Section 3.3

Box 5. Language, linguistics, and grammar: Frequently unasked questions

The research on language presented in this book employs the view of language illustrated in Section 3, which is the perspective adopted by one of the best-developed components of symbolic cognitive theory, generative linguistics. This theory is framed by the combinatorial strategy of explanation. The generative viewpoint may hold some surprises for those new to it. In the following answers, we attempt to articulate the outlook of generative linguistics on basic questions about language that reflect presuppositions that seem to be widely held, if infrequently expressed.

Q1. “Why are linguists always making such a big deal about language learning? What’s so hard about learning words?”
Unasked question: Isn’t language learning basically just word learning?

A1. There it is, the classic image of language learning: Mommy pointing and gleefully proclaiming *doggie*! Little wonder there is often scant appreciation for the problem of language acquisition. But according to the combinatorial strategy, the main action in language concerns not the *atoms* of combination—such as words—but their *patterns of combination*—grammar. It is not so much individual words, but the structures that are built with them, that make human language unique. And while there are important crosslinguistic tendencies to be found among individual words, it is in the principles of their combination that we see the real flowering of the idea that abstract universal principles are a window into the inner workings of the human mind. The history of words, their nuances of meaning and usage—these are fascinating topics, but not central to what defines language in the symbolic theory of cognition: richly productive principles governing the construction of complex combinations of atomic units. It is the question of how such abstract principles get into the minds of such young children that makes the problem of language acquisition so compelling.

Q2. “Well, suppose I grant that grammar is key to what makes human language special. But what’s so hard about learning word order?”
Unasked question: Isn’t grammar basically just word order?

A2. In syntax, the primary relation between parts *X* and *Y* of complex structures is not *X precedes Y* but *X is embedded within Y*. Here, *X* and *Y* are *phrases*, not words: see (7) and Figure 1. And phrases are abstract entities; phrase boundaries must be computed by the hearer, and learners must learn how to parse sentences into phrases at the same time they are learning the grammar that governs how phrases embed within one another. This is no easy task, to say the least. Word order is certainly one aspect of syntax, but not a particularly important one. One reason is that word order is a *surface* property of language, and one of the major discoveries of modern linguistic theory is that surface properties are often less important than aspects of sentence structure hidden beneath the surface—phrase
structure, for example. This hidden structure is crucial for identifying the general principles governing the systematic patterns of combination, not only within a single language, but also across different languages.

Q3. “OK, maybe learning grammar—syntax—is hard. But these complexities don’t arise in phonology; learning how to recognize words is just a pattern-matching problem that doesn’t seem particularly special or difficult.” Unasked question: Isn’t phonology just the knowledge of how to recognize a word by its sounds?

A3. Phonology is a component of grammar, and thus, like syntax, is primarily concerned with patterns of combination and systematic patterns of distribution of linguistic elements. The individual speech sounds forming the atoms of combination—segments—have internal properties that are important, but in phonology, their importance derives from their implications for how sounds combine. The articulatory and acoustic properties of individual segments, which figure importantly in speech recognition, are more the province of phonetics than of phonology. Understanding how people identify sounds, and their combinations into words, is a fascinatingly difficult problem—but phonology has little to say about it. Phonology is to speech recognition as ethology is to animal recognition: how people recognize a goose may be an interesting problem, but ethology has little to say about it. Phonology studies the social and mating habits of speech sounds: it turns out that they form family units, syllables, with well-defined roles for different family members; syllables travel in pairs, metrical feet, in which one member is dominant (stressed). There is a taxonomy of different types of feet (iambic, trochaic), and of different ways they organize (stress systems) into larger groups (prosodic words). Learning all this is special and difficult for essentially the same reason that syntax is: the generalizations that must be learned involve hidden structure, for which direct surface evidence is weak or nonexistent. Only by analyzing the complex patterns of sound combination in a given language is it possible to learn how to identify syllables, feet, and so on, and to learn the hidden properties internal to sounds that govern their modes of combination.

Q4. “Suppose it’s true that grammar learning is special and difficult, both for syntax and phonology. But how can linguists effectively study language while ignoring its raison d’être: communication?” Unasked question: Isn’t communication the crux of language?

A4. The purpose of language is communication, so one can’t possibly study language without focusing primarily on the demands of communication … or so it might seem. But even animals with minuscule intellectual capacity communicate. What is so remarkable about human language is not that it lets us communicate, but

7 In an iambic foot, the second member is stressed; in a trochaic foot, the first. Foot theory is actually quite rich. A foot can sometimes consist of a pair of moras rather than a pair of syllables. A mora (µ) is a unit of syllable weight: heavy syllables contain two moras, light syllables only one. The definition of a heavy syllable varies across languages: it may require a long vowel, or a diphthong, or a final consonant. Feet consisting of more than two syllables—for example, three syllables or an unbounded number of syllables—have also been proposed (see, e.g., Hayes 1980; Burzio 1994).
what it lets us communicate: elaborately structured propositions, commands, and questions with a potentially extraordinary degree of intricacy. This is possible because of the way language allows us to form new, arbitrarily complex combinations. Again, we’re back where we started: it’s not that we can communicate an atomic message through an atomic word that defines what is special about human language (run!)—it’s that we can communicate complex, combinatorially structured meanings by means of complex, combinatorially structured expressions. This defines exactly the central province of two components of grammar: syntax and semantics. These grammar components do in fact address the crux of human communication—how complex meanings get expressed with complex signals. Furthermore, the complexity of human language involves an important grammatical component even down at the level of the atoms of communication—words (or more properly, the smallest meaning-bearing elements within words, morphemes). For communicating the full range of human messages requires many thousands of words, and this is made possible by the combinatorial structure internal to words: the regular patterns by which a small set of atomic sounds combine to form an enormous set of words. And this is exactly the province of the third principal component of grammar: phonology.

3.4 Explaining the productivity of cognition

The combinatorial strategy reduces the problem of explaining mental competence with wholes to the problem of explaining competence with their parts, and then, recursively, with the subparts of the parts, and so on. The most direct approach to employing the combinatorial strategy in cognitive science is the one we have taken to define the symbolic theory of cognition. In this approach, the combinatorial strategy is applied at the process level. That is, this theory postulates that internal to the mind of the cognizer there exist a parsing process that decomposes inputs into parts, individual subprocesses that process the parts individually, and further processes that assemble the results into an integrated output.

To say that in symbolic theory, these parsing and memory processes are ‘internal to the mind of the cognizer’ is to say that internal properties of this system of processes are relevant to predicting corresponding properties of the cognizer’s mental behavior. For example, suppose that according to the decomposition into subprocesses proposed by a symbolic theory $T_{sym}$ one specific task $T_1$ requires all the particular subprocesses required by another specific task $T_2$, plus additional subprocesses.9

8 The semantic component of grammar does not figure centrally in this book, but it’s worth briefly mentioning that the theme running through these unasked questions applies to semantics as well. The core of linguistic semantics concerns not the meanings of individual words, but the principles governing how atomic meanings combine to form complex meanings. The semantics of individual words—lexical semantics—is also a part of linguistic semantics; but again, of central interest is how properties of the meanings of individual words govern those words’ patterns of combination.

9 For example, $T_1$ and $T_2$ might consist of performing the same general task upon two different inputs $I_1$ and $I_2$, where $I_1$ requires repeating some type of subprocess more times than does $I_2$. 