

PERSISTENT TOPICS IN LINGUISTIC THEORY

Contemporary study of language has turned to questions of linguistic structure and cognitive psychology of a sort that aroused little interest in the immediately preceding period. The extent to which this is a return to long neglected topics rather than an innovation is not widely appreciated, however, and I would like to comment briefly on this matter here.

A central topic of much current research is what we may call the "creative" aspect of language use, that is, its unboundedness and freedom from stimulus control. The speaker-hearer whose normal use of language is "creative," in this sense, must have internalized a system of rules that determines the semantic interpretations of an unbounded set of sentences; he must, in other words, be in control of what is now often called a *generative grammar* of his language. A generative grammar must determine the *structural description* of each possible sentence, where the structural description of a sentence is a formal object of some sort that contains what information the rules of the language provide concerning the semantic content and phonetic form of this sentence. A study of generative grammars

shows very clearly that the structural description of a sentence is in general highly abstract. That is, both the phonetic and semantic interpretation of sentences can be determined by rules of great generality and explanatory power if the grammar assigns to these sentences underlying structures that have no simple point-by-point relationship to the actual sentences, and that cannot be derived from these sentences by application of taxonomic procedures of segmentation and classification. Furthermore, grammars that meet with some success in characterizing and accounting for the actual pairing of phonetic and semantic interpretations cannot be derived from the data available to the linguist or language-learner by any procedure that might be called "inductive," in any reasonable sense of this term. It does appear to be the case, however, that the generative grammars of widely different languages are similar or identical in nontrivial respects. Such observations as these have led to the consideration of theories of cognition that lay great stress on the intrinsic contribution of active mental processes to the determination of what is perceived and what is learned.

Among the topics of contemporary interest, then, are the following: the creative aspect of language use; systems of abstract structures that underlie the phenomena of performance; the universal conditions on underlying structures; models of perception and acquisition that incorporate an advance specification of general features of what is perceived or learned.

I will not try to describe current work dealing with these matters any further here.¹ Instead, I would like to comment briefly on a much earlier tradition in which topics of the same sort were intensively explored, and many specific conclusions were reached that are now being rediscovered.² I refer to the seventeenth and eighteenth century tradition of "universal" or

¹ For further information, see the chapters by G. A. Miller and N. Chomsky in R. D. Luce, R. Bush, E. Galanter (eds.), *Handbook of Mathematical Psychology*, Vol. II, Wiley (1963), particularly, chapter 11 and chapter 13, part II; J. Katz and P. Postal, *An Integrated Theory of Linguistic Description*. M.I.T. Press (1964); N. Chomsky, *Current Issues in Linguistic Theory*, Mouton (1964) and *Aspects of the Theory of Syntax*. M.I.T. Press (1965).

² This account is excerpted from a longer study entitled *Cartesian linguistics*, to be published by Harper and Row.

“philosophical grammar,” and the essentially Cartesian philosophy of mind from which, in part, it developed.

Like contemporary work in generative grammar, philosophical grammar arose in part as a reaction to a narrow descriptivism that regards the data of performance as exhausting the subject matter of linguistic description and that limits itself strictly to presentation of such data in an organized way. The famous *Grammaire générale et raisonnée* of Port-Royal (1660) is fundamentally an attempt to convert the study of language into something like “natural philosophy,” in contrast to the approach of Vaugelas and others in which it is a kind of “natural history.” Thus the Port-Royal Grammar is concerned not merely to record the phenomena of language, but to explain them. To explain such phenomena, it is necessary to establish general principles from which they follow; hence the grammar must be both *générale* and *raisonnée*. These general principles in effect constitute an empirical hypothesis as to the class of possible human languages. Such a hypothesis can be confirmed in two ways: by showing that it is compatible with the diversity of human language, and that it is sufficiently powerful to offer explanations for particular phenomena. Universal grammarians pursued both types of justification within the limits of the information and technique available to them. In the course of this study, they made many specific proposals regarding the structure of language and the way in which it is used. It is widely believed that these proposals have been refuted or shown in some way to be “irrelevant” by later linguistic work. This, so far as I can determine, is not so. Rather, the theories of philosophical grammar were simply forgotten as the attention of linguists shifted to other topics, and, particularly in the last generation, as the scope of general linguistics was narrowed in such a way as to exclude, in principle, the questions that were of primary concern to the universal grammarians.

The Port-Royal Grammar makes a distinction between what we may call the “surface structure” and the “deep structure” of a sentence, the former being its organization as a physical event, the latter, the underlying abstract structure that determines its semantic content and that is present in the mind when the

sentence is produced or understood. Thus the surface structure of the prototype sentence *Dieu invisible a créé le monde visible* indicates that it is of subject-predicate form, with a complex subject and a complex predicate. Its deep structure, however, is a system of three judgments, namely, the judgment that God has created the world (the "principal proposition"), that God is invisible and that the world is visible (its "incident propositions"). The underlying deep structure that conveys the semantic content is, therefore, a system of three propositions, present in the mind when the physical sentence is produced and understood.

Each of these underlying elementary propositions is, like the surface structure, of Subject-Predicate form. A deep structure consisting of elementary propositions, suitably organized and interpreted, is converted to a surface structure by formal operations of a sort that we may call "grammatical transformations." In the case just mentioned, these would include an operation of relativization (which, applying alone to the deep structure in question, generates *Dieu qui est invisible a créé le monde qui est visible*) and a further optional operation that deletes *qui est* and (in some circumstances) inverts the Noun with the following Adjective. Similarly, such a sentence as *scio malum esse fugiendum* is based on a deep structure containing the incident proposition *malum est fugiendum*; the infinitival constructions relate to the Verb as the relative constructions relate to the Noun.

There are many other examples of such analyses. It is important to recognize that what was being proposed was a kind of psychological theory. This is evident not only in the Port-Royal Grammar and Logic but also in much later work. The encyclopedist Du Marsais, for example, developed a theory of sentence interpretation based on the idea that an utterance with a certain *construction* (essentially, surface structure) must be analyzed into its underlying *syntax* (essentially, deep structure) in order to be understood. This procedure of analysis involves inversion of the processes of ellipsis and rearrangement that were used to form the utterance from its underlying structure, in which grammatically related items are contiguous. This analysis of construction and syntax is presented not as a technique for explicating texts (as in the much earlier grammatical work that in part suggested it), but as a psychological theory, an account of

the mental processes that are involved in the interpretation of utterances.

It was observed that languages may differ in the grammatical transformations that they employ and, correspondingly, in the surface structures of actual utterances. But the deep structures, which represent semantic content, were held to be universal, as a matter of principle. The reason offered is that mental processes are a common human endowment and that deep structures directly reflect them. Many examples were given of divergences in surface structure from language to language. These examples illustrate not only the diversity of languages, with respect to surface structures, but also the abstractness of deep structure in each particular language. One can see at once the irrelevance of modern critique. Modern linguistics has of course gone far beyond universal grammar in exhibiting the diversity of systems of surface structure. Studies of deep structure are rare, however, so that no evidence is provided for or against the hypotheses of the philosophical grammarian regarding the underlying uniformity of deep linguistic structures. What evidence there is gives little reason to doubt the correctness of much of what was proposed.

Examples were noted above showing how the nominal and verbal systems can be extended by a process of embedding of propositions. This device can be repeated indefinitely, so that a grammar of the form suggested will have the capacity to generate an infinite number of deep structures and, given an explicit specification of grammatical transformations, semantic interpretive rules, and phonological interpretive rules, such a grammar will relate semantic interpretations to phonetically represented signals over an infinite range. Of course, no explicit system of this sort was developed during this period, although the general framework of such a system was suggested by many observations and particular analyses. It is worthy of note, however, that the creative aspect of language use was a topic of considerable discussion and thought in the seventeenth century, in the context of the controversy over animal automatism. Descartes' arguments for the existence of "other minds"³ turn on the creative aspect of language

³ *Discourse on Method*, part V, and later, in his correspondence. See Chomsky, *Cartesian Linguistics*, for several quotations and references.

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use. It is this that he suggests as the best indication that another body does in fact have a mind. Descartes argues that the freedom of language use from stimulus control, its independence of what we would now call "conditioning," its appropriateness to situation and to preceding discourse, and its typical novelty all point to the existence of some sort of "active principle" that lies beyond the bounds of mechanical explanation, as he understood this. This position is expanded in an interesting volume by Géraud de Cordemoy,⁴ in which various tests are proposed for the presence of mind, most of them involving the creative aspect of language use.

It should be observed, incidentally, that there is nothing at all absurd in Descartes' argument; in principle, it is no different from the anti-Cartesian argument that gravitational forces must be postulated that go beyond Cartesian mechanism in that they involve action at a distance. It is also important to note that subsequent attempts to show that mechanical principles can account for human as well as animal behavior do not, so far as I can discover, attempt to refute these arguments. It is also worth mentioning that the Cartesian investigation of this problem does not limit itself to providing "criteria" of some sort for intelligent behavior, but rather raises the question of how this intelligence is to be explained. In this respect, the Cartesian investigations of mind, like the studies of philosophical grammar, are essentially scientific in their general outlook and goals, as contrasted with many modern "behavioristic" investigations of similar phenomena.

Interest in the creative aspect of language use, as well as the particular theories of deep and surface structure that are typical of early modern linguistics, developed within the framework of the general rationalist theories of perception and learning that appeared both in England and on the Continent in the seventeenth century. The reopening of these topics to investigation in the last few years has coincided with and in part contributed to a revival of interest in theories of cognitive processes that have a highly rationalist flavor. The reasons are clear. If it is true that deep structures are quite abstract and

⁴ *Discours physique de la parole* (1668).

related to surface forms by an intricate mechanism of rules, then there is no hope for "taxonomic" perceptual models that are restricted to operations of segmentation and classification and the like. Rather, it will be more profitable to investigate models that incorporate the system of generative rules, and utilize this information to construct a perceived signal to be matched against the sampled input data.⁵

In other terms, the mind produces a "percept" on the occasion of a certain stimulus, utilizing in the process a system of internalized schemata or a set of rules for generating such schemata. Furthermore, if the grammars of natural languages are not only intricate and abstract, but also very restricted in their variety, particularly at deeper levels, it becomes necessary to challenge the widespread assumption that these systems are "learned," in some significant sense of this term. It is perfectly possible that a particular grammar is acquired by differentiation of a fixed innate schema, rather than by slow growth of new items, patterns or associations. Choice between these alternatives, which can be made quite precise in various ways, is a matter of fact, and the little that is known about the structure of language suggests that the rationalistic hypothesis is likely to prove productive, and fundamentally correct in its general outlines. In any event, we see here once again a renewal of interest in quite traditional topics, and a return to points of view and specific proposals that were characteristic of a much earlier period in Western thought.

Modern "rationalistic" linguistic theory differs from its earlier variants in many ways, most importantly, in its utilization of technical devices that were not clearly understood until quite recently. It is now possible to do in a precise way what could only be vaguely and suggestively discussed in an earlier period, namely, to construct precise generative grammars that face the problem of relating semantic interpretations to phonetically represented signals over an infinite range, thereby beginning to meet at least a preliminary condition on any proposed model of linguistic competence. It has also become possible to face seriously the problem of specifying the underlying schema that

⁵ Such procedures are sometimes referred to as "analysis by synthesis" procedures.

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determines the class of possible grammars and, presumably, constitutes a precondition for language-acquisition, and to study the formal properties of languages meeting these general conditions. Study of these problems is, obviously, at a very early stage. My interest here is not to justify or to summarize the specific steps that have been taken, but rather to point out that in fundamental ways these steps constitute a return to traditional ideas and viewpoints, rather than a radical innovation in linguistics or psychology.