HAS LINGUISTICS YET EXPERIENCED ITS DEFINITIVE REVOLUTION?[1]

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Chomsky, in an interview in 1977 (Otero, 1988), stated that linguistics was yet to experience a Copernican– or Galilean-like sea change as far as its crucial points of concerns went, i.e. insight and depth of explanation. Some years later, in 1983 (Otero, 1988), he himself assessed his own contributions to this field as quasi pre-Galilean since he believed that an appropriate start to existing problems had begun even if no clear conclusions had yet been reached. This book being reviewed is the result of an international workshop on "The Chomskyan Turn: Generative Linguistics, Philosophy, Mathematics and Psychology" held in Israel in 1988 the aim of which was to probe the relevancy of Chomsky's contributions to each of the areas covered by the workshop.

The book is organized into three parts. Firstly, Chomsky's opening and closing papers, parts of a unified presentation, constitute Part One; Part Two is made up of papers which address Chomsky's contributions to linguistics, namely phonology, semantics, and pragmatics, philosophy and psychology, and written by linguists, philosophers and cognitive scientists such as Bromberger and Halle, Hornstein, Kasher, Matthews, Pylyshyn, Wexler, Fromkin, Newmeyer and Leiber; finally, Part Three has papers on syntax, and while Rizzi deals with referential indices the bulk of this section centres on Logical Form, with papers by May, Lappin, Reinhart and Rothstein.

Chomsky stresses his belief that a subject which is significant and worth pursuing should not be personalized, and although he believes the subjects examined by the conference fulfil these criteria he questions its general structure. When he addresses, how in his view, the study of language looks today, he relates it to "... broader questions about mind and knowledge and behavior that have deep roots in our cultural and intellectual history." (p. 4). He argues that the cognitive revolution of the 1950s formed the context in which the study of generative grammar took place and grew, mirrowing, under different guises, previous concerns although at the same time adding some new perspectives to them. Among the earlier issues to be reconsidered are the representational-computational theories of the mind or the innateness of the growth of knowledge and understanding, which date back to the XVIIth and XVIIIth centuries. The

difference in the way they are approached lies in the fact that in that 'second' revolution a new technical understanding was born in this century in relation to both the nature of computation and formal systems. This allowed old questions to be asked under different frames of perspective and to further and profitably inquire into controversial areas such as language itself.

According to Chomsky, states of the mind/brain and the way in which they manifest themselves in behaviour, namely cognitive states, are the concerns of the cognitive revolution. When human thought and action are addressed from this angle, psychology, and its sub-field of linguistics, are understood as part of the natural sciences, giving particular importance to the brain. Hence its mentalistic stance, although in a very precise sense due to the level of abstraction under which the brain is studied, is that of neural nets or computational systems of rules and representations. The mind/brain, under these terms, means to inquire into the physical properties of the brain so as to gain insight and understanding into explanatory theories, as has already happened in other natural sciences such as chemistry and genetics.

Chomsky understands that the basic concept which emerges when the study of language is undertaken is that of "having" or "knowing" a language, which in his view is a cognitive state, a certain state of the mind/brain. And the three questions which arise out of this concept are the ones he identifies, citing classical antecedents, as *Humboldt's problem* –i.e. what constitutes knowledge of language?–, *Plato's problem* –i.e. how is such knowledge acquired?– and Descartes's problem –i.e. how is such knowledge put to use? A further question which arises but which he thinks may be premature at present is how to integrate answers to these questions within the existing natural sciences, envisaging the need of having to reformulate them. He believes the study of the mind should serve as a guide for the brain sciences of the future so that the properties and conditions that must be satisfied by the mechanisms of the brain can be manifested.

Chomsky states that the first question above refers to Humboldt's insight that language is a system that provides for infinite use of finite means, taking these finite means to constitute a particular language and are represented in the mind/brain by language. Generative grammar regards the language faculty as a particular component of the human mind/brain, part of the human biological endowment, and I-language the linguist's theory of this innate component of the mind/brain, in contrast to E-language or set of expressions of a given language upon which grammars can be constructed so as to describe the general patterns which emerge from it (Chomsky, 1986b). The second question refers to a special case of Plato's problem that addresses (i) how so much is known having so little evidence and (ii) how these complex systems of knowledge can be shared. To answer these questions it is posited that an innate structure in the mind exists with the basic properties of cognitive systems as a result of the human biological endowment. Connected with this second question, phenomena studied under the concept of growth and maturation on the one hand, and phenomena that are considered under the domain of learning on the other are discussed. Finally, the third question relates to Descartes's twofold problem of production and perception. While it is considered little can be said about the former, i.e. the creative aspect of language use and Chomsky's distinction between "problems" and "mysteries" (Chomsky, 1975: 137), the latter is understood to be concerned with "... the process by which a person assigns a structural description to a presented expression in a particular situation." (p. 18), i.e. it involves resort to the

I-language or the system of knowledge of language represented in the mind/brain. Here the controversial concepts of parser and language or grammar are also discussed, as are those of parsability and learnability.

Chomsky ends his contribution to the conference by arguing that recent work has served to yield a very different conception of the nature of language from anything thought before. That is, phrase structure rules are unnecessary for a great deal core of natural language, since lexical items inevitably give much of that information. General principles such as Move-alpha allow transformational rules to be dispensed with. Simultaneously, other general principles interact to offer complex linguistic phenomena. Although how all this works is not yet fully understood, the overall outline seems to be foreseen. The general principles of the language faculty are associated with parameters which account for the variation that exists among languages. However, the values of these parameters are few, they may well be just two, and they may also be restricted to the lexicon, being the rest of the I-language fixed and invariant. It could be then that the number of possible languages is finite, although there is stringently constrained choice of lexical entries. From this Chomsky posits that acquiring a language would involve the determining of parametric values, which should in fact require simple data and restricted experiences.

According to Chomsky, the current position of generative theory, a principles-and-parameters theory, embodies "... a very radical departure from the long history of the study of language, ..." (p. 23). He understands the conceptual shift inherent to it to have a much deeper significance than that represented by the second cognitive revolution brought about by early generative grammar. He also considers this theory to have "... much more of a truly rationalist cast than the general and rational grammar of the seventeenth and eighteenth century." (p. 23). Thus, considering whether descriptive statements about language are language-particular or language-invariant, i.e. [+/-1p]; and whether they are construction-particular or construction-invariant, i.e. [+/-cp], in a principles-and-parameters theory descriptive statements only have the language-particular or language-invariant property since it is the interaction of language invariant principles with parameters set that yields the properties of the relevant expressions. That is, in such a theory general principles of language are [-1p] and [-cp], and the specification of parameters is [+1p] and [-cp]. Hence, the only property that descriptive statements can have is [+/-1p], property on the other hand necessary both for Plato's problem to have a solution –i.e. something must be [-1p]– and to account for the existence of more than one human language –i.e. something must be [+1p].

Given the general correctness of the principles-and-parameters approach to the study of language, Chomsky argues that efforts should concentrate on finding out what are the principles and parameters which make up the initial state of the language faculty and thus establish the set of possible human languages (p. 26). In relation to the lexicon, it is acknowledged that recent work accords to it a central role since it is supposed to project "... essential properties of the various levels of structural description from features of lexical items ..." (p.27) (Chomsky, 1984: 29ff.; 1986: 81ff.; 1988: 75f.; Horrock, 1987: 99f.; Cook, 1988: 11f.; Radford, 1988: 369; 391f.). Following his line of argument, Chomsky concludes that language is a biological system which singles itself out from the other biological systems in that it is infinite and digital, properties only shared by the number system which is "... quite probably, derivative from the language faculty." (p. 50). He contends that the mind consists of a number of

sub-systems, the language faculty being just one of them, with an internally highly modularized structure. In his view, communication is neither the main aim of the language design nor is language the only system used to this end.

Fromkin addresses the issue of language and brain and underlines Chomsky's crucial influence on all research into mind and language –i.e. cognitive psychology, psycho-linguistics, linguistics, neuro-psychology, and neuro-linguistics– due to his quest for understanding "... the nature and form of human linguistic knowledge, ..." (p. 84), concluding that research evidence on the theory of grammar from the last three decades does support his original assertion of the species-specific nature of language (Chomsky, 1986a; 1986b; 1986c; 1988). The scientific study of language and brain, she continues, has proved the modular conception of the grammar itself, consisting of interactive but independent components liable to suffer the consequences of damage caused to focal brain areas, as is attested by aphasia research linguists have carried out. However, even in this area she sees the influence of Chomsky's fundamental contribution to linguistics, since in her view no anatomical brain localization of function can account for syntactic theory or the nature of the syntactic deficit. It is only the theory itself that can do this. And she believes it has been Chomsky who has uncovered the shortcomings of mechanistic and empiricist views of science, offering theory instead of procedural methods, thus allowing linguistics to achieve the status of a theoretical and explanatory science and not a mere classificatory science.

Wexler deals with the relation of generative grammar –i.e. Chomsky's work– to psychology, namely the poverty of stimulus argument, which he considers to be the one associated with this branch of linguistics by current psychology. He argues that although generative grammar is a theory which gives central importance to internal states, as has done cognitive psychology since its development after World War II, both thus opposing behaviourism, Chomsky went further than this and sought to explain how the child constructs his grammar, positing that since the adult output grammar goes far beyond the linguistic evidence encountered, much of that linguistic knowledge must be innate. This is an application of the above principle –i.e. the poverty of stimulus argument– and also points out a position towards the theory of learning which is contrary to behaviourism, i.e. linguistic principles are innately given and not learnt from experience. Wexler also discusses how the already mentioned principle has been used in psychology, accounting for why it has not become central to mainstream psychology at the same time as he considers other psychological properties inherent to generative grammar and Chomsky's work.

Among the complex and varied array of contributions to this workshop, we will end by referring to some other points raised by other participants. Thus, Kasher asserts that within the research programme of generative linguistics, pragmatics –i.e. pragmatic competence–, and not merely syntax, has been focused upon (Chomsky, 1980: 224f.). In his view, there has been a continuity in the series of theories comprised in the growth of generative linguistics as a science. And although he acknowledges that syntax has been central to it, nevertheless he contends that throughout its development mere linguistic form has been transcended. That is, it being true that syntactic principles do not generalize because they only apply to the area which is specific to them –i.e. the language faculty which is dedicated to linguistic form. In spite of this the approach which has informed the general research implemented throughout the research programme is applicable to other cog-

nitive domains (Chomsky, 1986c: xxvi). And it is pragmatics from the viewpoint of Chomskyan linguistics that Kasher tackles in this conference. Matthews, on the other hand, deals with the psychological reality of grammars, stating clearly that by the term 'psychology' it is understood the scientific inquiry into human cognitive capacities. He asserts that grammars true of a speaker/hearer do bear a relation to performance models, in agreement with Chomsky's claims (1980: 106ff.; 189ff.). Leiber, for his part, addresses the label Chomsky stuck on the kind of linguistics he undertook, i.e. "*Cartesian* linguistics", contending its appropriateness as an indicator of the cognitive and formal aspects of language and thought that he was going to emphasize and develop in his work. He tries to disentangle this label from the contemporary characterizations of the beast-machine debate, while arguing that the generative linguistics of the last four decades is in fact a way of assimilating, amending and extending the general ideas of Descartes –and a number of other philosophers and scientists– into an explicit linguistic theory, a tradition started by the Port-Royal grammarians up to Humboldt. Newmeyer considers the historical development of generative syntax and challenges the view which interprets it as a steady progress via a process of accumulation. He strongly underlines the need to distinguish between Chomsky's views at any point in time and those held in the mainstream generative syntax, since they have not always been in agreement. Thus he stresses that although both after the publication of *Syntactic Structures* in 1957 and at the present time Chomsky has played and continuous to play a leading role amongst generative syntacticians, he points out that for at least half of this time his views were in a minority amongst them. It follows that when the focus of our inquiry is placed not on Chomsky's own positions but on mainstream research at a particular period, the accretionist view does not stand up to critical review. Newmeyer contends that the field of generative syntax instead of presenting a smooth development from language-particular rules to the present elegant model of interacting principles, virtually rule-free, in fact reveals alternating rule-oriented and principle-oriented periods. Hornstein reflects upon how contemporary thinking in the philosophy of language has tackled issues such as language acquisition, mentalism, empiricism/rationalism, and the scientific status of grammatical theory, contrasting Chomsky's mentalist study of the human mind and his rationalist proposals for a detailed structure of the language faculty with Quine's indeterminancy thesis and its epistemological implications. He understands the language faculty is strongly syntactic, although he urges the need to thoroughly investigate this assumption as well as the degree of transparency between syntax and interpretation, i.e. syntactic structure and semantic predicate argument structure. Finally, Bromberger and Halle deal with the issue of phonology and its different nature from other domains of linguistic knowledge, i.e. syntax and semantics. They maintain that facts belonging to each of these two spheres need not be addressed by theories which are similar formally until evidence attests to their similarity. In their view they are not, and they propose the structure of a deductive system to be that which best fits the structure of phonology.

It became apparent from this workshop that the methodology of research implicit in Chomskyan Linguistics has noticeably influenced other human sciences and social sciences, inevitably clashing with methodologies and philosophical orthodoxies currently in use. However, it also seems that it is the confluence of all the different paradigms through which modern linguistics has passed that has yielded the complex and broad understanding we now have of what language is. We believe

that introductory works on linguistics such as those by Lyons (1981), Riemsdijk and Williams (1986), Atkinson et al. (1988), Robins (1989), Akmajian et al. (1990), Brown and Miller (1991) or Fromkin and Rodman (1993) prove it. A valuable and useful aid to the subject matter tackled by the book, and to an understanding of Chomskyan thought itself, may be found in Lyons's (1991) *Chomsky*. Here, the non-linguist reader, or even the inexpert one, is offered an overall framework of the development of Chomsky's work and the evolving systems of generative grammar, accounting for the formalisms upon which it is based. In addition, it deals with "... the complexities of the relationships between generative grammar and natural languages, on the one hand, and (...) some of the assumptions that Chomsky had built into the formalism, on the other." (p. 6).

Notes

1. Kasher, A. (ed.) (1991) *The Chomskyan Turn*. Oxford: Basil Blackwell: 410 pp.

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