

Linguistics: The Cambridge Survey

II Linguistic Theory: Extensions and Implications

Edited by Frederick J. Newmeyer

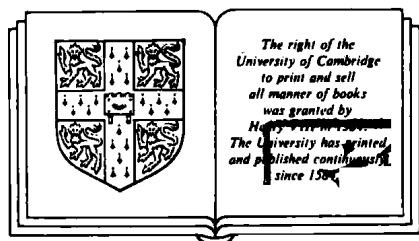
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University of Washington

Volume II

Linguistic Theory: Extensions and Implications



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Preface

Linguistic theory: extensions and implications is the second of four volumes comprising the work, *Linguistics: the Cambridge survey*. The first volume, *Linguistic theory: foundations*, presents an overview of the state of grammatical research today, focussing on particular components of the grammar and their interactions (e.g. 'syntactic theory,' 'morphological change,' 'the phonology-phonetics interface,' and so on). This second volume, like the first, addresses the motivation for, and adequacy of, the reigning conceptions in theoretical linguistics. However, unlike the first, it is devoted to probing the *independent* evidence for these conceptions, that is, evidence that can be adduced beyond the introspective data about grammatical patterning upon which theorizing has traditionally relied so heavily. The chapters in this volume also show how the theory lends itself to natural extensions that help provide answers to questions raised in diverse branches of linguistics and allied fields.

The first chapter, in addition to introducing the following ones in some detail, provides an historical sketch of the attempt to motivate the concepts of generative grammar externally and to apply them to practical goals. The point is stressed that the history of this enterprise has been a very uneven one. There was a widespread consensus in the 1960s that generative grammar was both motivated and applicable, a consensus that had collapsed by the mid 1970s. But now the pendulum has swung back again, for reasons that the authors of the following chapters will make abundantly clear, and the prestige of generative grammar among psychologists, neurologists, computer scientists, and so on has reached an all-time high.

The second through the fifth chapters treat the interplay of generative grammar with the four areas that linguistic theory has traditionally been in closest touch with: language processing (Frazier), first language acquisition (Roeper), second language acquisition (Flynn), and neurolinguistics (Kean). Each demonstrates that the basic constructs of the theory are relevant to the understanding of the particular area and, in turn, that research in that

particular area has deepened our understanding of the workings of the grammar.

The sixth and seventh chapters treat 'abnormal' language. Curtiss's discussion of the acquisition of abnormal language and Fromkin's analysis of speech errors demonstrate the degree to which 'nontraditional' data can be invoked to test the foundations of grammatical theory.

The eighth, ninth and tenth chapters explore, in rather different ways, the boundaries between grammatical competence and pragmatic abilities. Kempson's chapter on conversational principles, Prince's on discourse analysis, and Sadock's on speech acts each present views on 'where the grammar stops' and where abilities and faculties derived from general principles of communication and cooperation begin.

'Applied linguistics', in two very different senses of the term, is the subject of the eleventh and twelfth chapters. Halvorsen discusses computer applications of linguistic theory, while Hayes shows how the constructs of generative phonology can be applied to an understanding of metrical patterning in verse.

The final chapters deal with language varieties that possess (or, at least have been claimed to possess) properties that are rather different from those typically studied by grammarians. Padden examines the signed languages of the deaf from the viewpoint of attempting to understand their grammatical structure and Bickerton and Muysken present sharply counterposed views on the nature of creole languages.

Frederick J. Newmeyer

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1 Extension and implications of linguistic theory: an overview

Frederick J. Newmeyer

Noam Chomsky's *Syntactic structures* (1957), which introduced the theory of transformational generative grammar, did not suggest any possible extensions of the theory or point to any of its broader implications. As Chomsky wrote later, he felt that it would have been 'too audacious' for him at that time to have raised the 'psychological analogue' to the problem of constructing a linguistic theory (1975:35). But Robert B. Lees, in a review that appeared simultaneously, did not shrink from this task. He closed the review with a frontal attack on the predominant behaviorist learning theory, arguing that the complexity and abstractness of natural language grammars leads irrevocably to the conclusion that they must literally be 'in the head' of the speaker. But if so, he asked, then how could they possibly be learned inductively? 'It would seem,' he concluded, 'that our notions of human learning are due for some considerable sophistication' (1957:408).

It was Chomsky's 1959 review of B. F. Skinner's *Verbal behavior* that drove home the fact that his theory of language, far from being a mere clever manipulation of arcane symbols, was a psychological model of an aspect of human knowledge. Chomsky's review represents, even after the passage of almost 30 years, the basic refutation of behaviorist psychology. The review takes in turn each basic construct of behaviorism, and concludes that 'a critical account of his book must show that . . . with a literal reading . . . the book covers almost no aspect of linguistic behavior, and that with a metaphoric reading, it is no more scientific than the traditional approaches to this subject matter, and rarely as clear and careful' (Chomsky 1959:31).

How then is verbal behavior to be explained? While acknowledging that its complexities defy any simplistic treatment, Chomsky wrote (1959:57):

. . . the actual observed ability of a speaker to distinguish sentences from nonsentences, detect ambiguities, etc., apparently forces us to the conclusion that this grammar is of an extremely complex and abstract character, and that the young child has succeeded in carrying out what from the formal point of view, at least, seems to be a remarkable type of theory construction.

Chomsky went on to argue (p. 57) that this ability indicates that rather than being born 'blank slates,' children have a genetic predisposition to structure the acquisition of linguistic knowledge in a highly specific way, bringing to the language acquisition process a 'data-handling or "hypothesis-formulating" ability of unknown character and complexity.'

Since Chomsky's review was published in a linguistics journal, its immediate impact on the field of psychology was minor. However, it did attract the attention of George A. Miller, Eugene Galanter, and Karl Pribram, three researchers at the forefront of the young discipline of cognitive psychology, who immediately realized the relevance of Chomsky's work to their interests. Miller, Galanter, and Pribram made extensive reference to generative grammar in their ensuing book *Plans and the structure of behavior* (1960). They saw in Chomsky's approach to syntax a model example of their claim that behavior must be organized simultaneously at several levels and require a complex planning device to coordinate the interplay between the various levels. As a result of their book (and the Skinner review, which by the mid 1960s had become well-known among psychologists), Chomsky was soon regarded as a leading figure in American psychology. As Judith Greene put it (1972:15): 'Chomsky's theory of generative transformational grammar was the first to force psychologists to reconsider their whole approach to the study of language behavior, and so heralded the psycholinguistic "revolution".'

At the same time, evidence began to accumulate from neurological studies that language did indeed have a biological basis, thus providing an underlying plausibility to the nativist claims that had been made primarily on the basis of the nature of the grammar that had to be acquired (see especially Lenneberg 1964, 1967). Not surprisingly, then, the two major psycholinguistic research topics of the early 1960s were acquisition of phrase structure and transformational rules by the child (Braine 1963; Menyuk 1963; Miller & Ervin-Tripp 1964; McNeill 1966), and the relationship between those rules and a model of language processing (Miller 1962; Miller & Isard 1963).

Language teachers as well found transformational generative grammar relevant to their concerns. Disillusioned with behaviorist-inspired teaching methods like the audiolingual method and programmed instruction, many welcomed Chomsky's theory, whose emphasis on the creative aspect of language and its freedom from stimulus control seemed to encourage a more active role for the learner. By 1965, Owen Thomas could write (p. 1) that 'transformational grammar has significant application to the teaching of all languages, including English, at all grade levels and to both native and nonnative speakers.' In this period, the journals of applied linguistics routinely discussed the application of the theory for some pedagogical purpose (for an historical overview of this period of second language learning research, see Newmeyer & Weinberger in press).

Finally, Chomsky's early work had an impact on philosophy, particularly the philosophy of science, even before the publication of his *Cartesian linguistics* in 1966. While the success of generative grammar benefited from the retreat of empiricist philosophy, it helped contribute to that retreat as well. Indeed, Israel Scheffler's book *The anatomy of inquiry* (1963), a classic in the philosophy of science, cited Chomsky's results in *Syntactic structures* to bolster his case against empiricism. He pointed out that since Chomsky had demonstrated the need to define such theoretical notions as 'noun' and 'morpheme' independently of particular languages, so philosophers should concern themselves with the *general* nature of scientific laws, rather than take an atomistic empiricist approach.

The 1960s, then, were heady years for generative grammar, as it quickly surpassed the once-hegemonic post-Bloomfieldian approach in importance and triggered new research programs in fields as diverse as philosophy, psychology, language pedagogy, poetics, anthropology, and computer science. But the next decade saw a decline in its relative importance, both within linguistics as a whole and among those outside the field who wished to apply its conceptions and results to their own concerns. For example, the hoped for payoffs in improved methods of language teaching did not materialize, leading some to the conclusion that the generativist view of language was seriously flawed; naturally a misconceived theory could not be expected to lead to fruitful applications. John Lamendella (1969) offered a popular explanation for the failure of the attempted applications: transformational generative grammar was simply 'irrelevant' to pedagogy.

Just as applied linguists deplored the theory's seeming inability to abet language teaching, psycholinguists began to express increasing dissatisfaction with the claim that grammar is innately based. Alternative hypotheses were formulated which, it was hoped, could deal with the same range of facts without the need for the innate syntactic principles that many found jarring to common sense. In the early 1970s, more and more psycholinguists abandoned Chomsky's conception of innate grammatical universals, and turned to the Piagetian idea that language acquisition results from the interaction of all-purpose cognitive skills with external environmental stimuli. The focus of acquisition studies in this period thus shifted from the acquisition of grammatical competence to that of pragmatic abilities and to probing the cognitive basis for language development.

This rejection of a nativist basis for grammar went hand-in-hand with the conclusion by most psycholinguists that language processing proceeds without drawing on a formal grammar. This negative conclusion was arrived at for two types of reasons. First, the competence model assumed by generative grammarians at the time seemed to be inconsistent with the dominant contemporary view of the grammar-processor interface. This

view, the 'derivational theory of complexity' (DTC), posits an isomorphic relation between the grammatical steps involved in generating a sentence and the real time steps of the processing mechanism. According to the DTC, if a certain sequence of operations (say, transformations) applies in the grammar in a particular order, then the processor's operations will mirror those steps. It was pointed out by a number of investigators that, given current assumptions about the way that the grammar was organized, this isomorphic relationship did not exist. For example, all generative grammarians before the late 1970s assumed the existence of a transformational rule of passive, which functioned (roughly) to map sentences like *John threw the ball* onto those like *The ball was thrown by John*. Since the derivation of passives involved the application of one more rule than the derivation of actives, the DTC predicts that passive sentences should take longer to process than actives. However, Slobin (1966) found this not to be the case, and thereby called into question the idea that the grammar was utilized by the processor and, by extension, that there was any need at all for an autonomous competence grammar. Second, experimental evidence seemed to disconfirm the idea that the process of sentence comprehension involves drawing on an autonomously stored grammatical representation. For example, in one experiment, Bransford & Franks (1971) presented subjects with sentences such as (1):

- (1) Three turtles rested on a log and the fish swam beneath them

In a subsequent recognition task, subjects believed that they heard (2a) as often as (2b):

- (2) a. The fish swam beneath the log
b. The fish swam beneath the turtles

Since the deep structure of (2a) is not represented in the deep structure of (1), Bransford & Franks concluded that meaning was inferred by the use of extralinguistic knowledge such as real-world spatial relations, rather than being based on a stored grammatical representation. Such results led many psycholinguists to reject the notion of an autonomous level of grammatical competence in their construction of parsing algorithms.

As a result of the combined weight of the above factors, the prestige of generative grammar had fallen to an all-time low around 1975. Since then, it has gradually reasserted itself and there is now widespread (though by no means universal) agreement, both within the field of linguistics itself and outside the field as well, that it forms the basis of a psychologically realistic model of human language. Much of the explanation for this must be credited to the massive evidence that has accumulated in the past decade for the idea of an autonomous linguistic competence, that is, for the existence of a

grammatical system whose primitive terms and principles are not artifacts of a system that encompasses both human language and other human faculties or abilities.

The most direct evidence for the reality of grammatical competence comes from the complex relationship between grammatical form and communicative function. Put simply, there is no possibility of deriving the particular shape that a grammatical construction may take from the function that the construction serves in discourse. An example might prove helpful. Consider the following three common syntactic devices in English: the occurrence of the auxiliary verb before the subject, the omission of an understood *you* subject, and the occurrence of a 'wh-word' (*what*, *who*, *how*, *when*, etc.) in sentence-initial position. These devices are illustrated in (3a), (3b), and (3c) respectively:

- (3) a. Are you having a good time?
 b. Go home now
 c. What are you eating?

Now consider four common discourse functions in human language: making a command, expressing conditionality, asking a question, and making an exclamation. As Figure 1 demonstrates, each of the three syntactic devices mentioned above can serve three or four of these discourse functions (see Williams 1980 for more discussion of this point):

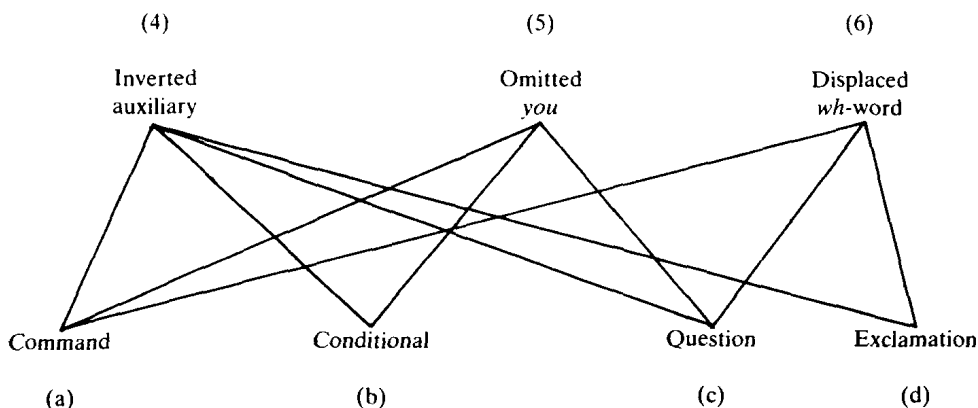


Figure 1.

- (4) a. Don't you leave!
 b. Had John left (I would have taken his seat)
 c. Did he leave?
 d. Was he (ever) big!

- (5)* a. Leave now!
b. Leave (and you'll regret it)
c. Leaving now?
- (6) a. How about leaving!
c. What is it?
d. How big he is!

This great disparity between form and function appears to be the general rule rather than the exception, a fact which strongly suggests that there are principles governing structural regularity in language that cannot be considered by-products of principles external to language. In other words, competence demands a characterization on its own terms.

The case for an autonomous linguistic competence has received support from the fact that (in extraordinary cases) linguistic abilities may be dissociated developmentally from other cognitive abilities. For example, there are cases on record of children whose syntax is completely fluent, yet who are unable to use language communicatively; conversely, cases are attested in which a child's communicative intent is obvious, yet that intent cannot be phrased according to the grammatical patterns of the language being acquired (for more discussion, see Chapter 6 in this volume). Children's errors, as well, point to the fact that the acquisition of grammar is not merely a by-product of other development, in particular conceptual development. If it were the case, for example, that the child learned concepts first and then learned to map those concepts onto syntactic categories and structures, we would predict that semantically atypical members of a syntactic category should be used erroneously as if they were members of a category that directly reflected their meaning. But errors of that sort are rare: children rarely utter such sentences as *She naughtied* or *He is nicing to them*, despite the fact that *naughty* and *nice* are actionlike adjectives, and we rarely find such errors as *He is know it* or *Was he love her*, though *know* and *love* are not action verbs. These facts seem to suggest that the child has the specifically *syntactic* knowledge predicted by a theory of linguistic competence; when syntactic knowledge and conceptual knowledge conflict, the latter does not automatically override the former (see Maratsos & Chalkley 1980).

Furthermore, in recent years there has been a return to the idea that a model of mentally represented linguistic competence *does* play a role in language processing. This change of view came about for several reasons. First, generative grammarians have (for theory-internal reasons) modified the competence model so that many once-popular grammatical analyses that were incompatible with the DTC have been abandoned for those consistent with it. Second, the DTC itself has been called into question, thereby undermining any attempt to refute the existence of linguistic competence on

the grounds that it is inconsistent with that theory. And finally, the experimental evidence which challenged the utilization of a competence grammar in processing has itself been challenged. For example, the Bransford & Franks conclusions have been called into question by the demonstration that the contribution of formal grammar to sentence comprehension is manifest only during online tasks, i.e. those performed simultaneously with sentence processing; after a certain (short) period, nongrammatical factors predominate. Hence, it seems that Bransford & Franks' offline experiment does not undercut the idea that speakers utilize grammatical representations when processing a sentence (for discussion, see Carlson & Tanenhaus 1982 and Chapter 2 in this volume).

At the same time, other experimental evidence has borne out the idea that processing does draw on competence. One study shows that when subjects are presented with a class of sentence pairs that differ in some minimal way, their response times in determining that the sentences are different show a significant effect of grammaticality, but not of plausibility. Thus there is evidence for distinct syntactic and semantic components in processing. Another study finds that sentences with syntactic violations take longer to read than well-formed sentences, even when perceivers do not consciously detect the violation – a finding that would be unexpected on the view that syntax is used in a haphazard manner or only when other sources of information yield no unique analysis of an input sentence. Yet another study shows that readers are temporarily 'garden-pathed' (i.e. they initially pursue an incorrect analysis) in syntactically ambiguous structures even when preceding sentences provide disambiguating information which in principle could guide the processor's choice of an appropriate syntactic analysis (for discussion, see Frazier, in Chapter 2 of this volume).

The discovery (and increased acceptance) of the idea of the autonomy of formal grammar is of profound importance in and of itself. The broader implications of this concept follow from the current conception of the relationship between the grammar and the other faculties and abilities involved in giving language its overall character. It is now well-accepted that complex linguistic phenomena are best explained in terms of the *interaction* of these diverse systems. This so-called *modular* approach to linguistic complexity can be represented schematically (following Anderson 1981:494) as in Figure 2.

Even though it is only in the last decade that modular explanations have come into their own, they were invoked in the earliest days of generative grammar. For example, Miller & Chomsky (1963) noted that sentences with multiple center-embeddings are invariably unacceptable, as in example (7):

- (7) the rat [_Sthe cat [_Sthe dog chased] ate] died

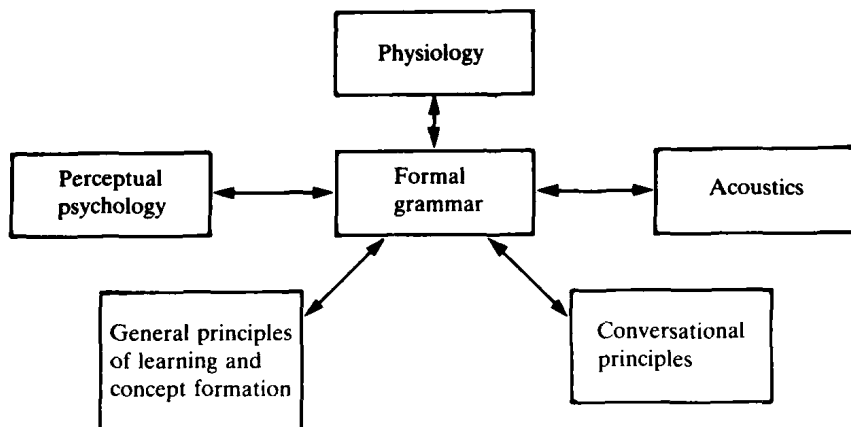


Figure 2.

They demonstrated the implausibility of a strictly grammatical explanation of the unacceptability. For one thing, the deviance of (7) could hardly be due to a deep structure or semantic ill-formedness, since it is interpretable (if one is given time to work out its intricacies) and other sentences plausibly derived from the same deep structure are acceptable:

(8) The rat died that was eaten by the cat that the dog chased

Nor could the unacceptability be a consequence of the filtering function of the transformational rules – no (relevant) transformations apply in the derivation of (7). And the only way to block (7) at the level of surface structure would be to incorporate into grammatical theory a device that would literally ‘count’ the embeddings in the surface string – a device unlike any ever proposed to govern grammatical processes.

But there is an obvious reason, Miller & Chomsky argued, for the unacceptability of (7). Quite simply, the sentence is unacceptable because it is confusing. Without special aids (e.g. paper and pencil) it is difficult to figure out which subjects are paired with which predicates. They proposed a principle of sentence comprehension that states (essentially) that sentences are processed from ‘left to right’ and that the processing mechanism cannot be interrupted more than once. Since the comprehension of (7) demands a double interruption of the process of subject–verb assignment, the sentence is difficult to process.

In other words, sentence (7) is generated by the grammar, i.e. it is grammatical. Its unacceptability follows from the modular interaction of the grammatical principle of unlimited center-embedding with the perceptual

principle sketched above. Neither principle alone is sufficient to account for the unacceptability of (7) and the concomitant acceptability of (8).

The appeal of modular explanations is, in essence, that they allow order to be extracted from chaos. If one system alone (whether linguistic or perceptual) had been forced to deal with the facts of multiple center-embeddings, no elegant account of the facts would have emerged. But such an account is the natural result of regarding this superficial complexity as the product of two simple principles, each from a distinct domain. Modular explanations have been invoked to handle a wide variety of disparate data in recent years, and in many cases dramatic results have been obtained. Such results have been instrumental in kindling the resurgence of interest in generative grammar after its eclipse in the 1970s.

By 1980, the idea that the complexity of language could be explained by recourse to the modular interaction of formal grammar with principles from physiology, cognition, sociology, and so on had become well accepted. The central guiding principle of much current work *within* grammatical theory (in particular, within the 'government-binding' (GB) framework) is that the *internal structure of the grammar* is modular as well. That is, syntactic complexity results from the interaction of grammatical subsystems, each characterizable in terms of its own set of general principles (for discussion, see Chomsky 1981 and Volume I, Chapter 2 in this series, on 'Syntactic theory'). The central goal of syntactic theory thus becomes to identify such systems and characterize the degree to which they may vary from language to language.

Most early work in generative grammar was rather nonmodular in character. Essentially, each construction had its own associated rule: passives were derived by the passive transformation, subject-raised sentences by the raising transformation, and so on. It seems fair to say that a great deal of the ultimate failure of the generative grammar-based conceptions in psycholinguistics in the 1960s was a direct result of their carrying over to their research this view of grammatical organization. But as the work on constraints on rules accelerated throughout the 1970s, it became clear that at least some of the complexities of particular constructions could be attributed to general principles, rather than having to be stated *ad hoc* as particular rules. In GB, grammar-internal modularity is carried as far as it can go; with some minor exceptions, syntactic complexity results from the interaction of the set of grammatical subsystems. What many have found most appealing about a modular approach to the internal structure of the grammar is that it provides a theoretical foundation for linguistic typology (for discussion, see Volume I, Chapter 17 on 'Linguistic typology'). In this modular view, what appear on the surface to be major structural differences among languages

result from each language setting slightly different values ('parameters') for each of the various grammatical subsystems. Thus, just as we have seen to be the case with a modular approach to language as a whole, a modular approach to grammar allows, to a significant degree, apparently complex and recalcitrant data to be derived from an elegant set of basic principles – principles that vary, but within circumscribed limits, from language to language.

All of the chapters in this volume share the assumption that linguistic competence is best characterized by an autonomously functioning grammar that interacts in modular function with other faculties involved in language. Some provide further evidence for this idea; others assume its correctness and show how it can be applied to the explanation of some particular set of phenomena. Some, but not all, adopt as well the notion of grammar-internal modularity and show how it can help provide an account of linguistic data from diverse areas of investigation.

Chapter 2, 'Grammar and language processing' by Lyn Frazier, discusses experimental evidence that supports a modular approach to language. As she points out, the processor fails to take advantage of information at particular stages in processing that a nonmodular account would predict to be available to it. For example, context is not used in identifying candidate lexical representations, even though *a priori* one might assume that such information would be helpful to it. Furthermore, lexical and syntactic processing follow radically different strategies. Frazier provides pages of support for the view that generative grammars do indeed characterize the linguistic knowledge used during language comprehension, and remarks on the interesting convergences in recent developments in linguistics and psycholinguistics.

Chapter 3, Thomas Roeper's 'Grammatical principles of first language acquisition: theory and evidence,' reviews the evidence from child language studies for innately-determined linguistic principles. Roeper notes that one can argue indirectly that such principles must exist given the (uncontroversial) assumption that the child receives only positive evidence during acquisition. It can be shown experimentally as well that principles well-known from studies of adult language – c-command, subadjacency, and control, for example – also guide first language acquisition. Others however, such as the subset principle, appear to be unique to child language. Roeper argues that there is good reason to conclude from acquisition studies that the grammar is organized into distinct modules subject to parametric variation, and he discusses an important ongoing debate in the field, namely whether the principles of universal grammar (UG) are available to the child from birth, or whether they emerge maturationally.

Chapter 4, Suzanne Flynn's 'Second language acquisition and grammatical theory,' defends the controversial position that UG guides second