

# 17. Linguistics

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The ultimate objective of our research is to gain a better understanding of man's mental capacities by studying the ways in which these capacities manifest themselves in language. Language is a particularly promising avenue because, on the one hand, it is an intellectual achievement that is accessible to all normal humans and, on the other hand, we have more detailed knowledge about language than about any other human activity involving man's mental capacities.

Scientific descriptions of language have for a very long time followed a standard format. A number of topics are almost invariably discussed; for example, pronunciation, the inflection of words, word formation, the expression of syntactic relations, word order, and so forth. Moreover, the manner in which these have been treated has also been quite standard. While traditional grammars have many shortcomings, their great practical utility is beyond question; generations of students have acquired adequate command of innumerable languages with the help of grammars of the standard type. A plausible inference that might be drawn from this fact is that in their core all languages are much alike and that the differences among languages concern relatively superficial aspects. Accordingly, much of the research of the group has been devoted to studying the common framework that underlies different languages, and the general principles that are exemplified in the grammar of different languages. Results strongly indicate that this assumption is indeed correct as far as the linguistic evidence is concerned.

The preceding discussion leads quite naturally to the question, "What evidence from outside of linguistics might one deduce in favor of the hypothesis that all languages are constructed in

accordance with a single plan, a single framework?" It seems to us that the most striking evidence in favor of the hypothesis is, on the one hand, the rapidity with which children master their mother tongue, and, on the other hand, the fact that even a young child's command of his mother tongue encompasses not only phrases and utterances he has heard but also an unlimited number of phrases and utterances he has not previously encountered. To account for these two sets of facts, we must assume that in learning a language a child makes correct inferences about the structural principles that govern his language on the basis of very limited exposure to the actual sentences and utterances. In other words, we must assume that with regard to matters of language a child is uniquely capable of jumping to the correct conclusions in the overwhelming majority of instances, and it is the task of the student of language to explain how this might be possible.

A possible explanation might run as follows. Assume that the human organism is constructed so that man is capable of discovering only selected facts about language and, moreover, that he is constrained to represent his discoveries in a very specific fashion from which certain fairly far-reaching inferences about the organization of other parts of the language would follow automatically. If this assumption is accepted, the next task is to advance specific proposals concerning the devices that might be actually at play. The obvious candidate is the theoretical framework of linguistics for, while it is logically conceivable that the structure of language might be quite distinct from that of the organism that is known to possess the ability to speak, it is much more plausible that this is not the case, that the structures that appear to underlie all languages reflect quite directly features of the human mind. To the extent that this hypothesis is correct — and there is considerable empirical evidence in its favor — the study of language is rightly regarded as an effort at mapping the mysteries of the human mind.

The research conducted by the linguistics group has almost from its inception been an integral part of the M.I.T. Ph.D. program in linguistics, which at present is housed in the Department of Linguistics and Philosophy. Many of the results obtained by the group were first presented by faculty or graduate students as part of a regularly scheduled class or are to be found in papers or dissertations written by students in partial fulfillment of different requirements for their Ph.D. degrees. Since dissertations in linguistics often remain unpublished or are published only after considerable delays it has been decided to publish abstracts of the dissertations accepted during the year 1985 in the present RLE Progress Report. It is our plan to publish dissertation abstracts in each subsequent Progress Report.

## **On Deriving the Lexicon**

Richard William Sproat

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### **Abstract**

In this thesis I argue against the view that there is a separate word-formation component of the grammar, a component which has usually been termed the "Lexicon" in the recent morphological literature. I argue rather that the lexicon is what has been called the permanent lexicon, namely the data structure containing the information about the stems and affixes and idiosyncratic compositions of the language, and that word formation is actually split between the syntax and the phonology in that it is principles of syntax which determine the syntactic well-formedness of words, and principles of phonology which determine phonological well-formedness.

In the first chapter I argue that morphological Bracketing Paradoxes, including phonological cliticization provide crucial evidence that words must have at least two levels of representation, in particular a syntactic one and a phonological one. I show that a simple Mapping Principle governs the relationship between the two levels of representation. Subsequently, in Chapters 2 and 3, I show that the syntactic well-formedness and behavior of a word, like that of a phrase, can be determined by syntactic principles including, but not limited to, X-bar Theory, Theta-Theory, Binding Theory, Case Theory and the Projection Principle.

In Chapter 4 it is argued that lexical phonology is not in principle distinct from what has come to be termed post-lexical phonology, in that principles such as Cyclicity and Bracketing Erasure, which have generally been argued to be hallmarks of lexical phonology are either not needed or not unique to lexical phonology. I argue too that the theory of Lexical Phonology cannot be taken to be a theory of word formation, but at most is a theory of phonological well-formedness. I propose an alternative to Lexical Phonology based upon the distinction between phonological words and stems.

Finally, in the fifth chapter I summarize the psychological evidence pertaining to word-formation. I argue that the approach to morphology taken here is at least as compatible with such evidence as other theories of word-formation, such as Lexical Phonology. I also discuss some residual conceptual issues raised by the approach taken in this thesis.

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**Incorporation**  
**A Theory of Grammatical Function Changing**

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**Abstract**

The nature of processes which seem to change the Grammatical Function (GF) structure of a clause is investigated. It is argued that these processes are not the result of explicit transformational or lexical rules in the grammar, as has previously been assumed. Rather, apparent changes in GFs are side-effects of the general process of movement ("Move Alpha") when it applies so as to take a word level category from its original phrase and adjoin it to a governing word level category. This is termed "Incorporation." It is derived from the theory of government that the complements of the moved word are governed by the complex word formed by the Incorporation (the Government Transparency Corollary); this gives rise to the appearance of GF changing. Standard principles of syntax (the ECP) determine when this movement is possible, thereby explaining the range of GF changing phenomena observed.

These basic notions are motivated and defined in chapter 1.

In chapter 2, the notions are applied to the analysis of Noun Incorporation cross-linguistically. In this way, the syntax of this construction is explained including its distribution and the fact that it causes a Possessor Raising effect. Antipassives are shown to be a special case of Noun Incorporation as well. Moreover, Noun Incorporation facts reveal a way of generalizing the Case filter to the "Condition of Morphological Identification."

In chapter 3, it is shown that the properties of morphological causative constructions can be explained in terms of "Verb Incorporation," parallel to Noun Incorporation. Apparent differences between causatives in different languages are accounted for in terms of independent differences in the Case assigning properties of those languages. The Incorporation analysis is shown to be superior to alternatives in that it accounts for the way that wh-movement applies to causative constructions.

In chapter 4, it is shown that applicative constructions can likewise be accounted for in terms of "Preposition Incorporation." The analysis is extended to cover dative shift alternations, and the properties of all "double object" constructions are explained in a unified way. Moreover, it is shown that the theory of Incorporation correctly captures the behavior of the various imaginable combinations of applicatives, causatives, and Noun Incorporations.

Chapter 5 shows that the passive is to be assimilated into this framework by analyzing it as involving the incorporation of the verb into the IN node, which contains the passive morpheme.

This explains "implicit argument" effects, and why passive obeys the "1-Advancement Exclusiveness Law." Typological differences in passive constructions are related to similar differences in Noun Incorporation. The ways in which passive interact with other Incorporation processes is also discussed.

It is argued that these analyses imply that a level of underlying syntax structure must exist, which represents the semantic relationships among phrases in a "pure way" (the "Uniformity of Theta Assignment Hypothesis"). Moreover, it is shown that Morphology is a grammatical system which determines the shape of words in the same way whether they are formed in the lexicon or in the syntax by Incorporation. In this way, the strong relationship between morphological forms and syntactic structures is accounted for.

Thesis Supervisor: Noam Chomsky, Institute Professor of Linguistics

## Case Theory and the Projection Principle

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### Abstract

We examine structures in which an NP bears a grammatical relation to a verb, to which it bears no thematic relation. We see several semantic classes of verbs appearing in such constructions, and a number of different types of such constructions, but no systematic relation between the semantic class of the verb and the syntactic type of construction in which it appears.

To explain mapping between thematic structure and grammatical structure, we assume the Projection Principle (PP), which states that syntactic structure must reflect lexical properties (thematic structure/predicate–subject relations) at all levels. The PP appears to be violated by structures with non–thematic "objects" coreferential with an embedded subject, object, or oblique NP (= NP–th). We examine data showing that although the NP acts as an object, it is not outside of the clause containing NP–th. It is in an embedded initial A–bar position, acting as a predicate subject for the constituent containing NP–th. It acts as an object of the matrix clause due to government holding between a verb and complement and certain elements in the complement.

A second aspect of a theory of grammar is licensing of NPs for interpretation. Elements in A–positions are licenced by Case, an abstract relation holding between arguments and governors. Given A–bar subject positions, the domain of Case requirement is not A–positions, but rather, all positions governed by the PP: subjects and complements. Projection and Case are intertwined facets of interpretability.

In chapter 1 we introduce the domain of exploration. In chapter 2 we consider "Raising to Object" constructions. Certain English, Hindi, Icelandic verbs effect sentential Exceptional Case Marking (= S/ECM) by subcategorization for "INFL–Phrase," with government and Case to the specifier. In Romance, different ECM structures arise with verbs selecting for a Case–assigning head. Hungarian structures support our claims. "Non–vacuous" ECM in Blackfoot, Fijian, James Bay Cree, Kipsigas, Moroccan Arabic, Niuean, Standard Arabic, argues for embedded A–bar subjects.

In chapter 3 we look at non–thematic subjects (NTS). An NP may come to act as an NTS in one of three ways. Raising to Subject is examined in English. Kipsigas, and James Bay Cree NTS structures involve operator movement, as does "Tough Movement" in many languages. We thus divide the Theta–Criterion into two parts, one holding at all levels and one at LF, and introduce a licensing device of composed theta chains. Niuean and Standard Arabic show that NTS

structures arise under non-Case assigning verbs which allow A-bar subjects. Passive ECM verbs in these languages are identical to Raising to Subject verbs, as they are, in a different way, in English.

In chapter 4, NP complements in Chickasaw, Hungarian, Romanian, Kinyarwanda, Turkish substantiate our claims, as verbs ECM the A or A-bar possessor subjects of NPs, (= NP/ECM). The distribution of NP/ECM across languages argues that Cases exist independently of Case assignment, since NP/ECM requires the existence of an extra Case, as predicted by the Case Filter. NP/ECM allows for direct argument possessors, or indirect argument possessors. We predict that NP/ECM occurs only into object NPs. Several apparant exceptions actually support our claims.

In chapter 5 Case and chain theory is presented (Levin & Massam, 1984), accounting for expletive distribution, Case/argument structure relations of Burzio's (1981) Generalization, and the Nom/Acc, Erg/Abs parameter. The theory is revised to embrace data of this study, and we define Case requirements in terms of the Projection Principle.

We close with a typology which emerges from our study.

Thesis Supervisor: Noam Chomsky, Institute Professor of Linguistics

## **The Syntax of Operators**

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### **Abstract**

The aim of this thesis is to explore the implications that the existence of Logical Form has, both for the derivation of sentences and for the interaction of subtheories of Universal Grammar. Given that the behavior of lexical anaphors can be reduced to that of NP traces, as in Chomsky (1985a), it will be shown that principles A and B of the Binding theory can be derived from Theta theory. Arguments will be represented abstractly as chains, whose formation is governed by Principle A and the Empty Category Principle, as formulated by Kayne (1981a). In addition to argument movement, certain predicates are shown to move at LF, to permit th-marking of their arguments. This movement will be similarly constrained.

A major claim of this thesis is that a bound pronominal confers operator status on the category which contains it, and hence must be assigned scope. This claim receives independent support insofar as it explains an apparent counterexample to the hypothesis above, that Principle A must hold between links of a chain. Furthermore, this property of bound pronouns will play a central role in the availability of certain readings in sentences involving sloppy identity, and certain structures involving VP deletion and parasitic gaps. In these structures, it is just the assignment of scope to the category containing the bound pronoun which gives rise to the appropriate logical forms.

In addition to standard types of LF movement i.e., movement to COMP (as in wh-movement in Chinese), and adjunction (as in Quantifier Raising) it will be argued that a third type exists. This involves the identification of the moved category with its target, yielding a structure in which subtrees are represented on distinct planes, which meet at the merged (i.e., identified) node. The creation of such coordinate structures will account for the properties of parasitic gaps, which become across-the-board gaps at LF. Moreover, sloppy identity obtains only in coordinate structures, thus making it unnecessary to appeal to  $\lambda$ -abstraction to account for it.

In addition to permitting movement, LF licenses the insertion of material missing at S-structure. This enables various "deletion" constructions to be properly interpreted.

Thesis Supervisor: Noam Chomsky, Institute Professor of Linguistics



## A Metrical Theory of Syllabicity

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of Doctor of Philosophy

### Abstract

It is the purpose of this work to argue that the sole determinant of syllabicity in phonological representations is the structural position of the syllable nucleus. In addition to eliminating redundancy in phonological representations, such a model differs from one employing the distinctive feature [+syllabic] on both theoretical and empirical accounts. In theory, it provides a coherent account of what appear to be syllable sensitive rules, rules of accent and skeletal tier transformations, without reference to segmental features. In practice, it does away with an unexplained asymmetry inherent in systems using a distinctive feature [+syllabic]: within such systems, segments in languages with glide/vowel alternations must often be specified underlyingly as [+syllabic], but never as [-syllabic]. In a theory where syllabicity is a metrical property of the head of a syllable, this is the result of the fact that designated heads can be marked in underlying lexical representations, while the property of being a non-head cannot. More importantly, this theory allows regularities in glide/vowel alternations to be captured systematically by simple rules of N placement, which are independently motivated, thus affording greater overall simplicity in rule systems.

In chapter 1 we examine the redundant encoding of syllabicity on the skeletal tier, the segmental tier and the syllable plane. Phonological evidence from affixation processes in two Micronesian languages argues strongly for the elimination of syllabicity distinctions on the timing tier. Viewing skeletal slots as unspecified for syllabicity, we move on to an elimination of the distinctive feature [+syllabic] on the segmental tier. In chapter 2, we propose a Kahnian system of syllabification rules which make no reference to the feature [+syllabic]. Within this system, syllabicity is established by N-placement, where N is the syllable nucleus. N-placement may be lexical, or it may be determined by redundancy rule or phonological rule. We argue that syllabicity is either a redundant property of a particular feature matrix, or that it is a structural property corresponding to the metrical configurational property "head of a syllable." A primitive version of X-bar theory is shown to be operative within the syllable, and arguments for internal constituents, N, the nucleus, and its projections, N' and N'' are presented. Constituency within the syllable is shown to involve projection of N'' and N' along with rules of incorporation and adjunction. Incorporation rules are shown to be constrained by language-specific sonority scales and may be iterative or non-iterative. Adjunction, which is limited to maximal projections, may violate relative sonority scales. In the last section of chapter 2, skeletal templates of the kind evidenced in Semitic morphology are argued to be best represented as instances of lexical N-placement. We conclude from chapter 2 that a metrical theory of syllabicity is viable, and proceed to empirical arguments in support of such a theory.

In chapter 3 a variety of arguments for the feature [+syllabic] on both the segmental and skeletal tier are reviewed. A metrical theory of syllabicity which capitalizes on the distinction between syllabified and unsyllabified skeletal slots, as well as on the structural distinction between N and N' is not only able to account for each case under review, but appears to have wider empirical coverage in the case of glide/vowel alternations in Klamath and Tigrinya, and tense/lax distinctions in Ancient Greek.

In chapter 4 we strengthen the x-bar component of the theory by providing evidence of certain phonological rules which refer to the projections N, N' and N'', as well as other rules which refer to the categorial distinction between syllable heads and non-heads. The first set of rules are those of accent assignment within a metrical theory of stress. The second class of rules are what we refer to as skeletal-tier transformations. Skeletal-tier transformations are rules which insert or delete x-slots, and include rules of vowel and consonant epenthesis, tonic lengthening and gemination, vowel deletion, and vowel coalescence. We claim that such rules are limited by a set of universal conditions which make specific reference to the distinction between syllable heads and non-heads, thus providing evidence for a categorial component in phonology.

Thesis Supervisor: Donca Steriade, Assistant Professor