

NOAM CHOMSKY

Critical Assessments

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Chomsky's revolution in linguistics

Robert Sklar

Noam Chomsky, as a linguist and as a radical, lives in two worlds which are hardly aware of each other. To radicals he is the author of a formative essay on 'The responsibility of intellectuals', Norman Mailer's cell mate after his arrest at the October 1962 march on the Pentagon, a leading adult supporter of draft resistance: to linguists he is the controversial creator of a revolution in the study of language, a scientific revolution whose impact has already been felt not only in linguistics but in such other scholarly fields as psychology, biology, philosophy, English literature and education. If this essay on Chomsky's revolution in linguistics slights his current political views, it is only because they are more readily available and require no simplifying explanations. What matters is that Chomsky himself lives not in two worlds but in one. Chomsky's politics and his linguistics have always been more closely integrated than his colleagues in either field have ever suspected; and if the linguistics revolution succeeds, it cannot fail to have its impact on politics as well.

Chomsky's revolution in linguistics began more than a decade ago, at a time when scientists in all fields believed that science advances in a progressive way, through breakthroughs and new discoveries, by the patient or fortunate tracking down of an elusive answer to a tough old problem. It is only since Thomas S. Kuhn's influential and widely debated book, *The Structure of Scientific Revolutions*, appeared in 1962 that scientists have considered the possibility that scientific change takes place in a revolutionary way, by a struggle between the familiar mode of conducting a particular scientific field and a totally new one, with the new ultimately winning out and taking over the field. What has happened in linguistics since Chomsky appeared on the scene almost perfectly fits Kuhn's description of how a scientific revolution works.

A scientific revolution, as Kuhn describes it, differs from a political revolution chiefly in that the losers survive – often they go on with their

work as if nothing had happened at all. Most scientific work, according to Kuhn, operates under the rules of what he calls normal science. All the researchers in a field operate on the basis of a shared paradigm, which Kuhn defines as something more than a theory and less than a world view. The paradigm provides a set of rules, defining the boundaries of a field and determining the questions a scientist can properly ask.

Given the nature of science, however, the time comes when new techniques, or simply an accumulation of data, begin to create difficulties for the reigning paradigm. Researchers are confronted with anomalies in their work which would not be there if their field were functioning normally, and the science enters a period of crisis. A successful revolution is not always inevitable at this point, but if it comes, according to Kuhn, it will be led by a young scientist, or an outsider new to the field, who asks new questions and produces a new theory, around which a new paradigm can form. The new and old paradigms compete against each other for adherents, but the new paradigm is fated to win, because it provides possibilities for normal scientific research that the anomaly-ridden old paradigm no longer can. How long the struggle may take is another matter. When Darwin published his *Origin of Species*, he remarked that he did not expect to convince those naturalists 'whose minds are stocked with a multitude of facts all viewed, during a long course of years, from a point of view directly opposite to mine', but he expected to win the young and rising generation over.

Chomsky did not begin his linguistic career as a revolutionary but as a young scholar forced to rethink the fundamental questions of his field because the familiar answers were raising more problems than solutions. It had been more than fifty years since any linguist had been driven back to the beginning, to ask, in effect, 'What is language?' Before Chomsky the last linguist to ask the basic question so simply and directly was the Genevan, Ferdinand de Saussure, who published a book on language in 1878, when he was twenty-one, and published nothing thereafter during a lifetime of teaching and research. After Saussure died in 1913, several of his students pooled their notes of his lectures and published them in 1916 as Saussure's *Cours de linguistique générale*, the book which founded modern linguistics.

Saussure defined language as a relationship between a person's thoughts and the sound his voice makes. Thought he called the signified and sound the signifier, and they were linked by something called the linguistic sign. The way to study language, Saussure said, was to study linguistic signs, not in a historical or comparative way but in a single language at a single moment in time. To assist this study Saussure made a distinction between *langue* and *parole*, between language and utterance. He held that the ideas, concepts and images of a particular language culture at a particular

time could be totalled up and would comprise the language, out of which, in relation to utterance, the linguistic sign could be found.

In the United States modern structural linguistics began as a tool of anthropology, but it attained its independence under the leadership of Leonard Bloomfield, a scholar of German philology at the University of Chicago, whose textbook, *Language*, published in 1933, is regarded as the founding and classic work of the American school of descriptive linguistics. 'There can be no doubt,' according to a historian of the field, 'that Bloomfield's greatest contribution to the study of language was to make a science of it.'

Bloomfield argued that the sound patterns of a language change in a systematic way, and that the road to discovering those changes lay through a rigorous establishment of procedures. To get at the right procedures you had to begin by excluding all non-linguistic criteria. Bloomfield called himself a mechanist, and in his view anything having to do with the mind, thought or mental activity in any form, was not a proper subject for linguistics. In Saussure's terms, the American descriptive linguists studied only utterance, and did not concern themselves with language at all. American descriptive or structural linguistics was nevertheless a growing, confident and influential scientific field until Chomsky began to overthrow it more than a decade ago; and the basic disagreement between the old linguistic paradigm and Chomsky's new one, laying aside all technical matters, lies in their absolute conflict over the nature and relevance of the mind. Descriptive linguistics defines language as 'speech sounds which people utter under particular stimuli'. Chomsky describes language as an instrument for the free expression of thought and response to new situations.

In our daily lives, Chomsky points out, we are constantly uttering sentences we have never spoken before, and understanding sentences we have never heard before. In other words, our normal everyday use of words is creative. The descriptive school of linguistic scholarship tried to explain the undoubted fact that we make and understand new sentences all the time by various behavioural or mechanistic theories – that in childhood we are trained to respond to certain stimuli or that we acquire certain habits of language use, or that we create new sentences by analogy from old ones. None of these explanations, Chomsky insists, will serve. The only possible source for the creative aspect of language use lies in the innate competence of the human mind.

If it is possible to describe our daily, commonplace uses of language as creative in this sense, what does it mean to say that it stems from an innate competence of the human mind? It assumes, for one thing, that we are capable of forming thoughts and feelings and expressing them through our language. But it does not assume that the way we express a thought or feeling is going to be a complete and accurate rendering of

it. The process that creates thought from abstract mental structures is one thing, the process that transforms thought into spoken language is wholly another. The study of language must necessarily be mentalistic, Chomsky insists, or else it will limit itself only to the outer form of language, the small deceptive part that sticks out like the surface of an iceberg. Beneath that, Chomsky says, is a deep structure of infinitely greater complexity and importance.

The notion that language has both surface and deep structures was used in linguistics before Chomsky – by Saussure with his distinction between language and utterance, and even more explicitly by Wittgenstein. But for Chomsky, unlike his predecessors, this dual structure of language provides the key to even more basic questions about the nature of mind. ‘My own view’, Chomsky has written,

is that what is common to all languages is a certain schematism, a set of abstract formal conditions of a highly restrictive sort that sets strict limits on the choice of deep structures, surface structures, the transformational rules that interrelate them, the phonetic and semantic rules that interpret them.

What is most exciting to Chomsky and his associates is not the incredible variety and incompatibility of surface language use but rather the underlying unity of language form. ‘The general features of grammatical structure’, he writes, ‘are common to all languages and reflect certain fundamental properties of mind. . . . There are, then, certain language universals that set limits to the variety of human language’. The core of Chomsky’s effort in linguistics is to build a theory of how these language universals work.

Chomsky has sometimes referred to language universals as innate or abstract ideas, which has added considerably to the controversy and perhaps also to the confusion surrounding his theories. In technical terms, he defines language universals only as the ‘highly restrictive conditions that the rules of grammar meet’. In Chomsky’s theory rules of grammar generate the deep structures of a language, and deep structures are transformed into surface structures when we make spoken sentences out of thoughts and feelings in our minds.

In practice it is not difficult to see how Chomsky’s linguistic work differs from that of his predecessors. For the ambiguous phrase *the shooting of the hunters*, for example, every linguist would agree that it could have two different semantic interpretations, one based upon a kernel sentence – or a deep structure – with *hunters* as the subject of the verb *shoot* and another with *hunters* as the object. But Chomsky would go further and relate *the shooting of the hunters* as well to underlying abstract structures

– the rules of grammar – which generate the two possible semantic interpretations. An example like *sincerity pleases John* might make this more clear. This is a simple sentence with a verb and two nouns, one a subject and one an object. But if one tries to substitute nouns or verbs to make new sentences like *John pleases sincerity* or *sincerity looks John*, then it is clear that there are underlying principles – language universals, fundamental properties of mind – which make the first sentence grammatical and the others not. The basic question confronting Chomsky and his co-workers is to specify these principles at each point in the process of language, from rules of grammar through deep structure, surface structure, and finally to the phonetic and semantic interpretations we assign to our words.

Given this kind of theoretical progress, it is perhaps understandable that Chomsky refrained from further complicating an already difficult and hotly debated scholarly issue by pointing out the political and social implications of a theory emphasizing human competence and capacity to use language freely and creatively. In his recent book *Cartesian Linguistics*, however, talking about Wilhelm von Humboldt, the German statesman and scholar whose work he greatly admires, Chomsky makes clear that Humboldt's emphasis on spontaneous and creative aspects of language use derives from a more general concept of human nature. Thereupon he momentarily let down his guard, and in a long footnote he suggests in a curiously oblique way what the social and political implications of his linguistic theory might be.

After indicating that he approves of the Cartesian picture of human nature, Chomsky relates it to Rousseau's critique of modern society, quoting at length from Rousseau's *Discourse on the Origins and Foundations of Inequality among Men*. Modern social organization and the national state, Chomsky quotes Rousseau, have destroyed natural freedom, but man can regain his true humanity by 'new revolutions [that will] dissolve the government altogether or bring it closer to its legitimate institution . . . the uprising that ends by strangling or dethroning a sultan is as lawful an act as those by which he disposed, the day before, of the lives and goods of his subjects'. Chomsky could only have been using Rousseau's phrases to speak his own thoughts. The scientific revolutionary and the political revolutionary, it seemed clear, were one and the same after all.

The roots of Chomsky's scientific revolution in linguistics were laid early in his childhood. Chomsky's father, William, had emigrated from Russia in 1913 to avoid being drafted in the Czarist army, and became a Hebrew scholar at Gratz Teachers College and Dropsie College in Philadelphia, the city where Noam, an elder son, was born on 7 December 1928. During Noam's boyhood his father was writing for publication a

thirteenth-century Hebrew grammar, *David Kimhi's Hebrew Grammar*, and it was this early acquaintance with medieval Hebrew philology which prepared the foundation for all that followed.

In a recent conversation Chomsky described the background of his career in linguistics. 'My father's professional work was medieval Hebrew grammar', he explained:

so at age 10 I was reading proofs on a 13th-century Hebrew grammar. This actually affected a lot of work that I did later, because I came to the field much later, without approaching it through the structuralist position, but rather from a totally informal background in classical philology – just picked up by looking at things here and there. You couldn't even call it a background. I didn't know anything, I just had a feel for historical processes. In fact, though, I've never really been interested in historical linguistics as such, there was one fact about historical linguistics that had been rigidly excluded in structural linguistics that I just took for granted, and I'm very glad I did – that is, an account ought to give explanations, not just descriptions. Historical linguistics was concerned with explaining why such and such a distribution of forms existed at a particular moment, but structural linguistics made a very strict point of not giving explanations. In fact, giving explanations was regarded as some kind of infantile mysticism. Really the only innovation I think I introduced into the field basically was to try to give descriptive explanations – to try to give a theory of the synchronic structure of the language which would actually explain the distribution of phenomena. In my early work, at least, this was very self-consciously modeled on the kinds of explanations that people gave in historical linguistics that I knew about ever since I was a kid. I had no further contact with the field really until college, when I ran into Zellig Harris

– the most rigorous practitioner of the linguistic methodology Chomsky was to overthrow.

After graduating from Central High School in Philadelphia, Chomsky started his college career in a desultory way at the University of Pennsylvania. He was more interested in Middle Eastern politics than in academic studies, and he wanted to drop out of college and go to Palestine. In an effort to dissuade him, Chomsky's parents introduced him to Zellig Harris, the linguist, who was then deeply immersed in political activities which seemed to reflect their son's left-wing political views. The two men immediately hit it off well together, and Chomsky decided to stay at Penn and take Harris's courses in linguistics. 'He was at that time just finishing up his major work on structural linguistics, the thing that came

out as *Methods in Structural Linguistics*', Chomsky recalled. 'In fact, about the first thing I did before I ever took any courses from him was proofread the book for him. That's how I learned linguistics, by proof-reading Harris' book – which was fine for me, I really learned the field.'

Harris suggested that Chomsky go to work on a grammar of Hebrew. 'I worked on it from a point of view which had nothing to do with linguistics whatsoever', Chomsky recalled,

but really had to do with my own background in historical linguistics. I started right off, without even asking any questions, working within the framework of generative grammar, which seemed to be the only conceivable thing, namely, trying to find a system of rules which would enable you to characterize all of the sentence structures in the language. I very quickly discovered that if you wanted to do this properly you had to have a long sequence of ordered rules. I also noticed right off that the logical order corresponded to some extent to the historical order which I knew of. I found that if you gave it the right kind of logical order then you could explain a lot of phenomena which otherwise seemed very inexplicable. I worked on this for a couple of years in really total isolation.

Harris apparently never looked at it.

In retrospect, however, Chomsky feels he was fortunate in coming to linguistics by so unorthodox a route. 'There is a lesson here for the social sciences', he remarked.

Most people come into the social and behavioral sciences and they're immediately faced with a fixed range of questions and a format of problems that you're supposed to look at, and it's very hard to challenge it, I suppose, because you go through and then you repeat it to your students and the same sort of nonsense gets repeated for fifty years. Finally somebody asks a simple question and the whole field collapses.

Take this about language being habits. For about one hundred years people were saying language was a habit system and nobody ever questions it. Well, as soon as you ask, 'How can you innovate by habit?' then the whole field collapses and takes some entirely new way. Of course, it doesn't collapse in a minute. People argue for a while. But once one has seen the point of the fact that you cannot innovate by habit then most of linguistics and practically all of modern psychology sort of disappears. Normal human behavior is obviously innovative, and it's not based on analogy or something else.

Chomsky stayed on at Penn after he had completed his undergraduate

studies and wrote up his work on Hebrew grammar in a master's thesis, 'Morphophonemics of Modern Hebrew', which earned him an MA in 1951. He had also begun to study philosophy at Penn under Nelson Goodman, and when Chomsky was finishing his MA work Goodman nominated him, successfully, for a junior fellowship in the Society of Fellows at Harvard. Chomsky held a fellowship for four years, from 1951 to 1955, and at the end of that time he received a doctorate in linguistics from Penn.

Chomsky's project for his junior fellowship, curiously, was an effort at improving the techniques of structural linguistics. At Penn he had been working as a student and collaborator with Zellig Harris even while, on his own, he was pursuing the generative approach to Hebrew grammar.

I totally believed in Harris' approach, thought structural linguistics was right, and was trying to work it out. The natural thing for me to try to do as a student was to say, 'Okay, here's a diffuse set of techniques' [the techniques, that is, of structural linguistics] 'Let's really formalize them and see what their consequences are.' In fact the first article I published was in the *Journal of Symbolic Logic*. It was an attempt – which I think now completely silly – to overcome some of the inadequacies in the application of those techniques, to really sharpen them up. This was the great mass of work that I was doing for a couple of years after I left Penn. At the same time I was working on the side on this generative grammar approach, but thinking that it must be crazy, and not showing it to anyone.

Finally Chomsky came to realize he was getting results through his work on generative grammar, growing out of his earlier work on Hebrew, while his apparently more important effort to improve the techniques of structural linguistics had no visible success at all.

Sometime around 1953 or so I began to think, 'Well, how come this other way is getting results and this is just more and more manipulation, always leading to a blind alley?' As soon as you raise the question it becomes obvious that there's no reason why these step-by-step analytic procedures should ever work.

In his last year at Harvard Chomsky worked feverishly to complete an immense manuscript, over 900 pages long, on the generative approach to grammar, called 'The logical structure of linguistic theory'. One chapter of the manuscript, a section on 'Transformational analysis', he submitted to the linguistics department at Penn as his doctoral dissertation. Though he was awarded his PhD, at least one of his readers reacted in a way that was soon to be characteristic: 'I don't know what field this belongs

to, but it certainly isn't linguistics.' Over the next year or two Chomsky's dissertation and several articles came back promptly from the linguistics journals and publishers.

In 1957 his first book, *Syntactic Structures*, was published by Mouton of The Hague, a little book of fewer than 120 pages in pale blue paper covers, that had gone through five printings by 1965. *Syntactic Structures* was not a book Chomsky wrote for publication, since he assumed it was impossible for him to publish in the field, but was rather a compilation of Chomsky's notes for his introductory course in linguistics at MIT.

But it had the effect on some structural linguists that Kuhn describes when a new scientific paradigm appears at a time of crisis in the field. One of the leading young structural linguists, Robert Lees, read the book and switched his allegiance to transformational grammar. Lees wrote a long, highly favourable review in the journal *Language*, and thereupon *Syntactic Structures* raised a storm in the field of linguistics.

One result of *Syntactic Structures*, and Lees's review, was an invitation for Chomsky to take part in the next year's Texas Conference on Linguistic Analysis in English. After the Texas conference one of the participants, a professor at UCLA, switched from structural linguistics to transformational generative grammar – another conversion from the old paradigm to the new one, especially significant in the light of Kuhn's model for scientific revolutions. Chomsky, meanwhile, spent the 1958–9 academic year at the Institute for Advanced Study in Princeton, where his work began to attract the attention of young scholars in other fields.

Chomsky had planned for his year at Princeton to revise his 900-page manuscript for publication, and though he got three-quarters of the way through it, eventually he gave it up in favour of a renewed interest in mathematical models in linguistics. His mathematical work resulted in several published papers over the next few years, but more importantly it established Chomsky's credentials as an expert, which have been indispensable for his criticism of the social sciences. 'When Chomsky criticizes the application of computers to the social sciences', one scholar has said, 'people have to listen, because he's been there and he knows what he's talking about.'

At the same time Chomsky began his reading in the history of linguistics, mostly at the suggestion of his MIT colleague, Morris Halle, which was eventually to result in *Cartesian Linguistics*. It would be interesting to speculate what course Chomsky might have taken had he not made this foray into the past. Very often a discoverer or innovator expends the sum of his intellectual energy on his revolutionary original insight, and thereafter spends the rest of his career repeating himself with minor modifications, while his followers are better able to see the implications of his work and carry it through. The three books Chomsky published between *Syntactic Structures* and *Cartesian Linguistics* – *Current Issues in*

Linguistic Theory (1964), *Aspects of the Theory of Syntax* (1965) and *Topics in the Theory of Generative Grammar* (1966) – can be seen in this light, as works clarifying his ideas, replying to critics, incorporating revisions in the theory and so on. But by his work in the history of linguistics Chomsky has been able to widen the boundaries of his basic original insights and relate them not only to the history of his own field but also to the major movements of ideas in modern times.

Although Chomsky had referred to historical figures like Wilhelm von Humboldt in several of his works of the early sixties, it was not until 1964–5, when he passed a sabbatical year at Harvard's Center for Cognitive Studies, that he immersed himself in the history of linguistics and made the connections, overtly, with the nature of mind, and, covertly, with the nature of politics, that appear in *Cartesian Linguistics*. He saw more clearly than ever that his disagreement with the structural linguists was part of a larger question to do with the methodology of philosophy, psychology and the social sciences as well. The dominant trends for half a century in those fields have been empiricist in nature, holding that human knowledge is derived purely from experience – hence the view of structural linguists and behavioural psychologists that the creative aspect of language use could only be developed by training or habit or analogy to past experience. Chomsky's efforts to understand human language, however, had led him to the belief that language universals exist in the mind – that the mind, in philosophical terms, is a source of knowledge independent of the senses. Thus Chomsky placed himself in the rationalist tradition of philosophy.

'Without trying to make this sound a little bit inflated', he explained,

I really think there is a very serious issue that is raised in the empiricist-rationalist controversy. In philosophy this is a very hard position to maintain because almost everyone assumes that these issues are dead, and if you only use words clearly you can see there is no issue. I don't believe that at all.

The problem, he suggests, is that contemporary philosophers bring their own concerns to their studies in the history of philosophy, instead of trying to understand past philosophers in their historical and intellectual context.

If you study empiricism and rationalism this way, I think you find two fundamentally different approaches to the nature of human intelligence. The empiricist approach basically says that human knowledge is an adventitious construct which has developed through association and habit and so on from an essentially unstructured organism which

has as its structure only the ability to perceive certain impressions – and ability to carry out induction – which Hume quite honestly said must be just animal instinct; there is no explanation for it. The rationalist approach basically assumes that there's some fixed schematic structure within which any human knowledge has to develop and it can be initiated by experience but it's going to take the form which is determined by the nature of mind. This is a very different approach, I think.

In his own scholarly work Chomsky is anxious to move on towards the unanswered questions about the human mind.

I think I've done about as much arguing as I feel like doing for a while on this general rationalist–empiricist business. I think the thing to do now is to try to draw out and give an explicit characterization of those principles which do govern the functions of mind – human cognitive processes – in this domain and try to tie them as much as possible to other things that are known about the psychological capabilities of humans and just build on that.

The linguistics revolution can hardly rest content with the acceptance of transformational generative grammar within its field. One of the difficulties in talking precisely about scientific revolutions, from Copernicus and Galileo to Freud and Einstein, is that they are enmeshed in far wider and more complex changes in the way men view themselves and their world. 'Linguistics', Chomsky says, 'is really a theoretical biology, if you like, a theoretical psychology'. If Chomsky's rethinking of the question 'What is language?' has brought about a revolution in the field of linguistics, it cannot help but be involved – in ways we may not yet be able to see – in a larger revolution built upon the question, 'What is man?'