
Annibale Elia, Mario Monteleone, Federica Marano

FROM THE CONCEPT
OF TRANSFORMATION IN HARRIS AND CHOMSKY
TO THE LEXIQUE-GRAMMAIRE
OF MAURICE GROSS

*University of Salerno, Department of Political,
Social and Communication Sciences, Italy*

In this paper, we will describe the concept of *Transformation* firstly as it was introduced by Zellig S. Harris, secondly as it was modified by Noam Chomsky, and finally as Maurice Gross integrated it in his theory of *Lexique-Grammaire* (LG) after abandoning Chomsky's Generative Transformational Grammar (GTG). This choice made by Gross has deep and ancient roots inside Ferdinand de Saussure's Structuralism. Actually, according to Gross syntax cannot be separated from lexicon because no generalization can be made without any rigorous effort towards classification, verification and/or falsification of initial hypotheses. The rules introduced by GTG become only exceptions if one broadens the field of investigation, and if exceptions are so numerous that they cannot be statistically defined.

Introduction

The peculiarity of Maurice Gross' (1934–2001) LG theory stands in three main characteristics: (1) the fact of considering syntax indissoluble from lexicon; (2) the identification of simple sentences — instead of words or phrases — as minimum syntactic and semantic contexts to analyze; (3) the fact of being a formalization and descriptive method suitable to any language.

The theoretical-methodological system of LG consolidates in the second half of the 1970s, exactly from Gross' abandonment of Avram Noam Chomsky's (1928) GTG, which in the second half of the '60s was commonly referred to as Extended Standard Theory. Gross, who had trained as an engineer, begins dealing with those mathematical models which at the end of the 50's are processed by great mathematicians like Marcel-Paul "Marco" Schützenberger (1920–1996), and then used by Noam Chomsky in the context of GTG, i.e. in a version preceding the Extended Standard Theory. Gross works also with Zellig Sabbetai Harris (1909–1992), of whom he deeply appreciated the simplicity of the theoretical model. After a period dedicated to transformational analysis based on Chomsky's model, Gross officially decides to

sever ties with the generative-transformational linguistic framework in 1978, in order to devote himself to the LG approach. This choice of Maurice Gross is then scientifically formalized in an article of the following year, which the French linguist opens with this statement:

An attempt to construct a generative grammar of French with a coverage comparable to that of traditional grammars has failed. A description has been arrived at in the course of this work, however; it is much more complex than expected, and turns out to be entirely taxonomic. This result calls into question the validity of the so-called theory of generative grammar. (Gross 1979).

Here Gross takes *de facto* a very strong position, seemingly extemporaneous, yet as we shall see in the following pages deeply and anciently rooted inside Ferdinand de Saussure's (1857–1913) Structuralism.

1. Syntax in Saussure

Modern linguistics was born together with the ideas that Ferdinand de Saussure expresses in his courses at the University of Geneva between 1906 and 1911. Saussure's project is ambitious and innovative: putting aside his talent for historical-comparative linguistics, he raises crucial questions on the study object of linguistics, moving the interest axis from language comparison and historical reconstruction to the definition of the real communicative circuit implemented by speakers. As it is well known, Saussure's thoughts produced the *Course of General Linguistics* (CLG), assembled and published by two of his students on the basis of drafts and handwritten notes. Saussure's great innovation lies mainly in the (dialectic) separation between language as a mental system interspersed among speakers (*langue*) and the real communicative circuit implemented by speakers' concrete executions (*parole*). Another important aspect is the separation between the paradigmatic axis (associating, in absentia) and the syntagmatic axis (sequential, linear) of linguistic expressions. In Europe, in the '20s, Saussure's CLG is deeply appreciated by the Prague Linguistic Circle.

Saussure's system becomes a model for other disciplines which discover in structure an object of study more rigorous than the one offered by historicist approaches: this comes from the success of the other pair of axes indicated by the linguist of Geneva, the one of synchrony (structure) and diachrony (story). This model spreads so successfully that it leads to the birth of structuralism in the '60s as a study movement opposing the typically idealistic historicism. All elements included by the Saussure model inside *langue* become a privileged object of linguistic studies: phonemes, morphemes, phrases. But phrases, confined by the editors of the CLG in Saussure's unique realm of *parole*, lose the possibility of being treated at the system level. Of course, the notion of phrase introduces an important category of combinations, theoretically not only limited to combinations of words immediately preceding the sentence level. However, in the CLG posthumous edition, only idiomatic or fixed sentences are explicitly referred to at the level of *langue*. We will call here *Saussurean Vulgate* or "Saussure" the posthumous edition of the CLG, in order to distinguish it from the philological editions later elaborated by Godel,

Engler and De Mauro on the basis of handwritten notes and other documents. It is worth saying that the success of “Saussure” can be attributed to the notion of the system which, partially thanks to the reinterpretation of the CLG made by the Prague Linguistic Circle, will be successively called *structure*, and from which moves the phenomenon of cultural and scientific fashion known as *structuralism*. From this point of view, everything which is placed in the *langue* (system, structure) becomes a privileged object of investigation, while everything which is put in the *parole* (execution) becomes a marginal and non-systematic phenomenon, therefore epistemologically less important. All the contradictions and paradoxes resulting from this kind of double list of *good and evil*, to which Saussure’s speculation is reduced, are well known: let’s think, for instance, of the famous *Saussurean paradox* of the American sociolinguist Labov (see Elia 1978), according to whom Saussure would end affirming that the *langue* is a social fact, yet residing inside the individual, while the *parole* is an idiosyncratic matter residing inside the mass (social). After many years, and to various levels of analysis, the attention towards a linguistics of the *parole* has laboriously found its way. “Saussure” makes explicit mention of this linguistics; yet, for the reasons mentioned above, it has become a second-order topic in European linguistic developments. As most acutely underlined by Graffi (2001, to which we definitely refer for any detailed analysis on syntax history), all the European linguists, starting from the Prague School, who adhere to the “Saussure” model take ideas from the Saussurean notion of *phrase* and from the succeeding one of *dependence* (or function, especially in Hjelmslev’s glossematics), yet without developing syntactic studies of crucial importance (for instance, André Martinet’s (1908–1999) studies have never crossed the narrow border of his followers). The emphasis put in “Saussure” on the importance of *phrase* (i.e. on the *syntagmatic* level), of which the *syntactic* one would be only a part, does not adequately attract the attention of linguists, although it seems a very interesting position, like the one, also present in the CLG, of the substantial continuity between morphology and syntax. Paradoxically, the most interesting position in Europe is the one of Lucien Tesnière (1893–1954), who focuses not on the considerations about significant non-linearity, but on the hierarchy of connections between elements, yet placed outside of the “Saussurean” dominant framework.

After the acute philological work by Godel, Engler and De Mauro, and after the publication of additional unpublished writings, it is undoubtedly possible to show that Saussure’s reflections on syntax do not coincide with the claims in “Saussure”. But anyhow, syntax stands as the train missed by European linguists.

2. From Saussure to Bloomfield

Overseas, Leonard Bloomfield (1887–1949), in his 1923 review of the CLG, criticizes the position of “Saussure” which identifies the *parole* and not the *sentence* as the starting point of linguistic analysis. But on the other hand, it is just Bloomfield who shifts the interest from the pair *phrase/dependence* to the pair *constituent/construction*, paving the way first to Harris’ transformational theory and then to Chomsky’s generative-transformational theory, which will represent the true epistemological success of twentieth-century syntax. Therefore, rightly or wrongly, in this sense we can say that it is America and not Europe which takes the train of

syntax. Leonard Bloomfield comes to a re-reading of Saussure's notion of system applied also to combinations of words going beyond phrases: according to the method of *immediate constituents*, combinations are re-analyzed as morphemes, phrases, and finally, as sentences, producing schemes and labels which allow the evaluation of their structural equivalences. In this way, it is not only possible to describe the set of syntagmatic varieties existing within a single structure, but it is also possible to class different sentence structures on the basis of morpheme equivalence features. However, constituent analysis has some weaknesses. Evidences such as the intuitive but unmistakable similarity between active and passive sentences, or the relationship between declarative and interrogative sentences, cannot be easily handled by a mere observation of immediate constituents: it is necessary to separately analyze the two structures, needlessly duplicating the descriptive apparatus.

3. From Bloomfield to Harris and Chomsky

A decisive solution to these problems, the harbinger of a new epistemological revolution, will be carried out by Zellig Harris in the '40s. Harris comes easily to the notion of transformation precisely by means of the one of equivalence,¹ starting from Bloomfield's idea of morpheme and from his switching method between morpheme possible different lexical contents.

In the mid-50s Noam Chomsky, as one of Harris' students, applies his model of transformational analysis to Hebrew language, but he soon deviates from Harris' scheme to develop a more abstract notion of transformation. Chomsky tries to resume a traditional grammar norm, that is to say the one which divides a proposition into Subject and Predicate. Also, he offers a sort of derivation of the sentences, as they came to the surface coming from a *deep* structure, through transformations that bring into play rewrite rules deriving from the algebraic graph theory. In 1957 he publishes a small book (*Syntactic Structures*) in which his interpretation of transformation as a link between a deep structure and surface combines with the Harrisian idea about the existence of elementary sentences (at the level of simple sentences). So, Chomsky describes a project about syntax in which a few basic principles are taken: the linguist's task is to describe the mental linguistic competence of an ideal speaker-hearer (i.e. *competence*, which is similar to Saussure's *langue*); concrete linguistic realizations, with all their idiosyncratic variability, do not constitute the primary topic of language (i.e. *performance*, which is comparable to Saussure's *parole*); linguistic competence can be described using a combinatorial mathematical model that takes into account the sentence context in which word combinations are realized; this specific grammar formal model must be able to assign an appropriate syntagmatic structure to all sentences that respect the rules of a given natural language (this procedure is *generative* because the grammar must generate only grammatical sentences of a language, and nothing else); syntax is to be considered a study of word combinations (to which is assigned the status of grammaticality or of *good form*) sharply distinguished from the study of meaning (the semantic component), of which it is said that acts only at a later time, as a semantic interpretation; syntax uses

¹ As we will see, Harris' concept of transformation will be fully integrated in LG by Maurice Gross.

an algebraic rewriting system that has a tree representation in which categorical symbols (noun phrase, name, verb phrase, verb, ...) act at the highest level, while concrete lexical items (terminals), which are part of the vocabulary, i.e. of the grammar lexicon, act at the lower level; transformation is seen as the tool allowing to account for word combinatorial realizations that surface analysis, such as the one in immediate constituents, cannot be interpreted as correlations or equivalences with other word combinatorial realizations; importance is given to the identification of elementary (or nuclear) sentence structures, from which complex sentences can also be derived through transformation.

The project of 1957 produces a plethora of transformational studies aiming to describe English and other languages. This project is still sufficiently compatible with the model developed by Harris.

Initially, Maurice Gross works on the definition of formal grammar mathematical properties usable to describe languages. He considers transformations as a powerful tool to discover new facts of language, a kind of particle accelerator that allows a linguist to identify mechanisms, elements and data which are not directly observable.

With *Aspects of the Theory of Syntax* (1965) Chomsky redefines the program of GTG, outlining a model that will be named "Extended Standard Theory", and which sets out the new theoretical and methodological principles that it intends to pursue.

In *Aspects*, Chomsky takes a radical position against the attempts to introduce a generative semantics, affirms the primacy of syntax and expresses the idea of being able to account for lexicon irregularities by means of syntactic-transformational rules.

4. From Harris and Chomsky to Gross

The program in *Aspects* could lead to a lexico-syntactic description of languages, producing a lexicon based on the rules of selection and sub-categorization. However, this description is never achieved by Chomsky, and Maurice Gross comes forward to complete it.

In 1968, Gross has started to describe the 3,000 French verbs that select a complete sentence, applying the generative model developed by Rosenbaum in 1967. He completes a first version in 1975, using an electronic data-base. As the work goes on, he moves away from Chomsky's paradigm, and enters into open conflict with the GTG settings.

What happened? The 3,000 French verbs he had analyzed reacted faultily to the assumptions made by Rosenbaum (1967) for English: exceptions were more numerous than rules. When the properties analyzed for each verb exceeded the number of five or six, the classifications made showed that every verb had its own individual behaviour, almost completely independent from those of other verbs.

Following Harris, Gross states that grammar already includes and is not separated from semantics, and that specifications on semantic statements are concretely possible only if they are based on non-metalinguistic analyses of natural language. Also, Gross discovers that any generalization made without a rigorous effort towards classification, verification and/or falsification of the initial hypothesis is doomed

to failure. Also, and mainly with reference to the concept of transformation, that in all languages syntactic structures cannot be separated from the concrete and unpredictable behaviour of single lexical units. In Gross' vision, lexical units can be divided into two major groups, the first of simple words, the second of compound words.

As elsewhere stated, Gross borrowed Harris' concept of transformation and made of it one of the LG methodological pillars. Harris discovered transformations while he was developing a syntax theory based on more general terms. Harris came to observe that sequences of word classes could lead to the identification of sentences subsets having comparable formal aspects. With reference to specific sets of sentences, Harris then started to map the preservation of precise properties from one subset to another, applying the same evidence method used for linear algebra transformations. Thus the term "transformation" began to be used in linguistic studies as well, especially syntactic ones. In this way, Harris showed that starting from words' combinatorial predispositions it was possible to recursively define specific sub-classes having similar semantic features. Entire sequences of morphemes and phrases forming sentences were put into correspondence. Active and passive sentences were analyzed as being in a relationship of reciprocal transformation. Therefore, the step was short from this basic assumption to the identification of word categories (i.e. verbs) which determined the functioning of a complete sentence and ruled the saturation of complements. On such a basis, Harris also identified the existence of elementary (or nuclear) structures of sentences, consisting of operators (i.e. verbs) and arguments (complements).² In LG framework, Maurice Gross gave concrete form to all these methodological passages, classifying verbal predicates on the basis of their distributional and transformational likeness (i.e. adopting Harris' mapping procedure) and using binary matrix tables to define sets of verbal predicates having similar formal and semantic features. These are the very reasons why Chomsky's position³ and the one of Gross are today irreconcilable. According to Gross, the rules introduced by the GTG become only exceptions if one broadens the field of investigation. And if exceptions are so numerous that they cannot be statistically defined as such, then probably our linguistic competence is not as innate as it is stated by the Extended Standard Theory model: we rather acquire a large part of it in the course of our lives. Gross suggests that if this is what really happens, then it is necessary to rethink in a completely new way the role played by memory in the acquisition and production of the syntax of a language.

² In Europe, somehow sheltered from the great currents of American and post-Saussurean linguistics, Lucien Tesnière assigns a decisive role to verb regency inside sentences. Tesnière has also introduced a new terminology, actually not always accepted, where instead of *regency* (fr. *rection*, ingl. *gouvernement*) we find *value* (fr. *valence*, ingl. *valency*). As for the concept of the required complements of verbs — a concept far from being clear in his time, and which is not yet completely clear — Tesnière proposed the term *actant* (fr. *actant*).

³ From the late, 60s to the present, Chomsky has gradually simplified the *Aspects* model, achieving the current one which is known as *minimalist* (Graffi 2001); after reducing all transformations to a single one (MOVE, i.e. displace), this model makes less crucial the separation between deep and surface structure. Chomsky's paradigm is now oriented towards the definition of an innate universal grammar, which in the act of forming itself is projected inside concrete languages, through a series of *parameters* specific to each one of them.

References

- Chomsky, Noam A. 1957. *Syntactic Structures*. The Hague/Paris: Mouton.
- Chomsky, Noam A. 1965. *Aspects of the Theory of Syntax*. Cambridge, Mass.: MIT Press.
- Elia, Annibale. 1978. « Pour un lexique-grammaire de la langue italienne: les complétives objet ». *Linguisticae Investigationes*, II, 2. Amsterdam/Philadelphia: John Benjamins.
- Graffi, Giorgio. 2001. *200 Years of Syntax*. Amsterdam/Philadelphia: John Benjamins.
- Gross, Maurice. 1975. *Méthodes en syntaxe*. Paris: Hermann.
- Gross, Maurice. 1979. "On the Failure of Generative Grammar". *Language* Vol. 55, No. 4. 859–885.
- Gross, Maurice. 1986. "Lexicon-Grammar. The representation of compound words". *Proceedings of COLING '86*, Bonn, University of Bonn, <http://acl.ldc.upenn.edu/C/C86/C86-1001.pdf>.
- Harris, Zellig S. 1970. *Papers in Structural and Transformational Linguistics*. Dordrecht: Reidel.
- Rosenbaum, Peter S. 1967. "Phrase structure principles of English complex sentence formation". *Journal of Linguistics*, 3 Vol. 55, No. 4. 859–885.