Authors' note: This document is an uncorrected prepublication version of the manuscript of *Simpler Syntax,* by Peter W. Culicover and Ray Jackendoff (Oxford: Oxford University Press. 2005). The actual published book will have a different organization, in that the longer chapters are broken into two chapters. Please do not cite this version, but the published version.

Chapter One

Why Simpler Syntax?

1.1. Different notions of simplicity

Within the tradition of generative grammar, the most prominent focus of linguistic research has been the syntactic component, the part of language concerned with the grammatical organization of words and phrases. The present study will develop and defend a view of the syntactic component that is on one hand thoroughly within the generative tradition, but that is on the other hand markedly at odds with views of syntax that have developed in mainstream generative grammar (MGG).[1] Our approach concurs in many respects with many alternative theories of generative syntax, most notably Head-Driven Phrase Structure Grammar (Pollard and Sag 1987, 1994), Lexical-Functional Grammar (Bresnan 1982a, 2001), and Construction Grammar (Fillmore 1988; Fillmore and Kay 1993; Zwicky 1994; Goldberg 1995, 2005); it also shares commonalities with others such as Autolexical Syntax (Sadock 1991, 2003) and Role and Reference Grammar (Van Valin and LaPolla 1997). We will refer to this collection on occasion as "the alternative generative theories".

The differences between our approach and the mainstream can be divided roughly into two major aspects, which it is important to distinguish. The first aspect is technological: what formal devices does the theory adopt for its description of language? The second, deeper and more difficult to characterize precisely, is the theory's vision of what language is "like". Insofar as possible, we will attempt to sort out what in our approach to syntax is technological and what is conceptual, and in which of these respects we concur with and differ from both MGG and the alternative theories.

There is of course interplay between technology and conceptualization. On one hand, a formal theory is chosen in part to reflect one's vision of the phenomena. On the other hand, the scientific success of a formal theory is measured in part by its ability to generalize or "scale up" to an ever broader range of data. Although the same initial vision may be served equally by two or more alternative technologies (they are superficially "notational variants"), different choices of formal apparatus often lend themselves to different potential extensions. In turn, some extensions may lead to fundamental changes in one's vision of the phenomena, including how the theory integrates with neighboring fields, one important criterion for theoretical success.

Another important criterion for theoretical success, of course, is Occam's Razor: "Do not multiply (theoretical) entities beyond necessity." The problem in describing language is: Which entities should not be multiplied? What counts as

simple? We can see four criteria, which, though they often overlap, turn out to lead in different directions:

(1) a. Minimize the distinct components of grammar.
b. Minimize the class of possible grammars.
c. Minimize the distinct principles of grammar.
d. Minimize the amount of structure generated by the grammar.

Position (1a) is advocated in Paul Postal's paper "The Best Theory" (1972). He argues that Generative Semantics, which derives surface structure directly from semantic structure by transformations interspersed with lexical insertion, is inherently superior to the (Extended) Standard Theory (Chomsky 1972b, Jackendoff 1972), which has separate components for generating surface structure from deep structure, for relating deep structure to some aspects of semantics, and for relating surface structure to other aspects of semantics. Chomsky's (1972b) reply is that the goal should really be to minimize the class of possible grammars (1b), and a better way to achieve this goal is to have more components, each of limited scope. He justifies this goal on grounds of learnability, an issue to which we will return shortly.

One way to achieve a more limited class of possible grammars is to have fewer principles of grammar that languages can choose from. This goal (1c) is taken as primary in Principles and Parameters Theory (Chomsky 1981), part of whose vision is that crosslinguistic syntactic variation is tightly constrained. In the Minimalist Program (Chomsky 1993/1995) this goal is carried further, attempting to minimize not only the principles responsible for crosslinguistic variation but the entire set of principles necessary to characterize syntactic structure. In part, these goals are just good science: one always tries to characterize natural phenomena in maximally general and explanatory terms. But in recent years, the agenda has gone further, attempting to characterize language as in some sense a "perfect" system for relating sound and meaning, with a "Galilean" vision of an extremely simple Grand Unified Theory that accounts for all relevant phenomena.

Although the principles that characterize syntactic structure in mainstream research are relatively general, the actual syntactic structures ascribed to sentences have turned out to be not at all simple. The derivation of sentences is regarded as justifiably complex and abstract, and even surface structures are full of complexity that does not show in the phonological output. Chapter 2 will show how this position has developed over the fifty-year history of MGG.

The present work explores a different priority:

Simple Syntax Hypothesis (SSH):
The most explanatory syntactic theory is one that imputes the minimum structure necessary to mediate between phonology and meaning.

The simplification of structure comes with a price: the characterization of syntactic

structure requires a multitude of principles, of varying degrees of regularity. This is a radical break from the spirit of mainstream generative grammar. Our overall vision of language conforms not to the majestic Galilean perspective but rather to a view, attributed to François Jacob, of biology as a "tinkerer." The language faculty, developed over evolutionary time, provides human communities with a "toolkit" of possibilities for cobbling together languages over historical time. Each language, in turn, "chooses" a different selection and customization of these tools to construct a mapping between sound and meaning. We will call this the *Toolkit Hypothesis*.

As there are decades of tradition behind mainstream generative grammar, and a vast literature, our brief for the Simpler Syntax Hypothesis and the Toolkit Hypothesis necessarily spends considerable time being predominantly critical. The form of our argument will be that, given some phenomenon that has provided putative evidence for elaborate syntactic structure, there nevertheless exist numerous examples which demonstrably involve semantic or pragmatic factors, and in which such factors are either impossible to code uniformly into a reasonable syntactic level or impossible to convert into surface structure by suitably general syntactic derivation. Generality thus suggests that, given a suitable account of the semantics/syntax interface, all cases of the phenomenon in question are accounted for in terms of the relevant properties of semantics/pragmatics; hence no complications are necessary in syntax. We spend much of the present study chipping away at one grammatical phenomenon after another, some well-known and some less so, showing in each case the virtues of the Simpler Syntax Hypothesis (and often drawing on previously published arguments). However, we are also constructive: we take it upon ourselves to develop an overview of what the syntax-semantics interface looks like under the new regime.

1.2. A sample argument: Bare Argument Ellipsis

To convey the spirit of our enterprise, we begin with a brief look at the phenomenon of Bare Argument Ellipsis (BAE, also known as "Stripping", Ross 1969b), which we take up in more detail in chapter 5. BAE appears in the nonsentential responses in examples like these:

(2) a. A: I hear Harriet's been drinking again.
B: (i) Yeah, scotch.
(ii) Yeah, every morning.
(iii) Scotch?
(iv) Not scotch, I hope!

b. A: Has Harriet been drinking scotch again?
B: (i) No, bourbon.
(ii) Yeah, bourbon too.

c. A: What has Harriet been drinking?
B: Scotch.

B's responses are interpreted as though B were saying something like (3).

(3) a. (i) Yeah, Harriet's been drinking scotch.
(ii) Yeah, Harriet's been drinking every morning.
(iii) Has Harriet been drinking scotch?
(iv) I hope Harriet hasn't been drinking scotch.
b. (i) No, Harriet's been drinking bourbon.
(ii) Yeah, Harriet's been drinking bourbon too.
c. Harriet has been drinking scotch.

MGG's approach to this phenomenon is based on an assumption that we will call Interface Uniformity:

> *Interface Uniformity (IU)*: The syntax-semantics interface is maximally simple, in that meaning maps transparently into syntactic structure; and it is maximally uniform, so that the same meaning always maps into the same syntactic structure.

Since, on the surface, Interface Uniformity is patently false, it is necessary for MGG to introduce a "hidden" or "underlying" level of syntax (Deep Structure in the Standard Theory, Logical Form in subsequent versions) that maps directly into semantics and is related derivationally to surface form.[2] Under these assumptions, B's responses in (2) must have underlying syntactic structures along the lines of (3), and all parts repeated from A's sentence have been deleted (or are encoded as empty nodes) in the course of deriving phonological form. For example, (2a.i) has the derivation shown in (4).

(4) Harriet's been drinking scotch ==> scotch
or $[_{NP}$ e] $[_{T}$ e] $[_{VP}$ e scotch]] ===> scotch

The Simpler Syntax alternative claims instead that the responses in (2) have no syntactic structure beyond that present at the surface. The syntax-semantics interface, which does not observe Interface Uniformity, supplies the rest of the details of interpretation, relying on the semantic/pragmatic structure of A's sentences.

An IU-based account like (4) is attractive in part because there exist responses that contain apparent sentential modifiers:

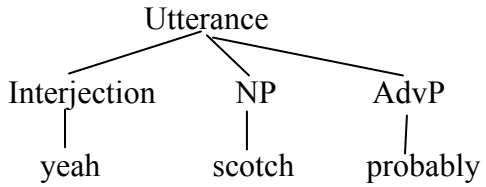
(5) A: (i) I hear Harriet's been drinking again.
(ii) Has Harriet been drinking again?
B: (i) Yeah, but not scotch.
(ii) Yeah, scotch, probably.
(iii) Yeah, I think scotch.
(iv) Yeah, scotch this time.

The argument is that the pieces of the response, e.g. *scotch* and *probably*, can be treated as syntactically well-formed only if there is an underlying sentential structure to which both are connected. This argument depends on a methodological principle we will call Structural Uniformity:

Structural Uniformity: An apparently defective or misordered structure is regular in underlying structure and becomes distorted in the course of derivation.

An SSH account, by contrast, requires the theory to countenance syntactically ill-formed utterances along the lines of (6), in violation of Structural Uniformity.[3]

(6)



The two approaches may seem at some level equivalent; and from the mindset of MGG, an IU-based account like (4) is far more elegant. However, let us dig a little deeper into the evidence. The IU-based account claims that the deletions in (4) are licensed on the basis of identity with the syntactic form and lexical content of relevant parts of the antecedent sentence. But in fact, the correspondence between antecedent and response is less than perfect. For instance, B's response (2a.i) does not mean 'I hear Harriet's been drinking scotch again,' with a literal copy of the antecedent. Rather, *I* uttered by B refers to B, not to A; B's response would have to say *you*. Moreover, even with this substitution, 'yeah, you hear Harriet's been drinking scotch again' is not the correct interpretation. Rather, B's response confirms what A has heard and adds information that A has *not* heard. Consider also B's responses in (2b,c). Again it is impossible to directly copy the syntactic form of A's sentence, which is a question; it must be adjusted to a declarative.

Of course the SSH account must provide for such adjustments as well. However, when we look at the basis for the adjustments, we find that they all involve semantic/pragmatic factors rather than syntactic ones. For instance, the *I-you* switch comes from maintaining constant reference in the antecedent and the response. Thus the SSH account, which derives the interpretation of the response from the *meaning* of the preceding sentence rather than from its *syntax*, does not need to say anything at all in order to get the pronoun switch for free. Similarly, the switch from question to statement is a natural part of any semantic/pragmatic treatment of discourse.

Semantics/pragmatics is still more deeply implicated in cases of BAE where the syntactic relation between the antecedent and response is more remote:

(7) a. A: Why don't you fix me a drink?
B: In a minute, ok?

[cf. infelicity of *Why don't I fix you a drink in a minute* as response: response is understood as *I'll fix you a drink in a minute*]

b. A: Would you like a drink?
B: (i) Yeah, how about scotch?
(ii) No, but how about some lunch?

[cf. **How about I would like scotch/some lunch?* as well as other improbable variants]

c. A: Let's get a pizza.
B: OK – pepperoni?
[cf. **Let's get pepperoni pizza?*: response is understood as something like *OK, should we get pepperoni pizza?*]
d. A: I hear there's been some serious drinking going on here.
B: (i) Not Sam, I hope.
(ii) Not my favorite bottle of scotch, I hope.

Such examples show that the plausibility of a putative syntactic reconstruction depends primarily on its semantic/pragmatic plausibility as a response; its degree of syntactic parallelism to the antecedent is a negotiable secondary factor. What this means is that a syntactic account needs, in addition to its syntactic machinery, all the machinery of the semantic account. In short, an account of BAE that assumes Interface Uniformity and Structural Uniformity ends up increasing rather than decreasing the overall complexity of the grammar. Once this is acknowledged, there is no justification for proposing all the extra hidden syntactic structure of (4); hence the overall complexity of syntactic structure can be reduced, while still accounting for the interpretation.

The argument can go further. Once we develop formal machinery that accounts for the interpretation of BAE in terms of the SSH, we can ask what other phenomena naturally fall under the same machinery, and whether they present similar difficulties to an IU-based theory. To the extent that a consistent story emerges across a range of phenomena, the overall choice is vindicated. This will be our tack in chapter 5, where we extend the SSH approach not only to BAE but to a range of ellipsis constructions, including Gapping, Sluicing, and VP ellipsis, by use of a formal mechanism we call Indirect Licensing.

This brief discussion of BAE is just a sketch; it is intended to set out a bit of empirical context in terms of which we can lay out our overall goals and hypotheses for a theory of language, the task to which we now turn.

1.3. The goals of linguistic theory

We begin a more thorough examination of the situation by reviewing the first principles of generative grammar, articulated in detail by Noam Chomsky in *Aspects of the Theory of Syntax* (1965) and many subsequent works. With only minor modulation and reinterpretation, these principles have stood the test of time and have received further confirmation through the flood of research in cognitive neuroscience in the past forty years. Here we will be brief; a more extended reappraisal appears in Jackendoff 2002a.

Generative grammar is grounded in the stance that the object of study is the instantiation of language in the context of the human mind/brain, rather than an abstract phenomenon that exists "in the community" (as posited, for example, by Saussure), in a collection of texts, or in some sort of Platonic space (Katz 1981; Langendoen and

Postal 1984). The fundamental linguistic phenomenon is a speaker producing an utterance that is understood by a hearer, and the fundamental question is what is present in the speaker's and hearer's mind/brain that enables this interchange to take place. A language "exists in the community" insofar as there is a community of speakers able to participate equivalently as speakers or hearers in an appropriate range of such interactions. In other words, generative grammar seeks a mentalistic account of language.

Unlike vocal communication systems in other primates, human language is not limited to a relatively small number of isolated signals. Rather, a speaker of a human language can create and understand an unlimited number of different utterances, concerning an unlimited number of different topics. This entails that a language user with a finite brain must have a productive system for constructing new utterances online (in both production and perception) from a finite basis stored in memory. The finite basis is standardly called the *lexicon* and the productive system is standardly called the *grammar*; we will reevaluate this division in section 1.5. Crucially, the productive system is not consciously accessible to the speaker; it is like the principles by which the visual system constructs a perception of the physical world, not like one's knowledge of the rules of games or traffic laws.

It has been customary since Chomsky 1965 to make a distinction between linguistic *competence* – the language user's knowledge of his or her language, and linguistic *performance* – the processing strategies by which this knowledge is put to use. At bottom, this is a distinction of convenience: a linguist investigating the grammatical details of a linguistic pattern finds it useful to idealize away from how these details are actually achieved in real time in a language user's brain. However, an idealization always implies a promissory note: in principle, the theory of competence should be embedded in a theory of performance – including a theory of the neural realization of linguistic memory and processing. One of the criteria for an explanatory theory of competence is how gracefully it can be so embedded, to the extent we can determine within our current understanding of processing and neural instantiation of *any* cognitive process.

From this mentalistic view of language, the question arises of how speakers acquire their lexicon and grammar. In particular, since the grammar is unconscious, parents cannot impart the rules to their children by instruction. Rather, the process of language acquisition must be understood in terms of the child unconsciously constructing the grammar on the basis of linguistic and contextual input. However, this raises two further questions: What sorts of inputs does the child use, and, most crucially, what are the internal resources that the child brings to bear on the construction of a grammar based on the input? Surely, part of what the child must be able to do is to extract statistical regularities in the input, but since the work of Miller

and Chomsky 1963, the generative tradition has stressed that there must be more than this to the child's ability (see Culicover and Nowak 2003 for a current assessment). The complexity of the achieved grammar, as discovered by investigation in linguistic theory, demands that the child be provided in advance with some guidelines along which to pursue generalization – a pre-narrowing of the class of possible analyses of the input.

The generative tradition has taken as its most important goal the characterization of these guidelines, calling them *Universal Grammar* (UG) or *the language capacity*. The nature of UG has been investigated by examining large-scale patterns of similarity across the grammars of languages (spoken and signed), language acquisition by children and adults, patterns of language loss and impairment, and historical change due to drift and language contact, as well as through mathematical/computational modeling of all these phenomena.

The goal of accounting for language acquisition puts empirical teeth in the desire to minimize the crosslinguistically variable principles of grammar. For this reason Chomsky says (*Aspects*, 46):

> [T]he most crucial problem for linguistic theory seems to be to abstract statements and generalizations from particular descriptively adequate grammars and, wherever possible, to attribute them to the general theory of linguistic structure, thus enriching this theory and imposing more structure on the schema for grammatical description.

The intent is to reduce the amount of the adult grammar that the child must learn, by attributing as much of it as possible to UG. If there is less to learn, it is easier to understand how the child becomes grammatically competent so rapidly and effortlessly. This aspect of minimization reaches its zenith in Principles and Parameters Theory, where all the child has to acquire is a rather small number of parameter settings, and the rest of the grammar follows from UG. (Optimality Theory takes a similar tack; see for example Tesar 1995.)

We agree that this is an important explanatory move. But we think Chomsky overstates the case when he says (1965, 35), "Real progress in linguistics consists in the discovery that certain features of given languages can be reduced to universal properties of language, and explained in terms of these deeper aspects of linguistic form." Such a discovery is indeed progress, but a theory of language also stands a better chance of being learnable if its syntax can be shown to have less abstract machinery such as extra nodes, hidden elements, and covert movements – all of which require the learner to be prompted by UG. Hence, it is also real progress in linguistics to show on independent empirical grounds – as well as on general grounds of parsimony – that one can dispense with all this machinery, so there is less to acquire, period. This is the direction in which the Simpler Syntax Hypothesis points us in the case of BAE above.

Another kind of real progress consists in the discovery of how certain features of

given languages, for which there is no UG input, can nevertheless be learned by the child from the input. Such features include of course voluminous facts of vocabulary, for instance that the noise /dɔg/ happens to mean 'dog'. This is just a matter of historical contingency, and the child has no choice but to learn it by brute force. And there is a vast amount of such material in any language. Hence a theory of language acquisition must be robustly equipped to cope with the task of learning it.[4] In seeking an explanatory theory of language, then, the theorist is often forced to judge when deeper explanation is called for, and when to give up and settle for a description in terms of learning. Section 1.5 discusses some phenomena that show how difficult a choice this is; the theme is continued throughout the book.

Next the theorist must face the question of where the child's internal resources for learning language come from. The answer must be that they are ~~is~~ innate, for they precede and enable learning. One can further ask what parts of these internal resources are specific to language learning, and what parts are shared with other components of other human – or primate – capacities. To the extent that some parts *are* specific to language, we are led to the claim that the capacity to acquire and use human language is a human cognitive specialization, a claim that has been central to generative grammar since the 1960s. We might distinguish the child's full internal resources for language acquisition, which include *inter alia* various social skills and the capacity for imitation, from the language-specific resources, calling the latter *Narrow UG* and the rest *Broad UG*. Then an eventual goal of linguistic theory is to sort out Narrow UG from Broad UG. Doing so, of course, may require a comparable account of the other aspects of human cognition subserved by elements of Broad UG, an account at present far beyond the horizon (cf. Pinker and Jackendoff 2004).

Finally, if Narrow UG is innate, it must be coded genetically, just like any specialized cognitive capacity in any animal, such as bat sonar. And to the extent that natural selection is responsible for the evolution of other complex cognitive capacities, we might expect the same to be true of the language capacity. Thus a plausible longterm goal for linguistic theory is to delineate the evolutionary origins of human language, to the extent permitted given the near absence of evidence. In the short term, this goal can be anticipated by asking of a theory of UG whether it lends itself to the logical possibility of incremental development over evolutionary time (cf. Jackendoff 2002a, chapter 8).

This goal often comes into conflict with the previous goal of pushing the complexity of language into UG, since the result of the latter is that UG itself becomes overloaded with complexity. Critics of generative grammar (such as Tomasello 1995) are justified in being suspicious of a learning theory that depends on the child having an innate language capacity that contains, say, an intricately crafted definition of government (Chomsky 1981; 1986a). This is more than a quibble about scientific

elegance. In order for such intricacy to be present in the prelinguistic child, it must be constructed in the brain (somehow) from the human genetic code. In turn, the genetic code ultimately has to be a product of genetic variation and natural selection in prelinguistic hominids (or perhaps earlier, if it serves some purpose more general than language). Granted, we know virtually nothing about how any innate cognitive capacity is installed in a brain by a genetic code, much less the dimensions of variation possible in such codes. But that doesn't absolve us from at least keeping this problem in mind, and therefore trying to minimize the complexity of UG in an effort to set the stage for eventual explanation.

Speaking to this concern, the Minimalist Program attempts to minimize the machinery in UG, while still explaining the acquisition of grammar on the basis of a finite set of parameters. It offers an overall vision of language as a "perfect" or "optimal" system, reducible to a few very general principles such as Merge and Economy. Within this context, Hauser, et al. 2002 suggest that the only feature of language that had to evolve specifically for Narrow UG is recursion, so that natural selection may have had little to do with the emergence of language. A priori this is a welcome result – but only if the Minimalist Program is empirically adequate on independent grounds (see section 2.4 and Pinker and Jackendoff 2004).

Again, these goals have been present in linguistic theorizing since the middle 1960s; and introductions like this one appear frequently in works on generative grammar. In the present study, we are trying our best to take all these goals – mentalism, relation of competence to performance, acquisition, and the innateness of Narrow UG – absolutely seriously. We will not mention processing and acquisition and evolution very often here, but we are relying on grounding provided by our previous work (Jackendoff 2002a, Culicover and Nowak 2003), to which the reader is referred for justification.

1.4. The architecture of the grammar

By the architecture of the grammar, we mean the articulation of the grammar into rule types: a specification of what phenomena each type is responsible for and how the various types interact with each other. Each rule type will be responsible for characterizing aspects of particular levels of representation. Thus a theory of the architecture of grammar will also delimit the significant levels of linguistic representation. Are there multiple levels of syntax such as D-structure, S-structure, and Logical Form, or is there only one? Which of these levels interacts directly with the lexicon? Which level interacts with semantic interpretation? And so on. The issue of architecture is supremely important in linguistic theory, for it has to be assumed that the language learner does not have to discover the architecture. In other words, the architecture is a fundamental part of Narrow UG, and therefore languages will not differ significantly in this respect, if at all.

All linguistic theories posit – at least implicitly – three essential levels of representation: phonological (sound) structure, syntactic (grammatical) structure, and semantic (meaning) structure. They differ widely in whether there are further levels (such as morphology or functional structure or pragmatics or phonetics), in how each level is further articulated, in how they interact, and indeed in how much emphasis is placed on them (many theories of syntax/semantics ignore phonology almost entirely).

We wish to call attention to four important architectural hypotheses on which we differ from mainstream generative grammar. Although MGG has gone through many different architectures since 1957, these four aspects of its conception have remained constant:

- The formal technology is derivational.
- There are "hidden levels" of syntax.
- Syntax is the source of all combinatorial complexity; phonology and semantics are "interpretive".
- Lexicon is separate from grammar.

We replace these with the following architectural hypotheses, which we share in various degrees with the alternative generative theories:

- The formal technology is constraint-based.
- There are no "hidden levels" built of syntactic units.
- Combinatorial complexity arises independently in phonology, syntax, and semantics.
- There is a continuum of grammatical phenomena from idiosyncratic (including words) to general rules of grammar.

The last of these calls for extensive discussion and is treated in the next section. This section takes up the first three plus two further issues:

- Semantics is served by a richly structured representation that is to a great degree

independent of language.

- The combinatorial principles of syntax and semantics are independent; there is no "rule-to-rule" homomorphism.

1.4.1. Constraints rather than derivations

In MGG, the technology of the competence grammar is formulated in terms of *derivations*: linguistic structures are constructed by applying a sequence of rules, each applying to the output of the previous step.[5] Hence there is an inherent directionality in the logic of sentence construction: certain rules and rule components necessarily apply "after" others. This conception of rules of grammar is shared by approaches such as Categorial Grammar (Montague 1974, Steedman 2000) and Tree-Adjoining Grammar (Joshi 1987, Frank and Kroch 1995).

By contrast, we, along with the alternative theories (LFG, HPSG, Construction Grammar, etc.), formulate the competence grammar in terms of the technology of *constraints*.[6] Each constraint determines or licenses a small piece of linguistic structure or a relation between two small pieces. A linguistic structure is acceptable overall if it conforms to all applicable constraints. There is no logical ordering among constraints, so one can use constraints to license or construct linguistic structures starting at any point in the sentence: top-down, bottom-up, left-to-right, or any combination thereof. Thus a constraint-based grammar readily lends itself to interpretations in terms of performance (see Jackendoff 2002a, chapter 7).

1.4.2. No "hidden levels" of syntax

The most striking technological innovation of early generative grammar, of course, was the transformation, an operation on syntactic structure that added, deleted, or reordered material. Transformations are perfectly natural extensions of a derivational construal of phrase structure rules: like phrase structure rules, they are a way to rewrite a string based on its structure. This leads to the possibility of "hidden levels" of syntactic structure that do not bear a direct relation to the phonological string. For example, Deep Structure in the Standard Theory is the level after phrase structure rules and lexical insertion have applied and before all transformations; Logical Form in GB is the level derived from S-structure by "covert movement." Crucially, because transformations can only move, insert, or delete constituents, these levels are necessarily made of the same "stuff" as overt syntax: they are tree structures whose nodes are syntactic categories such as N, V, AP, and PP. The "hidden levels" are a fundamental part of the vision of MGG. In particular, as we have seen in section 1.2, they are what make it possible to impose Interface and Structural Uniformity, thus bringing syntactic structure very close to meaning and permitting more cross-linguistic homogeneity in syntax than is evident from the surface.

The alternative theories, by contrast, are "monostratal": they have no hidden levels of syntax related to overt syntax by movement, insertion, and deletion. They

therefore are forced to conceive of the relation between syntax and semantics as more flexible. Needless to say, the absence of "hidden levels" is an important hypothesis of Simpler Syntax. LFG does posit a second level of syntax called "functional structure", but it is built of different "stuff" than overt syntactic structure and it is related to syntactic structure by constraints, not by operations that distort syntactic structure. In chapter 4 we will motivate a similar level, the "Grammatical Function tier", that proves necessary to implement the mapping between syntax and semantics.[7]

Looking back for a moment at the goals for the theory laid out in section 1.3: the choice of a monostratal theory has implications for acquisition. It was early recognized that one of the most difficult problems for the learnability of syntax was discovering the proper conditions for the application of transformations (Chomsky 1964a). During the 1970s, a great deal of effort went into discovering general conditions limiting the application of transformations, in order to reduce or even eliminate idiosyncratic conditions of application that would have to be learned. Wexler and Culicover 1980 in particular linked this undertaking to issues of learnability (see also Baker and McCarthy 1981). By abandoning movement rules altogether, this particular issue of learnability is sidestepped; different and potentially more tractable problems for acquisition come to the fore (Culicover and Nowak 2003, Tomasello 2003). We return to this issue in section 1.6 and at many subsequent points throughout the book.

1.4.3. Multiple sources of combinatoriality.

In MGG, all the combinatorial richness of language stems from the rules of the syntactic component; the combinatorial properties of phonology and semantics are characterized entirely in terms of the way they are derived from syntactic structure. The basic characteristic of language, that it is a mapping between meanings and phonetically encoded sounds, follows from the way a meaning and a phonetic encoding are derived from a common syntactic structure.

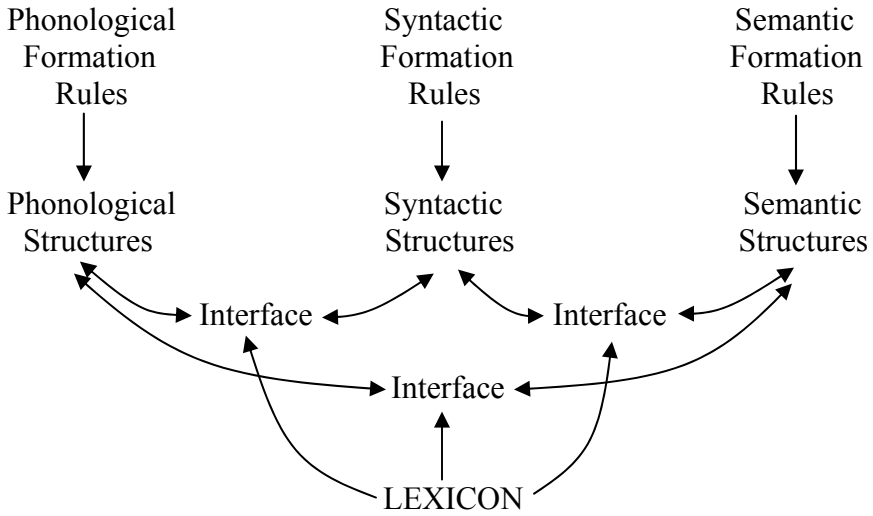
Our architecture contrasts with this "syntactocentric" view, both as a matter of technology and as a matter of conceptualization. In the early days of generative grammar, a syntactocentric architecture seemed altogether plausible, though Chomsky (1965: 16-17, 75, 136, 198) makes clear that it is only an assumption. Phonological rules appeared to be low-level rules that adjusted the pronunciation of words after they were ordered by the syntactic component. And there was no serious theory of meaning to speak of, so it made most sense to think of meaning as "read off of" syntactic structure. These considerations, combined with the brilliant success of early transformational syntax, made syntactocentrism virtually unquestionable.

The development of a multitiered phonology in the 1970s offered (in principle but not in practice) a significant challenge to the idea that syntax is the sole generative component in language, in that phonological structure was recognized to require its own autonomous generative grammar, parceled into tiers that must be related by

association rules. Association rules, because they relate structures made of different sorts of "stuff", must be stated as constraints rather than as transformations. Furthermore, the relation between syntax and phonology cannot any longer be stated in terms of syntactic transformations, because phonological constituency is constructed out of prosodic/intonational units rather than NPs and VPs. Thus, a constraint-based component relating the two is inevitable.

Similarly, during the 1970s and 1980s, many different theories of semantics developed, all of which took for granted that semantics has its own independent combinatorial structure, not entirely dependent on syntax. Hence again it is impossible to *derive* semantic combinatoriality from syntax by movement and deletion; rather a constraint-based component is necessary to coordinate the two structures. Thus on both the phonological and semantic fronts, the conditions that led to the plausibility of syntactocentrism were severely undermined. Nevertheless, syntactocentrism has continued for the subsequent twenty-five years as the reigning architectural hypothesis in mainstream generative grammar and many other frameworks. (For much more discussion, see Jackendoff 2002a.)

The architecture we are supposing here therefore abandons syntactocentrism and acknowledges the independent combinatorial character of phonology and semantics. It can be diagrammed roughly like this:



The grammar consists of parallel generative components, stated in constraint-based form, each of which creates its own type of combinatorial complexity. At the very least, these include independent components for phonology, syntax, and semantics, with the possibility of further division into subcomponents or *tiers*. The grammar also includes

sets of constraints that determine how the parallel components are related to each other; these are called *interface components*. Language thus provides a mapping between sound and meaning by (a) independently characterizing sound, syntax, and meaning, and (b) using the interface components to map between them. A sentence is well-formed if each part of each structure is licensed and each connection between parts of the parallel structures is licensed by an interface constraint. In particular, syntax plays the role of a mediator between the linearly ordered phonological string of words and the highly hierarchical but linearly unordered structure of meanings.

Next we must address the role of the lexicon. In every theory, a word is conceived of as a long-term memory association of a piece of phonological structure, a piece of syntactic structure, and a piece of meaning. In MGG, words are inserted (or Merged) into syntactic structure, and their phonological and semantic features are read off in the appropriate "interpretive" components. In the parallel architecture, a word is instead conceived of as a piece of the interfaces between phonological, syntactic, and semantic structures. Thus instead of "lexical insertion" or Merge introducing lexical items into syntax, we can think of lexical items as being inserted simultaneously into the three structures and establishing a connection between them. Or we can simply think of lexical items as licensing a connection between fragments of the three structures. In either sense, as interface constraints, they play an active role in the construction of sentences.

We should also make brief mention of morphology here (unfortunately so brief as to ignore and/or prejudge many important issues that we cannot address here). We take morphology to be the extension of the parallel architecture below the word level. Morphophonology deals with the construction of the phonological structure of words from stems and affixes: roughly, how the sounds of stems and affixes influence each other. Morphosyntax deals with syntactic structure inside words, for instance what syntactic categories affixes apply to and the syntactic category of the resultant, the feature structure of morphological paradigms, and the morphosyntactic templates involved in multiple affixation. Morphology also has a semantic component, delimiting the range of meanings that can be expressed morphologically (Talmy 1985) is an example of such work). Many productive affixes, for instance the English regular plural, can be treated as lexical items that, like words, provide an interface between pieces of (morpho)phonology, (morpho)syntax, and semantics. (See Jackendoff 1997a, 2002a for some discussion of the interaction between productive, semiproductive, and irregular morphology in this architecture.)

This architecture has enough flexibility that it can be used to compare different frameworks. For instance, the syntactocentrism of mainstream generative grammar can be modeled by eliminating the contribution of the formation rules for phonology and conceptual structure: these levels then receive all their structure through the interfaces

from syntax. Cognitive Grammar (Langacker 1987) can be modeled by minimizing the syntactic formation rules: here syntax is mostly derivative from semantics (and as far as we know little is said about phonology at all). LFG can be modeled by interposing the level of functional structure between syntax and semantics, and connecting it with similar interfaces.

Thus the traditional division of linguistics into phonology, morphology, syntax, semantics, and lexicon is not accepted here. Rather, the parallel architecture involves the three-way division into generative components of phonology, syntax, and semantics, plus a cross-cutting division into phrasal and morphological departments, plus interface principles between various components. And the lexicon cuts across all of these.

1.4.4. Conceptual Structure

A key assumption of our position concerns the status of meaning, represented formally as the level of *Conceptual Structure* (CS). We take it that Conceptual Structure is one aspect of human cognitive representations in terms of which thought takes place. By contrast with aspects of thought that are likely geometric (or quasi-topological) and analogue, such as the organization of visual space, Conceptual Structure is an algebraic structure composed of discrete elements.[8] It encodes such distinctions as the type-token distinction, the categories in terms of which the world is understood, and the relations among various individuals and categories. It is one of the mental frameworks in terms of which current experience, episodic memory, and plans for future action are stored and related to one another. And it is the formal basis for processes of reasoning, both logical and heuristic.

In other words, Conceptual Structure is a central system of the mind. It is not a part of language per se; rather it is the mental structure which language encodes into communicable form. Language per se (the "Narrow Faculty of Language") includes (a) syntactic and phonological structure, (b) the interface that correlates syntax and phonology with each other, (c) the interfaces that connect syntax and phonology with Conceptual Structure (the "Conceptual-Intentional Interface") and with perceptual input and motor output (the "Sensorimotor-Interface", actually one interface with audition and one with motor control).

We take it that the richness of Conceptual Structure is justified not simply on the basis of its adequacy to support linguistic semantics, but also on its adequacy to support inference and on its adequacy to support the connection to nonlinguistic perception and action. In principle, then, we should find evidence of some type of Conceptual Structure in nonlinguistic organisms such as babies and higher primates – a type of mental representation used for thinking but not for communication. Indeed, virtually all research in language acquisition presumes that the learner surmises the intended meaning of an utterance on the basis of context, and uses it as an essential part in the

process of internally constructing the lexical and grammatical structure of the utterance.[9] And an account of the extraordinarily complex behavior of primates, especially apes and especially in the social domain (e.g. Hauser 2000, Byrne and Whiten 1988), leads inexorably to the conclusion that they are genuinely *thinking* thoughts of rich combinatorial structure – not as rich as human thought, to be sure, but still combinatorial in the appropriate sense. In short, Conceptual Structure is epistemologically prior to linguistic structure, both in the language learner and in evolution.

The richness and epistemological priority of Conceptual Structure plays an important role in our argument for Simpler Syntax. In a syntactocentric theory, particularly under the assumption of Interface Uniformity, every combinatorial aspect of semantics must be ultimately derived from syntactic combinatoriality. In other words, syntax must be at least as complex as semantics. On the other hand, if Conceptual Structure is an autonomous component, there is no need for every aspect of it to be mirrored in syntax – only enough to map it properly into phonology. This presents the theorist with a different set of options. For example, consider again Bare Argument Ellipsis. In a syntactocentric theory, the interpretation could come from no place other than the syntax, so an account in terms of deletion or empty structure is unavoidable. A parallel architecture presents the option of accounting for the interpretation in terms of semantic principles, leaving the syntax with minimal structure. Because of syntactocentrism and Interface Uniformity, mainstream practice has virtually always favored accounts in terms of syntax, leading to elaboration of principles and structures in the syntactic component. However, if it can be shown that the generalization in question can be stated at least as perspicuously in terms of the meanings of sentences, regardless of their syntactic form (as we sketched for BAE), then good scientific practice demands an account in terms of semantics. A semantic account is particularly supported if the posited elements of meaning are independently necessary to support inference.

In turn, if independently motivated distinctions in Conceptual Structure are sufficient to account for a linguistic phenomenon, Occam's Razor suggests that there is no reason to duplicate them in syntactic structure. In such cases, syntactic structure will be constrained, not by internal conditions, but rather by the necessity to interface properly with meaning – what Chomsky 1995 calls "Bare Output Conditions." In other words, if the desired constraint on syntax can be achieved without saying anything within syntax itself, the extra syntactic structure should be slashed away by Occam's Razor.

Should *all* syntactic structure be slashed away? Our goal, a theory of syntax with the minimal structure necessary to map between phonology and meaning, leaves open the possibility that there is *no* syntax at all: that it is possible to map directly from

phonological structure (including prosody) to meaning. Although some people might rejoice at such an outcome, we think it is unlikely. Perhaps this represents a certain conservatism on our part, and someone more daring will be able to bring it off. But at minimum, we believe that *syntactic categories* such as noun and verb are not definable in purely semantic terms – and that fundamental syntactic phenomena such as agreement and case-marking are based on these categories. And we believe that there are *syntactic constituents* whose categories are determined (for the most part) by the categories of their heads, i.e. that there is something like X-bar phrase structure. We think it is not a matter of phonology or semantics that English verbs go after the subject, Japanese verbs go at the end of the clause, and German inflected verbs go in second position in main clauses but at the end in subordinate clauses. We think it is not a matter of phonology or semantics that English sentences require an overt subject but Italian sentences do not; that English has ditransitive verb phrases but Italian does not; that English has *do*-support but Italian does not (but see Beninca and Poletto 2004 for a Northern Italian dialect that does have *do*-support); that Italian has object clitics before the verb but English does not. That is, we are going to take it for granted that there is some substantial body of phenomena that require an account in terms of syntactic structure. It is just that we think this body is not as substantial as mainstream generative grammar has come to assume. This is why we call our hypothesis "Simple(r) Syntax" rather than just plain "Simple Syntax".

1.4.5. Combinatorial autonomy of syntax and semantics.

A recurring line of thought in syntactic theory takes it that, even if syntax has some properties autonomous from semantics, its basic principles of combination are in some sense homomorphic with those of semantics. Thus every syntactic rule has a semantic counterpart that says "when syntactic constituents X and Y are combined into constituent Z, the meanings of X and Y are combined in such-and-such a fashion." This hypothesis has appeared in venues as different as Katz and Fodor's (1963) early proposal for a semantic component in generative grammar and versions of syntax/semantics based on Categorial Grammar such as Montague (1974) and Steedman (2000). In Cognitive Grammar (Langacker 1987) and some versions of Construction Grammar (Goldberg 1995, 2005) this hypothesis follows from the central claim that all syntactic structure is inherently meaningful. It also is implicit in the formalism of HPSG, where the fundamental unit of combinatoriality is a *sign*, a complex of phonological, syntactic, and semantic features; when units are combined syntactically, they must be simultaneously combined phonologically and semantically as well. Finally, it is the intuition behind the Uniform Theta-Assignment Hypothesis (UTAH, Baker 1988) in MGG, which we discuss in chapter 2.

We take issue with this intuition, or at least we would like to keep our options open. The parallel architecture allows the possibility that syntactic and semantic

structures are to some degree independent in organization. For instance, the last subsection mentioned some factors in syntax that we think have little to do with meaning, such as verb position, agreement, requirement for an overt subject, and so on. These define the *forms* that are available for expressing meaning. To be sure, some of these choices will have semantic correlates. For example, if a language has a ditransitive construction, it will most likely be used with verbs of giving, because these are the stereotypical three-argument verbs. But this does not tell us what *other* three-argument verbs will make use of the same syntactic structure, and languages vary. Similarly, the syntactic structure *NP's N* can be used to express a possessor (8a), an agent (8b), or a time (8c), among other things; and each of these semantic relations can be expressed in other ways as well (9).

(8) a. the professor's hat
    b. the teacher's examination of the students
    c. Monday's meeting

(9) a. the hat of the professor
    b. the examination of the students by the teacher
    c. the meeting on Monday

To say that *NP's N* is the outcome of several distinct rules, each paired with different semantics, misses the point that this simply is an available syntactic structure in English. It makes more sense to us to say that the mapping between syntactic and semantic combinatoriality is many-to-many.

Another example dates back to the Generative Semantics/Interpretive Semantics dispute of the late 1960s. It turns out that the relative scope of negation and a quantifier such as *many* is to a great extent determined by their linear order in the clause, no matter how they achieve their position (Jackendoff 1969a, 1972):[10]

(10) Negation is to the left of and takes scope over *many*:
    a. Not many arrows hit the target.
    b. We didn't shoot many arrows at the target.
    c. We didn't shoot at the target with many arrows.
    d. The target wasn't hit by many arrows.
    e. Never did many arrows hit the target.
    f. Never did we shoot many arrows at the target.
    g. Never was the target hit by many arrows.
    h. I told nobody's secrets to many spies.
    i. Only then didn't many of the arrows hit the target.
    j. Only then wasn't the target hit by many arrows.
    k. Only then was the target not hit by many arrows.

(11) *Many* is to the left of and takes scope over negation (on primary reading):
    a. Many arrows didn't hit the target.

b. Many arrows never hit the target.
c. Many targets weren't hit by the arrows.
d. Many arrows, the target wasn't hit by.
e. We shot many arrows at no targets.
f. I told many spies nobody's secrets.
g. Only then did many arrows not hit the target.

These examples show that the principle relating quantifier scope to syntax is oblivious to which other principles happen to be involved in establishing linear order – including the active-passive alternation ((10d) vs. (11a)), the dative alternation ((10h) vs. (11f)), adverb fronting ((10e) vs. (11b)), and topicalization ((10d) vs. (11d)). Even the choice of negative contraction combined with subject-aux inversion can make a difference ((10i) vs. (11g)), but only if the consequence is reordering of negation and the quantifier (compare (10i)/(11g) to (10j)/(10k)). To say that each of these principles contains a condition involving scope misses the generalization among them all. On the other hand, if the principles of quantifier scope apply as independent constraints, dependent on linear order in the clause but not on how that linear order is established, then there is no longer a rule-to-rule match between the principles of syntactic composition that build the phrase structures of (10)-(11) and the principles of semantic composition responsible for surface phrase structure and quantifier scope. Both HPSG (Pollard and Sag 1994) and formal semantics (e.g. Cooper 1983) develop technology to deal with this problem, but they are forced to resort to such complexity because of their commitment to rule-to-rule isomorphism. Similarly, in order to preserve Interface Uniformity in light of such facts, MGG introduces the level of Logical Form and the covert movement rule of quantifier raising. We prefer a more direct and intuitive account which allows interface rules for different aspects of semantics to attend to different (but inseparably entangled) aspects of syntactic structure, and which preserves Simpler Syntax.

1.5. The continuum from words to rules; "syntactic nuts" and the core-periphery distinction

Mainstream generative grammar makes two divisions among linguistic phenomena, with the goal of identifying those aspects of language where deep generality and rich abstract deductive structure are to be expected. The first is the traditional division between grammar – the rules of the language – and the lexicon, which mainstream generative tradition takes to be the locus of all irregularity. In *Aspects* (p. 214), Chomsky cites approvingly Bloomfield's (1933, 274) characterization: "The lexicon is really an appendix of the grammar, a list of basic irregularities." The second division, introduced around the time of *Lectures on Government and Binding* (Chomsky 1981), distinguishes between two parts of the grammar itself, the *core* and the *periphery*. The core rules represent the deep

regularities of language, those that are governed by parameter settings. The periphery represents "marked exceptions" such as irregular verbs, for which there are no deep regularities. The research program idealizes the study of the language faculty to the study of the core:

> A reasonable approach would be to focus attention on the core system, putting aside phenomena that result from historical accident, dialect mixture, personal idiosyncrasies, and the like. As in any other empirical inquiry, theory-internal considerations enter into the effort to pursue this course, and we expect further distinctions to be necessary.
>
> (Chomsky and Lasnik 1993, reprinted in Chomsky 1995, 20)

Such an idealization is indeed "reasonable", but as always, an idealization carries with it an implicit promissory note to make good on the phenomena it has omitted. And "periphery" tends to become a tempting dumping ground for any irregularity one's theory cannot at the moment explain.

We have found ourselves taking a different tack, being attracted over and over again to "peripheral" phenomena. There turn out to be substantial numbers of them in English (several of which we treat in detail in chapters 5, 7, 8, 10, and 11; see also Culicover 1999 and Culicover 2004); we presume the same is true of other languages. We find over and over again that "peripheral" phenomena can lead to judgments as sharp and unexpected as the "core" phenomena, and, recalling our basic goals, we are led to ask how the language learner could possibly acquire these "syntactic nuts." That is, the periphery presents at least as much a problem for acquisition as does the core.

In addition, we must bear in mind the problem of lexical acquisition. Children acquire thousands of words in a relatively short time, and each word presents severe problems, particularly in the semantic domain; a vast and subtle experimental and theoretical tradition has grown up around this problem (see Bloom 2000 for a survey). In other words, even if we were to solve the acquisition problem for "core" grammar, it would still leave mysterious the acquisition of the rest of the language – which, including the lexicon, constitutes *most* of the language.

Conversely, it might turn out that a learning theory adequate for the lexicon and the "peripheral" rules would, with only moderate adjustment or amplification, be able to learn the "core" as well. This is the hypothesis we are going to pursue here, leading in a direction quite different from the mainstream program. To motivate this approach, this section will briefly sample some "peripheral" phenomena of English, some well known, some less so. Aside from their shock value, they are presented with three morals in mind:

- "Peripheral" phenomena are inextricably interwoven with the "core."
- The empirically most adequate analyses of the peripheral phenomena conform to the Simpler Syntax Hypothesis.

- There is a continuum of phenomena between words and rules and between periphery and core.

We will draw two important conclusions:

- An idealization to the "core," while a priori reasonable, has proven in practice to be systematically misleading.
- The traditional distinction between lexicon and grammar is mistaken.

The latter conclusion, also reached by HPSG and Construction Grammar, is in a sense our most radical break with both MGG and traditional grammar. It also points up the importance of choice of technology: only through using a constraint-based rather than a derivational technology has it been possible to arrive at this important change in our vision of what language is like.

1.5.1. Words that go in the wrong place.

Enough is a degree word that modifies adjectives and adverbs, alternating with *so*, *too*, and *as*. However, unlike these others, it follows its head.

(12) so/too/as/sufficiently/*enough big
big enough

As a nominal modifier, where it functions like a sort of quantifier, it can go either before or after its head.

(13) much/more/sufficient/enough pudding
pudding enough

The quantifiers *galore* and *aplenty* also go after the head rather than before it – obligatorily:

(14) many/numerous/*galore/*aplenty balloons
balloons galore/aplenty

Responsible, unlike other adjectives, can occur either before or after its head.

(15) a. the responsible/guilty parties
b. the parties responsible/*guilty

The word *notwithstanding* parallels other prepositions such as *despite*, *in spite of*, and *regardless of* in its semantics, but it can go on either side of its complement NP (fuller discussion in Culicover 1999; see also Huddleston and Pullum 2002). The related word *aside* goes on the right of its complement, though *aside from* goes on the left:

(16) a. Notwithstanding/Despite/In spite of/Regardless of your preferences, we're going ahead.
b. Your preferences notwithstanding/*despite/*in spite of/*regardless of, we're going ahead.
c. Your preferences aside, what kind of syntax is left to do?
d. Aside from your preferences, what kind of syntax is left to do?

Hence and *ago* are either prepositions which occur on the wrong side of their complement (a) or intransitive prepositions which, uncharacteristically, require a

specifier (b).

(17) a. He's leaving 3 years hence = He's leaving **in** 3 years.
He left 3 years ago = *German* Er ist **vor 3 Jahren** weggefahren.

b. He's leaving 3 years hence = He's leaving 3 years **from now**.
*He is leaving hence.
He left 3 years ago = He left 3 years **before now**.
*He left ago.

How are these exceptional words to be characterized? In the old days we could formulate a rule of "*enough*-shift" that applied to a single word (cf. Jackendoff 1977); perhaps other, similar rules would apply to the others. Or we might introduce a feature [+wrongheaded] on all of them and have a general movement rule that applied to words containing this feature. However, such a rule simply presumes Structural Uniformity, the insistence that in underlying form these words must be regular. The feature and the movement rule localize the irregularity at a point in the grammar that preserves the underlying regularity in the language.

What does this story entail for acquisition? It entails that children hear *enough* in the "wrong" place, and, knowing that it's in the "wrong" place, they "correct the error" and construct a grammar in which it is in the "right" place in underlying structure. Then, in order to create the right output, children construct a rule of "wrongheaded-shift" and tag the relevant words with the feature that this rule detects.

A more direct alternative would be that children hear these words in these positions, so that's where they put them, in violation of the general phrase structure rules of English. That is, these words are learned with their position explicitly marked. In order to accept such a story, of course, we have to accept that the phrase structure order of a language is not totally rigid, but is rather just the unmarked default. We might then consider the stipulated positioning of *enough* et al. as rather like morphological blocking, where, for example, the explicitly stored irregular form *drank* blocks the form **drinked* that the regular rules would produce. This solution is of course more in tune with SSH, in that it posits no additional hidden syntactic structure.

These two solutions are not notational variants. The feature+movement solution sees underlying form as altogether regular, and deviations from it are the result of movement. The consequence is that the learner must construct considerable abstract machinery to correctly produce and understand these forms.[11] The direct solution dispenses with movement and abstract features that trigger movement, at the price of reducing the exceptionless regularity of underlying phrase order and of having some lexical items that specify their own position. The word contains (or *is*) a rule for its syntax.

A bit of evidence for the latter approach emerges from a *very* minor system in English that concerns names of geographical features. There are four classes of words,

each of which dictates a different form for the names built from them:

(18) a. the Atlantic/Pacific/Arctic Ocean
the Mediterranean/Black/Caspian/Aegean Sea
the Mississippi/Hudson/Danube River

b. the Bay of Fundy/Biscay
the Gulf of Mexico/Aqaba
the Isle of Man

c. Beaver/Wissahickon Creek
Loon/Arrowhead Lake
Biscayne/Hudson/Buzzard's Bay
Vancouver/Mackinaw Island
Spot/Claypit/College Pond
Laurel/Sideling Hill
Loon/Sugarloaf Mountain

d. Lake Michigan/Superior/Geneva
Mount Everest/Washington/Monadnock

These words are productive, so they apply to fictional place names as well, e.g. *the Bojoric Sea*, not **Sea Bojoric*, and *Gloggle Mountain* but *Mount Gloggle*. (It so happens that *lake* and *bay* go in two classes – though a different two – so one has to learn each lake's and each bay's name individually.) Now this is no fancy recursive system, but it illustrates that a word can carry in its lexical entry a specific grammatical frame into which it fits. (It's certainly not the case that a rule dictates that *Mount* moves around the name preceding it in underlying structure, and that *Lake* moves around just some of the names preceding it in underlying structure!) This is just what we're proposing for *enough* et al. If the grammar/lexicon needs this for the *really* peripheral system illustrated in (18), why not use it as well for exceptional deviations from core phrase order?

1.5.2. Sluice-stranding.

(19a) is clearly understood as meaning the same as (19b).

(19) a. John went to NY with someone, but I couldn't find out who with.

b. John went to NY with someone, but I couldn't find out who John went to NY with.

(19a) is a case of what Ross 1969b calls *Sluicing*, where an isolated wh-phrase stands in the place of an understood indirect question. It is especially interesting because it contains not only the wh-phrase, but also a preposition from whose complement the wh-phrase has apparently been moved. Culicover 1999 (where there is more detailed discussion) calls this case *Sluice-stranding*. The issue for syntax, of course, is the source of the syntactic fragment *who with*. As usual, the strategy in MGG, following Interface and Structural Uniformity, is to derive it from an underlying regular structure,

in fact from the underlying structure responsible for (19b). The issue is how *who with* gets there.

The literature offers two main possibilities. Both assume what we will call Derivational Uniformity: since Sluice-Stranding is understood like a wh-question, it must undergo wh-movement. The first analysis, represented by Ross himself, assumes an underlying form of the usual sort; then *who* moves to the front in the usual fashion. The omitted part then deletes (alternatively it could be empty to start with), leaving just the fragment *with*. The other analysis, of which Lobeck 1995 is representative, first fronts the entire PP. Then – on the condition of the rest of the sentence being empty, either by deletion or base generation – *who* is moved around the preposition.

(20) a. *Ross's derivation*:
... but I couldn't find out [$_{CP}$ John went to NY with who] ==>
[who ~~John went to NY~~ with t] ==> [who with]

b. *Lobeck's derivation*:
... but I couldn't find out [$_{CP}$ with who(m) ~~John went to NY t~~] ==>
[$_{CP}$ with who(m)] ==> [$_{CP}$ who with]

The difficulty is that Sluice-stranding is both more productive and more restricted than these accounts would suggest. As for productivity: Ross notes that Sluicing is possible where the purported extraction site normally forbids extraction. (21a) illustrates for ordinary Sluicing of a PP; (21b) illustrates for Sluice-stranding.

(21) I saw a fabulous ad for a Civil War book, but I can't remember
a. by whom.
b. who by.
c. * by whom I saw a fabulous ad for a Civil War book.
d. * who I saw a fabulous ad for a Civil War book by.

As for restrictiveness: Sluice-stranding severely constrains what combinations of wh-word and preposition are acceptable. (22) shows a range of possibilities with normal Sluicing of a PP, all of which are acceptable. (23) shows that only a curiously restricted range of these are grammatical with Sluice-stranding. In particular, different wh-words are felicitous with different lists of prepositions, e.g. *what about* but **who about*.

(22) Normal pied-piped preposition:
... but I couldn't figure out
a. with/to/from/for/next to/about/beside whom
b. with/for/from/of/on/in/about/at/before/into/near beside what
c. for/by/with how much
d. to/from/near where
e. with/to/from/next to/about/beside which (book)

(23) Sluice-stranding:
... but I couldn't figure out

a. who with/to/from/for/*next to/*about/*beside
b. what with/for/from/of/on/in/about/at/*before/*into/*near/*beside
c. how much for/*by/*with
d. where to/from/*near
e. * which (book) with/to/from/next to/about/beside

The upshot is that under standard assumptions, sentences with Sluice-stranding have perfectly regular underlying structure; but (a) they are derived by applications of wh-movement that sometimes violate the regular constraints on movement, and (b) the acceptable combinations of wh-word+preposition nevertheless must be learned pretty much one by one (though there are subregularities that have the flavor of those in semiproductive morphology). What does this imply about acquisition? Since UG is supposed to take care of the constraints on movement, it must contain a rider that abrogates the constraints when movement takes place across deleted (or empty) structure – this is Ross's proposal. How do we feel about this, aside from the fact that it makes the analysis work? Is it an *explanation*? And moreover, once this is accounted for, there is the fact that the learner can make no secure generalizations about which instances of Sluice-stranding are possible.

Suppose instead that the learner acquires the possible forms of Sluice-stranding directly, without reconstructing a derivation from a regular sentential underlying structure. There is after all only a finite number of such forms, perhaps fifteen or twenty. This implies that the interpretation of (19a) as synonymous with (19b) is not a matter of common underlying syntax: like BAE, it is a matter of the syntax-semantics interface. And the bizarre syntax of the construction is not a matter of derivation from a fully regular form; rather, like BAE, it just is a fact of English that such forms are possible. This would be the conclusion urged by the Simpler Syntax Hypothesis, as by now should begin to sound familiar.

This case presents two complications beyond those of *enough* et al. The first is that the peculiarity of Sluice-stranding cannot be localized in particular words. It is not *who, what, how much*, and *where* per se that are exceptional, nor is it particular prepositions. Thus no distribution of features on individual *words* can account for the exceptionality. Rather, what is exceptional is the syntactic structure itself. Sluice-stranding extends the normal Sluicing structure to a wh-phrase plus a stranded preposition. It is sufficiently special that its individual cases must be learned one by one. But these cases are not marked on individual words: it is the combination of words that is idiosyncratic.

The other new thing here is that Sluice-stranding, because it involves wh-phrases, superficially looks like a case of wh-movement, one of the "core" rules of grammar. But if the wh-phrase in Sluice-stranding is interpreted without movement from a canonical underlying form, what does this say about normal Sluicing, not to mention

wh-movement itself? Is movement the right analysis? We put these questions off until chapters 5 and 6. Our purpose for the moment is to show how consideration of the "periphery" leads to questions about the basic assumptions surrounding analyses of the "core." If the analysis of clause-initial wh-phrases in terms of movement must be taken for granted (as is the case in MGG), there is no way to achieve a smooth transition from normal "core" indirect questions, through the marked case of Sluicing, to the truly exceptional Sluice-stranding.

1.5.3. Constructional idioms in the VP

Our last example in this section concerns the principles by which a verb's semantic arguments are realized in syntax, surely a supreme instance of a core system. The core principle is that the verb licenses everything in the VP adjacent to it, in particular direct objects. Adjuncts, which are not selected by the verb, are out to the right.

But now consider cases like (24a-c). These are syntactically congruent with verb-particle constructions like (24d,e), in which the verb licenses its complements in the usual way.

(24) a. Pat sang/drank/sewed his heart out. [also *his guts*]
b. Terry yelled/wrote/programmed her head off. [also *her butt, her tush*, etc.]
c. Leslie talked/cooked/composed up a storm.[12]

Normal verb-particle constructions:

d. Pat threw the trash out.
e. Leslie picked up the garbage.

The difficulty is that in (24a-c), the verb does not license the complements. Rather, *X's heart out, X's head off,* and *up a storm* are idiomatic combinations, all of which mean approximately 'intensely and/or excessively' – that is, semantically they function like adverbials. Yet at the same time, they apparently "use up" the direct object position, since the verb is not allowed to license its own object:

(25) a. * Pat sang the Marseillaise his heart out.
b. * Terry yelled insults her head off.
c. * Leslie cooked eggs up a storm.

There are two possible treatments of this that preserve the regularity of argument selection, in accordance with Structural Uniformity. One is to suppose that in underlying structure the NP+particle combination is not part of the verb's VP but is rather in another clause or an adjunct position. It is of course never superficially visible in this putative other position – *but the child hearing this construction knows it belongs there!* It is then necessary to invent a rule that moves the NP+particle to its surface position and somehow guarantees that the verb has no other arguments. Such a solution is little more than a counsel of desperation.

The other possibility is to propose a "lexical rule" that freely converts intransitive

verbs into idioms of the form V+*your heart out*, so that by the time argument selection takes place we have a unit that does not select any further arguments. This works. But notice that this claims that the lexicon as well as the syntax can accomplish free phrasal combination. *Drink your heart out* is not an not idiosyncratic phrasal combination like *kick the bucket*: *X's heart out* combines freely with verbs, within semantically defined limits. Such free combination "in the lexicon" is exactly what syntax is supposed to be for. So, according to this solution, the rock-bottom basic function of syntax has been abandoned for the sake of maintaining the assumption that the verb licenses all the elements of VP, an assumption that we take it ought to have lower priority in the theory.[13] Something is amiss.

The solution we favor is to preserve phrasal syntax as a locus of free combination, but to relax the absolute requirement that the verb license its syntactic complements. To be sure, the default (or "core") way to license constituents of VP is via the verb, but this is not the only way. Another way is for the constituents of VP to license themselves. Here is what we mean: (Pretty much) everyone treats *kick the bucket* as a lexical VP, where *bucket* is licensed by the idiom as a whole, not by *kick*. Likewise, we propose that [*V X's heart out*] is a lexical VP, where *V* is a freely chosen verb and *X* is a pronoun bound to the subject; all of its constituents are licensed by the idiom, not by the verb. The idiom is combined with the verb in syntax, where free phrasal combination properly belongs. In addition, because this idiom prescribes the form of the VP, there is no room left in the VP for arguments licensed by the verb. The price for this solution is (a) a richer treatment of the syntax-semantics interface, in particular a new kind of principle for licensing syntactic complements of the verb; and (b) a new sort of lexical item consisting of a VP with a free choice of verb. If these adjustments were required for just this case, they might not be worth it.

But this is not an isolated case. English harbors several more of these VP constructional idioms, of which (26) illustrates four.

(26) a. *Way-construction* (Jackendoff 1990a, Goldberg 1995):
Elmer hobbled/laughed/joked his way to the bank.
(≈ 'Elmer went/made his way to the bank hobbling/laughing/joking')

b. *Time-away construction* (Jackendoff 1997b):
Hermione slept/drank/sewed/programmed three whole evenings away.
(≈ 'Hermione spent three whole evenings sleeping/drinking/sewing/programming')

c. *Sound+motion construction* (Levin and Rappaport Hovav 1995):
The car whizzed/rumbled/squealed past Harry.
(≈ 'the car went past Harry, making whizzing/rumbling/squealing noises')

d. *(One case of) Resultative construction* (above references plus Simpson 1983, Goldberg & Jackendoff 2004)

The chef cooked the pot black.
(≈ 'the chef made the pot black by cooking in/with it')

Again these constructions preclude the verb selecting its own object:

(27) a. * Elmer told jokes his way to the bank.
b. * Hermione drank scotch three whole evenings away.
c. * The car made loud squeaks past Harry.
d. * The chef cooked the beans the pot black.

There is no way to predict the meanings of (26a-d) from the words (for the remarkable subtleties, see the cited sources[14]). Yet in each case the choice of verb is free within semantic limits – as long as it is intransitive. Hence it doesn't make sense to list the full VPs as idioms like *kick the bucket*. What are the alternatives?

As in *X's heart out*, it proves syntactically and semantically difficult to derive these from underlying structures in which the verb licenses all the complements of VP (see references). And a derivation by "lexical rule" subverts the fundamental role of syntax in forming free phrasal combinations. Moreover, since some verbs can appear in several of these constructions, the "lexical" solution is forced to say, for instance, that the lexicon contains not only the verb *laugh* but also the productively derived "idioms" *laugh X's head off*, *laugh X's heart out*, *laugh X's way, laugh NP[time] away*, and *laugh Xself into a stupor*.

The approach urged by Goldberg 1995, Jackendoff 1997b, and Goldberg and Jackendoff 2004 is to view the constructions in (26), like (24a-c), as lexical VP idioms with open verb positions. Unlike (24a-c), these idioms also select other arguments – within VP to be sure, but not selected by the verb:

(28) a. [$_{VP}$ *V X's* way *PP*], 'go PP, while/by V-ing'
b. [$_{VP}$ *V NP* away], 'spend [NP amount of time] V-ing'
c. [$_{VP}$ *V PP*], 'go PP, making V-ing noise as a result of motion'
d. [$_{VP}$ *V NP AP/PP*], 'make NP become AP/PP, by V-ing'

Because the idiom dictates the form of the VP, there is no room for the verb to have its own arguments there; this is why the verb must be intransitive.

The sound+motion and resultative cases are especially interesting because they have no special morpheme such as *heart out, way*, or *away* that overtly marks them. All there is to mark the sound+motion case is the semantic clash of a sound emission verb against a path complement; to mark the resultative, the presence of an object and a PP that the verb would not normally license. That means that there can be no *word* in the lexicon marked for these special interpretations. But where then do the rules of interpretation encoded roughly as (28c,d) belong in the grammar? Well, if *kick the bucket* is in the lexicon, and *V X's heart out* is in the lexicon, and *V X's way PP* is in the lexicon, then the logical place for sound+motion and the resultative is in the lexicon as well. That is, the lexicon must contain, besides words and idioms, pieces of

meaning-bearing structure without phonological content. Thus we are dealing here with pure "constructional meaning."[15]

There is no question that the constructions in (24a-c) and (26) are "peripheral." Every language has to have a way for verbs to license arguments, but not every language has to have this other way to license arguments in VP. And certainly these particular constructions in English are peculiar and must be learned. But it precisely in this that their interest lies:

- On the one hand, as with the other "syntactic nuts" discussed in this section, they are sufficiently idiosyncratic that they cannot possibly fall under a finite parameterization of the language faculty of the sort desired for MGG's "core grammar". On the other hand, they interact richly with the core system of argument selection – one might say they are "parasitic" on it, in much the same way as Sluice-stranding is parasitic on core wh-constructions.
- Not only do they challenge the strict distinction between core and periphery, they challenge the even more traditional distinction between lexicon and rules of grammar, by offering a smooth continuum from clearly lexical idioms such as *kick the bucket* to "rules of constructional meaning" such as the sound+motion construction.
- They radically change our view of argument selection. An examination of the "core" shows us only cases in which the verb selects the contents of VP. These constructions show us other strategies at work, which, because they exclude transitive verbs, must be in competition with those of the core.
- We take it that these strategies, like those of the core, are not entirely wild; there must be a typology of them that explains the range of possibilities into which (24a-c) and (26) fit. That is, "peripheral" phenomena must be constrained by UG as well, and an idealization to the "core" leads us to miss whole ranges of phenomena crucial to the characterization of UG.

Finally, if this account of VP constructions is correct on empirical grounds (and we refer the reader to the references above for justification), they support the Simpler Syntax Hypothesis, in that, although the items contributing to syntactic structure are unusual, the syntactic structure itself has nothing special about it – no extra nodes, no hidden elements, no movements or deletions. Section 4.12.1 shows how these VP constructions are integrated into syntactic structure.

We note also that this "constructional" approach lends itself to other phenomena discussed earlier in this section. The "wrongheaded" elements such as *enough* and the geographical words such as *ocean* are like *X's heart out*, in that they carry with them a syntactic frame that dictates how they are integrated with the phrase in which they occur. Sluice-stranding is defined by an unusual syntactic structure [$_{CP}$ wh-word P], of which the possible instances are listed. It thus parallels the family of NP+particle

idioms *X's heart out, X's head off, X's butt off*, etc., which have a common pattern made of known words but which have to be learned one by one. This suggests that at bottom all peripheral constructions can be treated as special sorts of lexical items.

We should add that we are aware of no attempts to analyze any of these phenomena (aside from the resultative and Sluice-stranding) in recent mainstream generative grammar. Moreover, any attempt to do so will have to encode their idiosyncratic properties in some way; simply using the very powerful formal vocabulary of MGG to capture these properties does not alter the fact that they are idiosyncratic, nor does it count as an explanation any more than does the more Simpler Syntax approach.

1.6. Core grammar and its relation to UG

We hear some mainstream readers objecting: "This may be all well and good for the periphery. But that has no bearing on the core, which has quite different properties altogether. The periphery may be learned by brute force, like words, but the core isn't. We know the core is very complex and abstract, so it requires a different sort of learning theory." We might start our reply by observing that word learning is far from brute force – it involves very sophisticated use of environmental input. But let's put that aside and concentrate on the core.

Chapters 2 and 3 will be devoted to showing that a large proportion of the complex abstract structure claimed by mainstream generative grammar has been motivated by flawed chains of argumentation. Over and over, alternative hypotheses have been ignored, and foundational assumptions have not been reevaluated in the light of new evidence. We will show that much of the complexity and abstraction has resulted from efforts to patch over earlier mistakes instead of going back and starting over – compounded by the effects of dogmatically accepting Interface and Structural Uniformity. We will further show that, once one recognizes these mistakes, it becomes possible for syntax to mediate between sound and meaning with far less structure than mainstream generative grammar has been accustomed to, even in the core, and with at least as much explanatory power.

Still, it might be that "core grammar", even if less abstract than usually claimed, is quite different in character from the periphery and therefore calls for a different learning theory. Here is the reason why we think this is not the case.

Consider again the constructional idiom [*V X's heart out*], surely a part of the periphery. This has to be stored in the lexicon, so that it is available for free combination with verbs. However, it is also a "parasitic" specialization of the more general principle of English that permits VPs containing a particle after the direct object. The standard old-time way to write this rule was as a phrase structure rule like (29a). But it could just as well be stated as the structural constraint (29b), a form totally parallel to the idiom.

(29) a. VP –> V NP Prt
b. [$_{VP}$ *V NP Prt*]

Now (29) is not a "core" rule: the precise behavior of English particles is far from well-attested in the languages of the world. And cousins of English such as German, Dutch, and Swedish have variants on this construction with slightly different behaviors (Dehé, et al. 2002). We find it unlikely that these variants are realizations of different abstract parameter settings, where the parameters are of sufficient generality to belong in an innate language capacity (and to be coded on the genome and selected for by evolution!). So let us suppose that (29) is a peripheral rule of English. Still, it is more general in its application than [*V X's heart out*], because it has more variables in it and therefore allows more dimensions of variation in its realization. At the same time, if the sound+motion construction (28c) is in the lexicon, generality bids us put (29) in the lexicon too. (In a moment we will ask whether (29), like (28c), has a meaning component.)

But in turn, (29) is a specialization of a still more general rule of English, the one that says the VP begins with the verb. Written as a phrase structure rule, this is (30a); as a structural constraint, it is (30b).

(30) a. VP –> V ...
b. [$_{VP}$ V ...]

This is beginning to look like a "core" rule: in fact it is the setting of the "head parameter" for the English VP. Going still further, (30) is a specialization of an even more general rule (31): phrases have heads, and the category of the phrase is determined by the category of its head.

(31) a. XP –> ... X ...
b. [$_{XP}$ ... X ...]

This is of course (part of) X-bar theory, a basic component of UG – at last a believable candidate for a component of an innate language capacity.

There are other rules of English that are not specializations of these principles, at various levels. The "wrongheaded" words of section 1.5.1 carry with them structures that violate normal head position for the phrases they are embedded in; that is, they are violations of rules like (30b). As is well known, gerundive complements such as *John's habitually drinking scotch* occur in all the syntactic positions appropriate for NPs; but they are headed by a V, so they violate (31). An even worse violation of (31) is the minor construction exemplified by *head to head, side by side, dollar for dollar*, and so on (Williams 1994a, Jackendoff 1997a, Jackendoff in preparation). These expressions occur in adverbial positions, have no obvious head, and permit no complementation and only extremely limited modification (e.g. *day by miserable day*). But they too are expressible in a constructional format.

This analysis leads us to believe that there is a smooth continuum of linguistic

material in the lexicon, ranging from words through idioms through truly idiosyncratic constructions through more general but still specialized constructions to the most general core-like principles. There is no principled distinction between core and periphery, only a gradation of generality. This is in fact how the grammar is treated in HPSG and Construction Grammar. What are its implications for learning?

Our vision of learning (Culicover, 1999, Culicover and Nowak 2003, Jackendoff 2002a; Tomasello 2003, Croft and Cruse 2004) is that the learner stores current analyses of novel heard utterances in the lexicon. The learning procedure then attempts to construct new and more general lexical entries, in which common parts of existing lexical entries are retained and differing parts are replaced by a variable. This makes the new lexical entry function as a schema or rule that encompasses existing entries and permits construction of new utterances. In turn, this schema along with others may be further abstracted into a still more general schema by replacing further dimensions of variation with variables. The result is a hierarchy of lexical entries, in which each layer consists of generalizations of items in the more specific layers below (the term used in HPSG and Construction Grammar is *inheritance hierarchy*).

What does UG have to do with this? We conceive of UG as pre-specifying the highest, most general layer of the hierarchy. The gradual creation of lower, more specialized levels from idiosyncratic input is guided by the criterion that, if at all possible, lower levels should be specializations of the highest layer, so that the hierarchy is maximally coherent. Thus UG guides but does not determine the course of language acquisition. If the input contains curiosities such as *day by day* and *who with*, the child can learn them by the usual procedures, even if they do not fall entirely under UG. It is just that these constructions fail to generalize any further with anything else, and hence remain *sui generis* excrescences on the language. On the other hand, relatively "core" phenomena such as (30) are quite direct specializations of UG, and represent degrees of abstraction and generality that likely could not be achieved without the principles of UG as "goals" or "attractors" for the process of generalization. In short, with the addition of these "attractors," a theory adequate for acquisition of the lexicon and the periphery will also be adequate for the core.

What sorts of things would one want in UG, on this picture? Here are some pieces of the toolkit that UG offers for syntax, for a first approximation:

(32) Structural principles:
- a. Basic principles of phrase structure:
  - i. X-bar theory: phrases of category XP, headed by lexical category X
  - ii. Some of the most common alternatives such as the conjunction schema
- b. Basic principles of agreement and case-marking (where we mean morphological case rather than abstract case)
- c. Principles of long-distance dependencies, whereby an element at the front of

a clause is identified with a gap somewhere within that clause, potentially deeply embedded (cf. chapter 6).

(33) Principles of the syntax-semantics interface (cf. chapter 4)
   a. Basic principles of mapping: Syntactic heads map to semantic functions; syntactic arguments (subjects and complements) map to semantic arguments; syntactic adjuncts map to semantic modifiers
   b. Supplements to basic principles of mapping:
      i. Some version of a thematic hierarchy, specifying how various configurations of thematic roles map into configurations of syntactic roles, specified in terms of position and/or case-marking
      ii. More elaborate marked options for argument mapping, including passive, and principles for "argument sharing" among heads (these include the prototypes of Raising and Control and also of light verb and serial verb constructions).
   c. Basic options for mapping information structure (topic/focus) into syntactic structure
   d. Basic options for mapping coreference and quantification into syntactic structure

In addition, there may be some more primitive "protolinguistic" principles that appear as fallbacks when (32)-(33) do not apply:

(34) More primitive "protolinguistic" principles
   a. Structural principles: parataxis (jamming constituents together in some linear order)
   b. Interface principles: pragmatic construal in context (e.g. BAE).

And there are likely further "functional" principles that help shape formal grammar in the interests of more effective processing, of which (35) presents some samples (cf. Bates and MacWhinney 1982, Newmeyer 1998Hawkins 1994; 2004). Because these have the effect of favoring simpler processing, they may simply emerge as a consequence of historical change and may not need to be an explicit part of UG, coded on the genome.

(35) "Functional" principles
   a. Structural principles: Prefer putting all heads on same side of their complements
   b. Interface principles:
      i. Syntax to information structure:
         Topic/given information early; focus/new information late
      ii. Syntax to prosody
         Short constituents early; long constituents late (motivating e.g. rules of extraposition)

(32)-(35) are concerned purely with the construction and interpretation of syntactic phrases. Phonology and morphology of course have their own indigenous principles of UG. Conceptual Structure – the system which all of this expresses – is defined by its own principles of well-formedness.

We have taken care to divide (32)-(35) into principles that specify autonomous syntactic structure and those that connect syntactic structure to meaning (and prosody). This accords with our view (section 1.4.5) that syntactic and semantic structure are to some extent de-linked – that there is no "rule-to-rule" homomorphism. The English verb-particle construction [$_{VP}$ V NP Prt], which played a role in the discussion of section 1.5.3, provides another example. This syntactic configuration is used for at least five different semantic purposes (Jackendoff 2002b):

(36) a. *Prt serves as an argument of the verb, substituting for a directional PP*:
Dana tossed the eggs in/over/around.
[cf. Dana tossed the eggs into the pan/over the counter/around the room]

b. *Prt is an aspectual modifier (i.e. not an argument of the verb), specifying completion*:
Gus ate the eggs up; Gus packed his suitcase up; Gus read the article through.

c. *Prt and verb form an idiomatic unit*:
Pat looked the information up; Pat turned the light off.

d. *Prt and NP form an idiomatic unit* (cf. (24)):
Terry sang her heart out; Terry studied her tush off.

e. *Prt marks a VP construction whose argument is the NP* (cf. (26b)):
Leslie knitted the afternoon away.

We see no semantic commonality among all these uses (though there are some pairwise commonalities), so a common vague meaning seems out of the question. One could certainly call the construction polysemous. But to us, such a conclusion would miss the point that English has this structure available and, say, French does not. Perhaps historically the structure arose from one of the meanings in (36). But once there in English structure, it was available for other meanings to be poured into it as well – that is, it took on an autonomous syntactic life of its own.

We take this generally to be the situation; it is what it means for a linguistic phenomenon to become "grammaticized." For instance, it is argued by some functionalists that subject position is a "grammaticization" of topic and/or agent. Our point is that although subject position often plays this role (and stereotypically so), there are many other uses for subject position, including even filling it with a meaningless expletive. And in fact, in response to the grammaticization of subject position, English has grown another topic position, ahead of the subject, which is used exclusively for highlighting information structure.

We do not take the list in (32)-(35) to be complete or necessarily correct. And one

of the most important goals of linguistic theory ought to be to establish the proper balance between purely structural principles, interface principles, and functional principles. Mainstream generative grammar, of course, has emphasized the first of these at the expense of the other two. We are attempting to some degree to right the balance.

This conception of the rules of grammar leads to a different take on the notion of what the child is capable of learning. As we have said earlier, a boundary condition on language acquisition is that, whatever the nature of the *grammar*, the child must also learn thousands upon thousands of *words*. It is clear that there is some innate basis behind this, but the quantity of information acquired on the basis of input has to be vast. The child also learns thousands of idioms – there are probably as many idioms in English as there are adjectives. Here we have offered the possibility of treating rules of grammar as "bleached-out" idioms: they are more or less idiomatic syntactic structures, sometimes with learned interpretations. Thus whatever mechanism is appropriate for learning words and idioms ought to be capable of learning rules as well, with some guidance from principles like (32)-(35). To be sure, rules may be more difficult to learn than individual words, because they depend on combinations of words and have open argument places – that is, they are further from the direct input than simple words. That might lead us to believe there are fewer of them than there are words. But how many fewer? If English has, say, 8000 idioms, 500 constructions doesn't seem unreasonable to us. But of course it's silly to prejudge it; we await the empirical results.

There remains the issue of the complexity of UG. The sketch of UG in (32)-(35) is perhaps less complex than the UG of Government-Binding Theory (Chomsky 1981), but more complex than the aspirations of the Minimalist Program. Possibly it can be reduced further, and if so, that would be desirable. At this point, however, we leave the question open, and adopt (32)-(35) as a plausible working hypothesis.

Returning to the issues from the beginning of the chapter: The upshot is that minimizing the rules of grammar, either in terms of number or in terms of how much they can be absorbed into UG, is only a secondary goal. To be sure, one wants one's theory to be elegant, beautiful, optimal. But the actual "size" of a grammar is an empirical question. We think the primary goal of explanation is how the child acquires a grammar with a minimum of UG. We think we have shown how the Simpler Syntax Hypothesis is a legitimate route to explore toward that goal.

Notes

[1]Throughout this study we will use the term "mainstream generative grammar" (or MGG) to refer to the line of research most closely associated with Noam Chomsky, including *Syntactic Structures* (1957), the Standard Theory (*Aspects of the Theory of Syntax*, 1965), the Extended Standard Theory (*Studies on Semantics in Generative Grammar*, 1972b), the Revised Extended Standard Theory (*Reflections on Language*, 1975c), Principles and Parameters Theory (*Lectures on Government and Binding*, 1981), and the Minimalist Program (1993/1995). Readers who feel it is a mistake to call this line the "mainstream" should feel free to substitute their own favorite term.

[2]In Generative Semantics, which originated as an offshoot of the Standard Theory, the hidden level was taken to be *identical* to meaning – while retaining its syntactic character; the derivation from the hidden level to surface structure was still taken to be in terms of syntactic operations such as movement and deletion. See section 2.5.

[3]The SSH account as sketched here does not account for facts such as that in case-marking languages, BAE shows case-marking appropriate to its understood role in the antecedent. This is often taken to be evidence for Structural Uniformity. We will deal with this issue in chapter 5.

[4]Fodor's (1975) proposal that word meanings are all innate, even if it were independently plausible (see Jackendoff 1990a), does not help. The child still faces the problem of deciding which innate meaning goes with which noise: does *chien* match up with the innate monad DOG, or ANIMAL, or POODLE, or PET? and how does the child figure it out? That is, there is still a severe learning problem here. See Bloom 2000 for a review of this and related issues.

[5]This style of grammar has also been called *procedural*, *automata-theoretic*, and *proof-theoretic*.

[6]This treatment of rules of grammar was suggested as early as McCawley 1968a, who referred to "node admissibility conditions"; other terms for this formulation are *declarative, representational,* and *model-theoretic.*

[7]The possibility of a generative theory without transformations and without "hidden levels" was envisioned as early as Harman 1963, Shopen 1972, Brame 1978, and Bresnan 1978, each of these independently of the others. The technological

innovation of traces of movement in MGG made it possible to translate (most of) a multi-stratal MGG-style theory into monostratal constraint-based terms; such approaches have been explored by Koster 1978 and Brody 1995.

[8]A terminological point: Algebraic combinatorial systems are commonly said to "have a syntax." In this sense, music has a syntax, computer languages have a syntax, phonology has a syntax, and so does Conceptual Structure. However, within linguistics, "syntax" is also used to denote the organization of sentences in terms of categories such as NP, VP, and the like. These categories are not present in any of the above combinatorial systems, so they are not "syntax" in this narrower sense. Throughout this book, we use "syntax" exclusively in the narrow sense.

[9]We note however that there is a strand of research on language acquisition in the generative tradition that presumes that the learner's strictly syntactic experience triggers the setting of parametric values of grammatical principles or structures; for discussion and criticism, see Fodor 1998; 2001; Culicover 1999, and many others.

[10]Focal or topical stress and intonation on *many* can alter the scope in some of these examples (Jackendoff 1972). This only complicates the problem further, of course.

[11]Alternatively, one might say the underlying regularity of *enough* is a fact of competence and not of performance, in which case competence is being ignored by the processing systems, a very strange position indeed.

[12]Unlike normal verb-particle constructions, these have fixed order with respect to the object – and different orders to boot. We take it that this is just a brute fact about these cases.

[13]We don't think such a solution in terms of lexical rules has been proposed for this construction. But it has been for several of the other constructions to be mentioned below (Simpson 1983, Levin and Rappaport Hovav 1995, Toivonen 2002), and the same objection obtains.

[14]One might think the meaning of the sound+motion case is obvious from the words. But the words alone do not predict an important part of the construction's meaning: the sound must be interpreted as caused by the motion. This is demonstrated, for instance, by the contrast between *The bullet whistled down the hall*, where the whistling is caused by the bullet's motion, and **The boy whistled down the hall*, where

whistling is an independent action. The intended sense of the latter might be conveyed by *The boy whistled his way down the hall* or *The boy went whistling down the hall* (for which, see note 15).

[15]Another VP construction in English, unlike (24a-c) and (26), results in a violation of normal phrase structure.

(i) The cop came/went/ran whistling/smiling down the hall.

The verb in *-ing* form, semantically an adjunct, intervenes between the main verb and the PP expressing path of motion, which is a complement of the main verb. We know something special is going on because only certain main verbs license this construction, as seen in (iia). On the other hand, if the *-ing* verb is parenthetical (iib) rather than just jammed between the main verb and the PP, other verbs sound somewhat better. However, the parentheticals permit complements (iiia) while the nonparentheticals do not (iiib), showing there is an essential difference between them.

(ii) a. * The cop hopped/jumped/crawled/squirmed whistling/smiling down the hall.

b. ? The cop hopped/jumped/crawled/squirmed, whistling/smiling, down the hall.

(iii) a. The cop crawled/went, whistling under his breath, down the hall.

b. * The cop went whistling under his breath down the hall.

Our intuition (although this requires further investigation) is that this is a sort of serial verb construction, licensed by a small class of motion verbs such as *come*, *go*, and *run*. In this construction, a bare verb in *-ing* form is licensed in what would normally be a position for an adverb, and it is interpreted as an action accompanying the motion.