20TH ANNIVERSARY EDITION

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Preface to the 20th Anniversary Edition

As discussed in the introduction to the first (1995) edition, the essays included here draw from ongoing work from the late 1980s through the early 1990s.

It is important to recognize that the Minimalist Program (MP) under development in this work, and since, is a *program*, not a *theory*, a fact that has often been misunderstood. In central respects, MP is a seamless continuation of pursuits that trace back to the origins of generative grammar, even before the general biolinguistics program, as it is now often called, began to take shape in the 1950s.

In particular, a leading concern from the outset had been to clarify the concept "simplest grammar" and to determine how to choose the simplest grammar for each language.[1] The basic reasons are just normal science. Since Galileo, modern science has been guided by his maxim that nature is simple and that it is the scientist's task to show that this is the case. It has long been clear that the quest for simplicity is closely related to the quest for explanation, matters clarified by the important work of Nelson Goodman at mid-century. At about the same time, Einstein expressed the basic point in his characteristic way:

> Time and again the passion for understanding has led to the illusion that man is able to comprehend the objective world rationally, by pure thought, without any empirical foundations—in short, by metaphysics. I believe that every true theorist is a kind of tamed metaphysicist, no matter how pure a "positivist" he may fancy himself. The metaphysicist believes that the logically simple is also the real. The tamed metaphysicist believes that not all that is logically simple is embodied in experienced reality, but that the totality of all sensory experience can be "comprehended" on the basis of a conceptual system built on premises of great simplicity. The skeptic will say that this is a "miracle creed." Admittedly so, but it is a miracle creed which has been borne out to an amazing extent by the development of science. (Einstein 1950, 13)

As discussed in the 1995 introduction, two distinct notions of simplicity were pursued in early generative grammar: the general notion that Einstein refers to and that Goodman sought to sharpen, holding of rational inquiry generally; and a theory-internal evaluation procedure designed to select the optimal grammar for given data, within the format determined by Universal Grammar (UG), which is understood in the modern literature to be the theory of the biological endowment of the relevant components of the faculty of language (FL). In effect, this yields an abstract language acquisition device—but one that is unfeasible, as was recognized at once.

A more specific concern arose as the biolinguistic framework took shape starting in the 1950s. Any complication of UG poses barriers to some eventual account of the evolution of FL.[2] There is, then, an additional and compelling reason to seek the simplest formulation of UG, eliminating stipulations, redundancy, and other complications, insofar as possible. MP is the current version of this quest, within the general framework under consideration here.

MP was a natural development after the crystallization of the principles-and-parameters framework (P&P) in the early 1980s. P&P overcame fundamental quandaries of the earlier framework, eliminating the need for an evaluation procedure, as discussed in the 1995 introduction. That leaves us with only the general notion of simplicity and the specific concern for reducing UG to the minimum, now motivated in addition by concern about language origins that began to be discussed more seriously, but without much progress, in the 1970s.[3]

P&P has been pursued very productively, making available a vast array of new empirical materials in languages of great typological variety, studied in much greater depth than heretofore. It has also revitalized psychology of language, historical and comparative linguistics, and other related disciplines, and has led to innovative and highly insightful theoretical and empirical inquiry (see, e.g., Baker 2003, Longobardi 2003, Kayne 2013).

The 1995 introduction takes note of "a problem for the biological sciences that is already far from trivial: how can a system such as human language arise in the mind/brain …?" The problem is no doubt a significant one. To address it seriously, one must satisfy two elementary conditions. The first is to determine as best one can the nature of the phenotype—that is, what has evolved, namely FL. One must begin with the most satisfactory version of UG. No biologist, for example, would present a proposal about the evolution of the eye without presenting a clear account—preferably, the best available one—of what an eye is. That is close to a truism, as is the second condition: pay attention to the empirical evidence about the origin of language.

The evidence is slim, but not zero. There are two empirical theses about the origin of language (and, it can be plausibly argued, little more than these[4]). One, established with considerable confidence, is that there has been little if any evolution of FL since our ancestors left Africa, some 50,000–80,000 years ago. The second, proposed with fair confidence, is that not long before this, there is no reason to believe that language existed at all (Tattersall 2012). If so, then FL emerged suddenly (in evolutionary time), and we would expect it to be quite simple, its basic properties largely determined by laws of nature and by extralinguistic contingencies. Since language is clearly a computational system, the relevant laws of nature should include (and perhaps be limited to) principles of efficient computation. These considerations lend some independent reason to suspect that the research program of MP is on the right track.

While a direct continuation of work from the earliest days, MP did formulate a new research program, sometimes called "approaching UG from below." Pursuing this program, we seek to formulate a "perfect" solution to the conditions that language must meet, and then ask to what extent the many complex and varied phenomena of actual languages can be accounted for in these terms. By *language* here is meant I-language, what was called *grammar* in earlier work, in one of the uses of this systematically ambiguous term.[5]

The basic principle of language (BP) is that each language yields an infinite array of hierarchically structured expressions, each interpreted at two interfaces, conceptual-intentional (C-I) and sensorimotor (SM)—the former yielding a "language of thought" (LOT), perhaps the only such LOT; the latter in large part modality-independent, though there are preferences. The two interfaces provide external conditions that BP must satisfy, subject to crucial qualifications mentioned below. If FL is perfect, then UG should reduce to the simplest possible computational operation satisfying the external conditions, along with principles of minimal computation (MC) that are language-independent. The Strong Minimalist Thesis (SMT) proposes that FL is perfect in this sense.

SMT is not precisely formulated. MC can be interpreted in various ways, though some of its properties are uncontroversial, and reliance on these carries us a long way, as work stimulated by MP has shown. There is a plausible suggestion as to what the simplest computational operation is: Merge, as defined within MP.[6] SMT accords with the guiding principle of the natural sciences, and there is reason to expect something like this to be correct on evolutionary grounds. But of course, evaluation of the thesis is based on the empirical consequences of pursuing it.

When the first edition of *The Minimalist Program* was published, the thesis seemed too extreme to be seriously proposed. In the years since, I think that skepticism has lessened considerably. Some results have emerged that seem to me to provide substantial evidence that this program is on the right track.

One result has to do with the strange property of displacement that is ubiquitous in natural language: phrases are understood both where they are heard and in a position that is not articulated. To take a very simple case, the sentence *Which book did John read?* is understood to mean roughly 'For which book X, John read the book X'; the phrase *which book* is interpreted both where it appears and as the direct object of *read*, where it is not articulated. The same holds for quite intricate expressions. Displacement had always seemed—to me in particular—a curious imperfection of language. Why should languages resort to this device in a very wide range of constructions? Pursuit of SMT reveals that displacement with this property of multiple interpretation ("the copy theory of movement") is the simplest case. Some stipulation would be required to block it, and correspondingly, any devices designed to yield the result that comes free under SMT has an even heavier empirical burden to bear. This is a significant discovery, I think—too long in coming, and insufficiently appreciated, as are its consequences.

One immediate consequence is that SMT yields structures that are appropriate for C-I interpretation, but obviously wrong for the SM interface, where all copies but the hierarchically most prominent one are deleted (with interesting qualifications, which in fact support the conclusion). That follows from another application of MC: in externalization, reduce computation and articulation to the minimum. The result is that the sentences that are heard have gaps, leading to serious problems for parsing and perception, so-called filler-gap problems. We therefore have strong evidence that the basic design of language determines a crucial asymmetry between the two interfaces: the C-I interface is privileged; externalization in one or another sensory modality (or none at all, as in thought) is an ancillary feature of language. If so, then specific uses of externalized language, such as communication, are peripheral to the core elements of language design and evolution of FL, contrary to widespread doctrine.

There is a great deal of additional evidence supporting this conclusion, and none that I know of that is inconsistent with it. One important case is another curious property of language: structure-dependence of rules, a universal property that has been a puzzle since the 1950s. As an illustration, consider such simple sentences as *Instinctively, eagles that fly swim* and *Can eagles that fly swim?* Here the initial adverb or auxiliary verb does not relate to the linearly

proximal verb *fly*; rather, it relates to the linearly remote but structurally proximate verb *swim*. This observation holds for all relevant constructions in all languages, and it has been shown that children know the facts and make no errors as early as testing is possible (Crain and Nakayama 1987). It is next to inconceivable that these facts are learned.[7] The long-standing puzzle is that the procedure that is universally rejected, based on linear distance, is computationally far simpler than the one that is universally adopted, based on structural distance. The only known reason is that linear order is simply not available to acquisition of I-language, even though it is everywhere in the data. It appears that the internal system, biologically determined, observes SMT and therefore ignores linear order in favor of structural distance.

Linear order and other arrangements therefore appear to be reflexes of the SM modalities for externalization, having nothing particular to do with core elements of language design (though of course they have a variety of secondary effects). That conclusion fits with the very limited evidence about the origin of language. The SM systems long antedate the apparent emergence of language and do not seem to have been modified significantly afterward (not surprisingly, given the very brief time period prior to the departure of *Homo sapiens* from Africa).

It is a familiar fact that the complexity and variety of language appears to be localized overwhelmingly—and perhaps completely—in externalization (which includes Saussurean arbitrariness of the lexicon). In learning a language, the real problem is mastering externalization. Principles of semantic interpretation are virtually unlearnable, beyond the most superficial cases, and are probably simply determined by UG; and the same appears to be largely or completely true for the syntactic operations ("narrow syntax") that yield the structures at the C-I interface. A possible account of the origin of language is that some rewiring of the brain, presumably the result of some mutation, yielded the simplest computational operations for BP, including the link to some preexisting conceptual structures CS,[8] providing a LOT. Since this emergent system would have been subject to no selectional pressures, it would have assumed an optimal form in accord with natural law—specifically, MC—rather the way a snowflake forms. A subsequent task is to relate this system to some sensory modality for externalization, a nontrivial cognitive problem since input and output have no intrinsic relations (apart from possible effects of later adaptation). It is a task that can be solved in many ways, leading to the variety of languages, each easily subject to the effects of historical accident. There are doubtless constraints on how externalization takes place—the principles of morphology, phonology, prosody, and so on. But it may be that evolution played a slight role in establishing these constraints.

The general picture accords pretty well with what we know about language. The crucial question, of course, is to what extent SMT can in fact account for the relevant phenomena of language. There has, I think, been substantial progress in moving toward this goal, with some significant results, such as those just mentioned.[9] Needless to say, there remain vast areas to explore to determine how far SMT can reach, but the prospects seem exciting and certainly challenging.

Notes

1. See Chomsky 1951 and subsequent publications by many authors from the 1950s.

2. Commonly misnamed as *evolution of language*; languages change, but do not evolve.

3. Piattelli-Palmarini (1974) introduced the term *biolinguistics* to refer to the approach that was being pursued in work in generative grammar.

4. On the dubious character of much current work, see Hauser et al. 2014.

5. See the 1995 introduction. The term *I-language* (internal language viewed intensionally) was suggested in Chomsky 1986 in an effort to resolve the confusions caused by the ambiguity of the term *grammar*, which had been used to refer both to the object under investigation (I-language) and to the theory of that object. I also introduced another term, *E-language* (external language), referring to any other conception of language, and observed that there may be no coherent notion of "E-language." Since then the term has been used in a variety of ways, sometimes to refer to a (necessarily) finite corpus of data, sometimes to the set of expressions weakly generated by a generative grammar, analogous to the well-formed formulas of invented logical systems—a notion that may not even be definable for natural language, as discussed in Chomsky 1955, but at best is derivative from the more basic notion of strong generation of structures. My own feeling is that the term *E-language* should simply be ignored.

6. For discussion of this topic, see the papers collected in Graff and Van Urk 2012. For recent updates, see Chomsky 2013b, forthcoming. And see sources cited in these papers.

7. There have been heroic efforts to demonstrate the contrary (in the case of the auxiliary, not adverb construal). Every attempt that is clear enough to investigate fails, irremediably (see Berwick et al. 2011); but more interestingly, it would be of little interest even if some such effort were to succeed. The attempts fail to address the only significant question: Why? Why is it the case that this property is ubiquitous and exceptionless? I know of no answer other than the one repeated here.

8. For further discussion, see Chomsky 2010. It is important to recognize that CS for humans appears to be radically different from the elements of symbolic/communication systems in other animals (see Petitto 2005, Chomsky 2013a), a fact that poses very serious problems for studying the origin of human cognitive capacities.

9. For some recent ideas, see Chomsky 2013b, forthcoming.

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Introduction

The chapters that follow are based in large part on regular lecture-seminars at MIT from 1986 through 1994. These have been continuing now for over 30 years, with broad participation by students, faculty, and others, from various institutions and disciplines. In these introductory remarks I will outline some of the background for the material that follows.

This work is motivated by two related questions: (1) what are the general conditions that the human language faculty should be expected to satisfy? and (2) to what extent is the language faculty determined by these conditions, without special structure that lies beyond them? The first question in turn has two aspects: what conditions are imposed on the language faculty by virtue of (A) its place within the array of cognitive systems of the mind/brain, and (B) general considerations of conceptual naturalness that have some independent plausibility, namely, simplicity, economy, symmetry, nonredundancy, and the like?

Question (B) is not precise, but not without content; attention to these matters can provide guidelines here, as in rational inquiry generally. Insofar as such considerations can be clarified and rendered plausible, we can ask whether a particular system satisfies them in one or another form. Question (A), in contrast, has an exact answer, though only parts of it can be surmised in the light of current understanding about language and related cognitive systems.

To the extent that the answer to question (2) is positive, language is something like a "perfect system," meeting external constraints as well as can be done, in one of the reasonable ways. The Minimalist Program for linguistic theory seeks to explore these possibilities.

Any progress toward this goal will deepen a problem for the biological sciences that is already far from trivial: how can a system such as human language arise in the mind/brain, or for that matter, in the organic world, in which one

seems not to find anything like the basic properties of human language? That problem has sometimes been posed as a crisis for the cognitive sciences. The concerns are appropriate, but their locus is misplaced; they are primarily a problem for biology and the brain sciences, which, as currently understood, do not provide any basis for what appear to be fairly well established conclusions about language.[1] Much of the broader interest of the detailed and technical study of language lies right here, in my opinion.

The Minimalist Program shares several underlying factual assumptions with its predecessors back to the early 1950s, though these have taken somewhat different forms as inquiry has proceeded. One is that there is a component of the human mind/brain dedicated to language—the language faculty—interacting with other systems. Though not obviously correct, this assumption seems reasonably well-established, and I will continue to take it for granted here, along with the further empirical thesis that the language faculty has at least two components: a cognitive system that stores information, and performance systems that access that information and use it in various ways. It is the cognitive system that primarily concerns us here.

Performance systems are presumably at least in part language-specific, hence components of the language faculty. But they are generally assumed not to be specific to particular languages: they do not vary in the manner of the cognitive system, as linguistic environments vary. This is the simplest assumption, and is not known to be false, though it may well be. Knowing of no better ideas, I will keep to it, assuming language variation to be restricted to the cognitive system.

I also borrow from earlier work the assumption that the cognitive system interacts with the performance systems by means of levels of linguistic representation, in the technical sense of this notion.[2] A more specific assumption is that the cognitive system interacts with just two such "external" systems: the articulatory-perceptual system A-P and the conceptual-intentional system C-I. Accordingly, there are two *interface levels*, Phonetic Form (PF) at the A-P interface and Logical Form (LF) at the C-I interface. This "double interface" property is one way to express the traditional description of language as sound with a meaning, traceable at least back to Aristotle.

Though commonly adopted, at least tacitly, these assumptions about the internal architecture of the language faculty and its place among other systems of the mind/brain are not at all obvious. Even within the general framework, the idea that articulation and perception involve the same interface representation is controversial, and arguably incorrect in some fundamental way.[3] Problems relating to the C-I interface are still more obscure and poorly understood. I will keep to these fairly conventional assumptions, only noting here that if

they turn out to be correct, even in part, that would be a surprising and hence interesting discovery.

The leading questions that guide the Minimalist Program came into focus as the principles-and-parameters (P&P) model took shape about fifteen years ago. A look at recent history may be helpful in placing these questions in context. Needless to say, these remarks are schematic and selective, and benefit from hindsight.

Early generative grammar faced two immediate problems: to find a way to account for the phenomena of particular languages ("descriptive adequacy"), and to explain how knowledge of these facts arises in the mind of the speaker-hearer ("explanatory adequacy"). Though it was scarcely recognized at the time, this research program revived the concerns of a rich tradition, of which perhaps the last major representative was Otto Jespersen.[4] Jespersen recognized that the structures of language "come into existence in the mind of a speaker" by abstraction from experience with utterances, yielding a "notion of their structure" that is "definite enough to guide him in framing sentences of his own," crucially "free expressions" that are typically new to speaker and hearer.

We can take these properties of language to set the primary goals of linguistic theory: to spell out clearly this "notion of structure" and the procedure by which it yields "free expressions," and to explain how it arises in the mind of the speaker—the problems of descriptive and explanatory adequacy, respectively. To attain descriptive adequacy for a particular language L, the theory of L (its grammar) must characterize the state attained by the language faculty, or at least some of its aspects. To attain explanatory adequacy, a theory of language must characterize the initial state of the language faculty and show how it maps experience to the state attained. Jespersen held further that it is only "with regard to syntax" that we expect "that there must be something in common to all human speech"; there can be a "universal (or general) grammar," hence a perhaps far-reaching account of the initial state of the language faculty in this domain, though "no one ever dreamed of a universal morphology." That idea too has a certain resonance in recent work.

In the modern period these traditional concerns were displaced, in part by behaviorist currents, in part by various structuralist approaches, which radically narrowed the domain of inquiry while greatly expanding the database for some future inquiry that might return to the traditional—and surely valid—concerns. To address them required a better understanding of the fact that language involves "infinite use of finite means," in one classic formulation. Advances in the formal sciences provided that understanding, making it feasible to deal with the problems constructively. Generative grammar can be

regarded as a kind of confluence of long-forgotten concerns of the study of language and mind, and new understanding provided by the formal sciences.

The first efforts to approach these problems quickly revealed that traditional grammatical and lexical studies do not begin to describe, let alone explain, the most elementary facts about even the best-studied languages. Rather, they provide hints that can be used by the reader who already has tacit knowledge of language, and of particular languages; the central topic of inquiry was, in substantial measure, simply ignored. Since the requisite tacit knowledge is so easily accessed without reflection, traditional grammars and dictionaries appear to have very broad coverage of linguistic data. That is an illusion, however, as we quickly discover when we try to spell out what is taken for granted: the nature of the language faculty, and its state in particular cases.

This is hardly a situation unique to the study of language. Typically, when questions are more sharply formulated, it is learned that even elementary phenomena had escaped notice, and that intuitive accounts that seemed simple and persuasive are entirely inadequate. If we are satisfied that an apple falls to the ground because that is its natural place, there will be no serious science of mechanics. The same is true if one is satisfied with traditional rules for forming questions, or with the lexical entries in the most elaborate dictionaries, none of which come close to describing simple properties of these linguistic objects.

Recognition of the unsuspected richness and complexity of the phenomena of language created a tension between the goals of descriptive and explanatory adequacy. It was clear that to achieve explanatory adequacy, a theory of the initial state must allow only limited variation: particular languages must be largely known in advance of experience. The options permitted in Universal Grammar (UG) must be highly restricted. Experience must suffice to fix them one way or another, yielding a state of the language faculty that determines the varied and complex array of expressions, their sound and meaning; and even the most superficial look reveals the chasm that separates the knowledge of the language user from the data of experience. But the goal of explanatory adequacy receded still further into the distance as generative systems were enriched in pursuit of descriptive adequacy, in radically different ways for different languages. The problem was exacerbated by the huge range of phenomena discovered when attempts were made to formulate actual rule systems for various languages.

This tension defined the research program of early generative grammar—at least, the tendency within it that concerns me here. From the early 1960s, its central objective was to abstract general principles from the complex rule systems devised for particular languages, leaving rules that are simple,

constrained in their operation by these UG principles. Steps in this direction reduce the variety of language-specific properties, thus contributing to explanatory adequacy. They also tend to yield simpler and more natural theories, laying the groundwork for an eventual minimalist approach. There is no necessity that this be the case: it could turn out that an "uglier," richer, and more complex version of UG reduces permissible variety, thus contributing to the primary empirical goal of explanatory adequacy. In practice, however, the two enterprises have proven to be mutually reinforcing and have proceeded side by side. One illustration concerns redundant principles, with overlapping empirical coverage. Repeatedly, it has been found that these are wrongly formulated and must be replaced by nonredundant ones. The discovery has been so regular that the need to eliminate redundancy has become a working principle in inquiry. Again, this is a surprising property of a biological system.

These efforts culminated in the P&P model (see Chomsky 1981a, for one formulation). This constituted a radical break from the rich tradition of thousands of years of linguistic inquiry, far more so than early generative grammar, which could be seen as a revival of traditional concerns and approaches to them (perhaps the reason why it was often more congenial to traditional grammarians than to modern structural linguists). In contrast, the P&P approach maintains that the basic ideas of the tradition, incorporated without great change in early generative grammar, are misguided in principle—in particular, the idea that a language consists of rules for forming grammatical constructions (relative clauses, passives, etc.). The P&P approach held that languages have no rules in anything like the familiar sense, and no theoretically significant grammatical constructions except as taxonomic artifacts. There are universal principles and a finite array of options as to how they apply (parameters), but no language-particular rules and no grammatical constructions of the traditional sort within or across languages.

For each particular language, the cognitive system, we assume, consists of a computational system CS and a lexicon. The lexicon specifies the elements that CS selects and integrates to form linguistic expressions—(PF, LF) pairings, we assume. The lexicon should provide just the information that is required for CS, without redundancy and in some optimal form, excluding whatever is predictable by principles of UG or properties of the language in question. Virtually all items of the lexicon belong to the *substantive categories*, which we will take to be noun, verb, adjective, and particle, putting aside many serious questions about their nature and interrelations. The other categories we will call *functional* (tense, complementizer, etc.), a term that need not be made more precise at the outset, and that we will refine as we proceed.

Within the P&P approach the problems of typology and language variation arise in somewhat different form than before. Language differences and typology should be reducible to choice of values of parameters. A major research problem is to determine just what these options are, and in what components of language they are to be found. One proposal is that parameters are restricted to *formal features* with no interpretation at the interface.[5] A still stronger one is that they are restricted to formal features of functional categories (see Borer 1984, Fukui 1986, 1988). Such theses could be regarded as a partial expression of Jespersen's intuition about the syntax-morphology divide. I will assume that something of the sort is correct, but without trying to be very clear about the matter, since too little is understood to venture any strong hypotheses, as far as I can see.

In this context, language acquisition is interpreted as the process of fixing the parameters of the initial state in one of the permissible ways. A specific choice of parameter settings determines a *language* in the technical sense that concerns us here: an I-language in the sense of Chomsky 1986b, where I is understood to suggest "internal," "individual," and "intensional."

This way of formulating the issues, within the P&P model, brings out clearly a crucial inadequacy in the characterization of language as a state of the language faculty. The latter can hardly be expected to be an instantiation of the initial state with parameter values fixed. Rather, a state of the language faculty is some accidental product of varied experience, of no particular interest in itself, no more so than other collections of phenomena in the natural world (which is why scientists do experiments instead of recording what happens in natural circumstances). My personal feeling is that much more substantial idealization is required if we hope to understand the properties of the language faculty,[6] but misunderstandings and confusion engendered even by limited idealization are so pervasive that it may not be useful to pursue the matter today. *Idealization*, it should be noted, is a misleading term for the only reasonable way to approach a grasp of reality.

The P&P model is in part a bold speculation rather than a specific hypothesis. Nevertheless, its basic assumptions seem reasonable in the light of what is currently at all well understood, and they do suggest a natural way to resolve the tension between descriptive and explanatory adequacy. In fact, this departure from the tradition offered the first hope of addressing the crucial problem of explanatory adequacy, which had been put aside as too difficult. Earlier work in generative grammar sought only an evaluation measure that would select among alternative theories of a language (grammars) that fit the format prescribed by UG and are consistent with the relevant data. Beyond that, nothing seemed conceivable apart from some notion of "feasibility," left

imprecise (Chomsky 1965). But if something like the P&P concept of I-language proves to be accurate–capturing the essential nature of the concept of language that is presupposed in the study of performance, acquisition, social interaction, and so on—then the question of explanatory adequacy can be seriously raised. It becomes the question of determining how values are set by experience for finitely many universal parameters, not a trivial problem by any means, but at least one that can be constructively pursued.

If these ideas prove to be on the right track, there is a single computational system C_{HL} for human language and only limited lexical variety. Variation of language is essentially morphological in character, including the critical question of which parts of a computation are overtly realized, a topic brought to the fore by Jean-Roger Vergnaud's theory of abstract Case and James Huang's work on typologically varied interrogative and related constructions.

This account of the P&P approach overstates the case. Further variation among languages would be expected insofar as data are readily available to determine particular choices. There are several such domains. One is peripheral parts of the phonology. Another is "Saussurean arbitrariness," that is, the sound-meaning pairing for the substantive part of the lexicon. I put these matters aside, along with many others that appear to be of limited relevance to the computational properties of language that are the focus here, that is, that do not seem to enter into C_{HL}: among them, variability of semantic fields, selection from the lexical repertoire made available in UG, and nontrivial questions about the relation of lexical items to other cognitive systems.

Like the earliest proposals in generative grammar, formulation of the P&P model led to discovery and at least partial understanding of a vast range of new empirical materials, by now from a wide variety of typologically different languages. The questions that could be clearly posed and the empirical facts with which they deal are novel in depth and variety, a promising and encouraging development in itself.

With the tension between descriptive and explanatory adequacy reduced and the latter problem at least on the agenda, the tasks at hand become far harder and more interesting. The primary one is to show that the apparent richness and diversity of linguistic phenomena is illusory and epiphenomenal, the result of interaction of fixed principles under slightly varying conditions. The shift of perspective provided by the P&P approach also gives a different cast to the question of how simplicity considerations enter into the theory of grammar. As discussed in the earliest work in generative grammar, these considerations have two distinct forms: an imprecise but not vacuous notion of simplicity that enters into rational inquiry generally must be clearly distinguished from a theory-internal measure of simplicity that selects among I-languages (see

Chomsky 1975a, chapter 4). The former notion of simplicity has nothing special to do with the study of language, but the theory-internal notion is a component of UG, part of the procedure for determining the relation between experience and I-language; its status is something like that of a physical constant. In early work, the internal notion took the form of an evaluation procedure to select among proposed grammars (in present terms, I-languages) consistent with the permitted format for rule systems. The P&P approach suggests a way to move beyond that limited though nontrivial goal and to address the problem of explanatory adequacy. With no evaluation procedure, there is no internal notion of simplicity in the earlier sense.

Nevertheless, rather similar ideas have resurfaced, this time in the form of economy considerations that select among derivations, barring those that are not optimal in a theory-internal sense. The external notion of simplicity remains unchanged: operative as always, even if only imprecisely.

At this point still further questions arise, namely, those of the Minimalist Program. How "perfect" is language? One expects "imperfections" in morphological-formal features of the lexicon and aspects of language induced by conditions at the A-P interface, at least. The essential question is whether, or to what extent, these components of the language faculty are the repository of departures from virtual conceptual necessity, so that the computational system C_{HL} is otherwise not only unique but in some interesting sense optimal. Looking at the same problem from a different perspective, we seek to determine just how far the evidence really carries us toward attributing specific structure to the language faculty, requiring that every departure from "perfection" be closely analyzed and well motivated.

Progress toward this further goal places a huge descriptive burden on the answers to the questions (A) and (B): the effect of the interface conditions, and the specific formulation of general considerations of internal coherence, conceptual naturalness, and the like—"simplicity," in the external sense. The empirical burden, already substantial in any P&P theory, now becomes far more severe.

The problems that arise are therefore extremely interesting. It is, I think, of considerable importance that we can at least formulate such questions today, and even approach them in some areas with a degree of success. If recent thinking along these lines is anywhere near accurate, a rich and exciting future lies ahead for the study of language and related disciplines.

The chapters that follow are almost but not quite in chronological order. The first, written jointly with Howard Lasnik for a general Handbook on syntax (Chomsky and Lasnik 1993), is a general introduction to the P&P approach, as we understood it in 1991. It is included here for general background.

Chapter 2 (Chomsky 1991c), written in 1988, is largely based on lectures in Tokyo and Kyoto in 1987 and MIT lecture-seminars from fall 1986. Chapter 3 (Chomsky 1993), written in 1992, is based on the fall 1991 lecture-seminars. These chapters explore the possibility of a minimalist approach, sketch some of its natural contours, and pursue it in some central areas. Chomsky 1994b, based on the fall 1993 lecture-seminars, revises this picture and extends it to different aspects of language. It provides much of the basis for chapter 4, which, however, is a more far-reaching departure, taking much more seriously the conceptual framework of a minimalist approach and attempting to keep to its leading ideas in a more principled way; and in the course of so doing, revises substantially the approach developed in Chomsky 1994b and the first three chapters here.

The field is changing rapidly under the impact of new empirical materials and theoretical ideas. What looks reasonable today is likely to take a different form tomorrow. That process is reflected in the material that follows. Chapters 1 and 2 are written from much the same perspective. The approach is changed in chapter 3, considerably more so in chapter 4. Though the general framework remains, the modifications at each point are substantial. Concepts and principles regarded as fundamental in one chapter are challenged and eliminated in those that follow. These include the basic ideas of the Extended Standard Theory that were adopted in the P&P approaches: D-Structure; S-Structure; government; the Projection Principle and the θ-Criterion; other conditions held to apply at D- and S-Structure; the Empty Category Principle; X-bar theory generally; the operation Move α; the split-I hypothesis; and others. All are eliminated or substantially revised in successive chapters, particularly the last.

The end result is a picture of language that differs considerably from even its immediate precursors. Whether these steps are on the right track or not, of course, only time will tell.

Notes

1. For some discussion of this issue, see Chomsky 1994a,c, referring to Edelman 1992. Edelman takes the crisis to be serious if not lethal for cognitive science generally, whether computational, connectionist, or whatever.

2. Adapted, essentially, from Chomsky 1975a.

3. The term *articulatory* is too narrow in that it suggests that the language faculty is modality-specific, with a special relation to vocal organs. Work of the past years in sign language undermines this traditional assumption. I will continue to use the term, but without any implications about specificity of output system, while keeping to the case of spoken language.

4. For some discussion, see Chomsky 1977, chapter 1.

5. *Interpret* here is of course to be understood in a theory-internal sense. In a looser informal sense, interpretations are assigned by the language faculty (in a particular state) to all sorts of objects, including fragments, nonsense expressions, expressions of other languages, and possibly nonlinguistic noises as well.

6. Thus, what we call "English," "French," "Spanish," and so on, even under idealizations to idiolects in homogeneous speech communities, reflect the Norman Conquest, proximity to Germanic areas, a Basque substratum, and other factors that cannot seriously be regarded as properties of the language faculty. Pursuing the obvious reasoning, it is hard to imagine that the properties of the language faculty—a real object of the natural world—are instantiated in any observed system. Similar assumptions are taken for granted in the study of organisms generally.

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