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SOME PHILOSOPHICAL AND METHODOLOGICAL ASPECTS
OF CHOMSKY'S GENERATIVE GRAMMAR

Very often reflections on language are connected with a broader field of research - philosophy, logic, or psychology. One of the greatest twentieth century philosophers Ludwig Wittgenstein introduced and stressed the necessity of analysing ordinary language in philosophical investigations. His inquiries connected with language and philosophy¹ gave rise to the trend known as ordinary language philosophy and enabled the developments in the field of the theory of speech acts, discourse analysis, and pragmatics. Wittgenstein was interested in language and its usage mainly in order to clarify vital philosophical problems, whereas another great philosopher and logician, Rudolf Carnap², aimed at constructing a language based on principles of logical syntax. He inspired the future formal approaches towards language developed further by A. N. Prior, D. Lewis, R. Montague, and others³.

For both Wittgenstein and Carnap the research in the fields of philosophy and logic was connected with elaborating a theory

¹ L. Wittgenstein, *Philosophical Investigations*, Oxford 1953, Oxford University Press.

² R. Carnap, *The Logical Syntax of Language*, London and New York 1937.

³ A. N. Prior, *Time and Modality*, Oxford 1957, University Press; D. Lewis, *General Semantics*, [in:] *Semantics of Natural Language*, eds D. Davidson, C. Harman, Dordrecht-Holland 1972, D. Reidel Publishing Company; R. Montague, *Formal Philosophy. Selected Papers of Richard Montague*, ed. R. Thomason, New Haven and London 1974, Yale University Press.

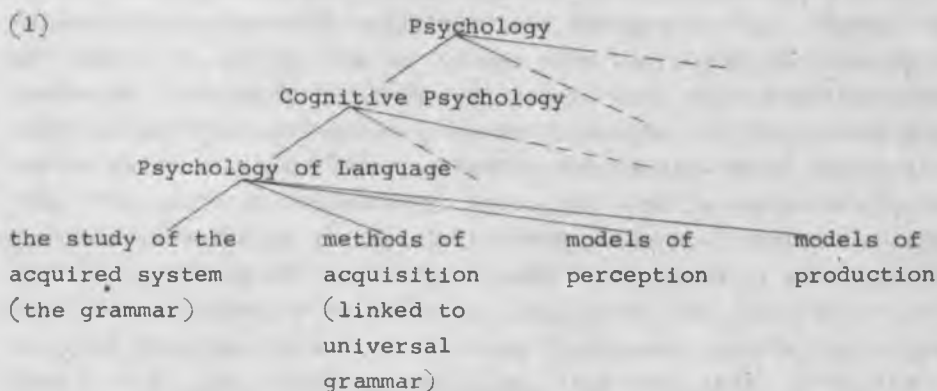
of language, but both this theory and language were used instrumentally as a tool in solving particular philosophical and logical queries. The logical positivism connected with Carnap, and Wittgenstein's ordinary language philosophy neglected studies of the nature of natural languages and lacked genuine linguistic insights. Also both these theories were not interested in psychology and even openly directed against psychologism in philosophy and science. Such attitudes restricted research for some time but already the advances of structuralism and achievements of formal logic together with elements of theory of communication enabled a different approach. This, together with interests in psychology, was the background for the path undertaken by Noam Chomsky. It resulted in a theory of language with great implications for psychology, philosophy, and theory of science - the Generative Grammar. Like Wittgenstein and Carnap, Chomsky also developed a theory of language which extends the interests of linguists and is vital for philosophy and psychology. Its importance for psychology is stressed and emphasized by Chomsky himself, and the significance for philosophy is a natural consequence of the theory's intellectual power and depth. Using methods developed by logicians, mathematicians, and structural linguists Chomsky introduced a highly original and very powerful method of analysing natural language and incorporated it into the studies dealing with human mind. When confronted with linguistic work it is possible and sometimes necessary to ask about the aims of research and the sense of constructing theories and models of the structure of language. In Chomsky's case the answer points directly towards psychology: "I would like to think of linguistics as that part of psychology that focuses its attention on one specific cognitive domain and one faculty of mind, the language faculty"⁴.

Therefore the aim of the study of language, in its relation to the study of human mind, is to develop a theory of language and a theory of language acquisition. Both these theories belong to the realm of cognitive psychology. In traditional psychology the problems connected with the theory of language did not occur, as it dealt only with language acquisition and only sometimes with language usage. As Chomsky pointed out this view is

⁴ N. Chomsky, *Rules and Representations*, Oxford 1980, Basil Blackwell, p. 4.

untenable because it would be impossible for a serious discipline to concern itself with the acquisition or usage of a form of knowledge (such as language) neglecting at the same time the structure of the system of that knowledge. Chomsky understands the role of linguistics as filling a gap in the activities of psychology. He writes about the necessity of a "psychology of language ... concerned at the same time with the system that is acquired and the ways in which it is acquired and used"⁵

The structure of psychology understood in such way may be presented by the diagram:



The first model of language structure and an outline of linguistic theory was presented by Chomsky in *The Logical Structure of Linguistic Theory* (1955 - but not published until 1975), and in *Syntactic Structures* (1957) - a rather informal introduction to the earlier more technical and complex work. It is possible to arrange Chomsky's next works into two groups - "technical" and "popular and philosophical" with the caution that the above labels are introduced for expository purposes only, and where "popular" means designed for a wider audience (i.e. not only for generative linguists but also philosophers and scientists interested in research in psychology). The most important technical works are: *Aspects of the Theory of Syntax* (1965), three papers collected in *Studies on Semantics in Generative Grammar* (1972), *Conditions on Transformations* (1973), *On WH-Movement* (1977), *On Binding* (1980), *Lectures on Government and Binding* (1981), and

⁵ N. Chomsky, *Language and Responsibility*, Sussex 1979, The Harvester Press, p. 44.

Some Concepts and Consequences of the Theory of Government and Binding (1982). The second group is represented by *Cartesian Linguistics* (1966), *Language and Mind* (1968, enlarged edition 1972), *Reflections on Language* (1975), *Language and Responsibility* (1979), and *Rules and Representations* (1980).

From the titles alone and the impressive number of publications it may be deduced that generative grammar is not a static theory - indeed it has changed during the years a lot but what is most interesting is that the main changes took part in the technical considerations and solutions, whereas the philosophical setting and background remained stable. From the very beginning the task for linguistic theory as set by Chomsky was to discover the nature and properties of the biological endowment that specifies the elements of the language faculty. To achieve this task, work within generative grammar framework tried to develop the concepts of grammatical transformation, deep and surface structure, and other devices aiming at explanatory adequacy. Achievements in this field have shown that the work dealing with transformations and conditions on rules of grammar, though aiming at explanatory adequacy, used devices which were so rich and unrestricted that they left this goal unfulfilled. Here I shall confine myself to the presentation of the latest development in generative grammar - the Government and Binding (GB) model as described in Chomsky 1980a,b, 1981, and 1982⁶.

One of the central notions crucial for understanding Chomsky's theory is Universal Grammar (UG). In the first, rather sketchy and intuitive formulations of the Standard Theory, UG is treated mainly as the study of the conditions that must be met by the grammars of all human languages and as a supplement to particular grammar which describes the regularities common to all languages⁷. Such a formulation of UG was determined by research concentrated on issues connected with features of transformations and conditions on rules of grammar. In more recent writings Chomsky develops a twofold analysis of UG; he treats it as a: "system that is genetically determined at the (child's)

⁶ As described in N. Chomsky, *On Binding*, "Linguistic Inquiry" 1980, 11, p. 1-46; *idem*, *Lectures on Government and Binding*, Dordrecht-Holland 1981, Foris Publications; *idem*, *Some Concepts and Consequences of the Theory of Government and Binding*, Cambridge, Mass 1982, MIT Press, Linguistic Inquiry Monograph 6.

initial state, and is specified, sharpened, articulated and refined under the conditions set by experience, to yield the particular grammars that are represented in the steady states attained"⁸. Therefore UG is that part of human biological endowment which gives the basis on which knowledge of language can develop. Rules of such UG, if attested as a general tendency for natural languages, form the core grammar - a highly restricted system of rules and parameters: "Fixing the parameters of core grammar and adding more marked constructions that make use of richer descriptive resources, the language learner develops a full grammar representing grammatical competence"⁹. Therefore the theory of UG as constructed by linguists must be based on a number of fundamental interacting subsystems which restrict the class of possible grammars. These are formed by the subcomponents of the rule system of grammar and subsystems of principles and their task is to specify the properties of representations and rules at the levels of D-structure, S-structure, Phonetic Form (PF), and Logical Form (LF). The rule system consists of three parts¹⁰.

- (2) 1. Lexicon
 2. Syntax: i. base component
 ii. transformational component
 3. Interpretative components: i. PF component
 ii. LF component

The lexicon specifies the morpho-phonological structure of a lexical item and its inherent syntactic features such as categorial features and contextual features. In the latest framework the main task of the lexicon is to determine the thematic-marking properties of lexical items and the properties of assigning thematic roles (θ -roles) to categories for which the verbs are subcategorized. The rules of the base component generate D-structures which are representations of the grammatical

⁷ N. Chomsky, *Aspects of the Theory of Syntax*, Cambridge Mass. 1965, MIT Press, p. 6, and *idem*, *Language and Mind*, New York 1968, Harcourt Brace Jovanovich, p. 63.

⁸ Chomsky, *Rules and Representations*, p. 234.

⁹ Chomsky, *On Binding*, p. 3.

¹⁰ Chomsky, *Some Concepts...*, p. 4.

functions associated with θ -roles. The rules of the transformational component map D-structures onto S-structures by the general rule Move- α . The grammatical functions are once again defined at this level. The syntax generates S-structures which are next assigned PF and LF representations by appropriate components.

Most recent work however, shows a shift in interest from the study of rule systems to the study of subsystems of principles which include the following¹¹:

- (3) 1. X-bar theory,
 2. θ -theory.
 3. Case theory.
 4. Binding theory.
 5. Bounding theory.
 6. Control theory.
 7. Government theory.

X-bar theory is concerned with phrasal expansion of lexical categories, θ -theory is concerned with the assignment of thematic roles, Case theory is concerned with the assignment of abstract Case to elements in Case-marking positions (such as subjects of tensed sentences), and with its morphological realization. Binding theory is concerned with the relations of anaphors and pronominals to their possible antecedents. Bounding theory specifies locality conditions, in particular on movement rules. Control theory is concerned with the choice of potential antecedents for abstract pronominal element PRO. Government theory is concerned with the relations between the head of a construction and categories dependent on it.

These subsystems are closely related and they interact in a number of ways and there are also some relations between the subsystems of rules and subsystems of principles - for example Case theory is closely related to Government theory and to the rules of lexicon; on the other hand there is interaction between Bounding theory and the transformational component. One of the main tasks of UG is to fully develop properties of the above systems and to analyse the relations occurring among them. The system of rules and principles has "associated with it certain

¹¹ Chomsky, *op. cit.*, p. 6.

parameters, which are set in terms of data presented to the person acquiring a particular language. The grammar of a language can be regarded as a particular set of values for these parameters, while the overall system of rules, principles and parameters is UG, which we may take to be one element of human biological endowment, namely, the language faculty¹².

In comparison with the Standard Theory model, together with its discussion of competence and performance, the GB theory retains interest in problems of competence, and even to a greater degree connects aspects of language learning with the linguist's task of building an appropriate theory of grammar. At the same time the GB model dispenses with the basic Standard Theory technique - the rule-writing system. The new model avoids the usage of the whole rule-writing apparatus - base rules and transformations in the traditional sense, and instead introduces either completely universal rules or rules which are universal except for the fixing of some parameters. The importance attached to the fixing of parameters is one of the consequences of a very important and significant new feature of the theory - its modularity. A theory is modular if its full complexity may be traced down to the interaction of distinct and very often independent subtheories, each governed by its own laws and with its own abstract structure. In the case of a modular linguistic theory the ways in which languages differ from one another are explained by the interaction of the modules - thus even small changes in the parameters may produce very distinct forms of languages. For this reason linguists concentrate on careful analyses of the changing form of one language, compare languages from one linguistic group, and study languages from various, distinct groups.

The task of the learner is to determine and fix the appropriate parameters of the identified language in order to reproduce the desired grammar. All the time the central concept is grammar, language being a derivative at a different, higher level of abstraction from neural mechanisms. It is worth mentioning here that also the mind is viewed as modular in character - as a system of interacting subsystems, and therefore the process of acquiring language may be understood as involving the interaction of distinct faculties of mind.

¹² *Ibidem*, p. 7.

Chomsky also advocates the assumption that modularity implies rich innate structure¹³ reviving thus classic problems originating in Cartesian philosophy. With Chomsky's research rationalism emerges as a new quality in modern thought - the debates on biological endowment and on problems of language learning add to the total conception of man in a way which could be called modular itself: investigation of separate linguistic facts appends new elements to systems of rules and principles, which in turn elaborate on the theory of grammar. Such a theory of grammar is itself only a part of those cognitive sciences which deal with the structure of human mind and together with other branches of psychology and philosophy aim at giving a finite picture of man.

An important point in the methodology of contemporary linguistics is the treatment of apparent counterexamples and phenomena not yet explained which, as in physics and other natural sciences, should be noted and observed but for the time being put aside waiting for more results of research before ultimately settled. In linguistics moreover, superficial study of language and mere observation of phenomena is not sufficient - significant statements are only those which are concerned with properties of rule systems, therefore a grammatical theory may be confirmed or refuted not through a collection of facts but only through a construction of a system and a theory. Let's examine Chomsky's discussion of an apparent counterexample the subjacency condition¹⁴. The subjacency condition is understood as holding that a rule cannot move a phrase from position Y to position X or conversely / in structure (4):

(4) ...X.../α.../β...Y.../.../...X...

where α and β are cyclic nodes (such as \bar{S} or NP)

This condition rules out such ungrammatical structures as (5):

(5) Who did you discuss /_{NP} the claim / _{\bar{S}} that John met //

But now let's take sentence (6):

¹³ Chomsky, *Rules and Representations*, p. 40.

¹⁴ The discussion is based on N. Chomsky, *On WH-Movement*, [in:] *Formal Syntax*, eds P. Culicover, T. Wasow, A. Akmajian, New York 1977, Academic Press, p. 73-75.

(6) John seems to be certain to win.

With the structure (7):

(7) John seems / \bar{S} to be certain / \bar{S} t to win //
 (where t is the trace of John)

Apparently the sentence violates subjacency under the assumption that the phrase John was moved out of its primary position (t) by a cyclic movement rule. But obviously the above sentence is correct - and this is so because the rule of NP-movement applies on two successive cycles and therefore it crosses only one binding node (\bar{S} in the example) at time. It is not the facts that are crucial here, but an appropriate formulation of the rule or condition - here the subjacency condition, an appropriate formulation of which must take under consideration the aspect of successive cyclicity. Therefore to discuss the validity of a given rule a fragment of grammar is required, not merely a list of phenomena - "the status of conditions on rules is empirical, but evidence can only be indirect and the argument, one way or another, is necessarily rather abstract and theory-bound"¹⁵. The above discussion was based on formulations earlier than the GB theory but this fact does not change its validity. Another interesting result of the acceptance of modularity is an integrated outline for the theory of the passive construction. In this case an analysis of the passives from different languages: English, German, Italian, Classical Arabic, and Hebrew shows that such constructions are formulated through a different organization of distinct parameters of core grammar - for example the Case module and the θ -theory - giving through the interaction of these modules various actual constructions categorized together as "passives"¹⁶.

The interaction of distinct parameters and rules fixes the core of UG. Constructions outside the core constitute the periphery representing marked cases. Such a periphery is a result of historical borrowings, changes and inventions and is often on the verge of grammaticalness. Still, it is generated by the grammar and can be accounted for through a complicated inter-

¹⁵ *Ibidem*, p. 74.

¹⁶ Chomsky, *Lectures...*, p. 117-127.

action of distinct parameters with possible slight changes when compared with the core and with utilization of principles not attested for core constructions.

The GB model of generative grammar is built according to requirements set for theories analysed in natural sciences and is based on three criteria¹⁷:

- (10) 1. Coverage of empirical data.
2. Consistence with standards of simplicity and elegance.
3. The extent to which the model sheds light on the essential problem of language acquisition.

The criteria of (10) are consistent with the task set forth for natural sciences which may be defined as truth seeking and acquisition of interesting insights into problems of the real world. Also common to natural sciences and linguistics is the method of making new, brave hypotheses in order to try to falsify them on the basis of the theory. Chomsky has adopted this method with success in linguistics and proposes the same for other humanities, and especially for branches of knowledge dealing with the human mind.

Linguistics gathers facts dealing with various aspects of phonology, syntax, and semantics, and arranges them and explains on the grounds of the linguistic theory. It does not contend itself with the surface representation of language but reveals and interprets the deep connections, giving (or at least trying to give) a full description of the process which relates sound to meaning. Thus it becomes a part of philosophy and at the same time one of its methods - interpretations are not performed in an intellectual vacuum - they turn back to important achievements from the past and use them in a new, fruitful way, and also they criticize what is fossilized and unproductive.

Criticizing structuralism and behaviorism Chomsky at the same time revived those past conceptions which could be transformed and utilized in generative grammar. Thus he revived and creatively applied to modern linguistic thought the ideas already present in the writings of Descartes and other Cartesians, Humboldt, and Sapir. Chomsky's position is in opposition

¹⁷ D. Lightfoot, *Trace Theory and Explanaton*, [in:] *Syntax and Semantics*, vol. 13, New York 1980, p. 142.

to such trends as mechanistic determinism and behaviorism, his views form a fusion of mentalism and physicalism - a consequence of the modular approach - mind and body are treated not as two contrary states but as modules which together create the human being.

Owing to Chomsky's incorporation of generative grammar into the field of studies dealing with problems of mind, linguistics - now equipped with a powerful methodology and techniques - has effectively joined the natural sciences. At the same time it has been transformed into one of the branches of philosophy.

Chomsky's views are far from being shared by all linguists - as a matter of fact every aspect of his thought is attacked: treatment of language, grammar and syntax; his views on rationalism and innate ideas; treatment of Cartesian and Humboldt's thought; and even his political views (not mentioned here). One of the most recent grammatical theories opposed to GB is Generalized Phrase Structure Grammar¹⁸.

It is a variant of a context-free phrase structure grammar which assigns to each syntactic description of a sentence a translation into intensional logic. One of its basic assumptions is the existence of only one single level of structural description, and rejection of the levels of deep and surface structures and the level of Logical Form. Instead it develops systems of rules and metarules (imposing in reality and contrary to assumptions, a double level of representation) and deals mainly with unbounded dependencies and coordinate structures. Though J. D. Fodor has argued that Generalized Phrase Structure Grammar does have implications for psycholinguistic concerns Gazdar et al "feel (that) it is possible, and arguably proper, for a linguist [...] to ignore matters of psychology"¹⁹

Chomsky's views on rationalism and inborn ideas are in an already traditional opposition to concepts of behaviorists and Piaget's school (see especially Piattelli-Palmarini 1981)²⁰. Chomsky's analysis of Cartesian thought is attacked by Aar-

¹⁸ G. Gazdar and E. Klein, G. Pullum, I. Sag, *Generalized Phrase Structure Grammar*, Oxford 1985, Basil Blackwell.

¹⁹ *Ibidem*, p. 5.

²⁰ M. Piattelli-Palmarini, *Language and Learning*, Cambridge, Mass. 1981, Harvard University Press.

sleff²¹, and his philosophical and political views are critically discussed by Sampson²². Sampson deals also with Chomsky's conception of creativity and its relation to liberalism. Agreeing with Chomsky's linguistic views Sampson disagrees with Chomsky's political conclusions²³ and from the same linguistic premisses arrives at fundamentally different political ideals and a rather different concept of human mind.

Another possible objection could be raised against Chomsky's non-involvement in studies of language meaning and usage falling under the traditional domains of semantics and pragmatics. It is good to realize here that Chomsky himself is interested almost only in studies in syntax and Logical Form (itself a type of semantics) but he does not discharge traditional semantics nor pragmatics: "a fuller account of knowledge of language will consider the interactions of grammar and other systems, specifically, the system of conceptual structures and pragmatic competence, and perhaps others, for example, systems of knowledge and belief that enter into what we might call "common sense understanding" of the world"²⁴. It is not unlikely that some of the problems discussed by cognitive linguistics²⁵ could be integrated within Chomsky's theory of grammar. One such problem, not dealt with by Chomsky, but incorporated into the Government and Binding model of Universal Grammar is the question of parsing strategies. In view of recent research such as Zabrocki²⁶ it is possible to see the parsing mechanism as one of the modules interacting with other methods of language acquisition in the complex processes of using and understanding language.

²¹ H. Aarsleff, *The History of Linguistics and Professor Chomsky*, "Language" 1970, 46, p. 570-585.

²² G. Sampson, *Liberty and Language*, Oxford 1979, Oxford University Press.

²³ *Ibidem*, p. 9.

²⁴ Chomsky, *Rules and Representations*, p. 92.

²⁵ R. Langacker, *Foundations of Cognitive Grammar*, Indiana University Linguistics Club, Bloomington 1983.

²⁶ T. Zabrocki, *Positionality*. Paper read at the 21st International Conference on Contrastive Linguistics, Białejeńko, 5-7 December 1985.

Future research may show that some of the above criticism is justified and even that "Chomsky's theory of generative grammar will be dismissed one day, by the consensus of linguists, as irrelevant to the description of natural languages... (but) even if the attempt he has made to formalize the concepts employed in the analysis of languages should fail, the attempt itself will have immeasurably increased our understanding of these concepts and that in this respect *Chomskyan revolution* cannot but be successful"²⁷.

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NIEKTÓRE FILOZOFICZNE I METODOLOGICZNE ASPEKTY
GRAMATYKI GENERATYWNEJ CHOMSKIEGO

Artykuł omawia najnowsze tendencje w gramatyce generatywnej uprawianej przez Noama Chomskiego - tak zwanej teorii Government and Binding. W teorii tej bardzo ważną rolę odgrywają systemy reguł (rules) oraz zasad (principles). Systemy te poprzez wzajemne powiązania umożliwiają generowanie struktur należących do rdzenia (core). Innym ważnym terminem używanym przez Chomskiego jest gramatyka uniwersalna, rozumiana jako biologiczne wyposażenie człowieka. Tak rozumiana gramatyka, zajmująca się tłumaczeniem i interpretowaniem faktów językowych w połączeniu z ich znaczeniem dla badań nad umysłem staje się bardzo istotną częścią współczesnej myśli filozoficznej.

²⁷ J. Lyons, *Noam Chomsky*, Revised Edition, London 1977, p. 151-152, Penguin Modern Masters.