence structure, etc.

From this perspective, linguistic structures look more tangible than language system as the former refers to concrete manifestation of language whereas the latter is rather a principle of organization. More, the system is not just a principle of organization in itself, it also displays the constraints underlying the combinations of its constituent units. **The system is a syntactic whole par excellence.** But the syntactic principle inherent to the system is a potential to be actualized through concrete facts language. From the system to linguistic structures, there is application of combinatory constraints, say syntactic principles, at any level of language manifestation.

There is no such system without syntactic constraints. As the term “system” is not the exclusive property of linguistics, we can assume spreading the use of syntax to other fields (even outside language) where it has hitherto not been applied. The computer scientist can therefore refer to syntactic principles talking about his binary language system. The chemical⁷ engineer may also use the term syntax in combination of atoms and molecules as this obeys to principles of organization as well. A hierarchical system of organization (like in social life) is syntactic by nature because it is indicative of the exact position each component or constituent can occupy in the structure.

The components of the triptych system – structure – syntax are bound in such a way that we cannot evoke one term to the exclusion of the others. They are inextricably connected. We shall devote the coming last part of our work to showing that other components of language structure, apart from the sentence, have syntactic principles inherent to them, namely sounds and meaning.

⁷ It should be borne in mind that the term “valency” used by Lucien Tesnière in Dependency Grammar has been borrowed from chemistry wherein it refers to the property of any atom to admit a certain number of atomic units.

4- Syntactic structures in natural languages

Our focus, in this last chapter will be on sounds and meaning, and the way they are organized and function according to syntactic principles. The morphosyntactic component of language will not be of great concern in this section as it has been thoroughly dealt with by many grammarians and linguists.

4-1- The syntax of sounds or phonotax

This section relies on the works by outstanding linguists like Troubetzkoy, Jacobson and Chomsky. We know since then that the phoneme is not the smallest indivisible segment of phonological analysis and that we do find distinctive features. According to the linguists of the Prague School, the phoneme is a bundle of abstract distinctive features which determine the contrasts that may exist between speech sounds. A phoneme is therefore considered as a combination of features organized following a certain pattern. The phoneme /t/ consists of the cluster of features [Alveolar + stop + **voiceless**] wherein it contrasts with the phoneme /d/ in one aspect of voiceness, [Alveolar + stop + **voiced**]. However, the phoneme /b/ will contrast with /d/ on another point [**Bilabial** + stop + voiced]. Alphabetic symbols such as *t*, *d*, *b*, etc. are, as Chomsky (1968:64) puts it, “nothing more than convenient ad hoc abbreviations for features bundles, introduced for ease of printing and reading but without systematic import.” This way of approaching the sound units are allegedly thought to allow generalizations about the connection between sounds in languages of the world. They also provide thorough insights into the cognitive organization of sounds in human language.

Sounds are therefore grouped in various ways according to their features which are classified according to the role they play in the system. One of the most important oppositions in the phonological system being that of vowels vs. consonants, the feature [consonantal], which distinguishes between the two classes of sounds, is considered as essential in the system. The feature [nasal] is hierarchically subordinated to [consonantal], because it subdivides some consonants (or vowels) into nasal and oral. Features like [labial] and [dorsal], which refer to the place of articulation are commonly subordinated to other features characteristic of consonants. The organization of features depends on the natural grouping of sounds into classes. A natural class consists of sounds which exclusively share a certain

number of distinctive features. For example, in English, the cluster of labial phonemes /b/, /p/, /m/, /v/, /f/ is considered as a natural class as well as the alveolar sounds /d/, /t/, /n/, /s/, /z/.

There are syntactic constraints as to the distribution and the combination of phonemes of the same natural class in any language. This is what is referred to as the sound pattern of a language or the phonological system. Phonemes of the same natural class are commonly in contrastive distribution, either initial or final, that is they appear in the same phonological environment where they have distinctive function. They can be substituted by one another but they scarcely appear in the same string following each other in English and many other languages. We may not such sound clusters in many languages *bpm fbp, pvb, vm* or *dts, ztn* etc. moreover, the combinatory constraints is not only within the same natural class, but also among natural classes. It is well known that the labio-velar /w/ may not follow phonemes like /b/ or /f/ at least in English. This is the case with many other sound clusters.

These phenomena are acknowledged and described by phonologists and phoneticians all over the world, but what most of them fail to underline is that those combinatory constraints about sounds fall within the scope of syntax, mainly syntax of phonemes, say phonotax.

4-2- Syntax of meaning or semantax

We will open this section about meaning with this famous example from Chomsky (1957) "*Colourless green ideas sleep furiously*". Chomsky argues that this sentence, though grammatically correct, is quite nonsensical in English, with regard to its meaning. If we consider the three-fold division of language into sounds, forms and meaning, we can assume that this sentence abides by English phonotax and morphotax, but it falls short as far as English semantax is concerned.

As a phoneme is considered a bundle of distinctive features (referred to as pHEME by Bernard Pottier), the meaning of a word is as well described in terms of distinctive semantic features⁸ or seme⁹, which is considered as the smallest indivisible unit of meaning.

⁸ This approach to the meaning of a word stems from Structural semantics theory modeled up following works on the phoneme by the linguists of the Prague School.

⁹ The term is said to have been introduced by Eric Buyssens in the 1930s and developed by Bernard Pottier in the 1960s

Applying the method of structural phonological analysis to the description of meaning yields what is commonly referred to as componential analysis, also called feature analysis. The analysis of words ‘meaning often consists in breaking down its sense into its minimal components which are known as semantic features or sense components. Semic componential analysis is a method characteristic of structural semantics which analyzes the structure of a word's meaning in terms of the presence and/or absence of a particular seme or semantic feature. Two types of semes are considered in the field: the generic seme, which defines the semantic class or paradigm the word belongs to; the generic seme is also called classeme. The second type of seme is the specific seme, or semanteme, which distinguishes a sememe (unit of meaning) from the other sememes of the same semantic paradigm. Like distinctive features, semantic features also fall into natural classes. A typical componential analysis of a semantic class would yield this:

Horse [+animate, +quadruped, +equine, +adult, ±female]

Mare [+animate, +quadruped, +equine, +adult, +female]

Stallion [+animate, +quadruped, +equine, +adult, -female]

Foal [+animate, +quadruped, +equine, -adult, ±female]

Colt [+animate, +quadruped, +equine, -adult, -female]

Filly [+animate, +quadruped, +equine, -adult, +female]

The componential analysis of the semantic feature of a single noun:

Man: [+common +concrete +countable +human +adult +male]

Woman: [+common +concrete +countable +human +adult +female]

One certain advantage of the componential analysis is that it specifies the semantic restriction related to the use of a given word with other words in a sentence. One would hardly think of using a noun like “house” with a verb like “eat” as “eat” requires a [+animate] subject nor would anyone consider using the verb “rain” with any [+animate] subject. This undoubtedly proves that there combinatory constraints at the level of meaning too. This has to do with semantax, the syntax of meaning.

Chomsky's example, "*Colourless green ideas sleep furiously*", is not acceptable in English because the semantic features of the words in this sentence are mutually exclusive.

Conclusion

Our objective in this work was to spread the use of syntax to other fields of linguistics, mainly phonology and semantics. It relies on works and findings of modern linguistics, which it tries to reconsider and revisit on certain aspects.

Language is a systematic whole starting from its smallest units up to larger structures. The organization principle underlying any linguistic structure is a cyclical phenomenon which conditions, constrains and restricts its use at all levels without limiting the possibilities it offers to create infinite speech productions. As language is a coherent structure, the laws governing its different components should not be held distinct and opposed. They stem from the same underlying principle which favors the economy and the permanency of the structure. Ideally and eventually, one may think of merging phonology, syntax and semantics in a unique field of research and study the way they mutually influence one another. The generativists are trying that experience but many aspects are left to be explored.

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