New Horizons in the Study of Language and Mind

This book is an outstanding contribution to the philosophical study of language and mind, by one of the most influential thinkers of our time. In a series of penetrating essays, Noam Chomsky cuts through the confusion and prejudice which has infected the study of language and mind, bringing new solutions to traditional philosophical puzzles and fresh perspectives on issues of general interest, ranging from the mind–body problem to the unification of science.

Using a range of imaginative and deceptively simple linguistic analyses, Chomsky argues that there is no coherent notion of "language" external to the human mind, and that the study of language should take as its focus the mental construct which constitutes our knowledge of language. Human language is therefore a psychological, ultimately a "biological object," and should be analysed using the methodology of the natural sciences. His examples and analyses come together in this book to give a unique and compelling perspective on language and the mind.

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Foreword

Neil Smith

Chomsky's position on the world intellectual scene is unique. He was the leading figure in the "cognitive revolution" of the 1950s and 1960s, and he has dominated the field of linguistics ever since. His theory of generative grammar, in a number of different forms, has been a guide and inspiration for many linguists around the world and the point of comparison for almost everyone. You may not agree with Chomsky's work, but it would be both short-sighted and unscholarly to ignore it.

Chomsky graduated from the University of Pennsylvania in 1949, with an undergraduate dissertation about Modern Hebrew, that was later revised and extended as his master's thesis. However embryonic, that work inaugurated modern generative grammar. The issues he touched on then have burgeoned to define a field of inquiry to which he is still contributing fifty years later, and which is in large part the product of his genius. Yet this intellectual odyssey has taken only half his time. The other half has been devoted to political activism, exposing the perceived lies of Government and the hidden agenda of the corporate establishment. This has involved him in giving seemingly countless lectures around the world, and has resulted in the production of about fifty books, hundreds of articles and thousands of letters. There may be little connection between the strands of his work, but his fame and in part his influence are the joint product of both. (Chomsky's output is prodigious; for a recent overview and discussion of a representative subset of his work, see Smith (1999).)

His foundational work on language has had widespread implications not only for linguistics but also for several other disciplines, most notably philosophy and psychology. The present volume of essays concentrates on this third strand in his thought, dealing especially with metaphysical issues arising from his research, and clearing some of the underbrush of confusion and prejudice which has infected the philosophical study of language. In so doing he brings new solutions to traditional puzzles and new perspectives on issues of general interest, from the mind–body problem to the unification of science.

The core of these articles is an extended meditation on Chomsky's "internalist" interpretation of the human language faculty. Much of the philosophical tradition has concentrated on language as a public construct of which individuals have partial knowledge. This view is preoccupied with the relation between language and external reality: the word–world relation which underpins standard theories of referential semantics. In opposition to this tradition Chomsky defends at length, and with a series of imaginative linguistic analyses, the view that knowledge of language is individualistic, internal to the human mind/brain. It follows that the proper study of language must deal with this mental construct, a theoretical entity that he refers to with the neologism "I-language", an *i*nternal property of an *i*ndividual. A corollary of his view is that the lay (and philosophical) concept of "language", according to which Chinese (as spoken in Hong Kong and Beijing) or English (as used by Shakespeare and us) is not a domain about which one can construct coherent scientific theories.

His concentration on an internalist view of language brings Chomsky's work into the domain of psychology, and ultimately biology: human language is a "biological object". Accordingly, language should be analysed by the methodology of the natural sciences, and there is no room for constraints on linguistic inquiry beyond those typical of all scientific work. Although this methodology is most fully developed in and characteristic of physics, it does not follow that linguistics is reducible to physics or to any other of the "hard" sciences. It has its own laws and generalisations that cannot be described in the language of "quarks and the like". "Naturalism" in this sense is central to all of Chomsky's work, and explicitly excludes dualist demands that the analysis of language must meet criteria different from or in addition to those of chemistry or bacteriology. The measure of success for linguistics, as for any empirical discipline, should be the explanatory insight and power of its theories, not their conformity to the strictures of philosophy.

A number of consequences follow from his naturalistic thesis: there is no justification for the common assumption that natural languages ought to be treated like the invented formal languages of logic or mathematics; for the demand that the rules of language that we ascribe to individuals should be consciously accessible; for the requirement that the mental be reduced to the physical.

His rejection of this philosophical dualism is seen most strikingly in Chomsky's treatment of the mind–body problem. A perennial problem in philosophy has been to account for how the mental can affect the physical, how something which is by definition insubstantial can cause changes in spatially located entities: in other words, how the mind can

move the body. Chomsky has cut the Gordian knot by emphasizing a more fundamental difficulty: the mind–body problem cannot even be formulated. This is not, as generally supposed, because we have too limited an understanding of the mind, but because we don't have criteria for what constitutes a body. In a typically radical attempt at clarification he points out that, as Isaac Newton's insights led to the demise of contact mechanics, the Cartesian notion of body was refuted and nothing since has replaced it. In the absence of a coherent notion of "body", the traditional mind–body problem has no conceptual status, so no special problems of causality arise. More generally, there is no special metaphysical problem associated with attempts to deal naturalistically with "mental" phenomena (such as knowledge of language), any more than there are metaphysical problems for chemists in defining the "chemical".

A further implication of this argument is that common notions of reduction in science are inappropriate. We obviously want to integrate our theories of the mental – including in particular linguistics – with our theories of the brain and any other relevant domain. However, despite the example of the reduction of biology to chemistry brought about by the revolution in molecular biology, unification does not have to take the form of reduction. More importantly, the assertion that the physical or the physiological has some kind of priority is misconceived: theories in linguistics are as rich and make as specific predictions across a wide domain as do theories of chemistry or biology. Trying to reduce linguistics to neurology in the current state of our understanding is then unlikely to be productive. Consider the specific example of understanding the implications of electrical activity in the brain, as measured by "event-related brain potentials" (ERPs). Linguists have a reasonable understanding of different kinds of "deviant" linguistic structure, where deviance is defined in terms of departure from principles of grammar, and it now appears that such differences correlate with particular patterns of electrical activity in the brain. Such correlations have been taken to suggest that linguistic facts can be explained in terms of neurology. But here, and in a range of other cases, it is linguistics that enables us to make any sense at all of the results, as there is no relevant electrophysiological theory in existence. It is as impossible to express interesting generalisations about language in terms of the constructs of cells or neurons, as it is to express generalisations about geology or embryology in terms of the constructs of particle physics. In both cases demands for reduction go too far.

In some areas, scientific unification, let alone reduction, may be impossible in principle. This is not simply the truistic claim that we are incapable of understanding some domains, but the more subtle point

that there are aspects of our make-up that are inherently inaccessible to our intelligence. We do not doubt that rats are intellectually incapable of dealing with notions like prime number, and we should not doubt that our genetically determined make-up has resulted in an organism which is similarly incapable of understanding some domains. As Chomsky puts it, the intellectual world is divided into "problems" and "mysteries". The former may (or may not) succumb to our theorising; the latter never will. Our Science Forming Faculty may enable us to get some theoretical understanding of vision, language, genetics and so on. It doesn't follow that all domains will be so amenable, and some issues – like that of free will or the correct characterisation of consciousness – may lie beyond our intellectual abilities and remain mysteries, just as prime numbers are presumably a mystery for the rat. The claim is not that we can get no insight into these areas, but that we can (perhaps) get no scientific insight, and will need to rely on the genius of novelists or poets for greater understanding.

One area where Chomsky is pessimistic about the reach of scientific understanding is the characterisation of our use of language as opposed to our knowledge of language. His work over the past half century has opened up the study of our "competence" (to use the term now replaced by "I-language"), but how we put that competence to use in our performance is still largely a closed book, perhaps a mystery. This is not to deny that we have made progress in understanding how humans process the sentences they hear. All of the following have provided some understanding: experimental and theoretical studies of language perception and language production; insights from language acquisition and language change; and the analysis of brain function in normal and pathological subjects. There are even preliminary insights into how we interpret particular utterances in context, but we are still as far away as René Descartes was from knowing why someone chooses to react to a picture with *how beautiful*, or *it reminds me of Bosch*, rather than by silence.

This collection is called "New Horizons", but many of the topics discussed above are ones that have been the focus of attention for many years. Since his early foray into the history of ideas in *Cartesian Linguistics* (1966), Chomsky has shown a striking ability to put his ideas into a wider historical and general scientific perspective. His historical scholarship serves not only to make possible the tracing of intellectual antecedents, but also to illuminate developments in linguistics by comparing them with those in the traditional sciences, especially the history of chemistry. At the same time he relates these developments to ongoing work in psychology, philosophy, mathematics and the cognitive sciences more generally.

There are two aspects to what is new. On the one hand, there are new kinds of evidence for old positions; on the other, there is now the possibility to ask questions which it was previously impossible even to formulate. We do not yet have answers to these questions, but the ability to pose them is itself an exciting advance.

The first of these can be illustrated by reference to a claim for which Chomsky has long been famous (or notorious): namely, that a substantial part of our knowledge of language is genetically determined, or innate. That something linguistic is innate is self-evident from the fact that babies do – but cats, spiders and rocks do not – acquire language. Much of Chomsky's work of the past 40 years has been devoted to spelling out the technical detail of precisely what we have to attribute to the "initial state" of the human-language faculty to explain that elementary fact. Advances in linguistics and related disciplines have given rise to a situation where there is now a "distant prospect" of adducing evidence from the brain sciences and genetics to show how this determination takes place and, therefore, of unifying this part of linguistics with other sciences. Such unification is not central to Chomsky's own work, but the sophistication of his linguistics has made it a feasible enterprise.

The second aspect is the possibility of relating our knowledge of language to an account of the rest of our cognition. To explain how this might come about requires an outline of a little recent history. Current generative linguistics is dominated by two strands: the theory of "Principles and Parameters" – as spelt out in *Knowledge of Language* (1986) – and Minimalism – as seen most clearly in his book *The Minimalist Program* (1995c). For many years Chomsky and his followers devoted considerable effort to devising formal mechanisms adequate to describing the vast complexity of natural languages, a complexity that becomes ever more amazing the more one looks at individual languages. Some of these formal devices, in particular transformations and the notions of deep and surface structure were remarkably successful, and achieved a certain common currency outside linguistics, among philosophers, psychologists and even the lay public. The trouble with this stage of the theory was that the resultant complexity made it look as if languages were unlearnable: how could a child master this dramatic complexity in the few years during which first language acquisition takes place?

Chomsky's response was that much more of our knowledge of language is innate than had been previously suspected. Specific languages like English or Japanese could obviously not be innate – as witness the environmentally triggered differences between them – but the course of normal language acquisition makes it equally clear that a huge amount must be innate. It is not just that there are constraints on the kind of

hypothesis the child learning its first language can entertain, all the core properties of language are built in from the start. That is, the child does not need to learn from scratch the properties of the language to which it is exposed; rather it merely selects particular options from an antecedently specified set. For instance, languages are either "head-first" (with the verb preceding the object, as in English) or "head-last" (with the object preceding the verb, as in Japanese). The child is born knowing that there are these two alternatives, and what it has to do is equivalent to throwing the switches of a switch-box to "fix the parameters" of the language it is learning. It is significant that this resolution of the tension between description and explanation mirrors developments in other sciences. In immunology, an "instructive" theory of antibody development was replaced by a "selective" theory in which the presence of antigens, even artificially produced ones, called up antibodies which were already present in the organism before it was exposed to external influence. The parallel with language acquisition is striking.

The theory of Principles and Parameters which has been developed over the last two decades is probably the first really novel approach to language of the last two and a half thousand years. It is conceptually so different from previous accounts of language, either traditional or generative, that for Chomsky this is the first time that linguistic theory might justify the description "revolutionary", more usually accorded to his work of the 1950s. The current version of Principles and Parameters – already substantially different from the version of the early 1980s – is embedded in the Minimalist Program of the 1990s. This is a radical attempt to rethink the foundations of the discipline, eschewing all constructs which are not conceptually necessary or forced by empirical necessity: the usual requirements of science. This rethinking has meant abandoning much of the descriptive machinery of earlier versions of generative grammar – even such successful innovations as the levels of deep and surface structure – and has forced a search for new explanations.

Chomsky is careful to stress that "Minimalism" is not yet a theory; it is just a program defining a certain kind of research endeavour. Any theory of language must of necessity provide a link between sound and meaning, between representations of the pronunciation and representations of the logical properties of words and sentences. Accordingly, a grammar – the I-language – must define two levels of representation, called PF for "Phonetic Form" and LF for "Logical Form", and specify the link between them. Ideally, there should be no other levels and the complexity of this link should be minimal. This suggests two questions which it had previously either been impossible to address seriously or perhaps even to formulate. First, how good a solution to this conceptual

problem of linking sound and meaning is a human language? Is it right to suggest that the grammars of natural languages are in some sense optimal? Second, what are the relations between the language faculty and other systems of the mind/brain? In particular, can any perceived deviations from optimality in the first be attributed to conditions imposed by the second?

Chomsky addresses these issues in terms of the question: "how 'perfect' is language?", with the answer, surprising for a biological system, that it is very close to perfect. What this means is that any deviations from conceptual necessity manifest by the language faculty (that is, the I-language) are motivated by conditions imposed from the outside. Chomsky calls these "legibility conditions": conditions imposed by the need for other systems of the mind/brain to use representations provided by the language faculty. In particular, this refers to the need for the articulatory and perceptual systems to exploit PF representations, and for the conceptual system to exploit LF. Against such a background, movement or "displacement" processes of the kind seen in the different positions occupied by *Clinton* in *They elected Clinton* and *Clinton was elected* appear to be conceptually unnecessary. Why do natural languages exploit such devices which are completely foreign to the artificial languages of logic and mathematics? One tentative answer is that displacement may plausibly be motivated by the need to structure information for optimal communication. If this is, indeed, the correct account then it looks as if a property of the language faculty is imposed from outside the system, from another part of the mind/brain.

Chomsky does not stop there, but attempts to link this apparent imperfection of language to another. Natural languages are full of phenomena that give rise to problems for second-language learners, and irritation for philosophers. There are morphological complexities like declensional paradigms and irregular verbs, which appear to have no real meaning of their own and to be semantically useless. They are another imperfection, necessitating the postulation of uninterpretable features; that is, features with no semantic interpretation. However, current syntactic theory makes systematic use of such uninterpretable features: their function is to drive the movement processes that we have just seen to be motivated from outside the language faculty. If such conjectures are on the right lines, they allow the interesting possibility of reducing two kinds of apparent "imperfection" to one. In fact, if the argument is correct, the imperfections are, indeed, only "apparent". Given the constraints that other systems of the mind/brain impose on solutions to linking sound and meaning, there may be no other alternatives, so conceptual necessity explains the form of the grammar overall.

Finally, I turn to the individual essays. The opening chapter "New horizons in the study of language" (Chapter 1) is a succinct and generally non-technical introduction to Chomsky's current thinking on the nature of the language faculty, setting his ideas in their historical and intellectual framework: the Galilean and Cartesian traditions. It shows his now familiar flair for taking simple examples and drawing out deep consequences from them. If a library contains two copies of Tolstoy's *War and Peace*, and each is taken out by a different person, did they take out the same or a different book? Either answer is appropriate depending on whether we are viewing the book as a material or as an abstract entity. This may seem self-evident but, as Chomsky goes on to show, there are serious implications for the philosophy of language. A further striking observation is that our knowledge that objects such as books can be viewed in these different ways seems to come to us largely independently of experience. Accordingly, we have a poverty of the stimulus argument for the innate determination of such knowledge. Much of the essay should be accessible to the layperson, but it also has a great deal to offer the expert.

"Explaining language use" (Chapter 2) is a critique of the views of externalist philosophers, especially Hilary Putnam, and a defence of naturalism in the investigation of language. Chomsky provides a long series of new examples to substantiate the view that the most successful treatment of language is in terms of computations over internal, mental representations. This, of course, is the domain in which his greatest technical contributions reside, but the discussion presupposes no expertise in syntactic theory. Part of his exposition involves a generalisation of the internalist notion I-language to the epistemological domain, invoking the notion I-belief. Again, the thesis is illustrated by simple but striking examples of the depth and detail of our knowledge of common lexical items like *house* and *near*. In *John is painting the house brown*, we know – apparently without instruction – that it is the external surface of the house that is being painted, rather than the inside. But the meaning of *house* cannot be restricted to its external surface. If two people are equidistant from the surface, one inside and one outside, only the one outside can be described as "near" the house. Again, as demonstrated in practical experiments, even very young children seem to know such facts, suggesting that the knowledge is in some sense antecedently available to the organism.

"Language and interpretation" (Chapter 3) takes these ideas further and, in particular, elaborates his arguments against Willard Quine, Michael Dummett and others on such issues as the indeterminacy of translation, public versus private language, the nature of tacit knowledge

and the status of linguistic "rules". Chomsky takes simple syntactic examples which have featured widely in the technical literature and uses them to argue for a range of philosophical positions. Consider the interpretation of *Mary expects to feed herself* (Where *Mary* and *herself* are taken to refer to the same individual), as opposed to the partially identical *I wonder who Mary expects to feed herself*, where this coreferential construal is impossible. Chomsky spells out a number of implications of such examples and their analysis. They belie the Quinean claim that there is "no fact of the matter"; they can be used to support an analytic–synthetic distinction; they raise problems for any notion of meaning holism; and they point to the independence of our language faculty from other aspects of our belief system.

"Naturalism and dualism in the study of language and mind" (Chapter 4) returns to the attack on the philosophers for their tacit adoption of the "bifurcation thesis": the view that the study of language should be subject to standards and conditions additional to those which hold for the natural sciences in general. Beginning with the observation that the term "mental" simply picks out some aspect of the world that we wish to subject to naturalistic enquiry, Chomsky proceeds to give a succinct history of ideas – especially as they pertain to the study of language – from Descartes to the present, drawing analogies especially from chemistry and the study of vision. The implication of the exercise is that the mind–body problem is unstatable; the putative role of consciousness in defining what constitutes knowledge of language is unmotivated; and that only an internalist construal of linguistic knowledge is capable of providing any explanation for our abilities.

"Language as a natural object" (Chapter 5) returns to a number of the same issues, but with the focus more directly on language and knowledge of language. Linguistics is one of the natural sciences, and Chomsky traces his intellectual antecedents in an erudite and informative summary of the history of science. Despite this repeatedly justified claim about the "scientific" status of linguistics, Chomsky is acerbic in his treatment of reductionist attempts to reduce language to the physiological or the physical. What is needed is unification, and reduction is only a rare case of such integration. The scope of current linguistics includes the problems of how children learn their first language, and how adults use it. Here Chomsky makes two surprising observations. First, if languages really are learnable, that would be a surprising empirical discovery; second, that languages appear to be in part unusable, as is evident from the fact that performance systems often fail. The essay ends with a sobering discussion of the limits of intuition. Intuition or linguistic judgements are central to argumentation in linguistics, but Chomsky points out that

we can have no comparable intuitions when it comes to the technical vocabulary of mathematics or philosophy, and that the philosopher's reliance on appeal to intuitions about Twin-Earth, for instance, is systematically pernicious.

"Language from an internalist perspective" (Chapter 6) addresses some of the same issues but with different examples and with a lengthy discussion of the difference between naturalistic scientific investigation and what is often called "folk science". The relation between the two is not self-evident. In physics one does not expect folk views to inform the expert's theory construction, and while ethnoscience is itself an interesting field of inquiry, there is no reason to assume *a priori* that the concepts and constructs of pre-scientific debate should carry over unchanged into formal theories of I-language. More particularly, there is no reason to impose conditions of accessibility to consciousness on the rules that characterise our language. If a child says *I rided my bike* we have no reason to deny that she is following the regular rule of past-tense formation and still less reason to assume that she is aware of the fact. As always, deep and sophisticated conclusions – about the sterility of externalist conceptions of language and the necessity for internalist ones – follow from simple examples.

The last chapter, "Internalist explorations" (Chapter 7), continues the exposition of his internalist perspective, providing both new examples and arguments, and extending the criticisms to a wider range of targets, in particular aspects of Twin-Earth. In addition, it ties the discussion in more closely with his recent work in the Minimalist Program, and ends with a sustained discussion of the scope and importance of notions of innateness.

Apart from his political work (entirely absent here), Chomsky is best known for his syntactic theorising. Many of the essays here include perspicuous and puzzling examples of the kind he is famous for constructing; the contrast between *John was too clever to catch* and the equivalent *John was too clever to be caught*; between *John was clever to be caught* and the impossible *John was clever to catch*. It is striking that, in addition to these syntactic examples, much of the exemplification in these essays is lexical, with subtle arguments based on a range of deceptively simple items. The arguments are marshalled with the same forceful logic as previously, and the conclusions lead to the same world view he has been defending for forty years; but the arguments are fresh.

What is impressive about Chomsky's writing is not just its awesome breadth and remarkable scope, but that after half a century he still has the power to surprise: from the observation that human beings are not a natural kind to the importance of Japanese for the analysis of English;

from the rejection of his celebrated invention "deep structure" to the conjecture that language, despite its biological nature, may be close to perfection; from the tension between common sense and science to the implications of what we know about a brown house or a cup of tea. Everything combines to give a unique and compelling view of language and mind.

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