

**SYNTAX and SEMANTICS**

**VOLUME 7**

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# **SYNTAX and SEMANTICS.**

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**VOLUME 7**

**Notes from the Linguistic Underground**

**Edited by**

**JAMES D. McCAWLEY**

*University of Chicago  
Chicago, Illinois*



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## **FOREWORD**

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The goal of the *Syntax and Semantics* series is to aid in the dissemination of ideas and analyses of theoretical importance to a wide audience of linguists, philosophers, psychologists, and others interested in the relationship between meaning and form. Up to the publication of the present volume, this has meant putting fresh articles in print as quickly as possible. This volume represents a departure from tradition, in that most of the articles it contains were written in the 1960s and only McCawley's valuable introduction, his notes on the setting and impact of each article, and the very useful glossary are new. But the aim of the series remains the same for, as McCawley amply documents, these papers have a great deal to say to present-day scholars.

For various reasons, none of these articles has ever appeared in a regular, English-language publication though many are frequently referred to and all deserve to be. Formal linguistics has come of age and the publication of this collection can be looked upon as a sort of certificate of majority for the field. There is much less reference nowadays to unpublished mimos, Xeroxes, and dittos and the present volume will aid considerably in making that practice less necessary.

These papers are not mere historical curiosities, but they will provide the historian of linguistics important data on the development of transformational grammar and especially of that branch of the science known as generative semantics. They are placed in their proper historical and theoretical perspective by one of the most influential participants in these developments and will reward the reader with insights into the foundations of modern syntactic thinking.

Jerrold M. Sadock



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**SYNTAX and SEMANTICS**

**VOLUME 7**



## INTRODUCTION

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JAMES D. McCAWLEY  
*University of Chicago*

1 The papers collected in this volume have three things in common: that they originate within the transformational-generative tradition<sup>1</sup> of syntactic and semantic analysis, that they have inherent and/or historical importance, and that they have hitherto been part of an underground literature: the many papers that have been circulated in office-duplicator or in project reports but have not been given normal publication in journals or books. (One of the papers has appeared in Russian translation and another in German translation in normal publications, but their English originals have remained underground until now.)

Most of the papers have been widely cited in the above-ground literature, and I make some attempt to suggest the impact that they have had on above-ground controversies in the introductory notes that I have supplied to each paper. The form in which each paper appears is substantially that in which the paper was originally circulated, except that I have allowed myself and the respective authors to make minor stylistic and terminological improvements, to replace ill-chosen examples by examples that make the same point better, to delete or summarize sections that are of minor interest, and to add clearly marked annotations in which the authors

may make retractions or discuss subsequent related work (original footnotes are keyed by numbers, added annotations by letters). In addition, the bibliographies of the individual papers have been collated into a single list of references, and citations in the papers have been keyed to that list (since unpublished papers often make reference to papers that at the time of writing were also unpublished but later were published, the reader should not be perplexed at finding references to "Ross, 1969a" in a paper written in 1967; 1969 is the date Ross's paper was published, and "Ross, 1969a" replaces the author's citation of an at that time unpublished paper). The papers in this volume are arranged in the order in which they were written.

2 The reader of this volume probably has two questions about it: why were the papers in it not published in the 1960s and early 1970s, when they were written, and why should anyone want to read them now?

No uniform answer to the first question can be given. In most instances, the failure of the paper to appear above-ground until now can be attributed to sloth on the part of the author; most of the authors could probably have found the time to rewrite and retype their papers and submit them to a journal, but they simply never got around to it. Or, by the time they did get around to seriously thinking of revising their papers for publication, their ideas had changed so considerably that they preferred to write entirely new papers, rather than revise their earlier efforts (which is not to imply that the authors then set about writing new treatments of the same themes--they often exhibited no less sloth with regard to their new intentions than with regard to the old ones). A contributing factor in the failure of some of the authors to publish their papers is probably the in-group mentality that was all too common among transformational grammarians in the 1960s. My impression is that most of the transformational linguists who were at M.I.T. or Harvard in the 1960s (which is where most of the authors represented in this volume spent part of that decade) felt that anyone capable of appreciating their work probably read the M.I.T. Quarterly Progress Report and the Harvard Computation Laboratory reports anyway, so what need was there to publish anywhere else? One of the papers in this volume, George Lakoff's "Pronouns and Reference", is an unfinished work that would have been of book length had it ever been finished. Other papers were intentionally written in a form inappropriate for normal publication, particularly Postal's "Linguistic Anarchy Notes" and the series of informal notes that it inspired

## Introduction

(Kuroda's "Linguistic Harmony Notes", and Morgan's "Cryptic Notes" and "WAGS"); Benwick, Fay, and Knight's "Camelot" was prepared by three students attending the 1968 Linguistic Institute as a summary of lectures given in courses there by Ross, George Lakoff, and myself.

3 There are a number of important linguistic issues that receive a more thorough and incisive treatment in papers included here than in anything hitherto published above ground. One striking example of this is George Lakoff's "Pronouns and Reference" (paper 16), which demonstrates that neither the once popular view that all pronouns are derived from copies of their antecedents, nor the now fairly popular view that all pronouns are present as such in base structures is a tenable position. He shows that while all anaphoric devices are subject to the constraint (Ross, 1967b, Langacker, 1969) that the anaphoric device may not both precede and command its antecedent (or rather, to a corrected version of that constraint, which Lakoff develops in his paper), there are both anaphoric devices that must be derived from copies of the antecedent and anaphoric devices that cannot be derived from copies of the antecedent, and hence the Ross-Langacker constraint must be an overall constraint on anaphora-antecedent pairs, rather than part of either a pronominalization transformation or a rule for interpreting base-generated anaphoric devices. Anderson's paper on the notion "base component" (number 7) argues that the conception of "base component" presented in Chomsky's "Aspects" conflates two matters that must be kept separate: the assignment of syntactic constituents to syntactic categories (which, Anderson argues, is neither language particular nor restricted to the level of deep structure) and the specification of what constituent order and what combinations of elements the language allows in deep structure. Anderson's approach has far-reaching possibilities that have never been explored in the literature. For example, it allows syntactic categories that do not figure in the deep structures of a language to appear in surface structure: if transformations create a combination of elements that does not appear in deep structure (say, if a transformation introduces prepositions, adjoining them to certain NPs), the universal category definitions could yield derived structures in which a category appears that did not appear at deeper stages of derivations (say, the category "prepositional phrase", if "prepositional phrase" is defined universally as consisting of preposition and NP). Anderson's paper is a welcome antidote to the prevalent prejudice against transformations that 'build structure' (see,

e.g., Akmajian and Heny, 1975, pp. 148-149 for a recent illustration of this attitude). 'Structure building' is outlandish only if one takes the base component of the grammar to be the source of all instances of syntactic categories.

4 Rather than continuing to tabulate the original and important ideas presented in these papers, a task that is better done in the introductory notes to the individual papers, to the extent that it needs to be done at all, I would do better to devote the bulk of this introduction to the matter of the historical significance of the papers, a subject not easily covered there, since it calls for discussion of the historical setting in which the papers were written.

Only the first four papers in this volume antedate the publication of Chomsky's "Aspects of the Theory of Syntax", and only the first three antedate the writing of "Aspects" and the oral dissemination of its conclusions. The underground transformational literature prior to "Aspects" is in fact rather sparse, even sparser than the above-ground literature. This state of affairs results from the fact that not only was the community of transformational grammarians quite small until well into the 1960s, but the rate at which ideas were born and died was also rather low. Three not unrelated changes took place fairly rapidly around 1964-1965: (i) the number of transformational grammarians increased from a minuscule figure to a quite sizeable one, (ii) transformational grammar turned from an avant garde movement in American linguistics into a clear contender for the title of "the establishment", and (iii) the character of writings by transformational grammarians changed to more research oriented from largely polemical, i.e., more concerned with identifying defects in the then dominant descriptivist or post-Bloomfieldian approach to linguistics and demonstrating the superiority of a transformational approach<sup>2</sup> than with developing and refining transformational grammar, which remained quite programmatic. The first two papers in this volume, both by Robert B. Lees, are high-quality examples of the early transformational polemic tradition, a genre that first achieved prominence with the publication of Lees' influential review (1957) of Chomsky's "Syntactic Structures". Such examples of that genre as Postal (1964) contrast strikingly with Postal's "Linguistic Anarchy Notes" (item 11 in this volume), where Postal's principal concern was to exhibit factual domains in syntax and semantics into which the then existing varieties of transformational grammar provided no insight.

The first two of these changes amount to a scientific revolution, and the third change signals the beginning of a

## Introduction

period of normal science, in the sense of Kuhn (1962). In speaking of a scientific revolution here, I have ignored entirely the question of whether transformational grammar was in fact an advance over the descriptivist approach. For the reason mentioned in footnote 2, it is not easy to give a nontrivial answer to the question (as opposed to the trivial affirmative answer that assumes the 1965 transformational grammarian's goals and priorities or the equally trivial negative answer that assumes the 1950s descriptivist's goals and priorities). I do not hold that scientific revolutions are always for the better; neither, apparently, does Chomsky, in view of his higher regard for seventeenth than for nineteenth century linguistics. As I have remarked elsewhere (McCawley, 1976a), "Scientific communities get the scientific revolutions that they deserve"; scientific communities in which bizarre and trivial concerns prevail are those that are most vulnerable to revolutions in which a worthless approach gains wide acceptance.<sup>3</sup> My feeling is that this time the American linguistic community was lucky and got a better revolution than it deserved, though by no means an ideal one.

However, the question of how good a thing per se it was for that particular revolution to take place is not of direct relevance to this historical sketch. Of much more relevance is the question of what climate the revolution created, given its timing in relation to other things going on in the field. The publication of "Aspects of the Theory of Syntax" took place during the period when the above three changes were taking place. Accordingly, the claims and the model of analysis of "Aspects" were the hottest thing in transformational grammar at the time when large numbers of persons started doing straight research within a transformational framework. It is thus not surprising that when the rate at which transformational literature was produced increased enormously in the mid 1960s, most of this literature took the "Aspects" theory as a frame of reference, whether in applying that theory to new factual areas or in proposing revisions in it. "Aspects" thus is at least visible in the background in most of the papers collected in this volume, many of which are devoted to critical examination of its tenets (or of the claims about the structure of English that have figured in the "Aspects" tradition of syntactic analysis--the tradition of analysis must be distinguished from the theory itself, since the theory allows for alternative analyses that are wildly at variance with the analytical tradition associated with "Aspects") and the formulation of alternatives. My impression is that the amount of work done in and on the "Aspects" theory in the mid and late 1960s was

far greater than one would expect, even granting the great increase in the number of transformational grammarians and the fact that transformational grammarians no longer had any reason for expending on antidescriptivist polemics energies that could be spent better on putting their theoretical house in order. Of course, an  $n$ -fold increase in the number of scholars in a field will often result in far more than an  $n$ -fold increase in the amount of research that goes on; a critical mass must be achieved before a scientific community becomes intellectually lively. And on the other hand, unless work is going on in several geographically separate centers, the idea pool (which is to a scientific community as a gene pool is to a biological species) is unlikely to become diverse enough for the implications and possibilities of the prevalent ideas of the community to be explored thoroughly. Of course, the increase in numbers of transformational grammarians in the mid 1960s dispersed the transformational linguistic community over the United States (and soon, much of the world), whereas it had previously been for all practical purposes confined to Building 20 at M.I.T.

But even so, the creative outburst that took place within the "Aspects" theory is astonishing. I see two reasons for this orgy of activity, besides those already touched on. First, the development of the "Aspects" theory [via the intermediate stage of Katz and Postal's (1964) theory] from the "Syntactic Structures" theory had involved a fair amount of identification and re-evaluation of premises (albeit nowhere near the amount that could have been carried out), and in the transformational community there thus prevailed an attitude that was relatively favorable to the critical examination of the foundations of transformational linguistic theory, which meant that the class of questions that transformational grammarians felt happy about asking was much greater than it had been a few years earlier. Second, a number of characteristics of the "Aspects" theory made it a far more stimulating framework, and far more attractive to persons outside of or only marginally within linguistics, than the "Syntactic Structures" theory had been.

One such characteristic is the obvious one, that "Aspects" brought semantics out of the closet. Here was finally a theory of grammar that not only incorporated semantics (albeit very programmatically) but indeed claimed that semantics was systematically related to syntax and made the construction of syntactic analyses a matter of much more than just accounting for the distributions of morphemes.

A second appealing characteristic of the "Aspects" theory was its much greater systematicity, in comparison with

## Introduction

both the "Syntactic Structures" theory and all nontransformational forerunners with which I am familiar. To my mind, the principal appeal of transformational grammar is that it allows the linguist to cope with syntactic complexity. By contrast, complex sentences threw the theory of Harris (1946) for a loop. Compare the elaborate formulas that Harris (1946; pp. 173-174) gave for a couple of special instances of English relative clauses (and was in principle unable to convert into a fully general account) with the general rule that is available under any variety of transformational grammar, by which a relative pronoun (more generally, a 'relative expression' such as *for whose mother* or *under the influence of whom*) 'originates' in the position of a corresponding non-relative expression and is moved to the front of the relative clause by a transformation. Note the way that a transformational treatment allows one to separate out the various factors that affect what relative clauses are possible: conditions on what is possible in nonrelative clauses, the process of moving the relative expression to the front of the relative clause, and the option of omitting the relative pronoun. However, the "Aspects" theory gives one more assistance in coping with complexity than the "Syntactic Structures" theory did. Whereas the "Syntactic Structures" theory did not make clear how the various rules involved in constructing a complex sentence could interact with each other, the "Aspects" theory provided a simple and elegant picture of how the rules interacted; each sentence had a deep structure in which sentences could appear within sentences in a way specified by the base rules, and the interaction of the rules was governed by the form of the deep structure (rules applied to lower Ss before any rules applied to higher Ss) and by a fixed ordering of the transformations, which governed the sequence in which they could apply to any given S of the deep structure.<sup>4</sup>

Third, the "Aspects" theory allowed the notion of syntactic category to be separated from various factors that affect what co-occurs with what (particularly selectional restrictions and notions of strict subcategorization such as the notion of transitive) and thus made it possible to do transformational syntax with fidelity to the facts, without having to set up an inventory of morpheme classes of the type that had figured in Harris' work and was implicit in early transformational grammar.

The first characteristic increased the inherent interest of doing transformational syntax, as well as making it relatively easy to come up with analyses that stood a chance of being right; characteristic two made it relatively easy to

determine what the grosser implications of a given analysis were; and characteristic three made it relatively easy to formulate transformational analyses in extremely general terms without any loss of precision, and to start dealing seriously with syntactic universals.

The "Aspects" theory accordingly was tested more thoroughly and more critically than any of its predecessors (transformational or otherwise), and much of the literature, both above-ground and underground, in the latter half of the 1960s got deeply enough into the implications of the "Aspects" theory to identify claims and assumptions of the theory that could be taken issue with or to find gaps in the theory and proposed corresponding revisions, both major and minor, in the theory. In some cases, what started out as a minor revision in the "Aspects" theory had far-reaching and at the outset unexpected implications. For example, George Lakoff's 1965 dissertation (published as G. Lakoff, 1970a) started out as an attempt to make precise the notion of exception that had been used informally by transformational grammarians; however, Lakoff was then able to show that the theoretical machinery that was needed to specify how rules apply in the presence of "exceptional" lexical items allowed a drastic reduction in the set of syntactic categories [e.g., it allowed "verb" and "predicate adjective" to be taken as belonging to the same syntactic category, a line of argument that led naturally to the proposal of Bach (1968) that there are only two 'elementary' types of syntactic units: predicates and referential indices] and in the process allowed deep structures to resemble semantic structures to a much greater degree than the deep structures presented in "Aspects" did.<sup>5</sup>

A number of papers in this volume criticize specific details of the "Aspects" theory. Collectively, they help remedy an anomaly in the literature, namely, the remarkable lack of reviews of "Aspects".<sup>6</sup> Anderson's paper on the base component further develops the proposal of McCawley (1968a) (originally worked out in 1965-1966), that the base component of a transformational grammar should be regarded as consisting not of rewriting rules but of node admissibility conditions, which specify directly what tree configurations are possible in deep structures, rather than requiring the deep structure tree to be constructed from a derivation that consists of strings. Chomsky is, in fact, unusual among transformational grammarians for the extent to which he prefers to talk about strings rather than about trees. It is generally trees rather than strings that are of relevance to a transformational grammarians concerns, and Anderson's paper provides an excellent example of how formulating rules in terms of trees

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rather than of strings provides a new perspective and reduces to an appropriate level of triviality certain problems (such as that of tree pruning), which otherwise call for arbitrary and unsatisfying accretions to grammatical theory.

Several of the papers are concerned with an issue that has been a major scene of controversy since 1967, namely, the division between syntax and semantics. At the time "Aspects" was published, the question of identifying deep structure with semantic structure was not raised, since the syntactic analyses that had been proposed up to that time involved underlying structures that, while they often reflected semantic structure more than did surface structure, still were a long way removed from semantic structure.<sup>7</sup> Moreover, the version of semantic structure that was best known to transformational grammarians at that time, that of Katz and Fodor (1963), involved semantic structures that were at least typographically quite remote from what were then being proposed as underlying syntactic structures and thus helped perpetuate the belief that syntactic structure and semantic structure were of radically different nature. It should be emphasized, though, that Katz and Fodor failed to raise seriously the question of the formal structure of semantic representations, and the typographical format that they chose allowed for far less structural complexity in semantic structures than was actually necessary, as Katz himself (e.g., Katz, 1966) soon recognized. A large body of syntactic analyses soon developed that in the various details that were at issue agreed with the presumably logical structures:

(i) Quantifiers were argued to be predicates of higher clauses (G. Lakoff, 1965, further developed in G. Lakoff, 1970c, and McCawley, 1972a) with the scope of the quantifier being the constituent it was predicated of.

(ii) Causative verbs such as transitive *break* and inchoative verbs such as intransitive *break* were argued to derive from structures containing 'abstract' predicates CAUSE and BECOME respectively, with a complement sentence that contained the corresponding stative adjective; e.g., *Floyd broke the glass* would have a deep structure constituent *the glass (be) broken* (G. Lakoff, 1966; R. Lakoff, 1968).

(iii) Negation was analyzed as an intransitive predicate with a sentential subject (McCawley, 1968c; G. Lakoff, 1970d).

(iv) Auxiliary verbs were argued to be deep-structure main verbs having the clause to which they applied as deep structure complement (Ross, 1969b, further developed in

McCawley, 1971a).

(v) The deep structure distinction among declarative, imperative, and interrogative sentence was argued to reside in a higher clause (such as *I order you to S*) that specified the speech act performed by uttering the sentence (Ross, 1970; McCawley, 1968b).<sup>8</sup>

(vi) Various adverbial expressions were analyzed as involving higher predicates, with the surface main clause as complement of that predicate (G. Lakoff, 1965), even in cases such as that of instrument adverbs (G. Lakoff, 1968a) where the higher predicate (*use*) did not appear as such in the surface form of the sentence (i.e., the underlying *use* was realized as the preposition *with*).

Moreover, the sorts of arguments that had been offered in justification of analyses that diverged less radically from surface structure could generally be found to support these analyses, particularly arguments based on shared selectional restrictions in the structures that were held to be related and on missed generalizations: respects in which the proposed analyses allowed uniform rules to cover cases that would have to be listed separately in alternative analyses. Of course, many of these analyses have been contested, in some cases on quite reasonable grounds; however, the existence of this large body of analyses and of the quite sizeable mass of arguments in their support made it much more reasonable to raise in 1967-1968<sup>9</sup> a question that would have been outlandish in 1965, namely the question of whether anything was to be gained by distinguishing between syntax and semantics, as those were understood in the "Aspects" theory, i.e., whether transformations did not simply amount to rules for specifying how semantic structures are related to surface structures, and base rules did not simply amount to rules specifying what semantic structures were possible.

The paper that first raised these questions seriously is Lakoff and Ross's "Is Deep Structure Necessary?" (paper number 9 of this volume), which can be said to mark the beginning of the variety of transformational grammar known as generative semantics. What characterizes generative semantics is not so much the well-known claim that there is no distinction between transformations and semantic interpretation rules as the abandonment of the assumption that there is such a distinction. For a generative semanticist, a grammar is a specification of what the relationship between semantic structures and surface structures is, and the proposition that a distinction between syntactic rules and semantic rules must be drawn is a claim requiring justification

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on the basis of facts about semantic structure and its relation to surface structure. Accordingly, for generative semanticists, semantic data play fully as important a role as do syntactic data, if a distinction between semantic data and syntactic data can even be drawn. The question of whether an analysis can be justified on the basis of syntactic data was an important question to an adherent of the "Syntactic Structures" theory and remains an important question to an adherent of the extended standard theory, which figures in Chomsky's recent works, whereas to a generative semanticist the question is either of minor interest or is rejected outright as meaningless (on the grounds that all linguistic data are strictly speaking "semantic").

In accordance with this change of attitude, a large proportion of the generative semantic literature has been concerned with investigating semantic structure (e.g., McCawley, 1970b, 1973b; Morgan, 1969b, 1973) and with determining what the rules relating semantic structure to surface structure must be, given semantic structures that are taken to have been justified (e.g., McCawley, 1968c, 1971b; Levi, 1975). Such concerns are illustrated in this volume by Morgan's notes on *again* (the first part of item 17) and on *know* and *forget* (the second part of item 17), Larkin's study of *will* and *must* (paper 20), and Neubauer's note on idiolectal differences in the meaning of *pretend* (paper 21), as well as in the more extended studies of pronouns and reference by Lakoff (paper 16) and by Karttunen (number 19). In addition, there is an extensive literature, represented in this volume by Morgan's note on *again*, that argues that the semantic constituents of a semantically complex lexical item can stand in syntactic relations to overtly occurring elements and hence that syntax cannot be segregated from semantic analysis of lexical items (e.g., G. Lakoff, 1969, 1971; McCawley, 1968c, 1971b).

The matter of pronouns and reference deserves some comment here. The earliest transformational treatment of pronouns (Lees and Klima, 1963) ignored matters of reference entirely and derived all personal and reflexive pronouns (except those personal pronouns that have no antecedent) from copies of their antecedents via transformations that optionally pronominalized a NP that was identical to some other NP and did not express formally in their rules the fact that when that option is exercised, the two NPs are interpreted as coreferential, and when the option is not exercised, they are generally interpreted as non-coreferential.<sup>10</sup> In "Aspects", Chomsky modified the Lees-Klima analysis so as to make pronominalization and reflexivization contingent on coreferentiality. He proposed

that every noun in deep structure be supplied with a "referential index", that identity of referential indices correspond to identity of purported reference, and that identity conditions in the formulations of at least some transformations<sup>11</sup> be interpreted as demanding identity not only of constituent structure and of lexical items, but also of referential indices. However, Chomsky's proposal appears only in one short paragraph ("Aspects", pp. 145-146) and none of the deep structures that are presented explicitly in "Aspects" gives any indication of referential indices, which suggests that Chomsky was admitting referential indices to his syntactic theory only grudgingly and only because they were forced on him by his adherence at that time to the proposition that deep structure completely determined meaning.<sup>12</sup>

In 1966, Ross, Langacker, G.H. Matthews, and Maurice Gross independently discovered an important constraint on the relationship of pronouns to their antecedents: The pronoun may precede the antecedent only if it does not command the antecedent (e.g., *Before he<sub>i</sub> went to bed, John<sub>i</sub> prayed to Zoroaster* is possible, but not \**He<sub>i</sub> prayed to Zoroaster before John<sub>i</sub> went to bed*; see Ross, 1967b; Langacker, 1969). Ross formulated this constraint as a condition on a pronominalization transformation and argued that that transformation must be in the cycle because of the way that it interacts with the cyclic transformation of Equi-NP-Deletion in such sentences as *The realization that he<sub>i</sub> was unpopular disturbed John<sub>j</sub>* (versus \**The realization that John<sub>i</sub> was unpopular disturbed him<sub>j</sub>*). A dilemma soon arose with the discovery by William A. Woods of sentences such as *The pilot<sub>i</sub> that shot at it<sub>j</sub> hit the MIG<sub>j</sub> that chased him<sub>i</sub>*, in which there are two pronouns, each contained in the antecedent of the other. As Emmon Bach and Stanley Peters noted, the pronouns in such sentences can be derived from copies of their antecedents only if the sentences have deep structures that are infinitely deep. Thus, one must either give up deriving all pronouns from copies of their antecedents (but how then is one to account for the facts discussed by Ross, which appear to show pronominalization behaving like a cyclic transformation?) or allow infinite underlying structures. Of the enormous literature that rapidly developed and continues to proliferate on Bach-Peters sentences as they have come to be called, the work that to my mind comes the closest to successfully resolving this dilemma is George Lakoff's "Pronouns and Reference"

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(paper 16 of this volume). Lakoff's paper is one of a number of works that accorded referential indices a more central role than they had in Chomsky's proposal.<sup>13</sup> In Lakoff's underlying structures, a referential index occupies a NP position, and the additional material that appears in that position in surface structure (quantifier, noun, and/or relative clause) is outside of the clause in question. However, Lakoff rejected the previously universal assumption that either all kinds of anaphoric devices are derived from copies of their antecedents or none are. He argued that some kinds of anaphoric devices must be derived from copies of their antecedents (for example, sentence-pronouns and anaphoric one) and other kinds cannot be, and he maintained that only the latter kind of anaphoric devices can give rise to Bach-Peters sentences. Since both kinds of anaphoric devices are subject to the Ross-Langacker constraint, that constraint can be neither part of the pronominalization transformation(s) nor [as in the way out of the Bach-Peters dilemma that was proposed in Jackendoff (1969, 1972)] part of a semantic interpretation rule for assignment of antecedents to anaphoric devices, but must be an overall constraint on pronoun-antecedent relations that is independent of whether a full NP or merely an index underlies the pronoun. Lakoff was not entirely successful in accounting for the facts presented by Ross, but he was able to adduce facts that cast serious doubt on Ross's explanation of them and supported an analysis in which the Ross-Langacker constraint applied to surface structures or to shallow structures, rather than to the immediate outputs of pronominalization transformations.<sup>14</sup>

Output constraints such as figure in Lakoff's analysis of pronouns illustrate a major respect in which much of the transformational grammar of the late 1960s and beyond differs from that of the middle 1960s and before. In transformational grammars up to about 1967, the possible surface structures were precisely those structures that the transformations could convert possible deep structures into (or sets of possible deep structures, in the earlier versions of transformational grammar in which a transformation could have two or more inputs). The form (though not the content) of a transformational grammar was that of a sentence factory: to construct a sentence of language X, put pieces together as follows, then perform the following operations on the result. "Aspects" deviated from this general form of a grammar only to the extent that it allowed for derivations that hung up. For certain kinds of embedding (such as relative clause structures), some transformation had to

apply (such as the one forming a relative pronoun from a NP that matched the head NP), and a derivation in which such a transformation could not apply did not result in a well-formed surface structure. Ross (1967a) and Perlmutter (1968) demonstrated the existence of *output constraints*: restrictions on what is admissible as a surface structure that are not merely consequences of the base rules and transformations but have the status of independent rules of grammar. A particularly clear instance of an output constraint is discussed in detail in the paper by Szamosi with which this volume concludes. The acceptance of the notion of output constraint was a major step in the evolution of what shortly became the standard generative semanticist conception of a grammar (G. Lakoff, 1970b): A system of *derivational constraints*, i.e., rules that specify either what may occur at some stage or other of derivations or how various stages in a derivation may or must differ from each other, with the possibility explicitly recognized that some rules may be *global*, i.e., may involve nonconsecutive stages of a derivation. For what it is worth, I will state here my feeling that this conception of a grammar is better suited to the construction of realistic theories of how human beings produce and comprehend language. Both production and comprehension operate on several levels simultaneously; e.g., while you are already uttering the first words of a sentence, you are still constructing the meaning that the sentence is to express. Both comprehension and production involve the construction of a surface structure and a semantic structure that fit together according to the rules of the language. There is no reason why constraints on surface structure and constraints on semantic structure (which is one way that base rules might be thought of) should not play an equal role in language use; both would be involved in determining what comes next, both in the process of production and in that of comprehension. Moreover, there is no particular reason why global rules should not be involved in the process of constructing a surface structure and a semantic structure that match. The whole process is global anyway, so why shouldn't some of its components be too?

5 I will terminate this historical sketch of transformational grammar here, since to bring it more up to date would take it beyond the period in which the papers of this volume were written and for which it was supposed to provide the setting. I must emphasize that this sketch in no way pretends to be complete. In particular, it shares one major

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imbalance with the rest of this volume, namely that it has fairly extensive coverage of the generative semantic branch of the transformational tradition but largely ignores the interpretive semantic branch. The reason for that gap is found in the somewhat haphazard way in which I chose the contents of this volume. My choices were made from among the underground works in syntax and semantics I already knew and liked, a body of works that is so large that it was easy for me to assemble a volume's worth of high-quality material without having to look very far. Indeed, if the underground literature were not so rich, the book would probably have been more balanced with regard to representing different varieties of transformational grammar, since I would have had to rely more heavily on the advice of others in making my selections. As it is, I had to omit a large number of items that I wish I had been able to include, items that could comprise a volume of size comparable to this one in the event that demand for a sequel to this volume should be sufficient to justify one. Should such a volume ever come into being, I hope I will be able to benefit from the advice of linguists whose filing cabinets contain mimeographed and Xeroxed papers that mine don't; I hereby solicit their advice and comments.

I wish to thank the authors represented in this volume for permission to include their papers and for the advice and information that they have given me, which have aided me greatly in the compilation and production of this book.

## NOTES

<sup>1</sup>When I say "the transformational-generative tradition", I refer to the scientific communities whose intellectual parentage is traceable back to the small and easily identifiable community of transformational grammarians that existed in the late 1950s and early 1960s. I will use the term "transformational grammarian" to refer to anyone thus included in the transformational-generative tradition without thereby implying that the work he was engaged in is transformational grammar. In this connection, I emphasize that (i) I use the term "transformational grammar" neither as a term of approbation nor as a pejorative, (ii) the question as to whether a particular piece of work is transformational grammar is not meaningful unless one specifies how broadly or narrowly the term "transformational grammar" is to be taken, and (iii) that term can be made precise only through arbitrary stipulation. I have somewhat arbitrarily

excluded from consideration in this volume the versions of transformational grammar associated with the name of Zellig Harris (see, e.g., Harris, 1957, 1965); this exclusion reflects only the fact that Harris-type transformational grammar and the transformational tradition that this book is concerned with have had little mutual influence except in the early days of both. See Lees' "What Are Transformations?" (paper number 2 of this volume) for some remarks on the relationship between Chomsky's conception of transformation and that of Harris.

<sup>2</sup>A revolution in a scientific community usually involves not only a change in what claims and what concepts are generally accepted in the community, but also a change in the standards of acceptability for claims and concepts. Not surprisingly, an approach generally is virtuous by its own standards of virtue, e.g., descriptivism and transformational grammar have the respective virtues of being nonmentalistic and of being mentalistic. Polemics arguing the superiority of a new approach often merely show it to be superior by its own standards. Even when the polemic purportedly shows the new approach to be superior by the prevailing standards, the adherents of the new approach will generally assume new priorities among the prevailing criteria of acceptability and will appear to the adherents of the prevailing approach to be throwing out the baby with the bath water. The effectiveness of polemics is often not so much in popularizing the polemicist's substantive claims as in popularizing his priorities as to what one should care about.

<sup>3</sup>Scientific revolutions are less like political revolutions, in which existing institutions change hands, than like technological or market revolutions, in which a new product outsells an existing product of a similar function. However, a scientific revolution is more likely than a market revolution to be for the worse. The consumers of ball point pens need to write and the consumers of zippers need to keep their flies closed, and they will go back to the old product unless the new one satisfies their needs. But most consumers of scientific theories have needs that are easily satisfied, mainly that of having something that they can teach their students, which doesn't test the product as stringently as the consumers of ball point pens and zippers test those products.

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<sup>4</sup>Two of the papers in this volume, Anderson's on do so (number 10) and Morgan and Green's on the cycle (number 14) touch on controversies surrounding this proposed organization of rules. Anderson's paper reflects the fact that it was written during a brief period when Ross and Lakoff, with whom he was working, had abandoned the cycle in favor of an alternative (sometimes called "linear cycle") of which more details can be found in the papers cited in the introduction to Anderson's paper. The Morgan-Green paper presents an argument for cyclic organization of transformations that is noteworthy in that it involves transformations that had previously played no role in such arguments. For information about different conceptions of "cycle", see the glossary of this volume under the headings "cycle", "last-cyclic", "post-cyclic", and "strict cycle".

<sup>5</sup>The perhaps bewildering differences among the papers of this volume as regards what syntactic category various items are assigned to reflects the fact that neither the "Aspects" theory per se nor any of the other versions of transformational grammar that are presented or alluded to in the papers that follow provides a clear basis for determining what syntactic categories there are. In fact, node labels are the detail of transformational analyses for which the argumentation is and always has been the shakiest. No variety of transformational grammar has provided both necessary and sufficient conditions for sameness of category. Generally speaking, interpretive semanticists recognize necessary conditions for sameness of category [i.e., they will provide arguments that two items are of different category on the basis of difference in syntactic behavior, as in, e.g., Jackendoff (1972, p. 100)] but do not recognize sufficient conditions, whereas generative semanticists recognize sufficient conditions for sameness of category [i.e., generative semanticists will provide arguments that two items are of the same syntactic category on the basis of likenesses in syntactic behavior, as in Bach (1968) and G. Lakoff (1970a)] but do not recognize necessary conditions. Moreover, the interpretive semanticists' necessary conditions and the generative semanticists' sufficient conditions cannot be combined, since they are not consistent with each other; e.g., the former imply that modal auxiliary verbs are not of the same category as main verbs, the latter that they are. My current conjecture is that syntactic categories as such do not exist; that the supposed syntactic category differences that have been recognized are merely reflections

of three factors: (i) the logical category (sentence versus predicate versus argument) of the corresponding element of semantic structure, (ii) the morphological category of the head of the constituent, and (iii) the position which the item is in in surface structure (e.g., whether it is in predicate position or modifier position), and that an adequate account of grammatical rules must operate in those terms directly, rather than in terms of syntactic categories.

<sup>6</sup> Of the few existing reviews of "Aspects", Matthews (1967) deserves to be singled out as particularly insightful.

<sup>7</sup> Significant exceptions to this remark can be found in the work of Paul Postal and George Lakoff. As early as 1963, Lakoff proposed (paper 3 of this volume) taking semantic structures as underlying syntactic structures and taking the base component of a grammar as generating the set of well-formed semantic structures. The fact that this proposal aroused no particular interest then (in days when the transformational literature was so sparse that the appearance of any transformational paper was cause for comment) can perhaps be attributed to the fact that transformational syntactic analysis was as yet so poorly developed that there was too great a gap between what Lakoff was proposing and what transformational grammarians were generally doing. Semantics had only been decriminalized and not yet legalized.

<sup>8</sup> This proposal, the so-called "performative analysis" was in fact suggested in Katz and Postal (1964, p. 149, footnote 9) but was dropped without being developed.

<sup>9</sup> The bulk of the papers just cited were written in 1966-1968, though many did not appear in print until later.

<sup>10</sup> Lees and Klima took the reflexivization transformation to be obligatory when the two NPs are first person or second person, because of such examples as *I hate myself/\*me*. However, that restriction is incorrect due to the possibility of noncoreferential first person pronouns, as in *I dreamed that I was Brigitte Bardot and that I kissed me*, which refers to a quite different dream than does a corresponding sentence with *myself*. The paper by Warshawsky Harris in this volume (number 4) provides further criticism and revision of the Lees-Klima reflexivization rule.

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<sup>11</sup>The problem of determining which transformations require this interpretation of identity conditions vanishes if one takes referential indices as attached not to a noun (as in Chomsky's proposal) but to a NP (as proposed in McCawley, 1968b). Referential indices are relevant to whether two NPs count as identical but not to whether two nouns do. See McCawley (1976b) for further discussion of the role of referential indices in identity conditions.

<sup>12</sup>Indeed, as far as I can recall, Chomsky mentions referential indices in his subsequent writings only in passages (such as Chomsky, 1970, footnote 11) where he condemns the "error" of identifying referential indices with the purported referents of the NPs.

<sup>13</sup>See in this connection McCawley (1968b), where it is argued that referential indices have the structure of sets rather than of discrete units, and Bach (1968), Postal (1968), and McCawley (1970a), where it is argued that in semantic structure, referential indices fill NP positions and nouns are in predicate positions.

<sup>14</sup>To get Lakoff's proposal to work for Ross's facts, it may be necessary to treat Equi-NP-deletion as leaving behind a phonologically null trace that continues to stand in anaphoric relations to other NPs.



## OPTICAL ILLUSIONS AND GRAMMAR BLINDNESS

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*This paper is dated May 17, 1960; it was duplicated and circulated informally. Like the much better known Chomsky (1961b), it is a reply to the remarks of Hill (1961) on the notion of grammaticality. It does not appear to have been cited in any other publication, above ground or underground.*

Suppose a chemist wished to study the effect of water on iron and that he prepared the following experiment to test the hypothesis that iron rusts in water. A number of small iron rods are prepared and given to a class of freshmen, acting as informants, to examine before and after placing them in glasses of water. The following experimental results are obtained:

- 1) Informant A reports no effect. He understands about rusting but finds no rusting after placing his rod in the glass.
- 2) Informant B reports that water causes iron rods to bend. He does not know about rusting and simply reports what he sees. He also is ignorant of refraction of light.
- 3) Informant C reports that water rusts iron. He

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knows about rusting and also knows that it might take some time; he therefore allowed the rod to remain in the glass long enough to oxidize. He also knows about refraction of light, but he correctly judges that it is irrelevant to the chemical effect being studied.

- 4) Informant D reports no effect. By mistake he obtained an aluminum rod, performed the relevant observations, and found no rusting.
- 5) Informant E gave no report but asked whether atmospheric oxygen is to be admitted to the glass of water during the experiment.

The chemist himself, interpreting the results of his experiment, reports that the hypothesis is not confirmed by the data, for informants do not consistently identify rusting on iron rods placed in water.

The hypothesis had been advanced by a brash, young student of chemistry, who is quoted as having said: "Anyone familiar with iron and water knows that iron rusts when placed in water, for if he is asked to observe an iron rod in a glass of water, he will report that rust appears on the iron." The chemist claims to have refuted the student's hypothesis about iron and water with the results of his experiment.

It is not difficult to say exactly what is wrong in this ludicrous caricature of scientific research, but when the same mistakes are made in a subtler fashion in bona fide investigations, it is not always obvious how and why they invalidate the conclusions that some scholars would like to draw.

To begin with, the original hypothesis of the student was supported by a reference to every-day events or common knowledge--everyone knows, roughly speaking, that iron rusts in water, even if few laymen can say explicitly why or how. The chemist sought to invalidate the thesis by showing that the supporting evidence from daily life was not literally true as stated, for the results of his experiment showed that if people are asked to report what happens when iron rods are placed in water, a great variety of responses will be obtained, only some of which may be relevant to the question under investigation. This is very unconvincing evidence that rusting is not a commonly recognized feature of iron.

Next, the experiment itself was very poorly designed.

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Informants A and D might have given the desired response but for the interference of extraneous, uncontrolled factors, namely, time of oxidation process and identity of the metal in the rod used. Informant B paid attention to the wrong features of the apparatus.

Taking account of these mistakes in laboratory procedure and experimental design, we might try to account for responses like that of Informant E, assuming that one could obtain others of this kind with further experimentation. This response shows that, far from refuting the literally taken evidence of rusting as offered by the student, experiments confirm that people, or at least some people, have even more and deeper knowledge of the properties of iron than were claimed; Informant E indicated that he not only knew iron rusts in water, but also that he knew something about why. It is not necessary, incidentally, to assume that he had learned this in school. The experiments to show the relevance of atmospheric oxygen to the phenomenon of rusting are very easy to perform.

The chemist is also known to have charged the student with incredible naivete on the following grounds. In predicting the results of such an inquiry about rusting of rods he must have paid attention only to the outward appearance of metal rods as the only evidence the experimental subjects might be expected to use to identify them as consisting of iron rather than, say, aluminum. The chemist assumes, in other words, that the only relevant question to be put to the subjects is, "Does this bar rust?" However, after the experiment, Informant D remarked, "I wonder what that rod was made of, it sure was light for iron!" Thus, he knew the relevance of the material of which the rod was supposed to consist, and he might well have reported correctly the difference in the behavior of aluminum and iron in water had the chemist supplied him with both.

By now our anecdotal analogy has been stretched far enough, and it is time to say explicitly what light it is supposed to shed on linguistics or linguistic theory. I shall be blunt.

Chomsky wrote that speakers of a language know the difference between grammatical and ungrammatical strings of words, and he supported this view by mentioning some differences in behavior they might exhibit when asked about some instances. Hill (1961), mistaking these and similar assertions as a proposal to establish a theory of grammar upon some behavioral or empirical tests for grammaticalness, sought to refute the statements by performing an experiment. He offered to some experimental subjects a list of such

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strings and asked that they accept or reject them and also, if possible, grade them into a sequence of acceptable to unacceptable.

The experimental subjects failed to sort the strings into two classes, grammatical and ungrammatical, and they also differed widely on their judgments of acceptability. Hill took this as a refutation of Chomsky's claim and even implied that the negative results could be viewed as a failure of Chomsky's theory of language to give correct experimental predictions.

Since it is not well represented in our story of the chemist, we shall ignore the implications of (1) Hill's own ability correctly to formulate both grammatical and ungrammatical sequences of words to match those he cited from Chomsky, and (2) Hill's own correct surprise at which of these sequences were sometimes accepted on various grounds by the subjects (namely, the ones Hill knew were ungrammatical).

In exact analogy with our anecdote above, I view the results of Hill's experiment not as a refutation of Chomsky's claim, but rather as an excellent confirmation of an even stronger hypothesis than that advanced by Chomsky. The responses showed, of course, that one cannot test for grammaticalness by asking informants about the acceptability or unacceptability of sentences, since there are many irrelevant and uncontrolled factors; sequences of words can be accepted or rejected for a great variety of reasons, each having greater or lesser relevance to the formal, or syntactic, features of sentences, that is, their grammaticalness. There is little reason to believe, in fact, that there is an empirical test for grammaticalness.

The comments made by the subjects show, however, that speakers of English not only know the difference between bona fide English sentences and ungrammatical strings of words, but that in some cases they even know why certain sequences are ungrammatical. First of all, a response like "That would make good modern poetry!" is very revealing; no one thought any of the ungrammatical examples would have made good classic poetry or good ordinary prose. But everyone knows that one of the formal devices used by the modern poets to achieve startling effects is distortion of syntactic structure. But this in turn implies that there must be an underlying "correct" form to distort; and Chomsky suggests simply that one minimal aim of linguistic science be an exact characterization of this underlying "correctness".

Second, one informant responded to the example: *I saw a fragile of.* with the question, "What's an of?" (or, perhaps, "What's an Of?"). This datum shows pretty clearly

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that the subject not only identified correctly the ungrammaticalness of the sequence in question, but he even knew what was wrong with it. And we can be quite sure that the same result would have been obtained had the example been presented in spoken form instead of written. In other words, Chomsky is not naive in calling the sequence ungrammatical because it is so only in this written form (with *of* instead of *Of* or perhaps *uhv*); rather, we see that the "naive" speaker not only identifies grammaticalness, but he even correctly analyzes the difference between the two contrasted sentences, one with the preposition, the other with an unfamiliar noun.

Hill strongly implies that he considers "grammaticalness" unacceptable as a technical term in linguistic science because so far no one has formulated an empirical test for it. The statements by Chomsky that Hill has attempted to refute are simply part of Chomsky's proposal that linguistics must seek to explain the indubitable ability of speakers of a language to distinguish, both when talking and when listening, between bona fide sentences of their language and various distortions of them.

Suppose, now, that there were a simple mechanical, empirical test for sentence-hood in English, and as example let us take a typical proposal often found at the beginning of linguistic studies: "A sentence is any sequence of words ending in one of two terminal contours, where the words may be chosen from a (long) finite list." (Of course, this is a quaint oversimplification of the proposals that have actually been made, but it permits a good illustration of the important point.)

If the above "operational definition" of sentence in English were correct, then the grammar of English would consist of two simple rules followed by as many lexical rules as there are words in the English lexicon (a finite number, of course). It might have the following form:

- (1)    S →    w { / } <sup>#</sup>
  - (2)    S →    WS
  - (3)    W →    A
  - (4)    W →    B
- etc.

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where # and / are terminal contour symbols, and A, B, C, ... are the individual words. Rule (1) generates all one-word sentences, and Rule (2) generates by recursion all other sentences from the latter. The grammatical study of English is now a closed subject!

It has not been very fruitful to seek an "operational definition" of the notion "sentence". Rather, traditional grammatical study has been, for the most part, aimed at formulating a characterization of sentences by means of grammatical rules. The fact that this study has been difficult and involved can be viewed as evidence that the notion of "sentence of language L" is not a trivial or simple one. Furthermore, since the grammatical or formal features of sentences are intimately related in many and various unknown or partially unknown ways to the use of sentences and to the meanings of sentences, it seems at least most unlikely that an operational test for sentence-hood will ever be found based on the acceptability or unacceptability of strings of words. Our best prospect at the present time is undoubtedly to seek a characterization of the most impeccably grammatical sentences by means of so-called generative grammars and then to attempt various extensions of that theory to cover other kinds of utterances.

Our major point, then, is that it is simply a misapprehension about the nature of scientific research and results to insist that grammaticalness or sentence-hood cannot be explicated or characterized by means of generative grammars unless there is a mechanical or empirical test for grammaticalness.

## WHAT ARE TRANSFORMATIONS?

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*This paper, dated December 1960, is one of three papers by R.B. Lees that were published in Russian translation in "Voprosy Jazykoznanija" but whose English originals have not as yet been published. The details of the three papers are:*

'<sup>Ч</sup>to takoe transformatsija?' (What are transformations?)  
Vol. 10, No. 3, pp. 69-77 (1961).

'O pereformulirovanií transformatsionnykh grammatik'  
(On the reformulation of transformational grammars).  
Vol. 10, No. 6, pp. 41-50 (1961).

'O vozmožnostjakh proverki lingvističeskikh položenij'  
(On the testability of linguistic propositions).  
Vol. 11, No. 4, pp. 45-55 (1962).

There are now numerous references in the literature of scientific linguistics to certain research on language and grammatical theory done at the Massachusetts Institute of Technology and elsewhere and very often called "the transformational approach" or "transform grammar". These terms have been coined by not-so-innocent bystanders and certainly demand some clarification. In particular, it is not at all clear to many, even to some of those who use these

terms, just what the words "transformational" or "transform" are supposed to mean.<sup>1</sup>

Within the immediate history of linguistics in America, the notion of grammatical transformation arose, as far as I know, in the course of Zellig Harris' work on discourse analysis, (Harris, 1952a, b, 1957). This study by Harris and his students consisted roughly of the following. Given some particular text, and employing various linguistic techniques, e.g., those outlined in Harris (1951), one could presumably assign to each sentence of that text its correct grammatical analysis. By this Harris meant briefly that one could segment these sentences into significant parts, label these parts as to grammatical category, bracket them with an immediate-constituent analysis, etc. But it happens that certain morphemically different constituents in two or more sentences share the same intrasentence context, and these sentences of the text could then be "reduced", as it were, to the same sentence-type of that text. Such a reduction, or collapse, of similar sentences under context equivalence serves to diminish the variety of semantically similar expressions and thus to condense the text to its essential minimum.

Such condensation, however, was often not very extensive, and one could easily see that there remained a great many constituents in the text that were still semantically equivalent but uncollapsed because they did not share exactly the same constituent contexts. But if, for example, an active sentence and its corresponding passive, or an assertion and its corresponding interrogative, could also be considered equivalent in some, perhaps new, sense, then the text could be collapsed further to a very few protosentences that comprise a compact summary of the whole.

Thus, Harris was led to consider intersentence relations, a notion that to that time had not been treated in contemporary linguistics, even though it had been quite commonplace in traditional grammatical literature.<sup>2</sup> In exact accord with his usual view of linguistics, Harris formulated this notion in terms of a set of operations that the analyst can perform on sentences of a text in order to convert certain sentence types into others. Thus, there was an operation that could convert an active into its corresponding passive, and vice versa; one that could turn a sentence into one of its nominalizations, and vice versa; etc. These operations, in line with his fondness for mathematical terminology, Harris called "transformations". Later, he and his students went on to formulate and study scores of such relations among sentence types based upon the idea of cooccurrence of certain

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constituents within certain contexts. Harris himself viewed the entire study as an extension of descriptive linguistics, not as a part of it.

Let us see in a little more detail what these studies were like. The new methods of relating sentences were developed into techniques for finding, or setting up, new transformations by relating sentence types that, although they differed among themselves in immediate-constituent (IC) analysis, contained constituents restricted identically as to which particular morphemes could appear in them. For example, if we should note that simple assertion sentences of the following form are so restricted as to include only the unstarred ones:

- (1) *Ivan izumlajet Petra.*  
'John astonishes Peter'
- (2) *Kniga izumlajet Petra.*  
'The book astonishes Peter'
- (3) \**Ivan izumlajet knigu.*  
'John astonishes the book'

and at the same time that simple passive assertions of the following form are subject to exactly these same restrictions:

- (4) *Pjotr izumljon Ivanom.*  
'Peter is astonished by John'
- (5) *Pjotr izumljon knigoj.*  
'Peter is astonished by the book'
- (6) \**Kniga izumlena Petrom.*  
'The book is astonished by Peter'

then we might be led to set up a transformation connecting the two sentence types, converting the one into the other in either direction.<sup>3</sup> Thus, sentences were said to have grammatical structures and also, over and beyond this, to be connected with other sentences by transformations. Most of these transformations, furthermore, were found to be reversible.

Now this is all historical background. And it does not at all account for the use of the term "transformation" in the work of MIT linguists, where it clearly has a very different meaning.

Among the students of Harris working on discourse analysis and other problems was N.A. Chomsky. Later, at the Society of Fellows at Harvard University, Chomsky attempted to formulate a theory for grammatical description that would

correctly account for all, or most, of what we know of linguistic structure, and he chose to think of this theory in the form that is often employed in the study of logic and the foundations of mathematics, namely as a set of abstract rules or an algorithm to enumerate from a finite vocabulary of symbols the infinite set of representations for all the grammatical sentences, assigning automatically to each generated string its correct grammatical analysis.<sup>4</sup>

A minimal requirement for the syntactic structure that is to be assigned to each sentence by its mode of derivation from these rules is surely the familiar immediate-constituent analysis, or bracketing, or branching diagram (IC tree). It is not difficult to formulate the conditions the rules of a grammar would have to satisfy in order for the derivations to assign IC structure to the generated sentences. In brief, it is simply that no more than one abstract grammatical symbol of a string be expanded by a given rule at a time. If this requirement is satisfied by the simple rewrite rules one is able to formulate for the generation of morpheme sequences, then to each generated string there will correspond uniquely a particular tree of derivation that expresses the required structural properties of an IC-analysis bracketing, or parsing.

It was natural for Chomsky to inquire how many different sentence types of English could be successfully generated by means of a reasonably simple set of such rewrite rules satisfying the requirement just mentioned. If, in principle, simple rules of this type could be given in the form of a reasonably simple algorithm to generate all English sentences, or at least all maximally grammatical English sentences, then there was a very good chance that a complete theory of syntactic structure for language could easily be formulated, for the properties of such a grammar would be relatively perspicuous. However, several apparently insuperable difficulties immediately arose.

In fact, difficulties arose precisely where other authors had already noted unsatisfactory aspects of IC analysis, though no solutions had ever been offered. I shall discuss only a few of these difficulties, but they will be sufficient for my purpose, which is to indicate the origin, nature, and need for grammatical transformations.

The major difficulty, and the most compelling by far, is just that to give IC expansion rules for all simple, maximally grammatical sentences proves to be impossible without completely counterintuitive complications in the grammar. In particular, whole large sets of lower-level rules would simply have to be repeated en masse in the grammar, and precisely at

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those places where Harris and his students had been studying co-occurring constituents in identical contexts. To take a specific example, there would have to be some set of rules in the grammar to ensure that among the active sentences, (1) and (2) above are generated but (3) is not. Similarly, however, there would have to be some rules somewhere in the grammar to ensure that among passive assertions, only (4) and (5) are derived but not (6). However, the first-mentioned set of rules and the latter set, it turns out, are then entirely identical in content. There is no way, in general, to combine these two sets of lower-level selection-rules, they must simply be repeated. In other words, there does not seem to be a simple, straightforward set of IC expansion rules to generate all ordinary sentences properly. Perhaps this simply reflects the complicated nature of language. But in view of the other difficulties I shall now mention, it would not seem so; that is, there must be some other mechanisms at work in the derivation of sentences than simply IC expansion.

A second difficulty that arose was that while many grammatical ambiguities could be explained in an IC grammar as the existence of two or more bona fide paths of derivation through the rules that happen to result in identical morpheme sequences, as would be quite appropriate, there always remained a number of residual ambiguities of the same kind, apparently, that could not be so construed as differences in IC bracketing. For example, one distinct path through a grammar of Russian would yield sentences of the form (7) and a second distinct path through the rules would yield sentences like (8):

- (7) *My našli sodejstvujuščie okisleniju kisloty sposoby.*  
'We found means that assist the oxidation of the acid'
- (8) *My našli sodejstvujuščie osaždeniju okislenija kisloty.*  
'We found oxidations of the acid that assist the precipitation'

But among the first set of sentences there would also be the sentence (9), the same sentence would also occur in the second set:<sup>5</sup>

- (9) *My našli sodejstvujuščie reaktsii okislenija kisloty.*

The ambiguity in (9) is then easily explained as a difference in IC structure, for when it is derived by path number 1 it is bracketed as in (10), but if a product of path number 2, it is bracketed as in (11):

- (10) *(My) (našli) (sodejstvujuščie (reaktsii okislenija) kisloty)).*  
'We found acids that assist the reaction of oxidation'
- (11) *(My) (našli) (sodejstvujuščie reaktsii) (okislenija kisloty)).*  
'We found oxidations of the acid that assist the reaction'

The difficulty arises, however, when we consider the ambiguity in sentences like (12):<sup>6</sup>

- (12) *Poseščenija rodstvennikov mogut byt' neprijatny.*  
'Visits by/to relatives can be unpleasant'

for there is no motivation for bracketing the string in two different ways, since the bracketing is the same in the syntactically contrasting but unambiguous

- (13) *Padenie mostov možet byt' neprijatno.*  
'The falling of bridges can be unpleasant'
- (14) *Učenie jazykov možet byt' neprijatno.*  
'The study of languages can be unpleasant'

The question is not whether the two versions of (12) are grammatically alike or different; any speaker of Russian knows that they differ radically in their syntactic structure. The point is that there is no motivation in constructing an IC grammar for employing two different paths of derivation to yield these two sentence types.

Notice, incidentally, that it is no solution to adjoin to general linguistic theory a provision that ambiguous strings shall always have two derivation paths, for this is simply tantamount to surrendering the use of ambiguities as empirical verifications for particular grammars.

A third difficulty which arises is the inability of IC structure correctly to classify certain sentence types. For example, every speaker knows that: (15) is an assertion sentence while (16) and (17) are both question sentences:

- (15) *Ivan ljubit Petra.*  
'John loves Peter'
- (16) *Ljubit-li Ivan Petra.*  
'Does John love Peter?'
- (17) *Kto ljubit Petra.*  
'Who loves Peter?'

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But there is no particular motivation on the basis of IC structure for this classification; (16) has inverted word order, but (17) does not; (16) may have a special intonation pattern, but (17) does not. Again, the problem is not that we cannot find some complicated set of criteria to pick out just the question sentence types; rather it is that, as far as the syntactic structure of these bracketed morpheme sequences is concerned, there is no particular formal motivation for doing so. In other words, the theory underlying the IC derivation of all other sentences does not automatically force us to classify (16) and (17) together as questions as contrasted with (15).

Finally, let me mention one more convincing argument against the formulation of grammatical structure exclusively as an IC bracketing, that is, as a labeled tree of constituents. No one would disagree, I am sure, with the analysis of coordinate constructions as multiple branches of some such tree; in fact, that seems to be the very content of the term coordinate. Unlike subordinate constructions, the elements of a coordinate construction are all on the same level of branching, not parenthesized within one another, but strung out one after another. Consider as a concrete example some conjunction like (18):

- (18)        *muzčiny, ženščiny i deti*  
                'men, women, and children'

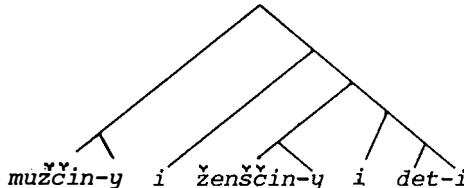
Such constructions may, of course, be indefinitely long. Therefore, the rules that enumerate them must necessarily be iterative, or recursive; that is, they must somehow bend back upon themselves and repeat their function indefinitely many times, each time adding a new conjunct, or coordinate element, to the generated string. Suppose, then, that for conjoined nouns we employ three rules like the following in our postulated grammar of IC expansion:

- A.     Nom       $\longrightarrow$    NP (Conj)
- B.     Conj       $\longrightarrow$    *i* + Nom
- C.     NP       $\longrightarrow$    N + Ending

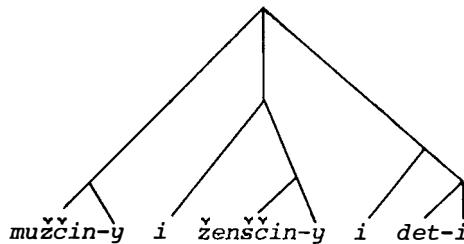
Rule A derives from a nominal a noun phrase with or without a following conjunct. Rule B expands this conjunct, if chosen in applying Rule A, to the sequence *i* 'and' plus another nominal. Finally, Rule C expands each noun phrase into a noun and its ending. If, when Rule A is applied, a conjunct is chosen, then the nominal will contain another nominal (from Rule B) within itself that also can

again be expanded so as to contain a third internal nominal. In this way, by looping back and forth between Rules A and B, any finite number of included nominals may be obtained, and the resulting conjunction may be indefinitely long, as was desired. Thus, three simple IC rules yield an infinite set of conjunctions.

But now notice that the bracketing imposed on these conjunctions automatically must have far too much internal IC structure, for each reapplication of Rules A and B produces a new echelon of included subordinate structure. That is, a string like (18) would have a tree of derivation like:



This, we agreed, was not the correct IC structure for co-ordinate expressions; it should have been a tree like:<sup>7</sup>



What kind of IC expansion rules would be required to yield this structure for conjunctions? Well, we could have a rule

$$D. \quad \text{Nom} \longrightarrow \text{NP(Conj)(Conj)}$$

between A and B. It yields the correct coordinate structure, but it unfortunately will permit the derivation of only binary conjunctions. So we add another rule:

$$E. \quad \text{Nom} \longrightarrow \text{NP(Conj)(Conj)(Conj)}$$

It should be clear now that the only way to generate all conjunctions of whatever length and at the same time to impose on each one its typical coordinate structure is to have an infinite number of rules in the grammar!

There is no a priori, formal reason why a grammar should not be constructed to contain an infinite number of rules. But there are the following severe empirical objections.

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First, if the grammar can contain an infinite number of rules, the study of grammar is rendered vacuous, for there is then nothing to prevent us from entering into the grammar one rule for each sentence to be enumerated, and the grammar thus loses its explanatory power. Second, if the grammar is presumed to be available to speakers for use in producing sentences, we must then suppose that speakers have stored in their brains infinitely many items of memory. And third, it turns out to be unnecessary in any case to use infinite grammars, for there is obviously a formulation of conjunctive constructions that will employ only a finite number of rules and yet yield coordinated strings of any length. The only difficulty is that such a formulation must violate the constraints that were placed on constituent-structure expansion rules. This is simply to say, the grammatical structure of Russian sentences is not expressible by means of IC structure alone.

Chomsky soon found that all these difficulties with IC analysis, and others as well, could easily be avoided by incorporating within a grammar a set of rules of a new type, going beyond the power of the IC expansion rules and expressing formally the idea of relationships among sentences of different types with which he had already become familiar in his work with Harris. In other words, he had to extend grammars to include Harris' transformations in some way.

These new rules were to take fully developed sentences derived in the usual way from an IC grammar and convert them into new, derived sentences. To do this properly, the new rules would have to be able to recognize not only the constituency of a particular string, but because of the ambiguous strings we spoke of before, yielded by the IC grammar, would also have to recognize the derivational history of the string to be converted. For example, (19) and (20) are bracketed alike:

- (19) *My postroili mašinu dlja opyta .*  
'We constructed the machine as an experiment'
- (20) *My postroili mašinu dlja školy .*  
'We constructed the machine for school'

But we should like to convert only (19) into a nominalization like (21), for there is no (22):<sup>8</sup>

- (21) *Naš opyt v postrojke mašiny ...*  
'Our experiment of constructing the machine'
- (22) *\*Naša škola v postrojke mašiny ...*  
'Our school of constructing the machine'

The difference between sentences (19) and (20), since they are bracketed alike, must be in their previous transformational history, and therefore the nominalization rule that produces (21) but not (22) must be able to recognize and take into account this difference. Thus, Chomsky presumed that transformational rules serve not to derive strings from individual strings, but rather they must serve in general to derive whole trees from trees.

Clearly, transformational rules cannot be constrained to convert only a single symbol at a time, and therefore the derived trees are not automatically reconstructible from the application of the rule itself without the addition of further conventions about derived IC structure. For example, it is probably correct to formulate grammatical theory so that the IC structure of an expression is that of a constituent that is replaced under the transformation that generated it.

It is absolutely indispensable to understanding that the reader comprehend the differences between Harris' early notion of transformation and the present concept of transformational rule as used in the work of Chomsky, Halle, Lees et. al. Harris' transformation was simply a relation between two sentence types that shared certain co-occurrences, and it was very often reversible. That which is often called a "transformation" in connection with Chomsky's work is, however, an entirely different concept. It is, roughly speaking, any one of a certain type of grammatical rule in a sentence-generating grammar, a rule that serves to permit the derivation of certain types of trees from others by means of permutations, additions, or ellipses of elements. Like any grammatical rule, it is not in general reversible; in fact, the notion of reversal of grammatical rules does not make too much sense. A transformational rule may be thought of as an ordered triplet  $[T, B, E]$  consisting of an IC-derivation tree  $T$ , a particular analysis or bracketing  $B$  of the last line of  $T$ , and an elementary transformation  $E$  indicating how the elements of  $B$  are to be converted so as to yield a new, derived tree  $T'$ . Sometimes we speak of the derived string as a "transform" (of the last line of  $T$ ). Thus:

$$(\text{Rule}) \quad [T, B, E] \longrightarrow T'$$

A great many of the optional grammatical transformation rules in a grammar serve to embed a transformed version of one sentence inside another by replacement of some constituent of the latter. Thus, the underlying source expression for the rule consists really of two source sentences. This need not complicate the basic formalism for

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expressing transformational rules, for we need only consider the top line of the input tree  $T$  to be  $\#S\#S\#$  instead of only  $\#S\#$  (where  $\#$  means sentence boundary and  $S$  stands for "sentence"), and the bottom line (the sentence to be transformed) to be simply the concatenation of the two input source sentences.

As an example of such an optional (so-called "generalized") grammatical transformation rule, I submit the following as a suggestion of how certain sentence types in Russian may be nominalized to yield nominal constituents in other sentences. Since I do not know many of the formal syntactic details of a Russian IC-expansion-rule grammar, clearly the particularities of this example may very well be incorrect. It is nevertheless very likely that the process of nominalization expressed by the rule is correctly formalized in general outline. Furthermore, in the abbreviated formalism we shall use here, only the last line of each relevant tree is given overtly; but it must not be forgotten that, strictly speaking, the rule given operates on the entire IC tree for the source expression.

$$\begin{array}{l}
 X + N_a + \text{num} + Y \\
 C_{\text{nom}} + N_1 + \text{pers} + \text{tense} + V_t (C_{\text{acc}} + N_2) \\
 \left. \begin{array}{c} \\ \\ \end{array} \right\} \longrightarrow \\
 X + V_t + \text{suff}_{\text{nom}} (C_{\text{nom}} + N_2) C_{\text{ins}} + N_1 + Y
 \end{array}$$

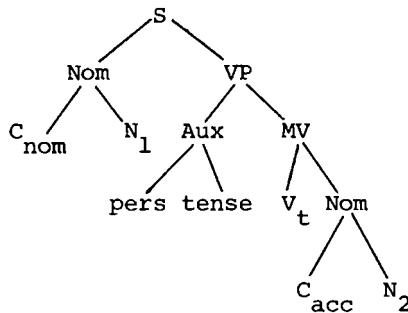
where  $N$  = noun,  $N_a$  = abstract noun,  $\text{num}$  = number,  $C_{\text{nom}}$  = nominative case,  $C_{\text{acc}}$  = accusative case,  $C_{\text{ins}}$  = instrumental case,  $\text{pers}$  = person morpheme,  $\text{tense}$  = tense morpheme,  $\text{suff}_{\text{nom}}$  = nominalizing suffix,  $V_t$  = transitive verb, and  $X$  and  $Y$  are arbitrary strings.

The representation of the second source sentence, the one that is nominalized, is given here in a nonstandard word order, i.e., with most of the nominal and verbal suffixes preceding their base morphemes, since, as in English grammar, this order seems to permit the simplest IC-structure grammar. Thus, we assume there will be a later obligatory rule in Russian to affix all these endings to the immediately following base noun or base verb to yield the natural morpheme order, and our derived string would then become:

$$X + V_t + \text{suff}_{\text{nom}} + \text{number} + C(N_2 + C_{\text{gen}})N_1 + C_{\text{ins}} + Y$$

where  $C$  = the case ending of the original  $N_a$ , which had been buried within the arbitrary string  $X$  in the first sentence.

The constituent structure of the second source sentence might then look like this:



where  $\text{Nom}$  = nominal,  $\text{VP}$  = verb phrase,  $\text{Aux}$  = auxiliary,  $\text{MV}$  = main verb, and  $S$  = sentence.

A specific example of how this proposed rule would enumerate the set of sentences that contain the verbal noun in *-anie* would be:

Let  $X = C_{\text{nom}}$ ,  $\text{num} = \text{Sg}$ ,  $Y = izumljaet nas$  'astonishes us',  $N_1 = čelovek$  'person' +  $\text{Sg}$ ,  $\text{tense} = \text{Pres}$ ,  $V_t = pisa(-t)$  'write', and  $N_2 = knig(-a)$  'book' +  $\text{Sg}$ .

$C_{\text{nom}} + N_a + \text{Sg} + izumljaet + nas$

$C_{\text{nom}} + čelovek + \text{Sg} + 3\text{rd} + \text{Pres} + pisa- + C_{\text{acc}}$   
+  $knig + \text{Sg}$ .

$\rightarrow C_{\text{nom}} + pisa + \text{suff}_{\text{nom}} + \text{Sg} + C_{\text{gen}} + knig + \text{Sg}$   
+  $C_{\text{ins}} + čelovek + \text{Sg} + izumljaet + nas$

$\rightarrow pisa + \text{suff}_{\text{nom}} + \text{Sg} + C_{\text{nom}} + knig + \text{Sg} + C_{\text{gen}}$   
+  $čelovek + \text{Sg} + C_{\text{ins}} + izumljaet + nas$

$\rightarrow pisa + ani + e + knig + i + celovek + om + izumljaet$   
+  $nas$

$\rightarrow Pisanie knigi čelovekom izumljaet nas.$   
'The writing of the book by the man astonishes us'

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where the underlying second source sentence itself, after the application of all the latter morphophonemic rules, would have yielded:

čelovek + Sg + C<sub>nom</sub> + pisa + Pres + 3rd + knig + Sg + C<sub>acc</sub>  
→ čelovek + Ø + pisa + e + t + knig + u  
→ čelovek + piš + e + t + knig + u  
→ čelovek pišet knigu.  
'The man writes the book'

### NOTES

<sup>1</sup>It is hardly necessary to document the use of these terms in the literature, but I shall cite a few randomly chosen references: Gudsinsky (1959a, b); Haas (1960); Householder (1959a, b); Stockwell (1959); Worth (1958, 1959).

<sup>2</sup>That is, modern linguistic analysis had given no formalization for the ancient, common-sense notion that a passive sentence is derived from its corresponding active.

<sup>3</sup>It is of no importance at this point in our study whether we believe the absence of (3) to be entailed by the applicability of some formal rule of Russian grammar or simply by the absurdity of its meaning. It is sufficient to note that whenever a sentence of the form (3) is absent, then so is the corresponding sentence of form (6). Lest there be confusion, however, let me remark immediately that there is nothing at all unreasonable about there being formal, syntactic rules of Russian grammar that forbid the missing sentence types. This should be clear from the following simple examples. We would say unhesitatingly that the utterance *Itti spit* 'To go sleeps' is ungrammatical because the subject of a sentence must be a noun, not a verb; *Čelovek spjat* 'The man sleep (3 pl.)' is ungrammatical because a singular subject cannot govern a plural verb; and finally that the utterance *Čelovek slučaetsa* 'The man happens' is ungrammatical because a noun like *čelovek* (concrete, animate, etc.) cannot be the subject of a verb like *slučat'sa*, which requires inanimate subjects like *sobytie* 'event'. If, then, the

classification of Russian nouns into animate and inanimate (which is required in any case in order to specify the form of the accusative case) and the verbs into those that take animate subjects, inanimate subjects, or both serves to explain many regularities in the way Russian speakers construct acceptable sentences, there should be nothing to prevent us from considering the distinction in question to be a purely formal, grammatical feature of the language, and from saying that (3) is ungrammatical. After all, that "ungrammatical" and "meaningless" are independent notions can already be seen from the fact that common utterances that are admitted by everyone to be utterly ungrammatical are nevertheless understood without difficulty, as in the case of the speech of a small child or of a foreigner with little command of the language. We should also find great difficulty in paraphrasing the meaning of many an utterance that is clearly recognizable as a grammatical sentence. For example, when a theologian assures me that "The human soul is immortal", I know that he has spoken a sentence in my language, but I must confess that I do not know what it means.

<sup>4</sup> A full description of this view of linguistic studies may be found in the following selected references: Chomsky, 1955, 1956, 1957a, b, 1958, 1959, 1961a; Chomsky, Halle, and Lakoff, 1956; Halle, 1959, 1961; Lees, 1957, 1960a-c.

<sup>5</sup> We are aware, of course, that these sentences are stylistic variants of the somewhat more elegant versions with the object of the verb in third position and the modifying participial expressions afterward, separated by a comma from their antecedent nouns:

- (7') *My našli sposoby, sodejstvujuščie okisleniju kisloty.*  
'We found means that assist the oxidation of acid'
- (8') *My našli okislenija kisloty, sodejstvujuščie osaždeniju.*  
'We found oxidations of the acid that assist the precipitation'
- (9') *My našli kisloty, sodejstvujuščie reakcii okislenija.*  
'We found acids that assist the reaction of oxidation'  
*My nasli okislenija kisloty, sodejstvujuščie reaktsii.*  
'We found oxidations of the acid that assist the reaction'

## What Are Transformations?

Nevertheless, they are grammatical utterances of Russian, and they have constituent structures as given by the bracketing in (10) (11). Furthermore, we suppose that (7) and (8) are unambiguous by virtue of likely grammatical rules preventing the construction of underlying utterances of the forms \**Sposob imeet kisloty* 'The means has acids' and \**Ono osaždaet okislenija* 'It precipitates oxidations', whatever these rules may be in detail. On the other hand, we might suppose that underlying the two permitted versions of (9) we could have the kernel sentences *Okislenie javljaetsa reaktsiej* 'The oxidation is a reaction' and *Ono okislaet kisloty* 'It oxidizes the acids'.

<sup>6</sup>The ambiguity in (12) is brought out when we notice the contrast in the underlying kernel sentences:

*My poseščaem rodstvennikov.*

'We visit relatives'

*Rodstvenniki poseščajut nas.*

'Relatives visit us'

<sup>7</sup>In our representation of the IC structure of these conjoined expressions, we have arbitrarily assumed that the suffix constituent on each noun is correctly construed with that noun constituent. This is probably not correct; the nominal suffix morphemes are in construction with other sentence elements (e.g., the accusative suffix may be construed together with a preceding verb that governs that case in its object noun) and are later positioned as endings on their respective nouns by means of obligatory transformations. Our diagram still illustrates the point to be made in the text, however, regardless of how the affixal morphemes are connected into the tree.

<sup>8</sup>The contrasting underlying source sentences for (19) and (20) might be:

*My postroili mašinu.*

'We constructed a machine'

*U nas opyt.*

'We have an experiment'

*My postroili mašinu.*

'We constructed a machine'

*U skoly mašina.*

'The school has the machine'



## TOWARD GENERATIVE SEMANTICS

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*This paper was circulated in office-duplicated form as an internal memorandum of the Mechanical Translation Group, Research Laboratory of Electronics, M.I.T., in August 1963; the research was supported in part by the National Science Foundation, the U.S. Army Signal Corps, the Air Force Office of Scientific Research, and the Office of Naval Research. It is the earliest work to use the term "generative semantics" or to propose that the base component of a transformational grammar generate a set of semantic structures. Nonetheless it played only a very peripheral role in the development of generative semantics, namely that of involving Lakoff in a number of issues (such as the syntax and semantics of causative constructions, and the syntactic correlates of the notions of act, event, and affect) that Lakoff later treated in greater detail in works that proved more influential (Lakoff, 1965, 1968d; Lakoff and Ross, 1966). When a spate of papers were written three or four years later, arguing that deep structures had to be close to or identical to semantic structures, this paper had been largely forgotten. The brief final section entitled "Some Loose Ends" is omitted here.*

## I. A CRITIQUE OF SOME PRESENT NOTIONS ABOUT MEANING.

A serious, sophisticated attempt to describe what is requisite for a theory of meaning is put forth in Katz and Fodor (1963) and Katz and Postal, (1964). The approach taken by Katz, Fodor, and Postal has been to view a semantic theory as being necessarily interpretive, rather than generative. The problem, as they see it, is to take given sentences of a language and find a device to tell what they mean. A generative approach to the problem might be to find a device that could generate meanings and could map those meanings onto syntactic structures.

In assuming an interpretive stance, Katz, Fodor, and Postal have made some penetrating observations. They have attempted to show that before one can begin interpreting a sentence one must know the grammatical structure of the sentence. Before they can begin, they require that a complete grammatical description of a sentence be supplied by a transformational generative grammar. Such a description would include an account of all of the phrase structure and transformation rules that have applied, including the lexical selections, of course.

Interpretation must start somewhere, and so Fodor, Katz, and Postal include a dictionary of morphemes and their meanings. The form of their dictionary entries is enlightening. Each meaning of a morpheme is represented as a bundle of discrete elements. One meaning of the word *bachelor* might be represented by the following set of elements: (animate), (human), (male), [never married]. The first three elements are "semantic markers". These occur repeatedly throughout the language. The last is called a "distinguisher". This gives semantic information of a much more specialized sort and occurs much less frequently in the language.

Interpretation then proceeds by rules, called "projection rules". There are two kinds of such rules. The first and most important operate on the underlying P markers supplied by the generative grammar. The rules begin at the bottom of the tree and work up it node by node, giving an interpretation or "reading" for each node. The rules work essentially by embedding the meaning of the modifier into the meaning of the head. This is done by "amalgamating" the semantic markers and distinguishers of each.<sup>1</sup>

Fodor, Katz, and Postal contend that rules of this sort completely determine the meaning of a sentence. The nicety of these rules is that they operate only on the underlying P markers and on the meanings of the original morphemes in

them. Transformations, they claim, do not introduce any elements of meaning--or at least they should be written so that they do not.<sup>2</sup>

Although Katz and Postal offer some nice arguments, their work is not completely convincing. Their projection rules depend entirely on syntactic structures. They offer no semantic rules free of syntax. As I shall point out below, I believe there are some.<sup>3</sup> Meanwhile, I should like to point out some phenomena that any semantic theory will have to explain and that will put great strain on any interpretive semantic theory--especially on one so closely wed to syntax as the Fodor-Katz-Postal theory.

It is a basic requirement of any semantic theory that two sentences that have the same meaning be assigned the same abstract representation (or reading). Moreover, any semantic relations (such as that of semantic subject to semantic predicate or semantic predicate to semantic object) must be identical for any two sentences with the same meaning. Now, let's assume that Katz, Fodor, and Postal are right when they claim that two sentences that are paraphrases of one another must have the same underlying P markers. If each sentence has only one underlying P marker, the sentences must have the same grammatical subject and the same grammatical object. Moreover, if the projection rules work as Katz, Fodor, and Postal claim they do, then the grammatical subject must be the same as the semantic subject, and the grammatical object must be the same as the semantic object. This does not appear to be true in English. Consider the following pairs of sentences:

- (1)      a. *I like the book.*  
              b. *The book pleases me.*
- (2)      a. *I fear John.*  
              b. *John scares me.*
- (3)      a. *I enjoy dancing.*  
              b. *Dancing delights me.*

The (a) and (b) sentences are full paraphrases of one another. They do not have the same underlying P markers. The grammatical subject of each (a) is the grammatical object of each (b) and vice versa. Moreover, semantic subjects and objects must be essentially different than grammatical subjects and objects. Whatever one designates as the semantic subject of (a) and (b) must differ from the grammatical subject of either (a) or (b). A more subtle

case of the difference between semantic and grammatical subjects and objects appears in causatives. Consider such pairs as:

- (4)      a. *The desk moved.*
- b. *I moved the desk.*
- (5)      a. *John suffocated.*
- b. *I suffocated John.*
- (6)      a. *The water boiled.*
- b. *I boiled the water.*
- (7)      a. *The batter walked.*
- b. *The pitcher walked the batter.*

The grammatical subjects of the (a) sentences are the grammatical objects of the (b) sentences. But the meaning of each (a) sentence is contained in the meaning of its corresponding (b) sentence. For instance, if someone moved the desk, we know that the desk moved. If someone suffocated John to death, we know that John suffocated, and so on. This implies that the semantic subject-predicate relation which holds in each (a) must also hold in each (b). The following paraphrases of the (b) sentences demonstrate this.

- (4) c. *I did something (pushed the desk), causing the desk to move.*
- (5) c. *I did something (pumped the air out of John's bedroom), causing John to suffocate.*
- (6) c. *I did something (reduced the air pressure), causing the water to boil.*
- (7) c. *The pitcher did something (threw four straight wide pitches), causing the batter to walk.*<sup>4</sup>

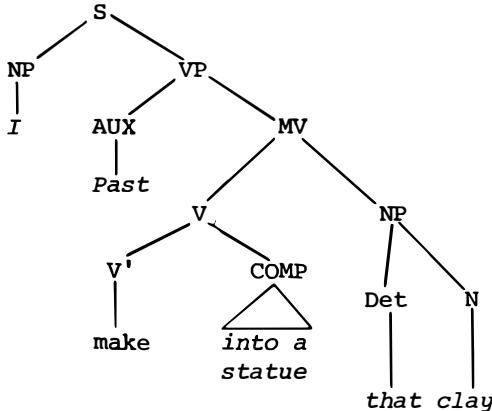
In each of the (c) sentences, the semantic and grammatical subject-predicate relations from the (a) sentences appear unchanged. In addition, the grammatical subjects of the (b) sentences appear as the grammatical and (I would claim) semantic subjects of *did something* and *cause*.

Now let's look at a very subtle case of sentences that are identical in meaning but have different underlying P markers.

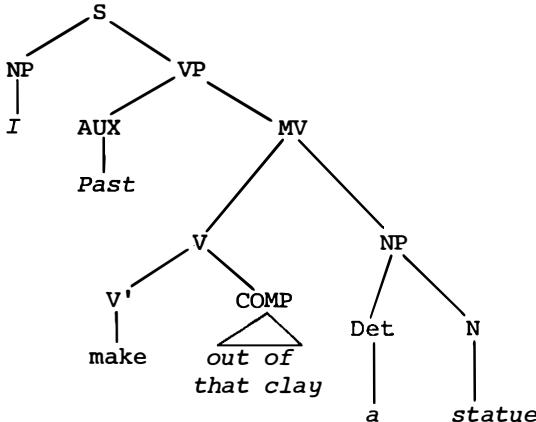
- (8) a. *I made that clay into a statue.*
- b. *I made a statue out of that clay.*

## Towards Generative Semantics

- (9) a. *I made John into a millionaire.*  
 b. *I made a millionaire out of John.*
- (8a) has the underlying P marker:



Whereas (8b) has the underlying P marker



Moreover, the verb V dominating V' + COMP in the P marker of (8a) has at least one different syntactic property than its counterpart in the P marker for (8b). It is a verb of affect, which means that it takes the proform *do something to*. Consequently, one can get (10)-(11) but not (12)-(13):

- (10) *What I did to that clay was make it into a statue.*

- (11) *What I did to John was make him into a millionaire.*
- (12) *\*What I did to a statue was make it out of clay.*
- (13) *\*What I did to a millionaire was make him out of John.*

Still another refutation of the claim that paraphrases must have the same underlying P markers comes from examples in which an intransitive verb has the same meaning as a transitive verb and its object. No one would deny that the verb in

- (14) *I wrote.*

is intransitive. Nor would one deny that the verb in

- (15) *I wrote a letter.*

is transitive and has an object--at least a grammatical object. Yet, (16) and (17) mean the same thing:

- (16) *I wrote to John.*

- (17) *I wrote a letter to John.*

It might be argued that (16) is a reduced form of (17) and has the same underlying P marker. But it would be more difficult to present the same argument for the sentences:

- (18) *Yastremski hit the ball to left field for a single.*

- (19) *Yastremski singled to left field.*

(18) and (19) mean the same thing but have very different underlying P markers. On the other hand, the P marker of (19) looks very much like that of

- (20) *Yastremski ran to left field.*

The difference in meaning between (19) and (20) is more than can be attributed to the difference in meaning between *ran* and *singled*. In (20) we know that Yastremski went to left field. In (19) we know that the ball Yastremski hit (but which is not mentioned in the sentence) went to left field.

Moreover, the difference in meaning between (21) and (22)

- (21) *Yastremski hit the ball.*

- (22) *Yastremski hit a smash.*

cannot be attributed simply to the difference in meaning between *ball* and *smash*. It must be in part due to a

difference in syntactic properties of the verbs in the underlying P markers. The verb of (21) is a verb of affect, while that of (22) is not. Consequently, you can get (23) but not (24):

- (23) *What Yastremski did to the ball was hit it.*  
(24) \**What Yastremski did to a smash was hit it.*

Yet the sentence

- (25) *Yastremski hit a ball extremely hard.*

which has a verb of affect in its P marker, has the same meaning as (22), which does not have a verb of affect in its P marker.

A semantic theory will, at least, have to account for sentences that have the same meaning but have different underlying P markers. In addition, it will have to break down further what Katz, Fodor, and Postal call "distinguishers". For instance, an adequate theory will have to predict that the following sentences will have the same meaning:

- (26) *John enraged Bill.*  
(27) *John made Bill very angry.*  
(28) *John made Bill become very angry.*

If the above three sentences are to receive the same "reading" (that is, if they are to be represented semantically in exactly the same way), then the dictionary entry for *enrage* must contain the meanings of *make*, *become*, *very*, and *angry*. Furthermore, these meanings must somehow be structured; they cannot merely be lumped into a set. And, in addition, a variable must appear in the dictionary entry to represent the grammatical object of *enrage*. The entry must somehow show that this grammatical object is the semantic subject of *become very angry*.

Let us take another example

- (29) *Duke Carmel batted the ball.*  
(30) *Duke Carmel hit the ball, using a bat.*

(29) and (30) have the same meaning. The dictionary entry for the verb *bat* must contain the meaning for the verb *hit* and, in addition, must have the meaning of *use a bat*, with the meaning of *use* and the meaning of *bat* structured with respect to one another so that one knows that *bat* is the semantic object of *use*. Furthermore, the entry must contain a variable to show that the syntactic subject of the verb *bat* is the semantic subject of *use a bat*.

## II. THE GENERATIVE APPROACH

There are several motivations for proposing a generative semantic theory. One is the intuition that we know what we want to say and find a way of saying it. A theory that maps meaning onto syntactic structures might account for this intuition. Then there is the purely practical motivation (theorists should shut their eyes at this point) that researchers in machine translation will sooner or later be forced to develop such a theory. Ideal machine translation programs will have to include both interpretive and generative semantic devices, just as they must include interpretive and generative syntactic devices. And last, there is the formal motivation. A generative semantic theory may well be simpler and more economical than an interpretive theory. It will probably be a very messy business indeed to reconstruct semantic relationships from morphemic meanings and P markers, considering that sentences with different P markers can have the same meaning. However, talk about the economy of a generative theory is idle in the absence of a model of such a theory.

The semantic properties of English nouns, as portrayed by Fodor and Katz, are closely related to some of the grammatical properties of the same nouns. Some of Fodor and Katz's semantic markers bear a very close relation to Chomsky's "syntactic features". Chomsky might write the complex symbol for the word *bachelor* with the meaning "unmarried man" [count, concrete, animate, human, male]. Although there is no one-to-one correspondence between the semantic markers (animate), (human), (male), and the syntactic features with the same names, there is undoubtedly a close relationship between the two kinds of units.

Similarly, some semantic properties of English predicates are closely allied with certain grammatical properties of English verbs. The verbs that express "doing something", that is, those that have the proform *do something* and that take the progressive *be + ing*, seem to share an important semantic property. Moreover, all of the non-doing-something verbs (those that do not take both the proform *do something* and the progressive form) are exactly the attributive verbs. Non-doing-something verbs like *be*, *have*, *own*, *cost*, *like*, *love*, *know*, *see*, *hear*, and *want* are all attributives of some kind or other.<sup>5</sup> We can therefore set up a distinctive semantic feature DS (do something) and test whether a given verb is +DS or -DS by placing it in the frame, "What I'm doing is...". For example,

- (30) a. *What I'm doing is listening to the lecture.*
- b. \**What I'm doing is hearing the lecture.*
- (31) a. *What I'm doing is looking at the painting.*
- b. \**What I'm doing is seeing the painting.*
- (32) a. *What I'm doing is learning the lesson.*
- b. \**What I'm doing is knowing the lesson.*

By this simple test we can assign the semantic property +DS or -DS to each verb. Another simple grammatical criterion can serve to define an important subclass of transitive doing-something verbs, the verbs of affect. Such verbs take the proverb *do something to*. For instance, (33) has the interrogative WH form (34):

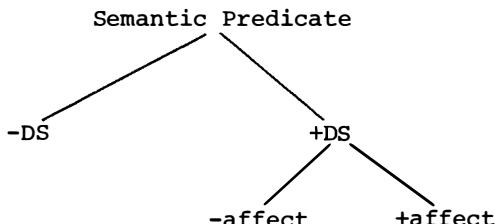
- (33) *John is painting the house.*
- (34) *What is John doing to the house?*

However, (35) does not have a corresponding form (36):

- (35) *John is painting a picture of his grandmother.*
- (36) \**What is John doing to a picture of his grandmother?*

unless it means that John is covering a picture of his grandmother with paint. Here we have an instance of two different verbs *to paint*. *Paint*<sub>1</sub> means "to cover with paint"; while *paint*<sub>2</sub> means "to create a likeness with paint". Both are +DS verbs. The difference between the two verbs can in part be described by assigning the semantic feature +affect to *paint*<sub>1</sub> and -affect to *paint*<sub>2</sub>.

We have now defined two semantic features, which are related by the tree structure:



This can be generated by the complex symbol rules:

$$(37) \quad \text{Semantic Predicate} \Rightarrow \left\{ \begin{array}{l} \text{+DS} \\ \text{-DS} \end{array} \right\}$$

$$(38) \quad \text{action} \Rightarrow \left\{ \begin{array}{l} +\text{affect} \\ -\text{affect} \end{array} \right\}$$

Such rules will yield complex symbols such as [+DS, +affect] which might be associated with the verb *hit* in the sentence *The batter hits the ball*. Notice that the DS feature only tells one something about the batter, that is that he performs an action, he does something. It says nothing about the ball. The affect feature, on the other hand, defines a relation between the batter and the ball; that is, the batter affects the ball, he does something to it. If we express the semantic subject and semantic object of the sentence by the ordered pair (sem. subject, sem. object), we can define the affect relation by +affect (subject, object). By using the notation [+DS, +affect] (subj., obj.), we can express all the information given by the semantic features. That is, the subject does something and the subject does something to the object.

The feature combination [+DS, - affect] would, however, be used to classify two kinds of utterances that should be distinguished, for instance,

(39) *John painted the picture.*

(40) *John played baseball.*

Note that one can ask (41) but not (42):

(41) *What did John do to produce the picture?*

(Answer: *He painted.*)

(42) \**What did John do to produce baseball?*

In sentences like

(43) *John painted a picture.*

*John wrote a book.*

*John breathed a sigh.*

*John built a house.*

*John made a desk.*

the subject effects something, causes something to come into being. We therefore set up a feature "effect" (+effect is to be read as "the subject effects the object") and add the rule:

$$(44) \quad -\text{affect} \Rightarrow \left\{ \begin{array}{l} +\text{effect} \\ -\text{effect} \end{array} \right\}$$

Among the attributives, or -DS verbs, are the pure attributives *be* and *have*. The construction *be+adjective* usually has a parallel in the form *have+nominal*. For example, (45a) means the same as (45b):

- (45)      a. *I am very ill.*
- b. *I have a bad illness.*

Similarly, with the following pairs:

- (46)      a. *I am enthusiastic.*
- b. *I have enthusiasm.*
- (47)      a. *I am fortunate.*
- b. *I have good fortune.*

In addition to the pure attributive *have*, there is the possessive *have*. The possessive *have* occurs in sentences like (48), while the pure attributive occurs in (49) and (50).

- (48)      *I have a house.*
- (49)      *The house has a porch.*
- (50)      *I have two arms.*

That the two *haves* are not the same can be demonstrated through the following examples. We can say (51) and (52) but not (53):

- (51)      *I have a house and two barns.*
- (52)      *I have a head and two arms.*
- (53)      \**I have a house and two arms.*

(53) does not make sense because *have* cannot take on the meaning of both a possessive and a pure attributive at the same time.

To distinguish between pure attributives and possessives, we set up the feature (poss.) and add the rule

$$(54) \quad -\text{DS} \Rightarrow \left\{ \begin{array}{l} +\text{poss.} \\ -\text{poss.} \end{array} \right\}$$

Not only must possessives be distinguished from pure attributives, but so must the verbs of perception, such as *see*, *hear*, *know*, *perceive*, *understand*, etc. To take care of these, we set up the feature "perc.", and add the rule.

$$(55) \quad -\text{poss.} \Rightarrow \begin{cases} +\text{perc.} \\ -\text{perc.} \end{cases}$$

To make further distinctions we can set up the following features:

Volition (Vol.) - to take care of *wish*, *want*, *desire*, etc.

Taste - to take care of *like*, *love*, *prefer*, *stand*, (as in *How can you stand her?*)

Expectation (Exp.) - for *expect*, *plan*, etc.

Valuation (Val.) - for *cost*, *measure*, *take*, *weigh*, etc., and add the rules

$$(56) \quad -\text{perc} \Rightarrow \begin{cases} +\text{Vol} \\ -\text{Vol} \end{cases}$$

$$(57) \quad -\text{Vol} \Rightarrow \begin{cases} +\text{Exp} \\ -\text{Exp} \end{cases}$$

$$(58) \quad -\text{Exp} \Rightarrow \begin{cases} +\text{Taste} \\ -\text{Taste} \end{cases}$$

$$(59) \quad -\text{Taste} \Rightarrow \begin{cases} +\text{Val} \\ -\text{Val} \end{cases}$$

We can account for some other major semantic properties of verbs if we set up two features to cross-classify with DS. These are "change" and a space-versus-state feature that we will call "space". *+space* refers to the spatial properties of the subject; *-space* to the internal state of the subject. The change feature tells whether the spatial properties or internal state changes. Examples:

(60) DS change space

-	-	+	I am here.
-	+	+	I got here.
-	-	-	I am sane.
-	-	-	I have my sanity.
-	+	-	I became insane.
-	+	-	I lost my sanity.
+	-	+	I sat.
+	+	+	I ran.
+	-	-	I thought.
+	+	-	He turned Communist.

## Towards Generative Semantics

Changes that are directed may be of two major kinds: "to" and "from".

- (64)                    *I went to Chicago.*  
                         *I came from Chicago.*  
                         *I gained my sanity.*  
                         *I lost my sanity.*

Changes may also be undirected. For instance,

- (65)                    *I moved.*  
                         (66)                    *I changed.*

Features to represent these phenomena can be introduced by the following set of rules, the first of which is a revised form of (37).

$$(66) \text{ Semantic Predicate} \Rightarrow \begin{bmatrix} \left\{ \begin{array}{l} +\text{DS} \\ -\text{DS} \end{array} \right\} \\ \left\{ \begin{array}{l} +\text{change} \\ -\text{change} \end{array} \right\} \\ \left\{ \begin{array}{l} +\text{space} \\ -\text{space} \end{array} \right\} \end{bmatrix}$$

$$+\text{change} \Rightarrow \left\{ \begin{array}{l} +\text{directed} \\ -\text{directed} \end{array} \right\}$$

$$+\text{directed} \Rightarrow \left\{ \begin{array}{l} +\text{direction} \\ -\text{direction} \end{array} \right\}$$

where +direction corresponds to "to" and -direction to "from".

A feature system such as this can help explain some regular formations in English that are usually written off as idioms. For instance,

- (67)                    *His face went pale.*  
                         *The leaves turned yellow.*  
                         *I came to know that.*

Words for spatial change regularly come to be used to express change of state. In all of these phenomena, the space feature is neutralized, that is, the distinction between +space and -space is lost. This is analogous to the phonological phenomenon in many American dialects in which the /d/ of *ladder* and the /t/ of *latter* become indistinguishable.

Moreover, such a feature system can define the set of possible answers to the question, "What happened?" Let us take a look at some permissible and nonpermissible answers.

- (68)     *What happened? The light turned red.*  
           *What happened? I got sick.*  
           *What happened? I asked for a candy bar.*  
           *What happened? John wrote a book.*  
           *What happened? I ran away.*  
           *What happened? John hit the ball.*  
           *What happened? I made John into a millionaire.*  
           *What happened? \*The light was red.*  
           *What happened? \*I was sick. (OK in sense  
                                 "I vomited")*  
           *What happened? \*I wanted a candy bar.*  
           *What happened? \*I had a house.*  
           *What happened? \*Meat cost two dollars a pound  
                                 in those days.*  
           *What happened? \*I used to like music.*

The permissible answers to "*What happened?*" are exactly those whose semantic predicate has either the feature +DS or the feature +change.

Substantives, like predicates, can be analyzed into their major semantic properties. By using rules of a similar form, we can generate the principal semantic properties of substantives. Here are some sample rules:

[The rules and the explanations of the features involved in them are omitted here.]

The rule to introduce subjects, predicates, and objects will be

$$(69) \quad T \rightarrow [s. \ pred.] (s. \ subj., \left\{ \begin{array}{l} s. \ obj. \\ \emptyset \end{array} \right\})$$

where *T* stands for Thought.  $\emptyset$  stands for a possible null object. There is a large class of sentences with a grammatical object but with no semantic object. For instance,

(70)       *John played baseball.*

(71)       *John danced a rhumba.*

(71) has the paraphrase

(72)       *John danced a dance, which was a rhumba.*

The main clause of (72) has the same meaning as (73); since (73) has a null semantic object, it follows that (72) has a null semantic object.

(73)                    *John danced.*

Moreover, if (73) has a null semantic object, so must (74):

(74)                    *John danced a beautiful dance.*

(74) is exactly the same case as (71), since *rhumba* has all the semantic content of the noun *dance* and in addition has some attributive notion for which we have no word. Semantically, *rhumba* contains an attributive that modifies the word *dance*, just as *beautifully* modifies *dance* in (74).

One extremely important feature must yet be added to all of our semantic categories, the "dummy" feature, which is illustrated in such sentences as

(75)                    *Someone did something to someone.*

From (75), we know only that the subject is human, the predicate *+affect*, and the object human. No additional semantic information appears. When this happens, we say that the feature "dummy" has been chosen by the rule:

$$(76) \quad \left\{ \begin{array}{l} \text{s. pred.} \\ \text{s. subj.} \\ \text{s. obj.} \end{array} \right\} \rightarrow \left\{ \begin{array}{l} +\text{dummy} \\ -\text{dummy} \end{array} \right\}$$

In addition, dummies in the subject and object may dominate embedded thoughts, just as syntactic matrix dummy dominated by a noun will dominate a nominalization. For instance, the *that* clause in (77) is dominated semantically by a set of features that are contained in the noun *fact* and whose *+dummy* form is realized in the proform *something* (as opposed to *someone*), as in (78):

(77)                    *I know that he is sick.*

(78)                    *That he is sick is something that I know.*

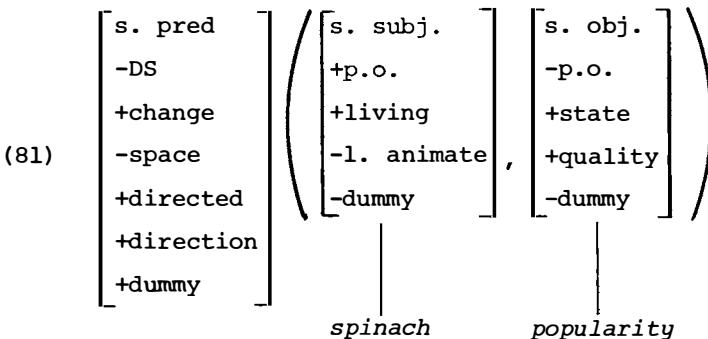
Let us look at an example of an embedded thought. Sentences (79a) and (79b) have the same meaning:

(79) a. *Popeye popularized spinach.*

b. *Popeye made spinach popular.*

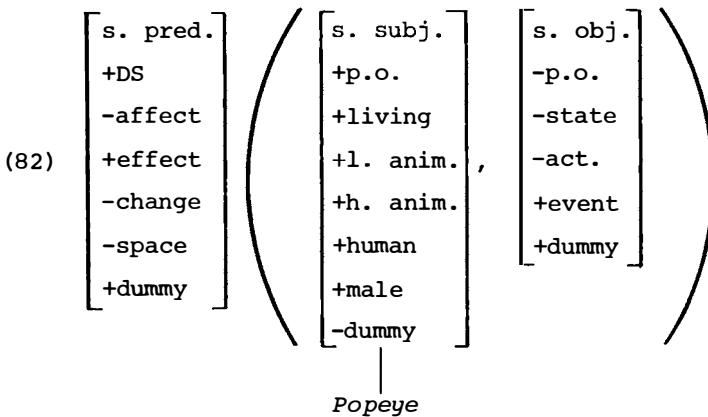
Embedded in that meaning is the meaning of (80), which would be represented as (81):

(80)                    *Spinach became popular.*



Note that the adjective *popular* is represented in (81) by its noun form *popularity*. The equivalence of the pure attributives *be* and *have* allows us to do this.

To get the meaning of (79a,b), we identify the thought (81) with the +dummy object of



Each of the -dummy entries in (81) and (82) would have an appropriate distinguisher added to the meanings provided by the features. Both predicates have +dummy entries because their meanings are entirely determined by their feature specifications. The meaning of *become* or *come to have* is completely specified by the feature +change and by the fact that it is a pure attributive. The meaning of *make* in (79a) is completely specified by the +effect feature and the other negative features.

It may be argued that the embedding rule exemplified above is completely equivalent to some syntactic transformation. This is not so. The conditions that govern the rule are semantic. If the predicate of the matrix thought is +effect, then the predicate of the embedded thought must be either +DS or + change. The restrictions on the embedding

rule represent the semantic law that one cannot cause a state that already exists. Among the sentences excluded are

- (83)      a. \**I made him know that.*  
 b. \**I made him see that.*

When (83b) is given an interpretation, it is taken to mean "I made him come to see that".

Another major semantic rule also involves an embedding within a matrix thought that has a +effect predicate. If the matrix is (84a) and the thought identified with the subject is (84b), then we get the resulting thought (84c):

$$(84) \quad \begin{array}{ll} \text{a.} & \left[ \begin{array}{l} \text{s. pred.} \\ +\text{effect} \end{array} \right] \left( \left[ \begin{array}{l} \text{s. subj.} \\ +\text{dummy} \\ \{ \begin{array}{l} +\text{quality} \\ -\text{state} \end{array} \} \end{array} \right], [\text{s. obj.}] \right) \\ & \\ \text{b.} & \left[ \begin{array}{l} \text{s. pred.}' \\ +\text{dummy} \end{array} \right] \left( [\text{s. subj.}'], [\text{s. obj.}'] \right) \\ & \\ \text{c.} & \left[ \begin{array}{l} \text{s. pred.} \\ +\text{dummy} \end{array} \right] \left( [\text{s. subj.}'], [\text{s. obj.}] \right) \end{array}$$

This rule is the linguistic equivalent of the chain of causation. Suppose John is the subject of (84b). If what John does causes something to happen, we say that John caused that thing to happen. For example, we know from (85) that the Yankees won because of what Mantle did:

- (85)      *The Yankees won because of Mantle.*

Similarly, (86) can mean 'He does something to make me afraid':

- (86)      *He scares me.*

It can also mean 'What he can do makes me afraid', 'What he might do makes me afraid', etc. The wide variety of possible meanings for (86) is a result of the generality of the conditions on (84b).

The nature of the semantic transform defined by (84) gives us reason to believe that a generative semantic theory may be more economical than an interpretive theory. A matrix thought like (84a) can be mapped into many different syntactic structures. An interpretive theory would have to have a different rule for each different syntactic structure.

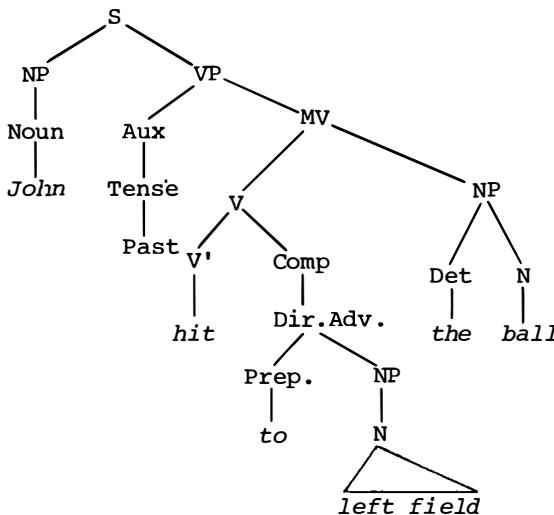
Moreover, an interpretive theory would have to give as output all the possible meanings for each syntactic construction. This would be an extremely uneconomical way of accounting for the simple semantic regularity given by (84).

NOTES

<sup>1</sup>Amalgamation is basically a process of putting markers together with markers and distinguishers together with distinguishers.

<sup>2</sup>Katz and Postal claim that the question, negative, and imperative morphemes must be introduced in the phrase structure rules so that the transformations that manipulate them will have no effect on meaning. Klima has given independent syntactic grounds to substantiate their claim.

<sup>3</sup>The view that semantic rules can operate only on syntactic structures leads one into some messy contradictions. One centers about the possibility of defining a degree of meaningfulness parallel to Chomsky's degree of grammaticalness. Let us take the sentence *John hit the ball to left field*. It has the P marker



If we substitute for the verb *hit* the verbs *grasp*, *know*, *fall*, and *think*, we get sentences with varying degrees of grammaticalness.

- (a) *John grasped the ball to left field.*
- (b) *John knew the ball to left field.*
- (c) *John fell the ball to left field.*
- (d) *John thought the ball to left field.*

Of the above sentences, (a), (b), and (d) break the categorical restriction that the verbs chosen cannot occur before directional adverbs. (c) and (d) break the categorical restriction that the verbs do not take grammatical objects. (d) breaks more categorical restrictions than (a), (b), and (c) and is therefore the least grammatical of the four. A theory in which semantic rules can only operate on underlying P markers would predict that the most grammatical of the above sentences would be the most meaningful, and the least grammatical, the least meaningful. This is not the case. (a), (b), and (c) are not meaningful at all. (d), however, has the meaning that John (exercising mind over matter) got the ball to go to left field by thinking. Other examples of the same sort are *My wife drank me into the poorhouse* and *John splashed me into the center of the pool*.

<sup>4</sup> Some may claim that the paraphrases I offer are not "full" or "normal" paraphrases. I would retort that they are essential paraphrases, in the sense that they are meant to illustrate what all paraphrases of the (b) type have in common.

<sup>5</sup> As Barbara Partee has pointed out, every verb has attributive forms, namely, the simple present and simple past. *I run*, *I create things*, *I used to play baseball*, all contain examples of doing-something verbs used as attributives. The non-doing-something verbs, however, are always attributives.



## REFLEXIVIZATION

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*These two papers on reflexivization, the first dealing principally with the analysis of the picture-noun construction, the second with the formulation of precise conditions under which reflexivization is to apply, are term papers that Warshawsky Harris wrote while a first-year graduate student at M.I.T.; the first paper dates from February 1965, the second from May 1965. Her observations about picture nouns have been widely cited (for example, in Ross, 1967a; Postal, 1971; and Jackendoff, 1972), though until a mimeographed edition of the papers was made available by the Indiana University Linguistics Club in 1974, they were known mainly through the citations by Ross et al. The second paper is apparently the first work in which the notion of "tree pruning" that was later developed by Ross (1969a) is employed, though a similar principle had been proposed earlier in unpublished work by Kuroda on Japanese syntax.*

### REFLEXIVIZATION I

Lees and Klima (1963) present a principle for distinguishing between pronominalization and reflexivization rules. While both rules operate under the condition of identity with an antecedent noun, identity within a simplex

sentence, that is, within the same simple phrase marker, will yield reflexive forms, while identity within a complex sentence, that is, across sentence boundaries, will yield nonreflexive pronoun forms. However this condition is stated formally within the theoretical framework of the grammar, it does an impressive amount of work and can often be used as a clue to the analysis of certain sentence types.

There are, however, sentences in which compelling considerations force us to entertain the possibility of exceptions to the restriction on reflexivization. This paper will deal with one of these seeming exceptions, as exemplified by the sentences in (1):

- (1) a. *John read a book about himself.*
- b. *John heard a description of himself.*
- c. *John gave Mary a picture of himself (or herself).*
- d. *John gave Mary some statistics about herself (or himself).*

Although the occurrence of reflexive pronouns should indicate that these are simplex sentences, other considerations point to a different analysis. The possible presence of a relative clause--*John read a book which was about John*, *John gave Mary some statistics which were about Mary*--forces us to consider these as complex sentences of the type in which relative clauses yield postnominal modifiers. That is, the sentences in (1) would appear to result from the application of the same rules that produce *John stared at the blood on him* from *John stared at the blood*, *The blood was on John* → *John stared at the blood which was on him*. In the sentences under discussion here, then (which will be referred to as "picture sentences" for convenience), the two underlying sentences would be of the type *John read a book*, *The book was about John*. Since neither of these simplex sentences contains two occurrences of *John*, there appears to be no way to reconcile this analysis with the previously stated condition on reflexivity.

Three possibilities now present themselves: (a) we can try to ascertain whether there is a different analysis that would somehow provide an antecedent noun within the simple phrase marker to yield the reflexive; (b) we can re-examine the condition on the reflexive to determine whether some reformulation is called for; (c) we can accept picture expressions as exceptions to the reflexive rule and perhaps note some generalizations about the rule that would be required to produce them. This paper will be concerned

## Reflexivization

primarily with point (c).

The troublesome construction is of the form  $NP_1$ -*of/about-NP<sub>2</sub>*, involving such  $NP_1$  as *book*, *picture*, *description*.<sup>1</sup> The nouns that fit into the  $NP_1$  position are fairly numerous, as can be seen from the list (2), which, though extensive, is, I am sure, far from exhaustive.

### (2) Picture Nouns

#### Group I (Nominalizations with *of*)

discussion (discuss)	drawing (draw)
description (describe)	sketch (sketch)
remembrance (remember)	snapshot (snap a shot of)
film (film)	advertisement (advertise)
painting (paint)	dramatization (dramatize)
photograph (photograph)	illustration (illustrate)
allegory (allegorize)	portrayal (portray)
impersonation (impersonate)	representation (represent)
outline (outline)	silhouette (silhouette)
diagram (diagram)	takeoff (take off?)
imitation (imitate)	parody (parody)
burlesque (burlesque)	distortion (distort)
sight (see)	view (view)
reflection (reflect)	satire (satirize)
depiction (depict)	analysis (analyze)
study (study)	critique (criticize)
criticism (criticize)	judgment (judge)
evaluation (evaluate)	estimation (estimate)
assessment (assess)	measurement (measure)
appreciation (appreciate)	knowledge (know)
summary (summarize)	appraisal (appraise)

#### Group II (Nominalizations with *about* or *on*)<sup>2</sup>

##### A

talk (talk about)	generalization (generalize about)
speech (speak about)	comment (comment about)
lecture (lecture about)	tale (tell about)
commentary (comment about)	argument (argue about)
report (report about)	oration (orate about)
sermon (sermonize about)	conversation (converse about)
debate (debate about)	muttering (mutter about)
recitation (recite about)	gossip (gossip about)
chatter (chatter about)	lie (lie about)
whisper (whisper about)	joke (joke about)

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broadcast (broadcast about)	journal (journalize about)
song (sing about)	dissertation (dissertate on)
writing (write about)	dream (dream about)
fable (fable) <sup>3</sup>	complaint (complain about)
reflection (reflect about)	theory (theorize about)
testimony (testify about)	slander (slander)

B

?statement (state something about)	proclamation (proclaim something about)
declaration (declare something about)	pronouncement (pronounce something about)
report (report something about)	imagining (imagine something about)
announcement (announce something about)	decree (decree something about)
thought (?think something about)	discovery (discover something about)
finding (find something about)	doubt (?doubt something about)
belief (believe something about)	knowledge (know something about)
assumption (assume something about)	guess (guess something about)
supposition (suppose something about)	revelation (reveal something about)
?plan (plan something about)	notice (note something about)
note (note something about)	saying (say something about)
phrase (phrase something about)	utterance (utter something about)
detail (detail something about)	insinuation (insinuate something about)
decision (decide something about)	deduction (deduce something about)
admission (admit something about)	observation (observe something about)
disclosure (disclose something about)	confession (confess something about)
claim (claim something about)	prediction (predict something about)
feeling (feel something about)	composition (compose something about)

Group III

question	address	account
rumor	engraving <sup>4</sup>	carving

## Reflexivization

treatise (treat?)	etching	conception
vision (envision?)	conviction	information
impression	opinion (opine?)	story (story) <sup>5</sup>

### Group IV (Nonnominalizations)

sentence	material	data
statistics	spectacle	paragraph
memories	falsehood	drama
picture	print	portrait
book	play	movie
opera	novel	essay
article	letter	poem
statue	bust	(auto)biography
history	epic	cartoon
program	show	thesis
bulletin	volume	tract
pamphlet	magazine	periodical
fiction	anecdote	parable
theme	model	shadow
likeness	image	perspective
opinion	facsimile	idea
truth	evidence	notion
illusion	fact	

All the picture nouns seem to have something to do with a form of intellectual, creative, or sensory activity. There is also a sense of communication involved, implying a subject matter. If we take *John* to be this subject matter, we can then say a picture noun will fit into the following possible paraphrases: *John is (appears) in a ...*, *John is the subject of a ...*, *A ... is about John*.

The list has been organized on the basis of certain obvious characteristics of these nouns. Some are followed by *of*, others by *about*. An overwhelming proportion are nominalized verbs, formed by the same rule that yields typical nominalizations of the type in (3):

- (3) a. *The committee approved the plan* →  
*The committee's approval of the plan*
- b. *Wall Street reacted to the news* →  
*Wall Street's reaction to the news*

The nouns that take *of* plus object have underlying verbs that are transitive (Group I): *Mary discussed John* → *Mary's discussion of John*. Most of the nouns which take *about* (or *on*) plus object have underlying verbs with *about* (or *on*)

plus object (Group II): *Mary argued about John* → *Mary's argument about John*. The correspondence here is almost perfect, with *slander* (*They slandered John* but *\*John heard slander of himself*) being among the few exceptions. This kind of match between the preposition following a verb and the preposition that appears in one type of nominalization of that verb is quite common in English and will be mentioned again later.

Before we proceed to specific observations on the other groups in (2), there are several additional points we should note about the verbs underlying so many of the picture nouns. The choice of possible objects is very wide, as illustrated in (4):

- (4) a. *John believed that Mary was beautiful.*
- b. *John stated the facts clearly.*
- c. *John photographed everything he saw.*
- d. *John judged Mary to be efficient.*
- e. *John argued about the green hat on the table.*
- f. *John complained about Mary's having behaved so badly at the party.*

There are, of course, certain specific restrictions for some of the verbs: *\*John complained about that Mary had behaved badly*, *\*John measured Mary's having behaved so badly*.

The possible objects in every case include nouns that are [+human]. (A distinction has to be made here between examples like *lectured John*, which is possible but not directly relevant to these expressions, and *lectured about John*, which is both possible and relevant. Furthermore, there are cases like *\*stated John* versus *stated the point*, but there is also *stated the point about John*.)

The subjects of the verbs must be animate, though not necessarily human, depending on how one regards sentences like *The squirrel thought about taking the nut from me but then decided to run away*. Ignoring the rather special case represented by *The machine remembered the data*, the only significant examples I could find of inanimate subjects for these verbs turned out to be nouns of the very type being discussed here, as shown in (5):

- (5) a. *The article analyzed the statements that had been uttered at the conference.*
- b. *The painting depicted the horrors of war.*
- c. *The book argued about the causes of the depression.*

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Since, as mentioned previously, these nouns all concern the results of animate intelligence or sensation, the sentences in (5) could be viewed as being related to sentences like *In the article someone analyzed...*, *In the painting someone depicted...*. These expressions, then, may not be exceptions to the [+human] subject required by the verbs.

Returning to the groups of nouns in the list (2), it should be mentioned that the categories are not very strict ones, and there is a good deal of overlapping. I have categorized Group IIB separately because the underlying verbs there seem to require special consideration. A number of them--those in the first part of the group--are verbs occurring in a construction that is often assumed to be another exception to the reflexivization condition:

- (6) *John believes himself to be irresistible.*

The problem here arises from the fact that certain considerations suggest the following source sentences for (6): *John believes it*, *John is irresistible* → *John believes it for John to be irresistible*. Here, again, reflexivization seems to operate on identity across sentence boundaries. Under this assumption, the relevant verbs could then be marked as having to undergo the special reflexivization rule being considered here even when the nominalization rule has not applied. That is, the other verbs underlying picture nouns would undergo the special rule only when marked [+Noun], while *believe* verbs would be [+Verb] (with the further restriction that they have an infinitival complement--to avoid *\*John believes that himself is irresistible*).

A related problem is that if *Someone believes something about John* is not taken as a simplex sentence, then the rule for deriving *someone's belief about John* has to operate on two source sentences, and our special reflexivization rule, when applied to nominalizations of verbs like *believe*, will have to apply across three sentence boundaries instead of just two. Compare (7) and (8):

- (7) I *John heard it S*

II                             *Someone discusses John* →  
                                   *a discussion of John*

*John heard a discussion of himself*

- (8) I *John heard it S*

II                             *Someone declared something* } →  
                                   *Something was about John*  
                                   *a declaration about John*

*John heard a declaration about himself*

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The other nouns in Group IIB have been included because there is reason to believe that the preceding remarks apply in part to them. They are different from the *belief* type in that there is no occurrence of *\*John uttered himself to be irresistible*. But they are similar to the *belief* nouns in that nominalizations like *Someone's Nom about John* may require two source sentences, given the possibility of, for example, *Someone uttered something which was about John*.

The last two groups in the list (Groups III and IV) include nouns of two kinds: (a) those with possible underlying verb forms that do not fit the patterns of Groups I and II, and (b) those with no obvious underlying verb forms.

Clearly, there are many more nominalizations than non-nominalizations in list (2), which leads one to consider whether Group IV nouns might not also be nominalizations of some kind. Consider first (9) and (10):

(9)	<i>dream</i>	<i>have a dream</i>
	<i>argue</i>	<i>have an argument</i>
	<i>lecture</i>	<i>give a lecture</i>
	<i>speak</i>	<i>give a speech</i>
	<i>state</i>	<i>make a statement</i>
(10)		<i>have an idea</i>
		<i>have illusions</i>
		<i>make a spectacle</i>
		<i>take a picture</i>

The verbs in (9) appear both as verbs and as nominalizations in {*have/give/make*}-Article-Nom constructions. The latter seem parallel to the constructions in (10), although here the nouns do not have obvious underlying verbs. Let us consider, then, the possibility that *have*, *give*, *make*, etc. are, in such cases, just dummy verb markers that appear in the superficial structure rather than coming in from the deep structure. We could then go on to assume that *idea*, *spectacle*, etc. do have underlying verb forms and that the same nominalization rule that applies to yield *discussion* from *someone discusses* obligatorily applies to *someone ideas* to yield *idea*. This could be extended even further to nouns like *book*, admittedly a wilder assumption. That is, *write* could be added to the list of dummy markers so that *write a book*, *poem*, *tragedy*, ... could be viewed as being parallel to *have a dream*. Then again, *someone books* would obligatorily be nominalized to produce *book*.

Let us interrupt briefly our discussion of picture nouns as nominalizations to make one further comment about the Group III nouns. Among these appears *rumor*, with a rather unusual underlying verb form. It is frequently noted that

## Reflexivization

although sentences like *John is rumored to have a jail record* are perfectly acceptable, there is no corresponding active sentence from which that passive form can be derived: \**They rumored John to have a jail record*. The fact that *rumor* is one of the picture nouns may show something further about the existence of some active form for the verb.

(Indeed I notice now that other verbs of this kind appear in the list--*John is said/reported to have a jail record*--although for some reason I am now at a loss to explain, I grouped *rumor* separately. Perhaps all this has something to do with the peculiarities of the *someone-Verb-something-about-someone* constructions, but I have not done enough thinking along this line to make any suggestions.)

To return to the subject of *idea* and *book* as nominalized verbs, it can be demonstrated that this assumption would result in substantial savings in the grammar. Verbs have to be marked for which complements they can take, and so do certain nouns (*The idea that...*). The same is true of prepositions, and, as was noted previously, the preposition following a nominalization is usually predictable from the verb. (I am assuming here that transitive verbs would be followed by *of*, which, for most verbs, would then be obligatorily deleted in the absence of nominalization.) If, then, the Group IV picture nouns were all considered to be verbs, this type of selection would have to be stated only in the verb system and would not have to be repeated for nouns.

A similar point has to do with agentive nominals. It is well accepted that these nominals in *-er* are based on verbs: *He farms* → *He's a farmer*. Note that there is at least one case of an agentive nominal in *-er* that seems to be based on a noun in the list of picture nouns--*biographer*.

Furthermore, there are many examples of nouns in *-ist* that have related verb forms. Taking only examples from the list:

<i>he analyzes</i>	<i>analyst</i>
<i>he satirizes</i>	<i>satirist</i>
<i>he caricatures</i>	<i>caricaturist</i>
? <i>he journalizes</i>	<i>journalist</i>
? <i>he allegorizes</i>	<i>allegorist</i>

Thus, it is far from unjustified to claim that other nouns in *-ist* on the list might also come from related verb forms: *novelist*, *essayist*, *cartoonist*, *anecdotalist*, *lyricist*, *dramatist?*, *portraitist?*. By the same token, we have *critic*, for *criticize*, so we may have *poet* for some verb underlying *poem*. It is also possible to think of

certain agentive nominals in -eer and -ian as related to verbs: *profits-profiteer*, *auctions-auctioneer*; *guards-guardian*. Again, there are several nouns of this type related to the apparent nonnominalizations in our list: *balladeer*, *pamphleteer*; *historian*, *tragedian*, *comedian*. The savings that would result from the formation of all agentive nominals within the verb system alone are readily apparent.

The statement of the special reflexivization rule being discussed here would also be simplified if all picture nouns were derived from verbs. Since it is assumed that nominalized verbs will not appear in the dictionary, a large proportion of the nouns in the list will be entered only as verbs, which will have to be marked somehow for this rule. If *book* and *idea* nouns are not verbs, the rule will have to be restated and repeated for nouns. Consider, in this regard, (11)-(14):

- (11) a. *John heard a description of himself.*
- b. *John heard Mary's description of him.*
- (12) a. *John read an analysis of himself.*
- b. *John read the psychiatrist's analysis of him.*
- (13) a. *John listened to a speech about himself.*
- b. *John listened to the master of ceremonies' speech about him.*
- (14) a. *John had a good opinion of himself.*
- b. *John was well aware of Mary's opinion of him.*

It seems from these pairs that an intervening noun blocks reflexivization across sentence boundaries even with these special picture noun constructions. Furthermore, where the picture nouns are obvious nominalizations, the intervening noun is clearly the subject of the underlying verb. Where the picture noun is not an obvious nominalization, the structure with the intervening noun is obviously related to a form with one of our dummy verbs, with the intervening noun as the subject: *Mary has an idea about John* → *Mary's idea about John*. Not only does this provide further motivation for considering *book* and *idea* nouns to be nominalized verbs, but it is also a needed part of the rule that could be stated most simply and most generally when applied only to verbs. That is, where the subject of the underlying verb is a proform that is subsequently deleted under nominalization, reflexivization will operate across sentence boundaries. Where the subject is not deleted in nominalizing the verb, the special reflexive rule is blocked (except where the subject and object are identical: *John liked his speech about himself*).

## REFLEXIVIZATION II

The principle that reflexivization operates only within a simple sentence while pronominalization ranges over complex sentences is a well-motivated and extremely useful one. However, it has had to be re-examined in the light of attempts to define its operation within the framework of the theory of the cycle. If reflexivization is indeed limited to simple phrase markers, it would seem that the rule would have to be outside the cycle of transformations. Cyclical application would permit it to range over "complex" strings when sentence boundaries are erased and would therefore produce ungrammatical forms like *\*She begged him not to beat herself*. On the other hand, there are certain occurrences of reflexive forms that are so far unexplainable under this assumption. Consider (1):

- (1) *John saw a picture of himself.*

In expressions like *picture of himself*, one feels that *of himself* modifies *picture*, and this intuition is borne out syntactically by the passive of (1), i.e., *A picture of himself was seen by John*. The sentence in (1) seems to be a typical construction formed by the operation of relativization on the underlying sentences: *John saw a picture*, *The picture is of John* → *John saw a picture which is of John*. However, neither of the source sentences contains two occurrences of *John* to explain the reflexive form that appears in the derived sentence (1). There is, then, no way to reconcile this analysis with the principle of restricting reflexivization to simple phrase markers. Thus, one is forced either to find and justify a different analysis for sentences like (1) or to admit reflexivization into the cycle. Actually, as will be discussed, there may even be reason to do both.

Were this the only type of example left unaccounted for under the assumption that reflexivization operates precyclically, one might simply propose that an ad hoc rule applies cyclically to these forms only. The existence of sentences like (2) and (3), however, complicates the picture still further:

- (2) *John prevented himself from killing himself.*<sup>6</sup>  
 (3) *John believed himself to be irresistible.*

Sentence (2) poses a problem in that there is no sentence *\*John prevented himself from it* or *John prevented himself to act as one of the underlying strings*. It has been suggested (Rosenbaum, 1967) that this *from* is introduced as a complementizer rather than as a preposition. In any event,

there is no readily apparent way to account for the reflexive forms in (2) without admitting reflexivization into the cycle.

Forms like (3) occur with at least forty rather common verbs (e.g., *know*, *proclaim*, *assume*, *declare*, *imagine*, *judge*). Given the reflexive form, it would seem, on the surface, that *himself* is the object of the verb, as in *John convinced himself to murder his mother*. However, although *John believes himself* is a perfectly acceptable sentence, it does not seem to be the semantically appropriate main sentence for (3). To support this intuition there is the fact that verbs like *believe* also occur in constructions like (4):

- (4)     *John believed there to be tickets available .*

Assuming *himself* to be the object of *believe* in (3) implies that *there* is the object in (4). *There*, however, is not a proper object (\**I believe there*). Indeed, the fact that it cannot occur with certain verbs (\**John convinced there to be tickets available*) is strong support for the assumption that complement structures with *convince* are not introduced in the same way as complements with verbs like *expect*, for example. Thus, it would seem that the reflexive form in (3) is not the object of *believe*.

A possible explanation which would be consistent with the simple-sentence condition on reflexivization is as follows. The occurrence of sentences like (5) must be accounted for:

- (5) a. *John believes it of himself .*  
      b. *John expects too much of himself .*  
      c. *John revealed something about himself .*

Clearly, verbs like *expect* and *believe* do occur with prepositional phrases that can be interpreted as having been introduced within the same simple phrase marker. Furthermore, note (6):

- (6) a. *I believe it of John that he could do something like that .*  
      b. *I expect it of myself to succeed .*  
      c. *He revealed something about Mary that was startling .*

In light of such examples, it does not seem unreasonable to assume that, just as *convince* can be followed by an object and some sort of prepositional phrase in one simple phrase

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marker (*I convinced him of it*), so can expect and believe (*I expect/believe it of him*). And the existence of the prepositional phrase in simplex expect/believe sentences would explain the appearance of the reflexive, as shown, roughly, in (7):

- (7) John believes [it S] of John  
John believes [it S] of himself  
John believes [it for John to be ready] of himself  
John believes himself to be ready.

There are several different groups of verbs that might be involved here: (a) verbs like expect (require, desire, ...it of oneself); (b) verbs like believe (announce, reveal, declare, desire, imagine, know, ...something about oneself; ...oneself to be); (c) verbs like utter (which do not take to-complements but do have utter something about oneself).

Such an analysis would simplify at least two more statements that may have to be made in the grammar. Obviously, discussion is a nominalization of discuss, as declaration is of declare. But note (8):

- (8) a. Someone discusses John → a discussion of John  
b. { Someone declares something } → a declaration  
{ Something is about John } about John

If, instead, we consider sentences like (5) to be simplex, the nominalization in (8b) will work on one sentence--Someone declares something about John--just as it does in (8a). This would allow a more general nominalization rule.

The same advantage applies when considering sentences like those in (9):

- (9) a. John heard a discussion of himself .  
b. John heard a declaration about himself .

Let us assume for the moment that these are exceptions to the constraint on reflexivization and therefore require a special rule. If (8b) is taken as the source for declaration, reflexivization would have to cross three sentence boundaries to yield (9b). If, on the other hand, Someone declares something about John comes from one simple phrase marker, only two sentence boundaries would be involved in both (9a) and (9b).

Furthermore, consider (10):

- (10) a. John read a book which was about him .  
b. John read a book about himself .

The appearance of the reflexive in (10b) but not in (10a) could be taken to mean that the sentences do not have the same source, that is, that (10a) is the result of the relativizing operation on two source sentences, while (10b) results from reflexivization in a simple sentence. The sentences *John heard something about himself* and *John heard something which was about him* do indeed seem to have different interpretations and therefore can conceivably be thought of as having different underlying structures. However, this analysis by no means provides all the answers, since there is still no ready explanation for the occurrence of sentences like (4) with *there*: it is clearly not possible to postulate an underlying form like *\*John believed it of there*. Something might be worked out along the lines of *John believed it of tickets for tickets to be available*, but this is obviously not the most natural of solutions. Furthermore, note (11):

- (11) a. *John read a book about himself to himself.*  
b. *John read Mary's book about him to himself.*

The introduction of *Mary's* in sentence (11b) seems to block reflexivization after *about* but does not affect the reflexive form after *to*, which seems to indicate that the entire *about* construction cannot be in the same simple sentence as the *to* construction.

A different account has been offered (Rosenbaum, 1967) for the *believe* sentences that has the distinct advantage of explaining the appearance of both the reflexive and *there* but that is based on the assumption that reflexivization must be allowed to operate within the cycle. According to this analysis, sentences like (3) would have the underlying forms in (12):

- (12) a. *John believes [it + S]<sub>NP</sub>*  
b. *John is irresistible*

That is, *believe* is assumed to be among those verbs that take nominal complements as objects. Then, an extraposition rule, which is needed to account for the position of the complement in sentences like *It is desirable for John to be here*, is assumed to apply vacuously to (13):

- (13) *John believes [[it]<sub>N</sub> [for-to John be irresistible]]<sub>S</sub><sub>NP</sub>*

The result is that the complement *S* is taken out of the *NP*, yielding (14):

- (14) *John believes [it]<sub>NP</sub> [for-to John be irresistible]<sub>S</sub>*

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Sentence (14) then undergoes the pronoun replacement rule that takes the subject of the complement sentence and substitutes it for the object *it* of the main sentence, giving (15):

- (15) *John believes [John]<sub>NP</sub> [for-to be irresistible]<sub>S</sub>*

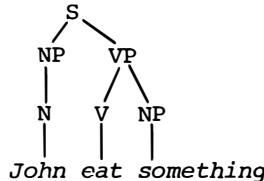
And reflexivization can now apply to yield *John believes himself to be irresistible*. The appearance of *there* with *believe* verbs can now be explained in the same way, that is, *there* is the subject of the complement that is substituted for the pronoun that is the object of the main sentence.

One result of this analysis seems suspicious, however. Although sentences like *John believed it of himself that he was irresistible* and *John believed himself to be irresistible* are both accounted for, different underlying structures are assumed despite the fact that they are clearly open to the same semantic reading.

All the examples cited above seem to provide sufficient reason to give serious consideration to the question of allowing reflexivization to operate cyclically. The crucial problem, as mentioned earlier, is how to block its operation to avoid *\*She begged him to stop beating herself*. Another look at the analysis for *believe* sentences yields one possible approach. Observe that in (15), the noun to be reflexivized is no longer in the complement sentence but now in the main sentence, in other words, under the same *S* as the identical antecedent noun needed to produce the reflexive form. Let us, then, reinterpret the notion of simplex sentence in terms of cyclical theory as a string--underlying or derived--dominated by a single *S*.

Transformations operate on terminal strings and state the reordering of these strings, but they give no information as to the resulting effect on the phrase marker. On the other hand, it is necessary to specify the constituent structure each time a new transformation is applied to an already transformed string. Thus there is a crucial need to discover rules for obtaining derived constituent structure, but the basic questions of what these rules should be, how they should work, and what they should produce are very far from having been answered. One fundamental issue still to be resolved is whether it is desirable to destroy as much structure as possible or preserve as much as possible. Take (16) as an example:

(16)



In deriving *John eats* from *John eats something*, what happens to the VP node to which the NP dominating *something* was attached? Since VP will now have only one branch, should it be preserved, or should it be erased and V attached to S?

There are other problems, too. If some type of erasure should take place, at what point are nodes to be erased--as each rule applies or postcyclically? And what effect will erasure have on the "is a" relations represented in the tree, and on the structure indices of transformations?

If it could be shown that a certain erasure principle yielded a tree that under some interpretation correctly predicted occurrences of the reflexive, there would be significant motivation for preferring that particular approach to derived constituent structure over another and would perhaps suggest a takeoff point for further investigation.

The interpretation proposed above--that reflexivization operates on identical nouns dominated by the same S--has the double advantage of allowing reflexivization to apply cyclically while at the same time maintaining the valuable generalization about the rule operating within a simplex sentence. The question is, will it work?

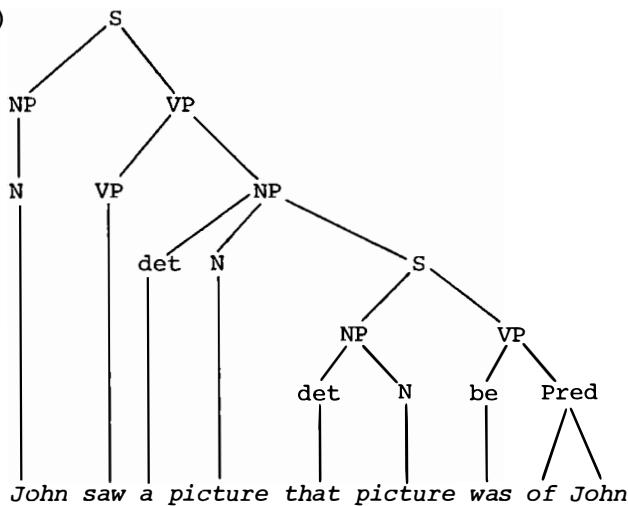
Let us look first at a possible--and very rough--derivation of the sentence (17):

(17)           *John saw a picture of himself*

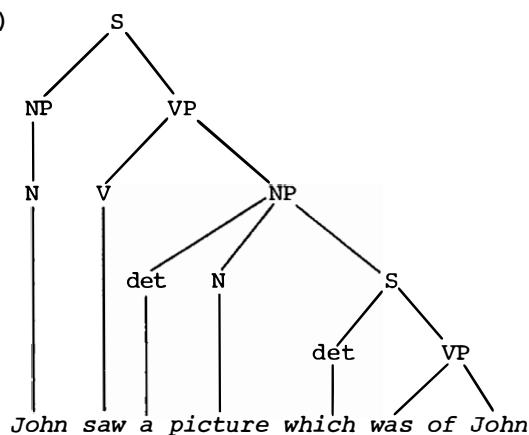
A series of trees will be presented in (18)-(20), representing first the underlying and then the derived constituent structure that might result from the application of reflexivization to the assumed source sentence. The particular rules involved are well known and will therefore not be described here. In the derived trees, single-branching nodes will be erased.

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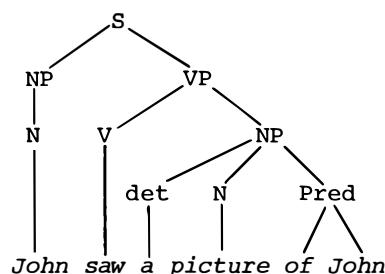
(18)



(19)



(20)



Note that (19), in which the node S cannot be erased because there is binary branching under it, yields (21):

- (21) *John saw a picture which was of him.*

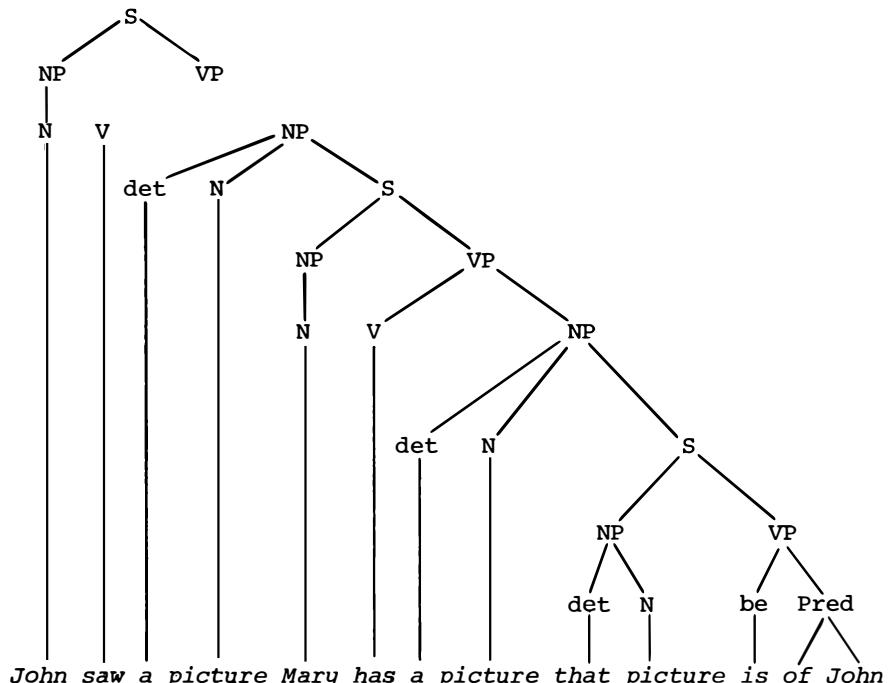
In (20), on the other hand, the S node is erased because of the deletion of *which was*, and the result is sentence (17), in which the reflexive appears.

Now let us compare the tree in (20) with the final tree in a possible derivation of the sentence (22):

- (22) *John saw Mary's picture of him.*

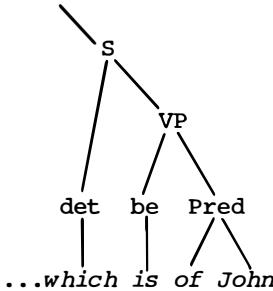
Note that the appearance of *Mary's* in this sentence, rather than the indefinite article, seems to block the reflexive. We would therefore hope to get a tree in which the constituent S is not erased. Here, again, the trees will be presented without explanation. They are obviously very rough approximations, and certain details could be added and others changed. The point at issue here, however, would presumably not be affected.

(23)

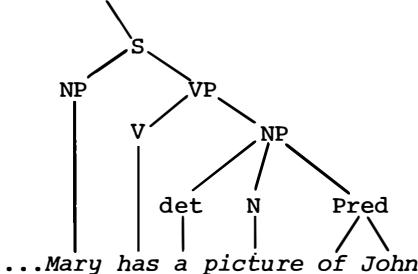


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(24)



(25)



Note that at this stage, the most deeply embedded S has been erased, since only Pred remained. Thus, if the subject of the resulting sentence were *John* rather than *Mary*, we would get *John has a picture of himself*, with the reflexive form correctly predicted.

We will now assume that the string in (25) is transformed into *Mary's picture of John*. If this transformation were not applied, the result would be *John saw a picture which Mary has of him*. Note that there is no reflexive form in this sentence, as is correctly predicted by the fact that the S dominating the embedded string in (25) still has two branches and is therefore not erased.

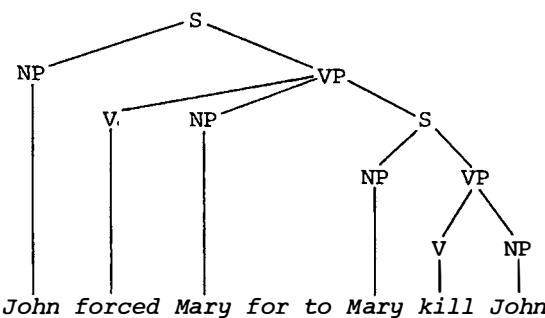
I am forced to omit the final tree in the derivation because I don't know how to draw it, that is, where and under what to put the genitive form. It is still quite clear, however, that at least the NP (*Mary's*) and Pred (*of John*) of the embedded sentence remain, meaning that the S node has two branches and is therefore not erased.

There are, however, the inevitable problems, and unfortunately they are fairly serious. First of all, it is immediately obvious that some rather weird "is a" relations are set up in the trees. Furthermore, the suggested derivations and source sentences fail to take advantage of an important generalization about the nouns that can occur in constructions

like *picture of John*--that is, that most of them, and possibly all of them, are derived from verbs. I have spent much effort in trying to determine possible derivations making use of this fact, but have not succeeded in coming up with anything workable, that is, with anything I could formalize. If verb forms are used, relativization cannot be the combinatory process: the verb in the main sentence cannot be nominalized until sentence boundaries are erased, and there is therefore no identical noun to fit the structure index. Thus, it seems that complementation has to be used. Here, however, one encounters the still open questions of exactly how and when and under what conditions a verb is to be nominalized and what the nominalization does to the derived constituent structure. Some patterns that may be significant will be mentioned directly.

First, there is another problem that must be brought up with regard to the proposal about S deletion. Note the tree in (26):

(26)



To get the sentence *John forced Mary to kill him*, the identical noun *Mary* is deleted and the NP node is erased. The result is that only VP is left under the embedded S node and therefore it, too, would be erased. According to the principle we are discussing, this should produce a sentence with the reflexive: \**John forced Mary to kill himself*.

Thus, although the principle seems to have much about it that seems right, a good deal more study is required to determine just what is wrong. Obviously, the conventions for erasing nodes must be more precisely formulated. Furthermore, it is hard to see why the two sentences *John forced Mary to kill him* and *John forced himself to kill himself* should not have the same derived constituent structure. Thus it seems that the "S principle" discussed above may not be a sufficient condition for the appearance of the reflexive. Indeed, an examination of all the sentences discussed thus far reveals that those in which the reflexive form does not appear all

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have one thing in common; that is, there is an intervening noun between the identical noun and its antecedent. This middle noun turns out to be the subject of the embedded sentence. When, on the other hand, the subject of the constituent sentence is the identical noun, the reflexive form results. This is true whether it appears as the underlying subject or the derived subject after passivization. With this in mind, note (27) and (28):

- (27)    a. *John heard himself being discussed by Mary.*
- b. *John heard Mary discussing him.*
- (28)    a. *John saw a picture of himself by Mary.*
- b. *John saw Mary's picture of him.*

Here, I believe, lies the direction for further study.

### NOTES

<sup>1</sup>For many people, *on* must be included here, in the sense of 'about', 'concerning', as in *a discussion on*, *a takeoff on*. In a few cases, *on* may be the preferred choice: *a dissertation on*, *a report on*.

<sup>2</sup>See Note 1.

<sup>3</sup>Verb form cited in various dictionaries.

<sup>4</sup>One might also regard *engrave John* to be like *paint John*. *Carving* and *etching*, also listed in this subgroup, might be regarded in the same way.

<sup>5</sup>Verb form cited in various dictionaries.

<sup>6</sup>This sentence was suggested to me by George Lakoff.



## PAST TENSE REPLACEMENT AND THE MODAL SYSTEM

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*This paper originated as a term paper that the author wrote while a first-year graduate student at M.I.T. and a member of the Mechanical Translation Group, Research Laboratory of Electronics, M.I.T. The version published here is a revised and extended version of that term paper that appeared in 1966 in Report NSF-17 of the Aiken Computation Laboratory, Harvard University. The research was supported in part by grants from the National Science Foundation to M.I.T. and to Harvard University.*

*Hofmann's observations about the correlations between time adverbs and auxiliary verbs and his proposed rule of "past tense replacement" played a major role in the development of the analysis of English auxiliaries that is presented in McCawley (1971a). In particular, Hofmann's paper provides several of the steps in my argument that Chomsky's celebrated formula for auxiliary verbs (Tense(Modal)(have -en) (be -ing)) is unnecessary.*

*The distinction Hofmann draws between epistemic and root modals has become standard in transformational studies on modals, although only the term "epistemic" has been generally accepted. He has argued more recently (Hofmann, 1969) that this two-way distinction should be replaced by a three-way distinction - epistemic, intransitive (root), and transitive (root) - where the latter two match Perlmutter's*

(1968, 1970) two verbs begin. Thus, he distinguishes the following senses of John must eat soup: (a) 'It must be (true) that John eats soup' = 'It is necessarily true that John eats soup' = 'It is necessary/needed for the world to be complete that John eats soup', (b) 'John's eating soup is necessary/needed (for the action to go on)', (c) 'For John, it is necessary to eat soup' = 'Eating soup is necessary for/needed by John'.

Two similar syntactic constructions, employing epistemic passives and pseudocopulative verbs, are discussed in the first two sections of this paper. Rosenbaum's analysis of these constructions is presented. In Section 3, the past tense replacement transformation is postulated to account for certain of the perfect infinitives found in these constructions. In Section 4, the modal system is discussed, and certain modal constructions are shown to be similar to the constructions of Sections 1 and 2.

1 In Contemporary English, we find that there are a group of sentences that appear to be passive but for which no corresponding active sentences exist. We may call them (with no philosophical implications intended) "epistemic passives", because passivized verbs of this type tend to qualify or limit the truth value of the predicate of the sentence.

- (1) a. *He is known to dislike singing.*  
b. \**Someone knows him to dislike singing.*  
c. *Someone knows that fact.*
- (2) a. *Harvard is said to be quite a school.*  
b. \**Someone says Harvard to be quite a school.*  
c. *Someone says this.*
- (3) a. *Moses is rumored to have been reincarnated as a butterfly.*  
b. \**Someone rumors Moses to have been reincarnated as a butterfly.*  
c. *Such events have been rumored from time to time.*

When used actively, verbs of this type always allow, and in general require, an abstract noun phrase such as *fact* or *event* as an object [as in the c sentences of (1), (2), and (3)], but seldom do they permit an object that is human.<sup>1</sup>

Contrary to this restriction between these verbs and their underlying objects, there is no restriction at all on

the surface subject of the passivized sentence except that it must suffice as the subject of the complement portion of the sentence, e.g., *dislike singing* of (1a). That is, theorems are proven, but people are usually not proven in the same sense; yet we have *He was proven to have lived in France*, and propositions but not electrons are inferred, yet we have *the electron is inferred to have a negative charge*.

We see, then, (a) that there are normal subject-verb selectional restrictions between the surface subject of the passive and the verb of the complement, and (b) that there seems to be no restriction between the surface subject of the passive and the passivized verb in spite of the fact that (c) these are verbs that have their objects restricted to abstract nominals. This is strong evidence that the underlying form of these sentences is something like:<sup>2</sup>

- (4) *Someone believes it, that John dislikes singing.*

which is passivized into [with the embedded sentence extraposed in (b)]:

- (5) a. *It, that John dislikes singing, is believed.*  
b. *It is believed that John dislikes singing.*

The subject of the embedded sentence is then moved forward and replaces the *it*. With several small changes, including deletion of the present tense morpheme in the predicate of the complement, we have:

- (6) *John is believed to dislike singing.*

Let us examine which verbs undergo this course of derivation and which do not. First, we may note that all the verbs that occur in these constructions have a "positive" sense. That is, a "negative" verb like *disprove* or *deny* is not found in such constructions.

- (7) a. \**John is disproven to be rich.*  
b. \**She is denied to live in France.*

But this observation is just a special case of a more general observation, which is, that if and only if a verb occurs in the epistemic passive, it can take a complement, "Z be true" (e.g., *It is true that John is coming*), with the meaning that the truth of the Z is qualified by or results from the main verb of the epistemic passive. Thus, in the sentences below, the epistemic passive (a) is equivalent to saying that the truth of (b) is derived from (c).

- (8) a. *John is rumored to be in France*

- b. *John is in France.*
  - c. *a rumor*
- (9) a. *Betty is known to chase fellows.*
- b. *Betty chases fellows.*
  - c. *(common) knowledge*
- (10) a. *He is inferred to be 5'6" and have large hands.*
- b. *He is 5'6" and has large hands.*
  - c. *inference*

The negative verbs *deny*, *disprove*, etc., may take a complement of the form "it S be true", but the truth of the S can never be a result of denying or disproving.

The analysis of the epistemic passive construction can now be improved by requiring that the matrix verb (the verb that is passivized) be one that permits *true* in its complement and that it not be negative in the special sense that *disprove*, *deny* are. This is not sufficient, however, as there are verbs like *contend*, *vouch*, and *vow*, which will take complements containing *true* and are not negative, yet which can not be epistemically passivized.

- (11) a. *He contends that it is true that John went to France.*
- b. *\*John is contended to have gone to France.*

Thus, apparently some ad hoc lexical specification is still needed to block derivations leading to sentences like (11b).

2 Another class of verbs that should be handled by this same set of transformations is a subset of the so-called copulatives, including *appear*, *seem*, *turn out*.

- (12) a. *It appears (to be) true.*
- b. *He appears (to be) willing.*
- c. *She seems (to be) anxious.*

In many cases, the *to be* is optional after such pseudo-copulatives. It is apparently from the examples with the *to be* missing that various grammarians have classified these verbs as copulative verbs. Yet they are more easily explained as having a deletable *to be*. Notice the following:

- (13) a. *It appears (to be) true.*
- b. *He appears (to be) willing.*

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- c. *He appears to be singing*
  - d. *He appears to be a man*
  - e. *He appears to have gone*
- (14) a. *He seems (to be) anxious*
- b. *He seems to have moved away - there's no one here*
- (15) a. *He turned out (to be) crooked*
- b. *He turned out to enjoy singing*

It appears that *to be* is deletable before adjectives only,<sup>3</sup> and it is simpler to say it is deletable before adjectives than it is to say that it is insertable before everything else. Furthermore, in (13e), (14b), and (15b), there is no *be* at all, but an ordinary verbal element. This paradigm is much more easily explained, then, if we assume the *be* in all the other cases is the *be* that is associated with adjectives, progressive modification (i.e., *be* followed by a present participle), and predicate nominals, respectively. Thus, we may conclude that these verbs are not really copulative; hence the name "pseudocopulative".

The derivation of these constructions is apparently identical to that of the epistemic passives discussed in Section 1. Starting with [parallel to (5a)]:

- (16) *It, that he is stupid, appears.*

Extraposition gives

- (17) *It appears that he is stupid.*

and precisely parallel to the change between (5b) and (6), we get:

- (18) *He appears to be stupid.*<sup>4</sup>

The verb *happen* belongs in this class but has one idiosyncracy - that *to be* deletion is impossible with it. Extraposition is not obligatory with *likely* (e.g., *That he is stupid is quite likely*), unlike the other verbs in this class, and, being an adjective, it takes *be* in front of it.

<sup>3</sup> The two constructions under consideration can have "perfect infinitives" in their complements; for example:

- (19) a. *He is rumored to have been rich*
- b. *He appears to have finished his work*

We shall examine below the conditions under which these perfect infinitives appear in the complements. Let us call

the past tense modification Ed and the perfect modification Perf. Perf is expanded into have + En, and Ed and En are the suffixes on the immediately following verbs for the past tense and past participle forms, respectively.

It seems that if and only if the complement sentence contains either Ed or Perf or both, then there will be a Perf in the portion of the complement that remains after the to.

To establish this, which may be called the "Ed-replacement transformation", we may argue as follows. First, there must be Ed and there cannot be Perf if a time adverb designates a past time point, e.g., at 3 p.m. yesterday or even merely yesterday.

- (20)      a. *He came last Tuesday.*  
              \**He has come last Tuesday.*  
              b. *He flew to Chicago yesterday.*  
              \**He has flown to Chicago yesterday.*  
              c. *He incited the revolt last year.*  
              \**He has incited the revolt last year.*

But if these sentences are embedded into one of the passives discussed above, Perf is invariably required.

- (21)    a. *He is rumored to have come last Tuesday.*  
          b. *He is reported to have flown to Chicago yesterday.*  
          c. *He is alleged to have incited the revolt last year.*

The time adverb belongs to the complement verb rather than to the main verb in each of these examples, because the main verb is in the present tense, and indeed these time adverbs cannot be moved to the front of the sentence (topicalized) as time adverbs usually can.

- (22)    a. *He came yesterday.*  
          b. *Yesterday, he came.*  
(23)    a. *He is reported to have come yesterday.*  
          b. \**Yesterday, he is reported to have come.*

Similarly, there are places where Perf is strongly preferred over Ed. Consider the following examples.

- (24)    a. \**He drank a gallon of vodka by now.*  
          b. \**His lordship finished eating now.*

## Tense Replacement and the Modal System

These may be rendered acceptable by using Perf,

- (25)      a. *He has drunk a gallon of vodka by now.*  
              b. *His lordship has finished eating now.*

and indeed, we get Perf in the embedded forms:

- (26)    a. *He is reported to have drunk a gallon of vodka by now.*  
          b. *His lordship is alleged to have finished eating now.*

Because the Perf in (26) could not have come from Ed, then it must have as a source the Perf in (25).

In the following sentence, both Ed and Perf are required on the main verb.

- (27)    a. *He had seen her only once before when I met him.*  
          b. *\*He saw her only once before when I met him.*  
          c. *\*He has seen her only once before when I met him.*

And again we have Perf in the complementized form,

- (28) *He is rumored to have seen her only once before when I met him.*

Thus, it seems that the Ed-replacement transformation as stated at the beginning of this section is necessary. But it is not restricted to the cases we examined above; rather, it is used in many different constructions in English. The following examples illustrate this fact (noting that a non-embedded Perf does not occur with *yesterday*). In adverbial participial constructions:

- (29) *Having done that yesterday, he proceeded with the second task.*

In Poss-Ing nominalizations:

- (30) *His having done that yesterday forced us to find him.*

In for-to nominalizations:

- (31) *(for him) To have done that yesterday would have been disastrous.*

And in certain cases of modals:

- (32) *He may have done it yesterday.*

The construction illustrated in (28) may eventually be shown to derive from Poss-Ing nominalizations, and we will examine the constructions involving modals later, but in any case, this Ed-replacement process is far from trivial and needs adequate explication.

In attempting to formalize the transformation for Ed-replacement, it should first be noticed that it will necessarily introduce Perf into strings that have no Perf, but only Ed. This pristine Perf must replace either the Ed or the Perf, either of which may not be present in a particular string. As it seems more natural not to move a Perf already in a sentence (if there is no Ed), we may have it replace the Perf:

$$(33) \quad X \text{ (Ed)} \text{ (Perf)} \text{ } Y \Rightarrow 1 \emptyset \text{ Perf } 4$$

and we must explicitly state that either 2 or 3 must occur for the transformation to apply; i.e., that it is not the case that there is no 2 and there is no 3.

There is a slightly better solution, however. If we revise the structural description to

$$(34) \quad X \text{ Ed (Perf)} \text{ } Y$$

the transformation will not apply in the case of a Perf alone, thus leaving such a string unmodified. In the other two cases, an Ed alone and an Ed followed by a Perf, it will apply, replacing either string with a Perf. It seems more reasonable to attach the Perf to the tense node, replacing Ed, rather than to have it replace Perf (which may or may not be there), because the Ed is necessarily there if the transformation applies. We will see later that there are data that demand this choice. Thus, the Ed-replacement transformation is:

$$(35) \quad X \text{ Ed (Perf)} \text{ } Y \Rightarrow 1 \text{ Perf } \emptyset \text{ } 4$$

This formulation (35) gives slightly unintuitive results in its account of the phrase marker associated with the output string. The following sentences will have two tense nodes, one dominating the first verbal element and the other dominating the *have* after it.<sup>5</sup>

- (36)
  - a. *He is rumored to have left yesterday.*
  - b. *He seems to have gone.*

We will return to this problem in Section 5.

4 Turning our attention to the modal system in English, we may recall that by and large, each of the modals have two different semantic uses, e.g., *may* may mean either 'permission granted' or 'possibility of being true', and

## Tense Replacement and the Modal System

*must* may mark either 'imperative requirement' or 'logical entailment'. Examples of these in order are:

- (37)      a. *You may go now.*  
              b. *He may have already gone.*  
              c. *I must go now.*  
              d. *He must have already gone.*

In sentences 37a and c, it will be noticed that Perf and Prog, the progressive modification, are not permitted<sup>6</sup> (38a and c) and the underlying subject must be animate (38c):

- (38)    a. \**You may have gone outside to play.*  
                        (*permission sense intended*)  
          b. \**You can be singing.* (*ability sense intended*)  
          c. \**My car must leave now.*

In (37b and d), however, (i) Perf may be a representative of Ed and (ii) there is no restriction on the subject except that it be compatible with the main verb that follows the modal. Both (i) and (ii) can easily be seen to be parallel to what was found in the epistemic passive constructions already discussed.

In the preceding examples, I have used only three modals, *may*, *must*, and *can*, but these parallel syntactic and semantic dualities are quite common throughout the modal system. If extensive examination of the modal system is made, several generalities can be discovered. First, there are two senses in which a modal may be used. The root sense, illustrated by (37a and c), is where there is a restriction of the subject to animate things, and Perf is forbidden and Prog is permitted only under exceptional circumstances. This is illustrated by *may* in the permission sense, *can* in the ability sense, *will* in the habitual-obstinancy sense. These have past tense forms *might*, *could*, and *would*, which are also generally used for counterfactual subjunctive, consistent with the general rule of using Ed for counterfactual statements.

- (39)    a1. *May I sit down?*  
          a2. *She told me I might go, but I didn't.*  
          b1. *Can you lift it?*  
          b2. *Could you play that well last year?*  
          c1. *He will interrupt any lecturer.*  
          c2. *He would stay up all night when he was a boy.*

Examples (37b and d) illustrated the epistemic sense where the modal seems to say something about the truth value of the sentence rather than to predict something about the subject. Here, the modal does not restrict the subject in any way, and Perf serves as the past tense marker.

Contrasting with the senses described above, both *may* and *can* have a meaning of 'possibility' (*can* here is almost exclusively used negatively as *can't*, and *may* prefers the positive), and *will* has a 'future' meaning. The forms *might*, *could*, and *would* are reserved for the counterfactual subjunctive.

- (40) a1. *He may have come yesterday.*
- a2. *I wish he might have come yesterday.*
- b1. *He can't have come.*
- b2. *I wish he couldn't have come.*
- c1. *He will have finished it before he comes.*
- c2. *I wish he would have finished it before he came.*

The remainder of the modal system isn't quite so patternful; *need*, *dare*, and emphatic *shall*<sup>7</sup> appear to exist only in the root sense but have no past tense form, while *should*, *must*, and *ought* have both senses but no past forms as modals.

We may now leave aside the root modals and concentrate on the epistemic modals. We have already noted that Perf could represent Ed and is, of course, the only way to represent past time with an epistemic modal. Similar to this, Prog is used for present time if the lexical verb is not stative. This may be seen to follow necessarily from the fact that Prog is used in simple sentences with nonstative verbs to indicate present time. Thus we have as unambiguous:

- (41) a. *He must have sung yesterday.*     past time
- b. *He must be singing now.*         present time } epistemic
- c. *He must sing now.*

but as ambiguous:

- (41) d. *He must know that now.*     root and epistemic

Although it is clear that these epistemic modal constructions are derived, it is not immediately clear just what the structures of the matrix sentences are. Let us compare the two most plausible alternatives.

We might suppose the underlying matrix to be a

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sentential (it S) subject followed by the epistemic modal, which would be considered to be an intransitive verb. This is similar to the matrix proposed for the pseudocopulatives in Section 2. A derivation similar to the pseudocopulative use of *seem* or *appear* would be obligatory with the additional necessity of dropping the *to* complementizer. In such a case, however, we would need to block ad hoc a derivation if an aspect (Prog or Perf) appeared in the matrix.

Alternatively, we might consider the verb of the matrix to be an intransitive *be* and the epistemic modal to be a modal, and no aspects could appear with either root or epistemic modals. This would simplify the base component. The first several rules would have the effect

$$(42) \quad S \rightarrow NP \ Tns \ (\{ \begin{matrix} \text{Modal} \\ \text{Aspect} \end{matrix} \}) \ Verb \dots$$

There are several indications that the second alternative is correct. First, there are sentences of form:

(43) *It isn't that John wouldn't have come, rather...*  
the first part of which must be (unextrapolosing the embedded sentence),

(44) *It, that John wouldn't have come, is not.*

This is just the negative of a structure "it S be", which seems infrequent at best. Perhaps it is explainable by the dictum that to assert a sentence to be (true) is equivalent to asserting simply the sentence? Such a structure seems to be supported by sentences like (quite acceptable in at least some dialects):

(45) *Lions have been mammals for as long as I can remember.*

Although the interpretation of this sentence is clearly generic (like *Lions are mammals*), it is readily observable that aspects do not occur in generic sentences:

- (46) a. \**Lions have been mammals for 3700 years.*  
b. \**Lions are being mammals nowadays.*

We could reconcile these facts if (45) were derived from an underlying

(47) *It, that lions are mammals, has been (true) for as long as I can remember.*

And indeed, what is being asserted by that sentence is that for as long as the speaker could remember, the generic

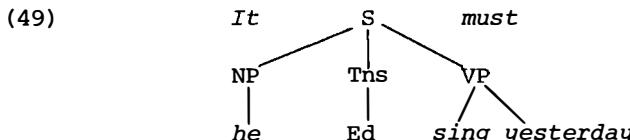
sentence *Lions are mammals* has been true, i.e., not doubted, and it is presupposed that the listener agrees or should agree that this generic is true. Questioning and sentence negation apply only to the *having been true for as long as he could remember*, which are two tests for identifying nonembedded sentences. It is furthermore a fact that if a presupposition is found in the base structure of a sentence, it is invariably embedded. Thus, there is a strong argument for (47) being the underlying structure of (45). But this implies that the Perf in (45) is epistemic. In the framework of the first alternative, we are forced to accept that Perf can be an intransitive verb. Whereas in the second analysis, Perf is merely an aspect with the intransitive verb *be* as would be expected from (42).

If this second analysis is accepted, what is the course of derivation by which the epistemic object (Modal or Perf) gets situated between the subject and the Tns of the embedded sentence with the remainder of the matrix erased? And what implications does this derivation have on the analysis of the epistemic passives and pseudocopulatives discussed in Sections 1 and 2? These problems will remain unanswered here in the face of a larger problem. Although there is some linguistic evidence for the second alternative, it apparently entails infinitely ambiguous syntactic derivations.<sup>8</sup>

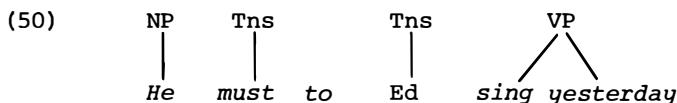
5 Returning to the Ed-replacement transformation (34), we see that it predicted two Tns nodes in the following sentence type:

- (48)            *He must have sung yesterday.*

The derivation of this sentence is something like (assuming for the moment that the derivation is that of the first alternative - like *seem* - the same result appears with the second alternative):

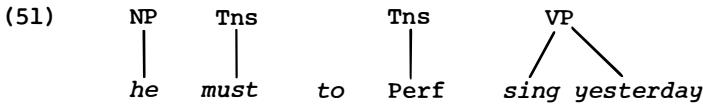


And with extraposition and subject incorporation,

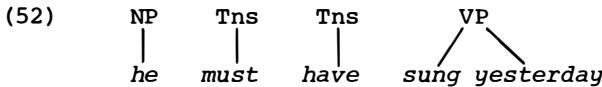


The Ed-replacement transformation converts this to

## Tense Replacement and the Modal System



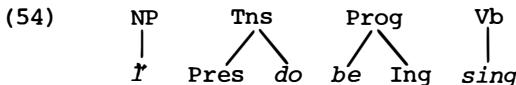
And after *to*-deletion and affix-hopping,



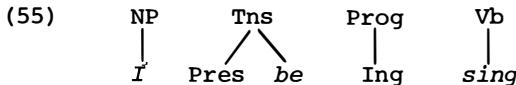
Tns plays several roles in the syntax of English. First and foremost, after *be*, *have*, or a modal has been attached under it, replacing the periphrastic *do* (by the *do*-replacement transformation), it serves as the node that is brought forward in inversion for questions, etc. Thus, the inversion transformation looks like:

$$(53) \quad \text{NP} \quad \text{Tns} \Rightarrow 2 \quad 1$$

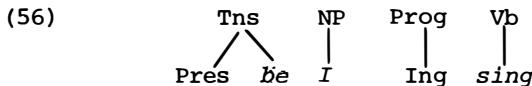
and we may have a derivation,



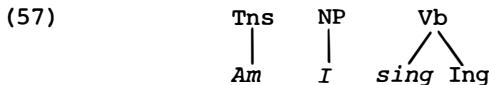
applying the *do*-replacement transformation;



and after inversion;



which, with the affix-hopping rule, becomes



As the inversion transformation is stated, it takes the first occurrence of Tns and pulls it to the front of the sentence. Thus there is no effect of having two Tns nodes. Another role Tns plays is in forming short answers. Here the rule is, to form a short answer, take a full answer (i.e., a sentence that satisfies the conditions for being an answer) and delete everything after the Tns and a *not* if one is there.

- (58) a. *Does he sing well?*                    *Yes, he does.*  
           b. *Is he smart?*                        *No, he isn't.*  
           c. *Has he gone?*                        *Yes, he has.*  
           d. *Can she go?*                        *Yes, she can.*

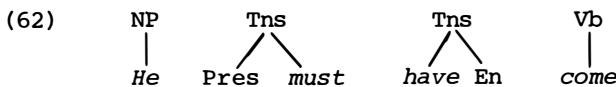
Notice however, that in addition to the short answers to

- (59)                    *Did he come?*  
           (60)            a. *Yes, he did.*  
                           b. *No, he didn't.*

there is another class of short answers to (57) that contains epistemic modals.

- (61)                    *He must have.*  
                           *He might have.*

By our formulation of the Ed-replacement transformation, the sentences from which these must have been derived contain two Tns nodes:



and deleting everything after the second Tns gives us precisely the form of these short answers.

Looking at tag questions with metamodals, we find two different patterns in my dialect:

- (63) a. *I shouldn't have come, should I?*  
           b. *I shouldn't have come, should I have?*

The first type may be explained by saying that inversion takes place in the tag and everything else of the second sentence is deleted or that the NP and the Tns are copied in inverted order. The second type of tag is clearly derived from a second sentence that first had everything after the (second) Tns deleted and then inversion took place. Similar confusion reigns in so tags.

- (64) a. *He must have gone to Chicago, and so must she.*  
           b. *He must have gone to Chicago, and so must she have.*

Thus, we find surprising support for transformation (35), which was thought to be counterintuitive.

6 To summarize, a class of passive constructions was

## Tense Replacement and the Modal System

examined and an analysis was presented for them that is essentially that of P. Rosenbaum (1967). This analysis was extended to certain so-called copulative verbs. An Ed-replacement transformation was formulated and was found not only to describe the facts of these complements, but also to predict certain seeming irregularities in short answers and tag questions. It was also shown how analysis of the epistemic constructions and the Ed-replacement transformation motivates a syntactic analysis of the modal verbs in English into two natural and pervasive classes that have various common characteristics. Certain problems are raised about their derivation.

### NOTES

<sup>1</sup>There are some lexical exceptions to this; for example, the verb *rumor* cannot be used except as a passive. There is a homophonous verb *know*, which takes human objects and which means 'to be acquainted with' (e.g., *I know her*).

<sup>2</sup>Rosenbaum (1967) gives a satisfactory derivation, utilizing *for-to* complementation rather than the *that* complementation, which is used here for ease in reading. Furthermore, all the transformations used in his derivation can be independently motivated.

<sup>3</sup>Notice that (13b,c) distinguishes an adjective from a participle of a verb. Also, for example,

*It appears broken.*

*\*It appears typed.*

<sup>4</sup>This derivation permits the explication of the otherwise unexplained *to me*, etc., in

*He appears quite intelligent to me.*

being derived from something like

*It appears to me that he is quite intelligent.*

<sup>5</sup>I am assuming a grammar where the modals and aspects are developed from the VP and there is an expansion rule of the form

S → NP Tns VP

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Modals *have* and *be* are drawn out of the VP and attached under Tns. See Section 5 for more explication.

<sup>6</sup> Actually, there are counterexamples where Prog occurs with such a root modal, e.g., *You must be singing when my mother arrives*. But these are cases of the Prog that can appear only with a *when*-clause. Note the nonoccurrence of:

\**Have you ever been taking a bath?*

\**Be singing!*

in spite of the unimpeachably grammatical:

*Have you ever been taking a bath when  
the doorbell rang?*

*Be singing when she comes in!*

<sup>7</sup> I am describing here general American, in which *will* is used as the future auxiliary in all three persons and *shall* is restricted to the sense of 'request for orders' (*Shall I open the window?*) and the 'promissory emphatic' use as in *I shall return*.

<sup>8</sup> Even though they are syntactically ambiguous, they need not be semantically ambiguous, which, as our intuition tells us, is the case. An analogous problem to this (indeed, the essential problem here) is where *John came* is derived from (as was already noted, these do not occur without negation in common speech):

*it is that John came.*

*it is that it is that John came.*

*it is that it is that it is that John came.*

:

each of which is generatable from the base. (The present problem lies in that there is no natural way to state the epistemic transformation in the second analysis without deriving *John may have come* from *it may be (that it is)<sup>n</sup>* that *John came* where  $n \geq 0$  is the number of embeddings or the syntactic ambiguity.) The reader is referred to Russell's theory of types.

## WHY YOU CAN'T DO SO INTO THE SINK

---

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*This paper appeared in Report NSF-17 of the Aiken Computation Laboratory of Harvard University under the title "A criterion for Verb Phrase Constituency": the research was supported by a grant from the National Science Foundation to Harvard University. It constituted the first serious attack on Chomsky's (1965) treatment of "strict subcategorization". Lakoff and Ross show that, contrary to Chomsky's claim, an element that plays a role in the strict categorization of verbs need not be a "sister" of the verb; specifically, most of the adverbs that are involved in strict subcategorization of verbs (e.g., manner adverbs, since verbs such as resemble and regard are subject to the constraint that they cannot be combined with manner adverbs) occur higher in the deep structure than Chomsky's claim allows them to. This argument shows that deep structures must be more highly structured than the analysis in "Aspects" suggested and was a step in the direction of deep structures whose constituent structure matched that of logical structure.*

*One detail of Lakoff and Ross's analysis was quickly superceded: where they treated do so as a unit, created in one fell swoop by a VP-pronominalization transformation, Anderson in 1967 (paper 10 of this volume) argued that clauses with an action verb must be assigned deep structures*

having do plus a sentential complement and showed that do so is merely what arises from pronominalization of that complement. Lakoff and Ross's paper contains one false conclusion whose refutation has resulted in important work in the analysis of pronouns and the relation of reference to syntax. Bouton (1970) observed that, contrary to Lakoff and Ross's claim (see their discussion of Example 38). do so can be contained in its antecedent (as in Susan kissed a man who had ordered her to do so). The problem of stating the conditions under which an anaphoric device can be contained in its antecedent yields further evidence for the proposals of G. Lakoff [1968c (paper 16 of this volume)] that in logical structure, complements are inside and relative clauses outside the constituents in which they appear in surface structure (summed up in Lakoff's slogan, "Complements in, modifiers out"). Bouton's work also demonstrated the existence of dialect variants as to what can be the antecedent of do so that cannot be described satisfactorily in terms of local (as opposed to global) rules.

## I. BACKGROUND

Words and phrases like often, at five o'clock, for 2 hours, without breaking anything, carefully, with a hammer, and there, have traditionally been called adverbs. Traditional grammarians considered adverbs to be modifiers of verbs, just as they considered prenominal adjectives to be modifiers of nouns, and they indicated this in their parsings by placing adverbs in the same constituents as the verbs that these adverbs were thought to modify. In transformational grammar, where the notion of constituent structure was made fully explicit, the traditional analysis was largely accepted and was interpreted as indicating that the node VP (verb phrase), which immediately dominates V (verb) and its direct object NP (noun phrase) if it has one, should also dominate adverbial constituents.

Transformational grammarians have recognized for some time that all adverbs cannot be lumped together indiscriminately, and they have concentrated their attention on the fact that certain adverbs may not occur with verbs of certain classes and that other adverbs seem to have to occur with certain classes of verbs. Lees (1960a, pp. 6-14) attempted to account for this phenomenon by setting up a hierarchy of constituents within the verb phrase constituent and claiming that different types of adverbs were

## Why You Can't Do So into the Sink

introduced at different levels in the hierarchy. A more recent attempt to account for this phenomenon appears in Chomsky (1965, pp. 95-106), where Chomsky claims that certain adverbials (those of place and time) are sister constituents of VP and may occur freely with any verb, whereas other adverbials are sister constituents of V (are dominated by VP) and are restricted in their occurrence with certain classes of verbs. Taking this as a fact, Chomsky then states a principle of strictly local subcategorization to account for this fact. His principle, in effect, embodies the claim that verbs may be subcategorized only with respect to adverbs that are dominated by the node VP. Chomsky (1965, p. 102) states the following set of rules to illustrate this claim for English:

$$(i) \quad S \rightarrow NP \text{ Predicate-Phrase}$$

$$(ii) \quad \text{Predicate-Phrase} \rightarrow \text{AUX VP(Place) (Time)}$$

$$(iii) \quad VP \rightarrow \left\{ \begin{array}{l} \text{be Predicate} \\ \left\{ \begin{array}{l} (\text{NP}) (\text{Prep-Phrase}) (\text{Prep-Phrase}) \\ (\text{Manner}) \end{array} \right\} \\ V \cdot \text{Adj} \\ S' \\ (\text{like}) \text{ Predicate-Nominal} \end{array} \right\}$$

$$(iv) \quad \text{Prep-Phrase} \rightarrow \left\{ \begin{array}{l} \text{Direction} \\ \text{Duration} \\ \text{Place} \\ \text{Frequency} \\ \text{etc.} \end{array} \right\}$$

$$(v) \quad V \rightarrow CS$$

Note that in these rules adverbials of place are introduced both by rule (ii) and by rule (iv). Those introduced in rule (ii) are not dominated by VP and so, according to Chomsky, cannot enter into the subcategorization of verbs and should be able to occur freely with any verb phrase. The adverbs of place introduced in rule (iv), on the other hand, are dominated by the node VP and so they do enter into verb subcategorizations and do restrict the occurrence of verbs. As an example of rule (iv) place adverbials, Chomsky offers the sentence:

$$(1) \quad John remained in England.$$

An example of a rule (ii) place adverbial might be:

- (2) *John solved the problem in England.*

Chomsky argues that *remain* must take a place adverb, though *solve* need not do so, and he claims that this can be accounted for by the strict subcategorization principle, providing that *in England* in (1) is introduced by rule (iv), but that *in England* in (2) is introduced by rule (ii).

However, there are some flaws in this analysis. If, as Chomsky claims, the time and place adverbials introduced in (ii) can occur with any VP, then we should be able to derive the following as grammatical sentences of English:

- (3) Time adverbial:

- a. \**John lived in the hotel at 10 o'clock*
- b. \**John lived in cities at 10 o'clock*
- c. \**The concert lasted four hours at 10 o'clock*
- d. \**John ran four miles at that instant*

- (4) Place adverbial:

- a. \**John was dead in Bayonne*
- b. \**John ran four miles on this spot*
- c. \**John drove to New York on this spot*
- d. \**John drove to New York in small country towns*

The ungrammaticality of these sentences indicates that the time and place adverbials that Chomsky introduces in (ii) are, in fact, restricted in occurrence with certain VPs. Moreover, restrictions of this sort cannot be handled by Chomsky's principle of strictly local subcategorization.

In the following section, we will present evidence that the principle of strictly local subcategorization cannot handle most of Chomsky's interesting cases. This evidence indicates that most of the adverbs that Chomsky and others have claimed were constituents of verb phrases are really not constituents of verb phrases. These findings are in accord with the evidence presented in G. Lakoff, 1965, Appendix F, where it was claimed that most adverbials are actually derived by transformation from predicates of "higher" simplex sentences. In this paper, we take no stand on that issue. Our aim is merely to point out that most adverbials are not constituents of verb phrases.

## II. A TEST

The phrase *do so* is a proform that may substitute for a

## Why You Can't Do So into the Sink

verb phrase. Thus, (6) would be derived from the structure underlying (5).

- (5) *Harry forged a check, but Bill could never bring himself to forge a check.*
- (6) *Harry forged a check, but Bill could never bring himself to do so.*

However, *do so* may be substituted only for a verb phrase containing a nonstative verb.<sup>1</sup> Thus, (8) cannot be derived from the structure underlying (7).

- (7) *Bill knew the answer, and Harry knew the answer, too.*
- (8) *\*Bill knew the answer, and Harry did so, too.*

Observe that verb phrases containing adjectives may not reduce to *do so*, whether the adjective is stative or not.

- (9) *\*John was heavy, and Bill did so, too.* (stative)
- (10) *\*John was careful, and Bill did so, too.* (nonstative)

The question now arises as to which of the adverbs that may follow the verb are included in that part of the sentence that is replaced by *do so*. We claim that *do so* replaces all of the constituents of the verb phrase and only these. Thus, elements that may occur after *do so* are outside of the verb phrase (are not constituents of VP), and elements that cannot so occur are inside the verb phrase. An immediate consequence of this claim is that time adverbials, *because*-clauses, and *if*-clauses are, not surprisingly, outside of the verb phrase. Thus, the following sentences are grammatical.

- (11) *John took a trip last Tuesday, and I'm going to do so tomorrow.*
- (12) *He voted for Johnson because he thought Johnson was good, but I did so because Goldwater is evil.*
- (13) *He would take the job if they paid him \$25,000, but I would do so if they paid me only \$18,000.*

On the other hand, direct objects, indirect objects, and directional adverbs are, also not surprisingly, inside the verb phrase. The grammaticality of the (a) sentences below shows that *do so* can replace parts of sentences that include these elements, and the ungrammaticality of the (b) sentences shows that *do so* must replace the verb and all of these elements.

- (14) a. *John took the exam, and I did so, too.*  
b. \**John took the midterm exam, and I did so the final.*
- (15) a. *John gave a book to Pete, and I did so, too.*  
b. \**John gave a book to Pete, and I did so to Mary.*
- (16) a. *John loaded a sack onto the truck, and I did so, too.*  
b. \**John loaded a sack onto the truck, and I did so onto the wagon.*

One interesting result of this test is that it corroborates Fillmore's (1963) claim that the *for*-phrase in

- (17) *Bill bought a car for John.*

is outside the verb phrase, while the indirect object *to*-phrase of

- (18) *Bill gave a book to John.*

is inside the verb phrase. Fillmore's argument rests on the fact that while (19) and (20) look similar,

- (19) *Bill bought John a car.*

- (20) *Bill gave John a book.*

(19) may not passivize to (21), though (20) may passivize to (22).

- (21) \**John was bought a car by Bill.*

- (22) *John was given a book by Bill.*

In (15) above, our test indicated that the indirect object *to*-phrase is inside of the verb phrase. (23) indicates that the *for*-phrase is outside of the verb phrase.

- (23) *I bought a car for John, and I'll do so for you too.*

Another interesting result is that this test supports Chomsky's claim that place adverbials are inside the verb phrase in some cases and outside of it in other cases.<sup>2</sup> The ungrammaticality of (24) shows that *in England* is inside the verb phrase in (1) above, and the grammaticality of (25) shows that *in England* in (2) is outside of the verb phrase.

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- (24) \**I remained in England, and John did so in France*
- (25) *John solved the problem in England, and I did so in France.*

The surprising result that this test yields is that most of the adverbs that have been thought by Chomsky and others to be inside the verb phrase are really outside the verb phrase.

### **Manner adverbials:**

- (26) *John flies planes carefully, but I do so with reckless abandon.*

### **Duration adverbials:**

- (27) *John worked on the problem for eight hours, but I did so for only two hours.*

### **Frequency adverbials:**

- (28) *John takes a bath once a year, but Harry does so twice a month.*

### **Instrumental adverbials:**

- (29) *The army destroys villages with shells, but the air force does so with napalm.*

### **Means adverbials:**

- (30) *The army destroys villages by shelling them, but the air force does so by dropping napalm bombs on them.*

### **Purpose adverbials:**

- (31) *John gambles in order to satisfy his masochistic urges, but Bret Maverick does so in order to make money.*

### **For someone's sake:**

- (32) *John made a million dollars for his mother's sake, but I did so for my own sake.*

*With-phrase:*

- (33) *John solved the problem with Mary and I did so with Jane.*

*Instead of:*

- (34) *John applied to Harvard instead of applying to M.I.T., but he should have done so instead of applying to Yale.*

*Without-clause:*

- (35) *The army destroyed the city without killing anyone and the air force did so without causing any damage.*

We propose the following rule to account for these phenomena.

$$(36) \quad \begin{array}{ccccccc} x & - & VP & - & Y & - & VP \\ & & 1 & - & 2 & - & 3 - 4 & - & 5 \Rightarrow \\ & & & & & & 1 & - & 2 & - & 3 & - & do & so & - & 5 \end{array}$$

where 2 = 4 and 2 begins with a nonstative verb.

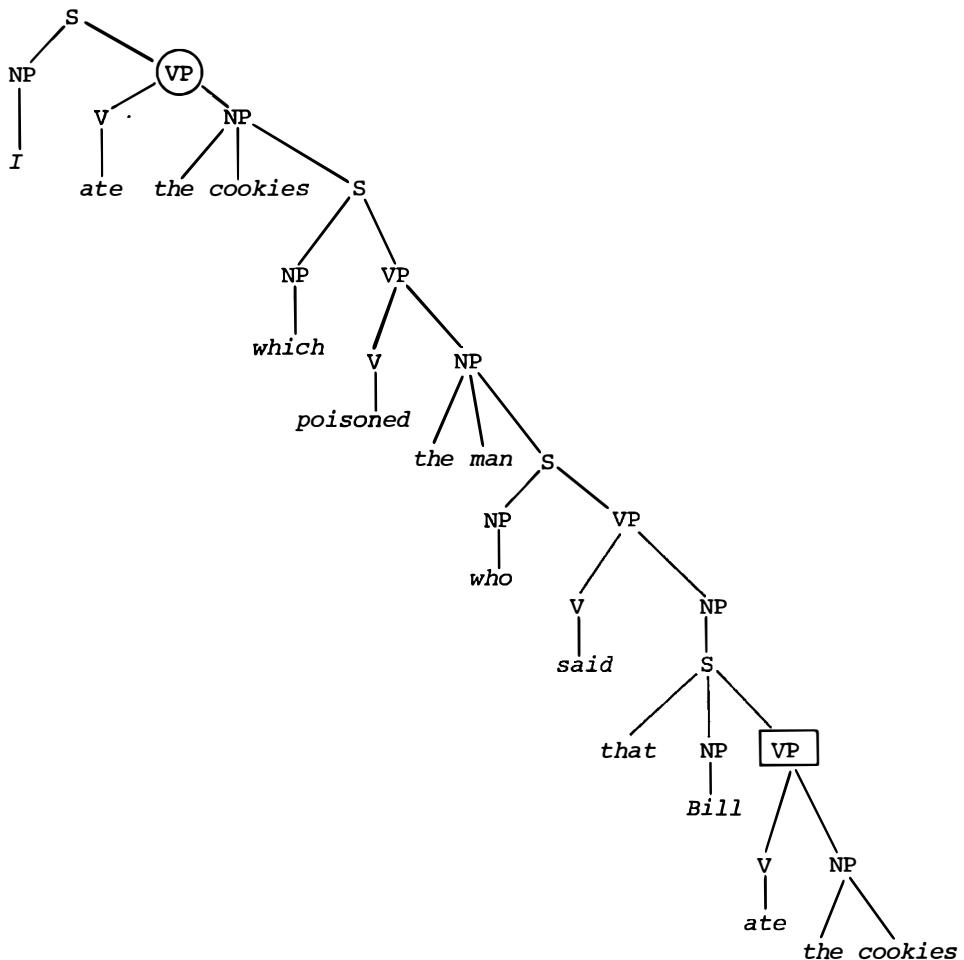
Notice that the structureal index of (36) can be met only if neither VP is contained within the other. This has the consequence that (37) can not be transformed into (38).

- (37) *I ate some cookies which poisoned the man who said that Bill ate some cookies.*
- (38) \**I ate some cookies which poisoned the man who said that Bill did so.*

The reason for this is that in (39), which is the structure underlying (37), the VP in the box is contained within (i.e., dominated by) the VP in the circle.

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(39)



However, (40) can be transformed into (41), because the time adverbial is outside the verb phrase [cf. (11)].

(40) *I left after he told me to leave.*

(41) *I left after he told me to do so.*

The (b) sentences below cannot be derived from the (a) sentences, because the underlined VP in each of the (a)

sentences is contained within the VP to which it would have to be identical in order for rule (36) to operate. That is, the same situation arises as arose in figure (39).

- (42) a. *I gave a book to a man who said that Bill gave a book to him.*  
b. \**I gave a book to a man who said that Bill did so.*
- (43) a. *I threw a snowball at a man who said that Bill threw a snowball at him.*  
b. \**I threw a snowball at a man who said that Bill did so.*

The ungrammaticality of (38), (42b), and (43b), is evidence that direct objects, indirect objects, and directional adverbs are inside the verb phrase. (41) showed that time adverbials are outside the verb phrase, and the following examples provide additional confirmation for our claim that most adverbials are outside the verb phrase.

Manner adverbials:

- (44) *John flies planes the way I tell him to do so.*

Duration adverbials:

- (45) *John will work on the problem for as long as I tell him to do so.*

Frequency adverbials:

- (46) *John hit the ball exactly the number of times that I told him to do so.*

Instrumental adverbials:

- (47) *John will murder your wife with any weapon you instruct him to do so with.*

We feel that the material we have discussed above is suggestive of the correctness of our claim, but there are many puzzling constructions with *do so* that we do not yet understand and that we have not included in this paper. We hope to be able to present a more nearly complete analysis in a later progress report.

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### **NOTES**

<sup>1</sup>For an account of the distinction between stative and nonstative adjectives and verbs, see G. Lakoff (1965) and G. Lakoff (1966).

<sup>2</sup>Although Chomsky describes *in England* as a place adverbial in *remain in England*, it may be the case that *remain in* is a transitive verb and *England* its direct object.



## CONCERNING THE NOTION "BASE COMPONENT OF A TRANSFORMATIONAL GRAMMAR"

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*This paper originated as a term paper written during Anderson's first semester as a graduate student at M.I.T. (winter 1966-1967) and was circulated in duplicated form at that time. In it, Anderson tackles a problem that has largely been avoided by generative grammarians, namely that of specifying what the substance of the base rules of a transformational grammar is. He shows that the standard conception of base rules conflates two independent notions - definitions of syntactic categories (which Anderson takes to be largely universal) and language-particular rules of constituent order - and argues that when these notions are separated and each made precise, the mechanisms corresponding to the former render unnecessary the tree-pruning principles of Ross (1969a).*

*Anderson's proposals share with the structure-preserving principle of Emonds (1970) the characteristic that the effects of transformations are constrained by the "base rules". However, Emonds' proposals do not separate word-order rules from definitions of categories and impose no particular constraint on the content of base rules.*

*It should be kept in mind that Anderson's concern is with how to fit universal category definitions into a theory of grammar, not with justifying the particular definitions that he proposes. The definitions, in fact, are merely a restatement of the particular universal base rules that were*

accepted by Ross and George Lakoff at the time this paper was written. One point of constituent structure that Anderson does try to justify is contested in Bresnan (1974), who argues convincingly that complementizers are "Chomsky-adjuncts" of the Ss that they go with.

The final argument in the paper, concerning examples (27)-(31), is incorrect as it stands, since the meaning of (27) corresponds not to (28), in which the main clauses are conjoined, but to a structure in which hate has a conjoined complement ' $\Delta$  arrest John and  $\Delta$  arrest Bill'. The multiple fors in (27) result from the "spreading" of a single occurrence of for, much the same way that a single occurrence of the past participle morpheme is spread over the conjuncts in I have often eaten a pizza and been sick an hour later. It may be possible to rescue this argument if one replaces and by or in (27) and takes the revised (27) as arising from (28) by a derivation involving the And-or conversion rule proposed in Horn (1972).

In a recent study, McCawley (1968a) discussed the form that the base component of a grammar should take and evaluated the empirical consequences of each of several proposals in terms of the assertions made about language by each. He has proposed that the phrase structure rules of a transformational grammar be viewed as an (unordered) set of conditions for the well-formedness of underlying phrase markers, rather than as a set of ordered rules that construct such objects (with or without an intermediate representation as a class of equivalent derivations in a string rewriting system).

Recent research in generative grammar has led to a detailed examination of the possibility that some significantly large portion of the base component is not a part of the grammars of particular languages at all, but is rather provided by universal grammatical theory. The strongest hypothesis about the contribution of universal grammar to the base so far taken seriously is the assertion that the categorial component of the grammar consists of exactly the following unordered conditions, stated here in the notation proposed by McCawley:

- (1)              < S;    S\* >
- < S; NP VP >
- < NP; N(S) >
- < NP; NP S >
- < NP;   NP\* >

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< VP; VP\* >  
< VP; V (NP) (S) >

(i.e., a node labeled S may directly dominate a sequence of nodes labeled S; a node labeled S may directly dominate a node labeled NP followed by a node labeled VP; etc.). It will be noted that the above rules are exceedingly simple in form, and if it can be shown that they constitute the (universal) base, the formal mechanism seems overly elaborate for the task it is called upon to perform in stating them. In fact, most of these rules appear to be little more than a statement of what it means for a constituent to be of type NP, VP, or S. Such an interpretation will be suggested here.

In the same paper, McCawley suggests a formalism for the expression of the structure of the linguistic objects called trees. A tree is said to consist of a finite set of objects called "nodes" (represented here by lower case letters  $x$ ,  $y$ ,  $z$ , etc.) and three relationships that relate the nodes to each other and to a finite set of elements called "labels" (represented by  $L_0$ ,  $L_1$ , ...):

- (2)        $x \rho y$      ' $x$  directly dominates  $y$ '
- (3)        $x \alpha L$     ' $x$  bears the label  $L$ '
- (4)        $x \lambda y$     ' $x$  is to the left of  $y$ '

In addition, the relation

- (5)        $x \rho^* y$     ' $x$  ultimately dominates  $y$ '

can be said to hold between  $x$  and  $y$  if

- (6)       there exists a sequence of nodes  $x_1$ ,  $x_2$ , ...  $x_n$   
such that  $x \rho x_1$ ,  $x_1 \rho x_2$ , ...,  $x_{n-1} \rho x_n$ ,  $x_n \rho y$ .

In terms of these relations, trees must meet the following conditions:

- (7)    a.     $(\exists x_0)(\forall x: x \neq x_0)(\sim (x \rho x_0) \wedge (x_0 \rho^* x))$   
(i.e., the tree is 'rooted' and 'connected')
- b.     $(\forall x_1, x_2, y)(x_1 \rho y \wedge x_2 \rho y \rightarrow x_1 = x_2)$   
(i.e., the tree has no 'loops')
- c.     $(\forall x)(\exists L)(x \alpha L \wedge (\forall L')(x \alpha L' \rightarrow L = L'))$   
(i.e., every node has exactly one label)

I should like to propose that certain of the nodes in any tree are labeled with the basic lexical categories, N(oun), V(erb), and C(onjunction). Assuming that every syntactic tree will have nodes labeled N, V, or C, the following conditions may also be imposed on trees:

$$(8) \quad (\forall x) (x\alpha N \vee x\alpha V \vee x\alpha C \Leftrightarrow \neg(\exists y) (x\beta y))$$

thus, all nonlexical nodes must be nonterminal, i.e., must branch (possibly unarily), and no lexical nodes may do so.

Given a tree of the above form, we may say that labels can be associated with nodes not already labeled N, V, or C by assigning the labels NP, VP, S according to the following implicational definitions:

- $$(9)$$
- a.  $((x\beta y) \cdot (y\alpha N)) \rightarrow x\alpha NP$
  - b.  $((x\beta y) \cdot (y\alpha V)) \rightarrow x\alpha VP$
  - c.  $((x\beta y) \cdot (x\beta z) \cdot (y\alpha NP) \cdot (z\alpha VP)) \rightarrow x\alpha S$
  - d.  $(\forall L) ((\forall x) (y\beta x \rightarrow ((x\alpha L) \vee (x\alpha C))) \rightarrow y\alpha L)$

Note that (9a-c) are simply definitions of what it means to be a NP, VP, or S, while (9d) is the assertion that a node that dominates only nodes of one type (and possibly a conjunction) is of the same type. A set of nodes meeting conditions (7) and (8) are labeled in accordance with conditions (9a-d) will be said to be a "constituent structure tree" and will be subject to the following condition of redundant node deletion:

$$(10) \quad ((x\beta y) \cdot (x\alpha L) \cdot (y\alpha L) \cdot \neg(\exists z) ((x\beta z) \cdot (z \neq y))) \rightarrow (x = y)$$

This principle asserts that it is unnecessary to label a constituent more than once: if a node exhaustively dominates another node of the same category, it is to be set equal to it, which is equivalent to deleting the "upper" of the two.

In order to specify exactly the class of all trees that would be considered well formed by the rules of the universal base given in (1), which will be called "underlying constituent structure trees", it is necessary to require that the members of this class meet the following additional conditions:

- $$(11)$$
- a. if  $x_0$  is the root of tree T,  $x_0 \alpha S$
  - b.  $((x\beta y) \cdot ((y\alpha N) \vee (y\alpha V))) \rightarrow \neg(\exists z) ((x\beta z) \cdot (z \neq y) \cdot ((z\alpha N) \vee (z\alpha V)))$
  - c.  $((x\beta y) \cdot (y\alpha V)) \rightarrow \neg(\exists z) ((x\beta z) \cdot (z\alpha VP))$

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- d.  $((x\wp y) \cdot (y\alpha N)) \rightarrow \sim (\exists z)((x\wp z) \cdot ((z\alpha NP) \vee (z\alpha VP)))$
- e.  $((x\wp y) \cdot (y\alpha VP)) \rightarrow \sim (\exists z)((x\wp z) \cdot (z\alpha S))$
- f.  $((x\wp y) \cdot (y\alpha C)) \rightarrow \sim (\exists L)((x\alpha L) \cdot (\forall z)((x\wp z)$   
 $\rightarrow ((z\alpha L) \vee (z = y)) \cdot (\exists z_1, z_2 \neq y)((x\wp z_1)$   
 $\cdot (x\wp z_2)))$
- g.  $(\forall x, y, z, L)((x\wp y) \cdot (x\wp z) \cdot (y\alpha L) \cdot (z\alpha L))$   
 $\rightarrow (x\alpha L) \cdot (\forall w)((x\wp w) \rightarrow ((w\alpha L) \vee (w\alpha C)))$

The intent of (lla) is to insure that underlying structures underlie sentences; that of (llb) to assure that a node dominates at most one lexical item in deep structure; that of (llc,d) to assure that NP and VP cannot dominate other instances of these categories except for conjoined structures and the NP direct object of a VP; (lle) asserts that a sentence may not dominate an S as well as its expansion into NP and VP; (llf) insures that a conjoined structure contains exactly one conjunction and at least two other nodes with the same label ( $\neq C$ ); while (llg) states that the only conditions under which a node may dominate two nodes of the same type is in case of conjunction.

The class of underlying constituent structure trees will be seen to be exactly the class of trees generated by the base rules (1), except for order. I propose that the definition given above of this class replace the categorial subcomponent of the base of the grammar altogether. In this conception of a grammar, the base would consist of a lexicon with appropriate insertion rules for the attachment of lexical items to the terminal nodes of underlying constituent structure trees in accordance with the selectional and sub-categorizing features peculiar to the individual lexical items, together with a set of language-particular rules whose function is to establish the ordering relation  $x\lambda y$  among the nodes of the tree. In what follows, I will assume that trees are subject to the following conditions:

- (12) a. For every pair of nodes  $x$  and  $y$ , with  $y \neq x$ , either  $x\wp^*y$  or  $y\wp^*x$  or  $x\lambda y$  or  $y\lambda x$ .
- b. If  $w\wp^*x$  and  $w\wp^*z$  and  $x\lambda y$  and  $y\lambda z$ , then  $w\wp^*y$ .
- c.  $\lambda$  is a partial ordering of the nodes of the tree.

(12a) asserts that distinct nodes that do not stand in a domination relation must stand in a left-to-right ordering relation; (12b) asserts that there is no "discontinuous-constituent structure", in which a node fails to dominate something that is between nodes that it dominates. It can be shown from (12) that

(13) If  $x\alpha^*w$  and  $y\alpha^*z$  and  $x\lambda y$ , then  $w\lambda z$ .

The following would be a set of ordering rules for English:

(14) Let  $x\alpha y$  and  $x\alpha z$  and  $y \neq z$ . Then:

- a.  $(x\alpha S) \cdot (y\alpha NP) \cdot (z\alpha VP) \rightarrow y\lambda z$
- b.  $(x\alpha NP) \cdot ((y\alpha N)v(y\alpha NP)) \cdot (z\alpha S) \rightarrow y\lambda z$
- c.  $(x\alpha VP) \cdot (y\alpha V) \cdot ((z\alpha NP)v(z\alpha S)) \rightarrow y\lambda z$
- d.  $(x\alpha VP) \cdot (y\alpha NP) \cdot (z\alpha S) \rightarrow y\lambda z$
- e.  $(\forall L)((x\alpha L) \cdot (y\alpha C) \cdot (z\alpha L) \rightarrow y\lambda z)$

The class of underlying constituent structure trees with lexical items inserted by the lexicon of language  $L$  and an ordering induced on their nodes by the base ordering rule of  $L$  will be called the class of "deep structures" of  $L$ .

In such a conception of the "base component" of a grammar, there thus exists a distinct level of representation on which the structure of each sentence is represented in unordered form. In class lectures in the summer of 1966, Chomsky criticized Šaumjan for asserting that a grammar must contain such a level of representation. In Chomsky's conception of a transformational grammar, such a level would indeed be unmotivated, since the constituent structure rules are language particular and operate on ordered, concatenated strings of symbols. Even in McCawley's base components, no natural division exists between unordered and ordered structures. But if the categorial component of the grammar is indeed provided by universal grammatical theory (up to order), such a level is indeed motivated, since it represents exactly the extent of structure as given universally. Indeed, if the order of constituents is given by language-particular rules, it seems impossible to avoid such a level of representation.

The principal advantages of the formalization given above for the contribution of universal grammar to the "base component" lie in the natural account it gives of the factors of structure that remain constant during the course of a derivation. Thus, the operation of the transformational component will considerably alter the deep structures before

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they become surface structures, mostly in the line of simplifying structure. It is well known that surface structures violate many of the constraints on deep structures, yet it seems natural that certain principles should remain invariant. In particular, it seems that the criteria that determine the label attaching to a constituent (of higher than lexical degree) should be maintained insofar as possible; thus, we do not wish to permit surface structures wherein a node that dominates only a verb is said to be a noun phrase. etc. The natural way to capture this fact is to require that all intermediate stages of a derivation be constituent structure trees. That is to say, if during the course of a derivation, a node ceases to meet the criteria given above in (9a-d) for being a node with the label it has at that point, its label is to be changed so as to be in accord with some one of these criteria. If it meets none of the conditions (9a-d), it is unclear what status it should have (subject to a qualification to be discussed below); one might wish to assert that it retains its old label, or that it becomes altogether unlabeled. Such empirical evidence as exists seems to support the former. In addition, it should be noted that in accord with principle 10, any node that becomes redundant during the course of a derivation is "deleted".

The requirement that intermediate stages of a derivation be constituent structure trees in the sense of (9) and (10) captures correctly the generalizations that one would like to make about the structures of such trees. The requirements of (11) are peculiar to underlying trees; the restrictions on surface structures seem to be that they be constituent structure trees derivable by a permissible sequence of transformations from a well-formed deep structure. But this latter requirement also contributes to the imposition of a requirement on the possible results of applying a transformation; the output of every transformation must be a constituent structure tree (possibly with some changes in labels in accord with the above requirement), and at least the last such tree (the surface structure) should contain no constituents that cannot validly be given any label. These constraints on intermediate trees in a derivation and on the possible consequences of applying transformations have not been discussed previously, though their desirability seems apparent.

Notions similar to those suggested above in their syntactic consequences have been proposed by Ross, partially as a result of work on the rule of conjunction reduction in English. In particular, he has proposed a rule of "tree pruning", whereby nonbranching S nodes (or in one formulation, S nodes that cease to dominate both NP and VP) are to be deleted, and a rule of

"node relabeling", whereby a node that comes to dominate a conjunction of nodes of the same type is relabeled as being of that type also. This last is seen to be almost directly equivalent to condition (9d) above; a demonstration that the proposal embodied in this paper explains the facts accounted for by the rule of tree pruning will be given below. But these two rules by themselves do not suffice to handle all problems that have arisen in connection with node labels. In conjunction reduction in particular, nodes are continually appearing with embarrassingly counterintuitive labels that must be corrected by additional ad hoc conditions or hand-waving rules. In principle, any collection of such ad hoc conditions, even including the rule of tree pruning, must fail, whether they correctly describe the data or not. Such conditions merely state the problem in formal terms; the level of explanatory adequacy can only be reached by an account of these phenomena that shows why just these conditions should hold and not some arbitrary set of others. For example, there is no reason why the rule of tree pruning should apply exactly to S nodes, and not also to, let us say, NP nodes that are directly dominated by conjoined nodes. Also, why should exactly those nodes that cease to branch delete, rather than, let us say, those that come to dominate a number of nodes that is a term of the Fibonacci series greater than the eighth? Since these rules are general metaconditions given by the theory of grammar, there appear to be no restraints on the sort of conditions that may apply. It is the thesis of this paper that an account of these facts in terms of more general facts about the composition of trees, facts that it is necessary to state in any event to properly define the concept of "well-formed deep structure", comes much closer to explaining them.

Let us now examine some of the data presented in support of the principle of tree pruning and show that the relevant phenomena follow from the principles adduced above. In his paper on this principle, Ross (1969a) suggests that (15d) is ungrammatical because at the point at which the rule of extraposition from NP applies, the modifying phrase *from India* is no longer dominated by S and is hence not subject to this rule.

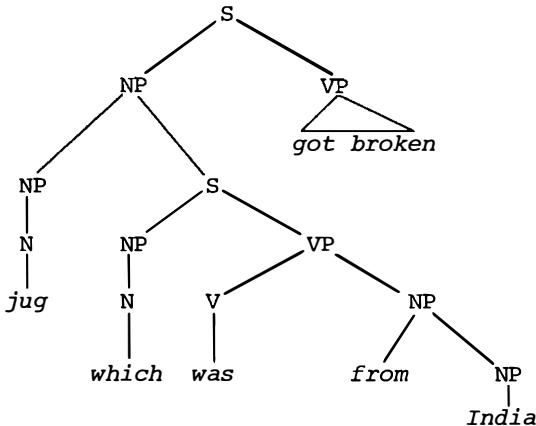
- (15) a. *A jug which was from India got broken.*
- b. *A jug got broken which was from India.*
- c. *A jug from India got broken.*
- d. \**A jug got broken from India.*

Assuming that the structure given in (16) underlies all four of these sentences and that the rule of relative clause

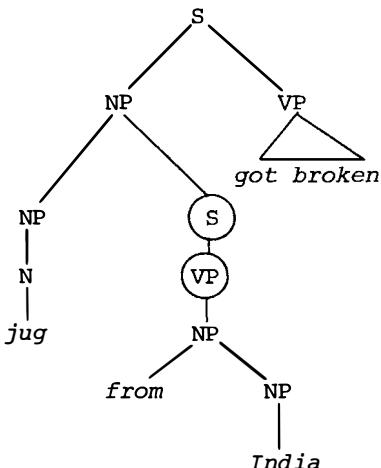
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reduction then applies (optionally) to this structure giving (17) as the structure underlying (15c,d), we can see that the circled node in (17) no longer meets condition (9c) for being an S; furthermore it now does meet condition (9d), and hence must be relabeled NP. At this point, the principle of redundant node deletion (10) applies, giving the structure in (18).

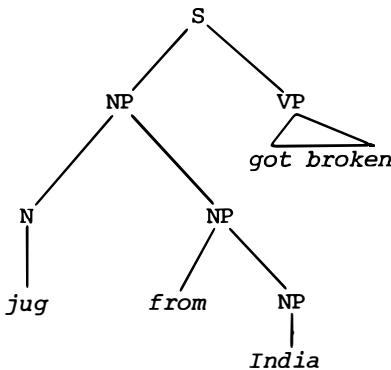
(16)



(17)



(18)



Note that the deletion of the circled node S is only part of the process; first, the circled node VP must become an NP, then be deleted, then the S becomes an NP and is deleted in turn. This is clearly necessary, since whatever it may be in deep structure, *from India* is nothing but a prepositional phrase adjunct of a noun in surface structure. It is counter-intuitive to claim that it is also a VP, as Ross does in his paper. In any event, the structure in (18) does not contain an embedded S and hence is not subject to the rule of extraposition.

Most of the cases discussed by Ross in his paper and the chapter of his thesis on this topic are of similar character, and it can be seen that they follow from conditions (9a-d). When a node labeled S ceases to dominate both NP and VP and comes to dominate only one of these, it will be seen that condition (9d) will require its being relabeled NP or VP as appropriate, at which point redundancy will have set in and it will go altogether. Thus, the tree-pruning metarule is seen to follow in most cases from other facts. Several more interesting cases are provided by embedded sentences with nonlexical grammatical formatives; it will be seen that they will require a modification of the theory as stated so far.

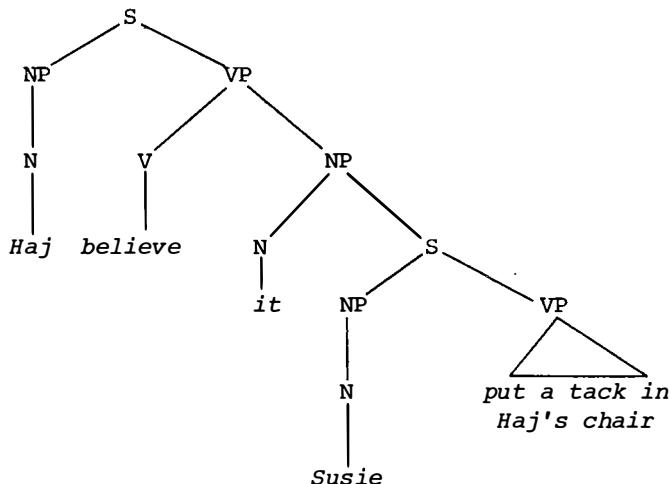
Consider the structure underlying the sentences in (19), which is given (approximately) in (20).

- (19) a. *Haj believed Susie to have put a tack in his chair.*
- b. *Susie was believed by Haj to have put a tack in his chair.*
- c. *For Susie to have put a tack in his chair was believed by Haj.*

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- d. \**Haj believed Susie to have put a tack in his own chair.*

(20)



In the derivation of all these sentences, the first significant rule to apply will be complementizer introduction on the higher cycle (if there are cycles). This will adjoin the element *for* to the lowest S and the element *to* to the VP of that S. The type of adjunction to be employed is an unsettled question; Ross and Lakoff have proposed that these complementizers be introduced by Chomsky-adjunction, but have cited as evidence for this claim only the possibility of defining the notion of subordinate clause in German so as to include structures of the type where a nonconjoined S directly dominates another S. So far as I can see, this notion is inadequate to classify even all German clauses correctly; relative clauses, for example, do not seem to fit this definition. Further, the extra S node created by this operation appears to do no work in the grammar. Because it is created within the cycle, no cycle ever takes place within it, which is contrary to the intuitive motivation for the principle of the cycle that has so far been advanced. It seems counterintuitive to claim that the major constituent break in an embedded clause such as *that people take Fichte seriously* in (21) should come after the *that*:

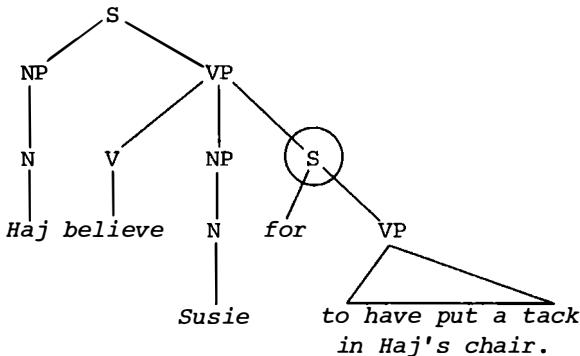
- (21) *In a world like ours, it is frighteningly possible that people take Fichte seriously.*

If the extra S node does no real work, and furthermore must

be gotten rid of in every case, it seems more likely that it should never have been there. I shall assume henceforth that the complementizer is adjoined as daughter to the S (or as sister to its NP and VP).

At any rate, after the complementizer has been inserted in (20), Passivization may occur, giving the sentence (19c). Previously, on the same cycle, the rule of *It-replacement* may optionally have applied, giving the structure (22) underlying (20a,b,\*d).

(22)



If Passivization takes place now, we get (19b); if it does not, we get (19a) or (19d). Note that if Passivization had occurred on the inner cycle, *It-replacement* could still have occurred, giving one of:

- (23) a. *Haj believed his chair to have had a tack put in it by Susie.*  
 b. *Haj's chair was believed by him to have had a tack put in it by Susie.*  
 c. *Haj believed a tack to have been put in his chair by Susie.*  
 d. *A tack was believed by Haj to have been put in his chair by Susie.*

In all such cases where *It-replacement* has occurred, what is the status of the circled node S after the rule applies? Clearly, it is necessary to retain it as an S, for otherwise Reflexivization might apply, giving the ungrammatical (19d). But why should such a constituent be a sentence?

In general, the issue here is the status of nodes that dominate nonlexical formatives such as complementizers and prepositions. Apparently, any rule that introduces a terminal

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element directly provides by its operation a new well-formedness criterion in addition to those given in (9). For example, one might say that the rule introducing *for*, *Poss*, *that*, etc. simultaneously provides the definition (24) because they are introduced under S:

$$(24) \quad (x\alpha y) \cdot (x\alpha w) \cdot (x\alpha z) \cdot (y \in \{\text{for, Poss, that}\}) \\ \cdot (w\alpha NP) \cdot (z\alpha VP) \rightarrow x\alpha S$$

The situation is more complex than this, however. Other rules in English segmentalize certain features of NP so as to create prepositional phrases, and these rules also introduce some of the same formatives as are introduced by Complementizer placement. Thus, these rules will necessitate additional conditions, such as

$$(25) \quad (x\alpha y) \cdot (x\alpha z) \cdot (y \in \{\text{for, to, by, of, Poss, ...}\}) \\ \cdot (z\alpha NP) \rightarrow x\alpha NP$$

But now it would appear that for the cases of *for* and *Poss*, at any rate, the simplest rule providing for their introduction as complementizers is no longer part of a schema such as (24), but is rather a rule such as (26).

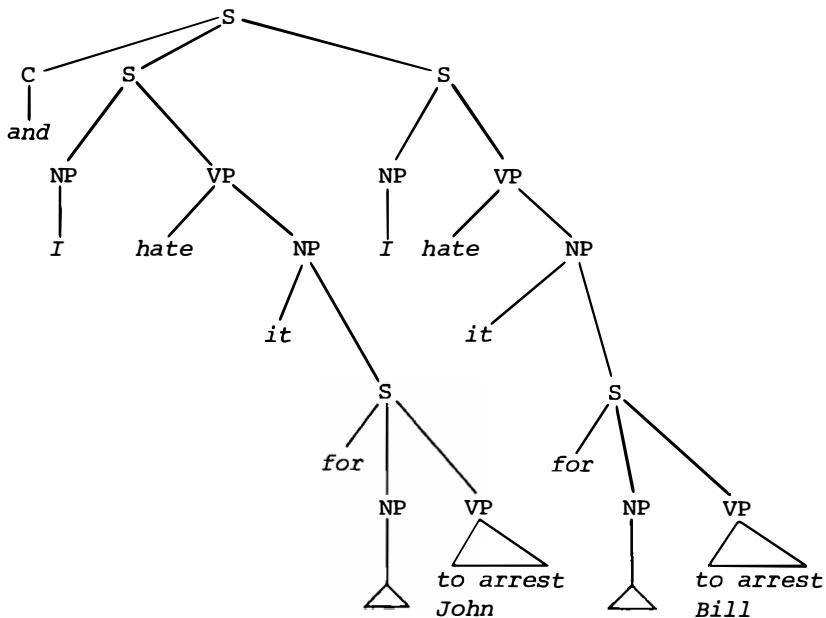
$$(26) \quad (x\alpha y) \cdot (x\alpha z) \cdot (y \in \{\text{for, Poss}\}) \cdot (z\alpha VP) \rightarrow x\alpha S$$

This is precisely the rule needed to retain the circled node S in (22). The lack of a similar simplified rule for *that* could be adduced as an explanation of the fact that *It-replacement* does not apply to embedded sentences with *that* complementizers, since this would create an undefined configuration. *Equi-NP deletion*, another rule that creates a structure in which an S node dominates a complementizer and a VP only, similarly does not apply to embedded sentences with *that* complementizers; the relationship between the restrictions on these two rules is an otherwise gratuitous fact without the concept discussed above to unite them in terms of their production of ill-formed trees.

The interactions of the various conditions introduced by rules which introduce terminal elements directly produce several interesting cases in conjunction reduction. Thus, consider the deep structure underlying (27), which is given after Complementizer placement in (28).

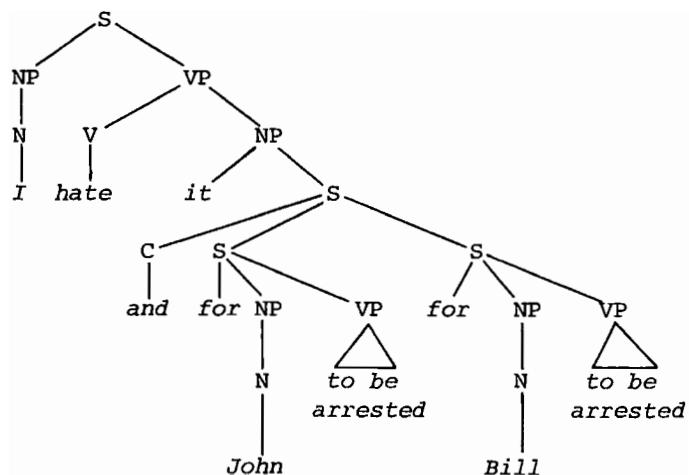
$$(27) \quad I \text{ would hate for John and for Bill to be arrested.}$$

(28)



After Passivization has applied to both conjuncts and Conjunction reduction has applied to the whole conjoined structure, the result is as in (29)

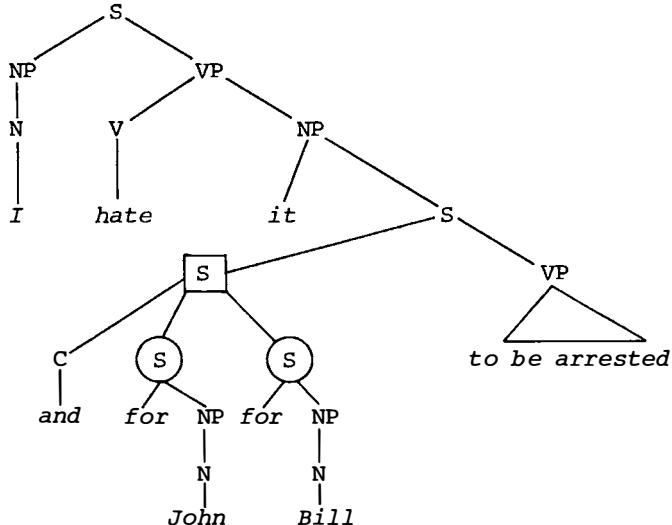
(29)



### The Notion "Base Component"

When Conjunction reduction has raised the elements VP in the embedded sentences, the structure will be as in (30):

(30)



But note that now condition (25) applies, relabeling the circled S nodes as NP, at which point (9d) requires that the boxed S node also become NP, yielding the correct derived structure. The fact that such a rule as (25) exists for *for* and *for Poss* by virtue of independently motivated parts of the grammar (preposition introduction rules) also helps to explain why (31a-b) are much more acceptable than (31c).

- (31) a. *I dislike it for John and for Bill to tell lies.*  
 b. *I dislike John's and Bill's telling lies.*  
 c. \**I dislike it that John and that Bill tell lies.*

Since no such rule as (25) exists to define the configuration *that+NP*, it is not well formed.

There remain many problems concerning node labeling that I have not gone into here and that I do not claim to have solved. I do believe, however, that some such approach as that outlined here will form a necessary part of any attempt to account for node labeling in an explanatorily adequate manner. In particular, I suspect the all-or-nothing approach to the permissability of a derived constituent structure's

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bearing a given label will have to be abandoned in terms of the notion that some configurations are more highly marked than others, in the sense in which that word is used in current phonological theory. Some account of the markedness of syntactic constructions must play a part in any adequate theory of language; it seems to me that the considerations discussed above must be part of such an account.

## MIND AND BODY

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*This paper was written in 1967, while the author was a visitor at M.I.T., and was circulated in duplicated form. It has been given little attention in the aboveground linguistic literature [its conclusions are cited in McCawley (1968a)], although the underground edition appears to have been fairly widely read, and it may have indirectly influenced some subsequent studies (such as Lawler, 1971, and Borkin, 1973) that have been concerned with pinning down exactly what the different occurrences of a "human" NP refer to (whether to the person, to his body, to his ideas, or to his influence as manifested through the actions of those to whom he gives orders). The version published here is that which was circulated in 1967, with some minor deletions and stylistic improvements, supplemented by annotations prepared by the author in 1974.*

### I. PHYSICAL AND MENTAL PREDICATES<sup>a</sup>

*John weighs 150 pounds.*

*John is 6 feet tall.*

*John's temperatures is 98°*

What do we mean by such sentences?<sup>1</sup> What is the object the weight, size, and temperature of which is being estimated?

The answer is obvious: John's body. Clearly, the word *John* serves in the above sentences as an abbreviation for the expression *John's body*.

*John washed himself - John washed his body.*

*John saw himself in the mirror - John saw (the reflection of) his body in the mirror.*

*John lay on the floor - John caused his body to begin to lie on the floor.*

To be sure, this abbreviation may be obligatory. But just as in the case of other obligatory transformations (e.g., deletions) the obligatoriness of the transformation does not prevent us from establishing a hypothetical deep structure different from the surface structure, so too the obligatory character of the abbreviation

*John's (living) body ⇒ John*

should not be allowed to obscure the real underlying structure. We do not use such sentences as

*John's body lay on the table.*

if John is alive. Nevertheless, the sentence is obviously about some relation between two material objects - a table and John's body.

Consider now some other sentences:

*John loves Mary.*

*John has revolutionary ideas.*

*John believes that story.*

Can we paraphrase these sentences by substituting for the word *John* the expression *John's body*? Evidently not. The conclusion is clear: the meaning, or rather the use, of the word *John* differs in the two series of sentences. In the first series, *John* refers to a certain physical object (*John's body*); in the second series, to a certain human individual, conceived of as a nonphysical entity.<sup>b</sup> To repeat, a nonphysical, i.e., neither a physical, nor a mixed psycho-physical entity. The expression *John's body* contains clear proof of this, for if John has a body, John can be neither a body nor a combination of a body and anything else.

The objection might be raised: but do we not say that John has a mind (*John's mind*)? Does this mean that in sentences concerning John's desires, beliefs, likes, and dislikes, the word *John* is again an abbreviation, this time an abbreviation for *John's mind*? Certainly not. "My attitude towards him is an attitude towards a soul. I am not of the

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*opinion that he has a soul" (Wittgenstein, 1953, p. 178).*

*John has a soul;  
Upon the whole  
The tombstone lies that says: hic jacet.  
But if John really has a soul,  
Who in the world is John who has it?*<sup>2</sup>

We cannot consider the expression *this man* as an abbreviation for *this man's mind* (or *soul*), because if we did, we would be compelled to admit that this man's mind means this man's mind's mind, and so on, ad infinitum. The word *mind* is not necessary in the postulated vocabulary of primitive semantic units; it can perfectly well be dispensed with.<sup>c</sup>

*John's mind is an inquisitive one  
= John is inquisitive  
= John is disposed to ask questions  
  
John's heart is a sympathetic one  
= John is sympathetic  
= John usually feels sympathy for other people.*

One of the most controversial questions in philosophy is, can we ascribe states of consciousness - thoughts, feelings, memories, intentions, etc. - to the same entities to which we ascribe corporeal characteristics - height, spatial position, weight, etc.? From the semantic point of view it seems clear that we cannot. For in sentences about height, weight, spatial position, etc., the subject can be paraphrased according to the scheme *John* ⇒ *John's body*, whereas in sentences about thoughts and desires this is not possible. Such a radical difference in the range of possible paraphrases must reflect a radical difference in meaning. Therefore, the subjects of *John is dirty* and *John is kind* are different. "...It is certain that I (that is, my mind, by which I am what I am) is entirely and truly distinct from my body" (Descartes, "Meditation VI").

I disagree, for example, with the Katzian type of analysis, according to which the semantic counterpart of the word *man* is always a combination of the markers "human" and "physical object" (Katz 1966, p. 155). For in some sentences the word *man* refers only to a physical object (*The man was dirty*), while in others, it does not refer to any physical object at all (*The man believed the story*).

This same objection could be made to Strawson's view, according to which the notion of "person" is primitive, "person" being a peculiar primitive semantic unit to which both physical and mental predicates can be applied.<sup>3</sup> However, it is only in the surface structure of the sentences that both physical and

mental predicates apply to the same subject (*John is dirty - John is smart*); in the deep structure, physical and mental predicates are never coapplicable. The notion of person cannot be treated as primitive, since it is dissoluble into two elements, which can be spoken about separately and which are not mutually substitutable: *d John hates himself* cannot be rendered as *John hates his body*, nor *John hates his body* as *\*John's body hates John*.

## II. SELECTIONAL RESTRICTIONS

"There are some predicates that can take only animate subjects (objects); there are some others that can take only inanimate concrete subjects (objects); there are still others that take only abstract subjects (objects)." Statements of this kind constitute the basis of a theory of selectional restrictions, advocated by, among others, Noam Chomsky. The verb *frighten*, for instance, is said to be allowed to take abstract subjects and animate objects, but not conversely. Combinability with animate subjects (objects) is claimed to be one of the important characteristics of verbs "in the base" by George Lakoff.

I disagree. I do not think that "selectional restrictions" of the kind exemplified above are a separate property of verbs that should be stated "in the base". The phenomenon of selectional restrictions in natural language is of an importance that can hardly be overemphasised, but in my opinion, this phenomenon has very little to do with *the boy's frightening sincerity*.

*John's hair is blond - \*John's eyes are blond.*

*John's eyes are hazel - \*John's hair is hazel.*

Here is a genuine example of a selectional restriction: *blond* means 'fair', 'light in color', but its use is restricted to hair (and recently, furniture); *hazel* means 'light reddish brown', but its use is restricted almost exclusively to eyes.

The restricted use of *blond* and *hazel* cannot be predicted on the basis of their meaning; therefore, it must be considered a separate property (superficial, not deep) of these words. Not so in the case of *frighten*. The restricted range of applicability of the word *frighten* can be predicted on the basis of its meaning.

To *frighten* means to cause someone to be afraid. Only an event can constitute the cause of something. Therefore, the word *frighten* opens in the sentence a slot for the specification of an event. This does not mean that an event (e.g., "someone's being sincere") is the deep subject of

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frighten. It is not, because *frighten* is not a predicate. A genuine predicate is contained in the meaning of *frighten* (namely: 'to be afraid'). "Being afraid" is a mental predicate, therefore it may be applied only to human subjects (and to man-like animals, cf. Wittgenstein's revealing remarks). Since the verb *frighten* combines in its meaning a predicate, whose subject is stated separately (in the form of the surface object), and the concept of causality, it opens, as we have said, a slot for an event expression, i.e., for the combination of a subject with a predicate. By a very general transformation (which I will discuss below in Section VII) the sentence that indicates the cause of some event can be reduced to the bare subject or to the bare predicate. There is nothing more to it than that. So far, so good, it might be objected, but is it not necessary to give a list of predicates that take only human subjects anyway?

The point is that this list can be limited to a few simple elements ('to believe', 'to want', and a few others). The huge majority of mental predicates can be shown to be mere combinations of elementary mental predicates. Of course, combinations of mental predicates are also applicable only to human arguments - but that sort of selectional restriction is again predictable on the basis of the meaning. Here are some examples:

<i>to hope</i>	<i>to order</i>
<i>to force</i>	<i>to interest (in something)</i>
<i>to convince</i>	

All these verbs are applicable only to human (animate) objects. And indeed, how could they possibly be applied to anything else if their meaning contains an element of belief or desire?<sup>e</sup>

<i>John hopes that X</i>	= <i>John expects and wants X</i>
<i>John ordered Bill to do X</i>	= <i>John said to Bill that he (John) wants Bill to do X even if Bill does not want to do X in order to cause Bill to do X</i>
<i>John forced Bill to do X</i>	= <i>Bill did not want to do X but he did do X because of something that John did in order to cause Bill to do X</i>
<i>John interested Bill in X</i>	= <i>Bill began to want to know about X because of something that John did in order to cause Bill to want to know about X.</i>

*John convinced Bill of X = Bill began to believe X  
because of something that  
John did in order to make  
Bill believe X*

Consider also the following sentences:

*John smiled at Mary.*

*John winked at Mary.*

*John was talking to Mary.*

*John wrote Mary a letter.*

*John nodded to Mary.*

The word *Mary* cannot be replaced in the above sentences by an inanimate object. A selectional restriction? Yes, if one chooses to call it so. But one fully predictable on the basis of the meaning.<sup>4</sup>

*John smiled at Mary = John smiled in order that Mary  
might think that John...*

*John winked at Mary = John winked in order that Mary  
might think that John...*

*John was talking to      John was talking in order that  
Mary                        =      Mary might think that John...*

The prepositions (*at, to*) function in the sentences under consideration as abbreviations for rather complex semantic structures, structures that contain the elements 'want' and 'think' and that therefore can only be applied to human subjects.<sup>f</sup>

Thus there are accidental, language-particular selectional restrictions and there are semantically motivated selectional restrictions. The two types of phenomena have nothing in common and should be most carefully distinguished.

A basic type of semantically motivated selectional restriction is those pertaining to predicates. The most important point here is that there are physical predicates and mental predicates; there are subjects to which physical predicates are ascribable and there are subjects to which mental predicates are ascribable. *Tertium non datur.*<sup>g</sup>

### III. STATEMENTS ABOUT PERCEPTION

*John saw a fox.*

Who saw a fox - *John*<sub>1</sub> (John's body) or *John*<sub>2</sub> (the genuine

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"John")? Is this a sentence about the man John or about a material thing, John's body (about "the inner John" or about "the outer John", as Augustine would say)? In a slightly different formulation, this same question has engaged philosophers for centuries.

Denying sense to the attempt to think of feelings, sensations, emotions, etc. apart from a living organism may seem to be practically the same as denying disembodied mind altogether. Such a denial does not follow, nor has it historically always been held to follow. Aquinas, for example, believed that there were wholly disembodied intelligencies, but that they were not liable to any such experiences as seeing and hearing and feeling afraid and having a pain: the evil spirits in hell are tormented not by aches but by the frustration of their wicked wills.... Sensuous experiences are possible only in connection with a living organism.... Only since Descartes has the main problem become: "How is *cogitatio* related to bodily processes?" ("*cogitatio*" covering, for him, everything "in the mind", from a toothache to a metaphysical meditation); the old problem was rather: "How can a being that thinks and judges and decides also have sensuous experiences?" It was "intellectual" acts like judgment, not just anything that would now be called "consciousness", which seemed to Aquinas to be wholly incommensurable with events in the physical world; for him, "the unbridgeable gulf" was in a different place. (Geach 1957, p. 269)

This is one of the many philosophical problems that seem to stem from a lack of semantic analysis, in particular from confusion of the surface structure of sentences with their deep structure.

In my opinion, sentences about perception are compound sentences; in the deep structure (in Wittgenstein's sense) they contain a sentence about a man, another sentence about this man's body, and a third element (the exact nature of which constitutes a problem apart) that indicates the causal relation between the facts described by those first two sentences; i.e.,

*John saw a fox = (1) John had an image of a fox*

(3) *because*

(2) *John's eyes came into (indirect)  
contact with a fox*<sup>5</sup>

This is no more than a provisional formulation of the three semantic components involved.<sup>h</sup>

In light of this interpretation, the apparently contrary views of Aquinas and Descartes turn out to be fully compatible. We must agree with Aquinas, since the idea of a disembodied intelligence that senses and perceives is self-contradictory, and we must at the same time agree with Descartes, for since the notions of seeing and perceiving involve mental images, they cannot be wholly reduced to bodily processes. As Augustine says, "Homo interior cognovit haec per exterioris ministerium; ego interior cognovi haec, ego animus per sensus corporis mei".<sup>6</sup>

Of course, if the meaning of the verbs of perception includes the element of contact of the human body with some physical object, then we cannot "perceive" (in the basic sense of this word) any nonexistent states of affairs. Sentences like:<sup>7</sup>

*I see that Jones is not here.*

*I see that they are going to have tea in the garden.* are clearly abbreviations:

*Because of what I see I believe that Jones is here.*

*Because of what I see I believe that they are going to have tea in the garden.*

As Bertrand Russell (1965, p. 70) says: "Suppose you are told: there is butter in the larder, but no cheese. Although they seem equally based upon sensuous experience in the larder, the two statements *there is butter* and *there is no cheese* are really on a very different level. There was a definite occurrence which was seeing butter, and which might have put the word *butter* into your mind even if you had not been thinking of butter. But there was no occurrence which could be described as 'not seeing the cheese' or as 'seeing the absence of the cheese'. You must have looked at everything in the larder, and judged, in each case, 'this is not the cheese'. You judged this, you did not see it; you saw what each thing was, not what it was not."

One last point I would like to raise here is the ambiguity of the word *I* in statements of perception. G. E. Moore (1959, p. 303) reports a valuable comment of Wittgenstein's on this question. "He was quite definite that the word "I" or 'any other word which denotes a subject' is used in 'two utterly different ways', one in which it is 'on a level with other people' and one in which it is not. This difference, he said, was a different in 'the grammar of our ordinary language'. As an instance of one of those two uses, he gave 'I've got a match-box' and 'I've got a bad tooth', which he

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said were on a level with 'Skinner has a match-box' and 'Skinner has a bad tooth'. He said that in these two cases 'I have...' and 'Skinner has...' really were values of the same propositional function, and that 'I' and 'Skinner' were both 'possessors'. But in the cases of 'I have toothache' or 'I see a red patch' he held that the use of 'I' is utterly different."

Perhaps one amendment might be added to Wittgenstein's analysis. In the deep structure of the sentence *I have a toothache*, the word *I* occurs twice - in each of its two different senses.

*I have a toothache = I am in pain* (where *I* cannot be assigned any separate element of meaning, and is just a part of a complex expression of pain, a part of the "secondary pain behavior")<sup>i</sup>

*because*

*something is wrong with my tooth*  
*(my tooth meaning here a tooth*  
*of mine = a part of this body)*

Therefore, strictly speaking, we should say that the word *I* has three, or even four different uses (to avoid the word "meanings"):

- (1) In such sentences as *I am in pain*, *I believe...*, *I want...*, *It seems to me...*, *I imagine...*, *I* has no separate meaning by itself.
- (2) In such sentences as *I believe in God*, *I am ambitious*, *I like Jim*, *I* means *this person*.
- (3) In such sentences as *I am heavy*, *I am dirty*, *I am short*, *I* means *this body*.
- (4) In such sentences as *I see...*, *I am walking*, etc. *I* is a shorthand abbreviation covering various combinations of the three previous senses (or rather covering various parts of sentences with the word *I* in its previously singled out senses)

IV. IDENTIFICATION OF PARTICULARS

I have been claiming that the subjects of *John is heavy* and *John is kind* are different. However, the function of the subject of a sentence consists in identifying the object to which a given predicate is ascribed. The way in which the word *John* fulfills its identifying function when used in referring to a living body rests upon demonstrative identification: we identify material bodies on the basis of their spatiotemporal relationship to our own bodies (cf., in this connection, the interesting analysis by Strawson). But how can a word identify anything (i.e., be the real subject in the deep structure) in cases when it does not refer to a physical body? Strawson (1959, p. 10) suggests the following answer: "Perhaps not all particulars are in both time and space. But it is at least plausible to assume that every particular which is not, is uniquely related in some way to one which is."

There can be no doubt that the only material (spatio-temporal) particular that can claim the role of a sign by means of which a human person can be identified is the human body. If for each person in the world there is exactly one body that stands in a special, unique relation to that person, the identification of the person can rest upon the identification of the body.<sup>8</sup>

This explains perhaps the oddness of the expression *John's body* in reference to a living human body. We learn the meaning of the word *John* (that man) by means of our having learned the meaning of the abbreviation *John* (that body). *That man* means for us the man whose body is that object there. For this reason, our ability to use the expression *that man* is often dependent on our ability to identify "that body". We would feel uneasy about saying *this man's body is heavy* instead of *this man is heavy*: the word *this* somehow already implies the body, because *this (person)* may be meant as *the person whose body is this*.

V. OWNERSHIP

The problem I want to deal with is basically not ontological, but semantic. What is meant by *John's body*, *this man's body*? *Man* (in the sense 'homo') is apparently a primitive; a "body" is some kind of "thing" (*thing* being a primitive). But what is the relation between a man and his body? What do we mean by saying that this is his body? The naive answer (yet one that has been given by many philosophers) runs as follows: *John's body* means that John has this body, that he owns this body. But what does *to have* or *to own*

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mean? V. Rosenvieig, in his semantic analysis of the vocabulary of possession, takes the meaning *to own* as indefinable (primitive). The same position was taken recently by E. H. Bendix (1966), in his comprehensive analysis of different uses of the verb *have*. Is this solution inevitable? The primitiveness of the notion of ownership seems to me dubious. I would suggest the following as a possible line of analysis:

<i>X owns Y</i>	=	<i>X has the right to do with X what he wants to</i>
<i>Y belongs to X</i>	=	<i>people (the society) want X to be able to do with Y what he wants to.</i>
<i>John has a car</i>	=	<i>there is a car that John "is free" to do what he wants with</i>
	=	<i>there is a car that people (the society) want to depend on John's will</i>
	=	<i>there is a car that people (the society) want to have happen to it whatever John wants to happen to it.</i>

If this analysis is essentially correct, the notion of "ownership" cannot be applied exactly to the relation between a man and his body. First, because the dependency of the human body on the will of the human person is not due to any social contract. Second, because the sentence *There is a body that John owns* would be nonsensical (in Wittgenstein's sense of a sentence being nonsensical) just as the sentences *John was born*, *John was the son of his mother* are nonsensical.

We learn to single out a particular man, we learn to be able to speak of him at all by virtue of his having a body. Therefore we cannot predicate of him that "he has a body". The relation that holds between a man and his body is not suited to be a predicate. Nonetheless, the relation holding between a man and his body does resemble somewhat that of ownership: this ownership rests on dependency, on the permanent possibility of causal relationships between someone's will and some changes affecting the owned object. Now, the dependency of states of the human body on the human will is crucial for the relation "that man - that man's body" (cf. Plato's idea,

admirably expressed in "Alcibiades", of this man = the user of this body). "My body" is the body (thing) which "is at my disposal" (= with which I do what I want).j

## VI. MIND-BODY INFLUENCE

Let us examine some linguistic facts.

*John enlarged the hole in the wall with the knife.*

What is the deep structure of this sentence? When we look at it more closely we find several underlying sentences.<sup>9</sup>

*The hole in the wall began to be larger than it had been before*

*because*<sup>10</sup>

*the knife... (came into contact with) the wall*

*because*

*John (John's body)... (did something with) the knife*

*because*

*John wanted it*

Thus we are presented here with a whole series of causally connected events: John's will causes (a part of) his body to move, the movement of John's body causes the knife to come into contact with the wall, the contact of the knife with the wall causes the hole in the wall to become larger.

*John opened the door with the hammer*

*= the door opened (= began to be open)*

*because*

*the hammer... (came into contact with) the door*

*because*

*the hammer moved (= changed its place = began to be in a different (= not the same) position from what it had been before).*

*because*

*John's body moved*

*because*

*John wanted (his body to move)*

*because*

*John wanted the door to be open*

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The instrumental adverbial always conceals in itself the subject of a separate sentence, with a specified or unspecified predicate (*John broke the window with a hammer* versus *John broke the window with a blow of a hammer*) and an exponent of causal relationship (*because*).<sup>11</sup> In almost all sentences that contain a verb of activity, there is a syntactic position<sup>12</sup> (open slot) for the instrument of the action; an instrumental adverbial can be inserted.

*John killed the rabbit (with a knife).*

*John wrote a letter (with a pen).*

*John moved the pillow (with his foot).*

The one exception to this pattern are sentences of the type:

*John stretched himself out on the carpet \*with...*

*John sat down \*with...*

*John got up \*by means of...*

*John walked \*by means of...*

With what? By means of what? Of nothing. Directly - by his will.

It is scarcely necessary to argue that verbs like *sit down*, *get up*, *walk*, etc. are semantically not less "transitive" than *seat*, *raise*, *carry*, *send*, etc. (Incidentally, *seat* does not mean, as is often said, *cause to sit*; if we were to define *sitting down*, after Webster, by means of "to rest upon the haunches", then the difference between *sitting* and *seating* should rather be stated as *to sit* = 'to cause one's own body to rest upon the haunches', *to seat* = 'to cause someone else's body to rest upon the haunches'.) Verbs like *sit down*, simply contain their object in their own meaning, this object being uniquely specified: one's own body. (We say "object", but what is actually contained in the meaning of these verbs is the subject of another underlying sentence, i.e., the sentence that describes the fact caused by the will of the person whose name constitutes the subject of the first underlying sentence.)<sup>13</sup>

Now when the object of volitional causation (the subject of the caused event) is one's own body, the sentence describing such an event cannot contain any instrumental syntactic position; the human body is the only thing (physical object) in the world the states of which can be caused directly by the will of the person who "owns" that body. It is this absence of any instrumental position in sentences about states of the body caused by the will that indicates that we are touching here the very heart of all philosophy:

"the meeting place between mind and matter".<sup>14</sup> "Imperat animus ut moveatur manus, et tanta est facilitas ut vix a servitio discernatur imperium: et animus animus est, manus autem corpus est" (Augustine, Book 8, Chapter IX).

Let us consider briefly the related question of whether anybody's mind can be directly influenced by some other mind.

*John informed Bill of it (by a letter).*

*John convinced Bill of it (by means of a diagram).*

*John interested Bill in it (by means of a book).*

However:

*John decided to do it (\*by means of...)*

*John adopted Bill's view (\*by means of...)*

*John rejected Bill's view (\*by means of...)*

The only person in the world whose states (beliefs, intentions, etc.) you can influence directly is yourself. When the object of volitional causation (the subject of the caused event) is oneself (the person who causes anything by his will) the sentence describing such an event can not contain any instrumental syntactic position.<sup>k</sup>

## VII. BODY-MIND INFLUENCE

*John kissed the wall.*

*John kissed the ground.*

*John kissed the rock.*

are perfectly good sentences. However:

*\*John kissed the house.*

*\*John kissed the room.*

*\*John kissed the island.*

are bad sentences. To kiss something means (contains in its meaning) to press one's lips to something. If you are pressing your lips to a wall, to the ground or to a rock, you are only making contact with a part of the given wall or rock; nevertheless, a part of a rock, a wall or the ground is still called *wall*, *rock*, and *ground*; therefore, you can be said to be kissing a wall, a rock, or the ground. But a part of a room is not a room, nor a part of a house a house; therefore, you can not be said to kiss them. Probably, the size of the object in question is also relevant; if you kiss a reasonably small object, your lips can be considered to come into contact

### Mind and Body

with almost the whole of the object in question. So far so good. But consider the following sentences:

*John kissed Mary's hand.*      *John kissed Mary.*

*John patted Mary's shoulder.*    *John patted Mary.*

A part of Mary is not Mary; you cannot kiss (press your lips to) Mary's body (as a whole), you can only kiss a part of Mary's body. So we would rather expect the sentence *John kissed Mary* would be just as unacceptable as *\*John kissed the house*. But it is not. Notice also the difference:

*John gave Mary a kiss (a pat, a stroke, etc.)*

but

*\*John gave the table a kiss (a pat, a stroke, etc.)*

Consider other facts.

*John kissed Mary's hand.*      *John kissed Mary on the hand.*

*John patted Mary's shoulder.*    *John patted Mary on the shoulder.*

However:

*John kissed the top of the table.*      *\*John kissed the table on the top.*

*John patted the leg of the chair.*      *\*John patted the chair on the leg.*

How can we account for this difference?

One more curious little fact. Imagine John's father is dead, and his body is lying in an open coffin.

*John came to the coffin and kissed the cold hand of his father.*

This is acceptable. But:

*John came to the coffin and \*kissed his father on the hand.*

The construction *to kiss (pat, hit, lick, etc.) on the hand (cheek, etc.)* is evidently only possible when referring to living persons. Why?

Another puzzle. *To kiss* means (or in any case contains in its meaning) 'to press one's lips to'.

*John kissed the wall*      =    *John pressed his lips to the wall.*

*John kissed Mary's hand*    =    *John pressed his lips to Mary's hand.*

But:

*John kissed Mary* = \**John pressed his lips to Mary*.

*To stroke something* means (or contains in its meaning) 'to move gently one's hand on something'.

*John stroked the book* = *John gently moved his hand on the book*.

*John stroked Mary's shoulder* = *John gently moved his hand on Mary's shoulder*.

But:

*John stroked Mary* = \**John gently moved his hand on Mary*.

What is the matter? It is obvious that there exists a whole complex of peculiarities restricted to sentences concerning the human body. Essentially the same peculiarities hold for Polish, Russian, French, and several other languages. Are these features universal? And if so, are they semantically determined, i.e., are they determined by some semantically motivated peculiarities of the deep structures of sentences referring to the human body? I would argue that such is the case.

In *John kissed Mary* the word *Mary* does not alternate with other objects of kissing such as *the book*, *the wall*, etc. (*John kissed the book*, *the wall*, etc.). In the sentence *John kissed Mary*, the position of object<sup>15</sup> is unoccupied; hence, an object can be inserted: *John kissed Mary - on the cheek*. The object position is occupied in the latter sentence by *on the cheek* and not by *Mary*. The fact that an expression such as *on the cover* cannot be inserted into the sentence *John kissed the book* is connected with the fact that in this sentence the object has been specified already (*the book*). Despite their formal differences, the functionally parallel elements are *on the cheek* and *the book*, not *Mary* and *the book*.

*John kissed (Mary) on the cheek.*

*John kissed the book.*

Notice that \**John kissed the cheek* would be a deviant sentence. It is another interesting fact, which we cannot go into now, that we never speak about living human bodies without reference to the "owners" of these bodies. What is important here is that we should postulate for the deep structure of the sentence some indication of the "owner".

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*John kissed (Mary) on the cheek* = *John kissed (Mary) on  
Mary's cheek*  
= *John kissed Mary's cheek.*

The above considerations lead us to a rather unexpected conclusion that in the two sentences

*John kissed Mary on the cheek.*

*John kissed Mary's cheek.*

the role of the word *Mary* is different. In the second sentence *Mary* is a modifier, indicating the "owner". But what is it in the first sentence? I would argue that it is the subject of another sentence, the predicate of which is unspecified, connected with the sentence about John's kissing by a causal conjunction (*because*):

*John kissed (hit, patted...) Mary on the cheek*

= *John kissed (hit, patted...) Mary's cheek, and  
consequently, Mary...*

Thus, language reflects the common belief to the effect that whatever happens to the human body ("happens" in the sense of "physically happens", "affects", the latter expression referring first of all to the contact of the human body with any other physical object) can be the cause of some new state for the human person. Again, the human body is the only physical object in the world the states of which can directly cause something for the human person.

The state of a dead human body cannot cause any state in the human person (the owner of that body). This fact could perhaps even serve as a definition of the notion of death; this explains why the sentence:

\**John kissed his dead father on the hand.*

is deviant.

But to explain all the facts, the analysis must be taken a little further. Consider again:

*John kissed Mary's hand* - *John kissed Mary on the hand.*

*John pressed his lips to  
Mary's hand* \**John pressed his lips to  
Mary on the hand.*

In order to account for the above facts we have to establish which part of the sentence is responsible for the semantic element of causality. Perhaps it is the verb itself that serves as the bearer of this element?

*to kiss X = to press one's lips to X (causing by that...)*

*to stroke X = to gently move one's hand on X (causing by that...)*

The part of the meaning indicated in brackets is realized only on condition that some being is indicated who may be the subject of the state of affairs that is brought about by the action. Nothing like that (... causing by that something for X ...) is included in the meaning of such expressions as *to press one's lips to*, *to gently move one's hand over*, etc.<sup>16,1</sup>

In support of this possibly bizarre-sounding analysis, one might cite further examples from the huge range of unspecified predicate phenomena in language, especially where the immediate context contains the semantic element of causality. When the content to be conveyed has the structure:

$S_1 P_1$  (at  $t_1$ ) because  $S_2 P_2$  (at  $t_2$ )

(some subject  $S_1$  has at the time  $t_1$  the property  $P_1$  because some other subject  $S_2$  has had at the time  $t_2$  the property  $P_2$ ), then one of the predicates ( $P_1$  or  $P_2$ ) very often becomes unspecified, and at the same time the semantic element *because* gets "hidden" in the verb that serves as the formal exponent of the other predicate. A few examples may help to clarify this point.

*John surprised Bill = Bill was surprised because John did something (had some property X)*

*John was mad at Bill = John was mad because Bill did something (had some property X)*

*John killed Bill = Bill died because John did something*

*John was frightened = John was frightened because Bill... by Bill*

And in general:

$S_1 P_1$  because  $S_2 P_2$

=  $S_1 P_1$  because of  $S_2 P_2$

=  $S_1 P_1$  because of  $S_2$

=  $S_2 P_2$  caused  $S_1 P_1$

=  $S_2$  caused  $S_1 P_1$

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*John was surprised because Bill had escaped*

- = *John was surprised because of Bill's having escaped*
- = *John was surprised because of Bill*
- = *Bill's escape surprised John*
- = *Bill surprised John.*

To refute this analysis, another interpretation must be proposed that would account for the facts in an equally simple or simpler way. One such alternative proposal might be: *To kiss X* does not mean simply 'to press one's lips to X' but 'to press one's lips to X because of certain feelings toward X'; *to stroke X* does not mean 'to move one's hand gently on X', but 'to move one's hand gently upon X because of the feelings toward X'. Indeed, when in the course of some technical activity the worker has to press his lips to some part of some mechanical device or to gently move his hand about that device, we would hardly call that *kissing* or *stroking*. Accordingly, it might be argued, *to kiss Mary on the cheek* must mean 'to press one's lips to Mary's cheek because of one's feelings toward Mary', *to stroke the child on the head* must mean 'gently move one's hand on the head of the child because of one's feelings toward the child' and *to kiss the Bible* (or the *ground*) must mean 'to press one's lips to the Bible (or to the ground) because of one's feelings toward the Bible (or the ground)'. Thus, the presence of an additional argument (the name of the human person, besides that of the human body) in the sentence *John kissed Mary on the cheek* is accounted for and there is no further need to postulate a separate sentence of the type *something happened to Mary* in the deep structure.

Perhaps the verbs *kiss* and *stroke* do contain a semantic component 'because of feelings toward'. But all the same, the presence of such a component is not the genuine reason for the "human argument" (*Mary*) to appear in the sentences under consideration. Here is the proof or what seems to me to be a proof:

*Mary hit herself on the forehead.*

*Mary happened to scratch herself on the forehead.*

The two syntactical positions of physical object (the human body) and human person are also present in sentences where the semantic element of "because of feelings" is out of the question. My scheme of semantic analysis - to come into contact with a human body causing by that something for the human person, "the owner" of that body - seems to provide an explanation for

all the observed facts.<sup>m</sup>

NOTES

<sup>1</sup>The semantic conception underlying this paper stems from Andrzej Bogusławski (see Bogusławski, 1966). The other people whose influence I am most conscious of are Igor Mel'čuk, Holger Sørensen, Uriel Weinreich, and Aleksandr Žolkovskij.

<sup>2</sup>This verse is borrowed from Anscombe and Geach (1963), p. 39.

<sup>3</sup>See Strawson (1959), Chapter 3 ("Persons").

<sup>4</sup>See in this connection the analysis of the notions "meaning", "sign", "signify" in Bogusławski (1966), p. 12.

<sup>5</sup>Strictly speaking, the sentence *John saw a fox* means that John had the mental image of (the appearance of) a fox, because John's eyes came into contact with reflected light, the cause of the given characteristics of the light being, in turn, its contact with a fox. Similarly, *John smelled the roses* means 'John had the mental image of a smell such as that produced by roses, because John's nose came into contact with some odorous substances in the air, the cause of which was roses'. *John heard the barking dogs* means 'John had the mental image of such sounds as those produced by barking dogs because John's ears came into contact with vibrating air, the cause of which was the contact of that air with the barking dogs', etc.

A different use of the verbs of perception is involved when they convey only the first semantic component, that of the mental image alone ("to see in a dream", "in imagination", "with one's mind's eye", etc.).

<sup>6</sup>

Augustine, "Confessions" Book 10, Chapter VI.

<sup>7</sup>I take these sentences from Warnock (1965, p. 61-62), who cites them in support of his rather surprising view that it is not only visible objects that can be literally seen.

<sup>8</sup>

For an argument in favor of this view, see Ayer (1965).

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<sup>9</sup>The dissolution of the meaning of verbs of activity into three components - the person's will, the causal relation, and some change in the world - (*John lay down on the floor = John's body began to be lying on the floor because John wanted it*) has been advocated by Andrzej Boguslawski. But the majority of linguists and philosophers regard "activity" as a primitive semantic element. As a counterpart for "activity" another "elementary" semantic element particularly in vogue in recent linguistic publications in America is that of "stativity". In my view, "stativity" is a fictitious notion. If we are prepared to call the combination of anything with its cause (or causation of anything by the will) "activity", then everything that does not fit into this scheme can be called a "stative" if we so desire, but all that this proves is that a special concept of "stativity" is completely superfluous and, more than that, misleading.

<sup>10</sup>I disagree with those who, like Lakoff and Ross, consider the semantic element of "cause" to be a predicate and consequently, an element constituting a separate sentence in the deep structure.

First of all, the relation between two events is, semantically, never a predicate. A predicate is always a property of an (a group of) object(s), not of an event. This point is of great importance, and I will therefore dwell on it a little longer.

In *I beat my wife in the yard* (Lakoff's example) *in the yard* is not a predicate ascribed to the event "*I beat my wife*". To say that it is the event that takes place in the yard is only an abbreviation for saying that the people involved in the event are in the yard when the event takes place.

*I beat my wife in the yard = When I beat my wife, we/me and my wife/ are in the yard.*

Furthermore, *being in the yard*, no matter to what it is ascribed, is not a predicate at all:

*I am in the yard = I, the yard - are in contact (touch one another),*

only the *being in contact* constitutes a genuine predicate.

I am aware that in claiming that an event cannot constitute the subject of any sentence and that, consequently, a relation between two events cannot be conceived of as a predicate, I am taking a position that was expressly attacked by, for example, Reichenbach (1966, p. 301-317). However, I feel it is necessary to reject Reichenbach's famous "higher

"functions calculus" in its application to natural language. It seems to me that in postulating it, Reichenbach, the pioneer of deep structure analysis, let himself be led astray by surface structure.

Reichenbach is no doubt right when he argues that in the sentence *John drives slowly* the word *slowly* cannot be considered an independent function (a predicate) of the argument *John*. But this does not necessarily entail that the adverb is here the predicate either of the property (driving) or of the fact (*John's driving*). We would be compelled to accept Reichenbach's alternative (the adverb is either a modifier of the predicate or a modifier of the sentence) only if we adopted his tacit assumption that semantic concepts (subjects, predicates) correspond to the words in linguistic expressions. Very few linguists would be willing nowadays to adopt such an assumption.

I propose the following semantic analysis (considerably simplified in respects that are not relevant here) for the sentence *John drives slowly*:

*John drives (cars) slowly* = When *John causes a car (or whatever he may drive) to change its location [to be in successive moments in different (not the same) places]*, the time intervals between the car's being in successive places are long (longer than in the majority of cases of other people's driving cars).

If the above line of analysis is correct (I would stake a good deal less on the details), one immediate consequence is that the adverb *slowly* is not a predicate at all, but simply some sort of time adverbial. And neither Reichenbach nor I would be willing to consider a time adverbial as a predicate.

Another example analyzed by Reichenbach in support of his higher functions calculus is *Annette dances beautifully*. I cannot go very far here into the analysis of that sentence; perhaps it will suffice to indicate the line of interpretation along which Reichenbach's conception can be refuted. The real subject of *beautiful* is "me" (the speaker), *X is beautiful* meaning roughly 'I approve of X', 'X is as I want it to be'. (Wierzbicka, 1975b)

One type of adverb has been shown by Lakoff, (1968a) to form predicates of particulars (*The tailor fitted me carefully* = *the tailor was careful in fitting me*; *John sharpened knives cautiously* = *John was cautious in sharpening knives*).

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Let us return to our initial problem of causality. Reichenbach is consistent in calling causality a "fact function" (predicate of facts). But since in the deep structure of sentences no fact functions exist, the causality cannot be a predicate either. The semantic element "because", which connects two sentences, does not form a part of either of them. Not being a predicate, it cannot constitute the basis of a third sentence either (if we agree to reserve the term "sentence" for a modally characterized combination of a subject and a predicate). Once more traditional grammar appears to have been right, this time in treating the element "because" on a level with other conjunctions - "and", "but", "so", etc. - which are not predicates at all.

<sup>11</sup>In cases when the verb *use* can be substituted for the instrumental adverbial, this complement conveys not only a causal content, but also the notion of purpose.

*John opened the door by means of a knife*

= *the door opened*

*because*

*the knife came into contact with the door*

*because John's body came into some contact  
with the knife*

*because John wanted it*

*because*

*John wanted the door to open.*

In general:

*John used the knife to open the door*

= *John did something with the knife (caused  
something to happen to the knife and the  
door) because he wanted the door to open.*

The analysis of the concept of purpose into someone's will plus causal relationship (*in order to = because he wanted to*) has been proposed by A. Boguslawski (1966). George Lakoff advanced the same idea during classes at Harvard in 1966.

<sup>12</sup>For the notion of syntactic position, see Karolak (1966).

<sup>13</sup>Semantically, the notion of the "object" is senseless (or at least superfluous); the object of an action is simply

the subject of some state of affairs that (the state of affairs) is caused by some other state of affairs. But of course there is no semantic common denominator for the object in this sense and the objects of other so-called transitive verbs. Semantically, there are subjects (sometimes compound subjects, e.g., ordered pairs, as in the case *A is to the right of B*), and there are properties - predicates. Elements that are suitable as subjects of sentences are not suitable as predicates, and vice versa.

<sup>14</sup>This expression has been borrowed from Viscount Samuel.

<sup>15</sup>Again, I am using here the term "object", "object position" only for the sake of brevity and in accordance with the common usage. The actual situation is that the meaning of such verbs as *kiss*, *lick*, *hit*, *tap*, etc. contains the predicate of *touching* (being in immediate physical contact). The property of being in contact can be ascribed only to a pair (a group) of objects; the subject of this property cannot be one single entity. Hence, if a sentence the content of which contains the element of *touching* refers explicitly to only one entity, another entity must always be implicitly given (contextually reconstructable).

<sup>16</sup>On the other hand, when such unusual expressions as *to press one's hand on someone*, do occur, they seem to imply immediately some kind of hidden effect for the touched person; recall biblical narrative, with its frequent references to "Jesus laying his hands upon people".

#### 1974 COMMENTS

<sup>a</sup>In the course of the eight years that have passed since this paper was written, my views on many points discussed here have changed. Nonetheless, I am still in substantial agreement with its main tenets; I believe it asks the right type of questions, and I still adhere to the framework within which questions of this type can be asked. This framework is briefly described below; for a fuller discussion, see Wierzbicka (1972).

Every natural language contains a subdomain that can be used as the language of semantic representation for the natural language in question. This subdomain reflects in an isomorphic way the universal and nonarbitrary *lingua mentalis* - the language of human thought; sets of indefinable expressions to be found

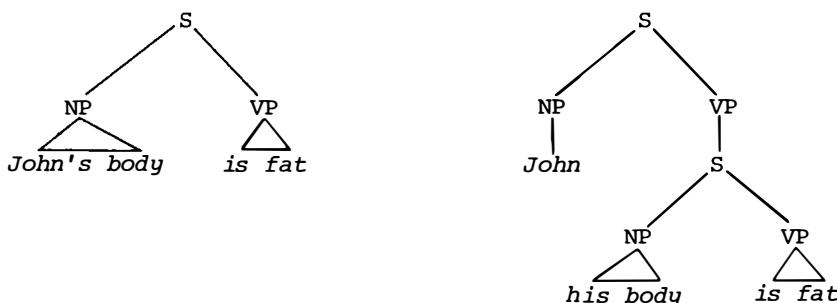
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in every natural language correspond to universal semantic primitives that can be thought of as lexical items of the mental language, or "atoms of thought". Proper semantic representation consists in paraphrase into these indefinable expressions drawn from natural language; no artificial symbols, "features", "markers", "abstract elements", labels, or indices are acceptable.

At the time of writing "Mind and Body", I had a few candidate primitives vaguely in mind, but I had not prepared even a tentative set. Since then, I have established what I believe to be the universal set (*I, you, this, something, someone, world, past, become, want, don't want, think, say, and imagine*), and I have found that some of my 1967 candidates are not among them. However, the main point of the paper - the argument in favor of distinguishing between "someone" and "something" as irreducible semantic units - seems to me valid. I also remain in agreement with the claims concerning the syntax of semantic representation, in particular with the thesis of the notion of "object" is irrelevant to deep syntax, and that the only categories that are relevant are those of subject and predicate. (For further discussion, see Wierzbicka, (1975a, 1975b).)

b

It seems clear that speaking about a person is not the same as speaking about a person's body. A human body may be six feet long, weigh fifteen stone, have this or that shape, color, temperature, or smell even after the death of its "owner". Nonetheless, it seems to me now equally clear that when we speak of the body of a living person, we usually do intend to say something about the person as well. When we say, for instance, *John is fat* we are saying something about John's body, but at the same time we are also saying something about John. The sentence *John's body is fat* appears to be semantically included in, rather than identical with the sentence *John is fat*. We indirectly characterize the person by saying something about his body. Schematically:

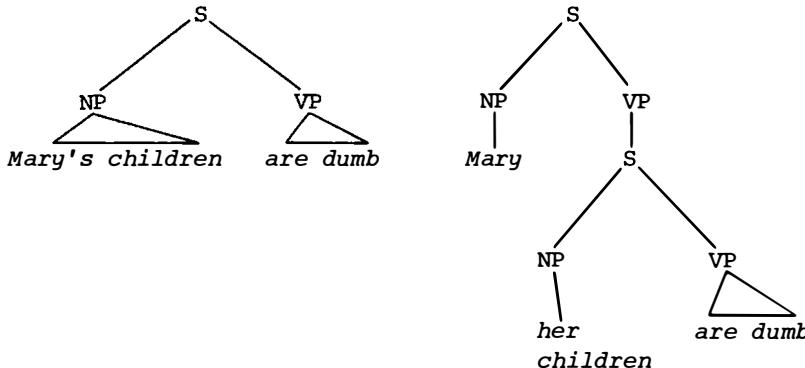


Similarly, two sentences of the type

*Mary's children are brilliant (dumb).*

*Mary has brilliant (dumb) children.*

are not synonymous, the second, but not the first, being a sentence about Mary.



This sort of mediated predication is faithfully reflected by surface structures that contain so-called "dislocated noun phrases", e.g., *Rudolf, women just can't resist him.* I believe that the supposed transformation of "dislocation" cannot be claimed to both exist and be meaning preserving. (See Wierzbicka, 1969.)

<sup>c</sup>I do not think that this paraphrase is exact (or for that matter that any other paraphrase given in this paper is exact), but that seems to be irrelevant from the point of view of the arguments involved.

<sup>d</sup>I should have said that the notion of person (better, "someone") is indeed primitive, but not Strawson's "person" to which both physical and mental predicates can be applied. Only mental predicates can apply to persons; physical predicates are restricted to those person's bodies.

<sup>e</sup>For a fuller discussion of the meaning of words for emotions and words for different speech acts see the chapter entitled "Acts of Speech" in Wierzbicka (1972).

<sup>f</sup>Clearly, the analysis of the meaning of the prepositions in *smile at*, *wink at*, or *say to* proposed here is not quite

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satisfactory. I tried to improve on it in Wierzbicka (1972), where I argued for the presence of the element "you" somewhere in the meaning of all communication expressions. But I still do not have what I would consider a fully satisfactory formula to express this intuition. (For further discussion of this point see Wierzbicka (1974).

<sup>g</sup>Today, I am inclined to think that the "tertium non datur" claim was in fact too strong. Perhaps there are objects to which both physical and some mental predicates can be ascribed. In particular, I tend to believe that in the deep structure of sentences about perception, "saying" is ascribed to objects like eyes, ears, nose, etc. (*My eyes tell me that...* versus *My eyes are shut*). (See Wierzbicka, to appear.)

<sup>h</sup>In more recent work (Wierzbicka, to appear), I have suggested a different analysis for words of perception, based on the idea that in perception various parts of the body "tell us" something, e.g.,

*I see that there is no cheese left*

= *because of what my eyes say, I say that there is no cheese left.*

<sup>i</sup>For a different analysis of bodily sensations, see Wierzbicka (to appear).

<sup>j</sup>In Wierzbicka (1975a), I have argued for a different semantic interpretation of the concept of "body", based on the idea that a person's body is a material sign of this person. In particular, I have proposed the following way of accounting for the relationship between "body" and "soul":

*John's body* = *the something that is a part of the world and that can be thought of as John.*

*John's soul* = *the something that is not a part of the world and that can be thought of as John.*

<sup>k</sup>For further discussion of action sentences see Wierzbicka (1975a).

<sup>1</sup>The concept of "unspecified predicate" seems to me now unsatisfactory. I have attempted to replace it with an explicit semantic representation in Wierzbicka (to appear).

<sup>m</sup>An interesting objection to my interpretation of these facts has been raised by Apresjan (1971). If sentences like *John kissed Mary on the hand* and nonsentences like \**John kissed the book on the cover* point to an implicit assumption about the interaction between mind and body, then what of sentences (perhaps not very common but certainly acceptable) like the following:

*Voz'mi kreslo za spinku, a ja voz'mu za nožki.*

'You take the chair by its backrest and I'll take it by the legs.'

The answer to this question probably lies concealed in the difference in acceptability between Apresjan's sentences about inanimate objects and those discussed by me. Why can we say *voz'mi kreslo za nožki* but not *poceluj kreslo v spinku* 'kiss the chair on the back'? Apparently, by moving the chair's back one causes something to happen to the chair as a whole, whereas by kissing the chair's back one does not - at least in the view of ordinary speakers, as manifested by ordinary language. Evidently, ordinary speakers treat it as quite possible for someone to do something (to cause something to happen) to an object by doing something (causing something to happen) to a part of this object; but they do not believe that every time when one does something to a part of an object one causes something to happen to the object as a whole - far from it. The deviancy of a sentence like \**John kissed the chair on the back* shows that from the point of view of an ordinary speaker, one does not cause anything to happen to a chair by kissing a part of it. Apparently, the same applies to human bodies, as shown by

\**John kissed the child's body on the forehead.*

But with respect to persons, the situation is different. From the point of view of ordinary speakers, by kissing a part of someone's body one does do something to this person:

*John kissed the child on the forehead.*

Sentences about animals, also pointed out by Apresjan, do present a problem. It seems clear, however, that in a sentence like

*He stroked the beetle on the back.*

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the speaker treats the beetle in question in a somewhat anthropomorphic way; the person stroking the beetle's back is thought of as doing something to the beetle, i.e., to a creature that has a body rather than is a body. Can a beetle be called "someone" rather than "something"? I think not; in ordinary language, people do not use the word "someone" referring to animals. Nonetheless, when we speak of an animal's sensations, feelings, or volitions we do seem to mentally compare it to a sensing, feeling, or wanting person. Semantically, the problem is really how to relate the concept of "animal" to those of both "something" and "someone", without reducing it to either. Limitations of space, as well as of my understanding, prevent me from pursuing this problem here any further. For further discussion see the chapter entitled "On semantics of sentences about animals" in Wierzbicka (1971).



## IS DEEP STRUCTURE NECESSARY?

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and

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*This paper originated as part of a letter from Lakoff and Ross to Arnold Zwicky, written March 1967, and was circulated in duplicated form at that time. It figured in much discussion at the conference on language universals and generative grammar that was held at the University of Texas at Austin in April 1967 (papers of that conference are published as Bach and Harms, 1968), and it greatly influenced the "Postscript" section of my contribution to that conference (McCawley, 1968b). Indeed, Lakoff and Ross's paper is what turned me from a revisionist interpretive semanticist into a generative semanticist. The program that it announces for the description of language in terms of transformational grammars whose base components are essentially universal and specify the set of well-formed semantic structures directly influenced most of the research done by generative semanticists in the late 1960s.*

*As is natural with a work that is both highly influential and highly programmatic, much of its content has been superceded by subsequent work. Generative semanticists no longer regard the relationship between semantic structure and surface structure as given by a system of "Aspects"-type transformations (see G. Lakoff, 1970b; Postal, 1974; and Lakoff and Thompson, 1975; for more recent generative semanticist treatments of the structure of a grammar), and many of the specific analyses have been rejected in favor of*

others or have been greatly refined (see Newmeyer, 1972, on idioms and lexical insertion, McCawley, 1972a, and G. Lakoff, 1970c, on quantifiers, and G. Lakoff, 1970d, on negation). In addition, the reliance on extrinsic rule ordering that figures in the argument about "condition D" has given way to a commitment to find explanations of why rules interact the way they do [see Kisselberth (1973) for a clear statement of this position with regard to phonology]. A German translation of this paper appeared in W. Abraham and R. Binnick, editors, *Generative Semantik* (Frankfurt/Main: Athenäum, 1972), pp. 66-70.

We believe semantics may be generative because (i) there has never been any argument that semantics must be interpretive and syntax generative, and (ii) while it has commonly been assumed that the conditions A-D define a single level of structure intermediate between semantic representation and surface structure, it has not been shown that those conditions do define a single level that is of any theoretical significance.

- A. *The base of the simplest syntactic component.*
- B. *The place where cooccurrence and selectional restrictions are defined.*
- C. *The place where basic grammatical relations are defined.*
- D. *The place where lexical items are inserted from the lexicon.*

First, we think we can show that D does not exist; lexical items are inserted at many points of a derivation. Lexical items may well be only a special case of idioms, and some idioms seem to have to be inserted before Passivization, and to undergo it or not (*They buried the hatchet--The hatchet was buried*), but others can come in only after it is sure that Passivization has not (or has) applied (\**The bucket was kicked by the gladiator; I've been had, but not \*Someone has had me*).

Second, McCawley (1968a) has argued that selectional restrictions are semantic, but so is cooccurrence in general. Picture the absurdity of a verb whose subject could be a *bachelor* but not an *unmarried man*. If one wants to maintain that cooccurrence is syntactic, one must show that cases exist of verbs that are selected by some features other than semantic ones. Der schlagende Beweis is that whenever semantic and syntactic features do not agree, selection is always in terms of the semantic ones. So, while there are

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verbs that require semantically female subjects (*menstruate*, *pregnant*), there are none in any language with gender distinctions that require grammatically feminine subjects. And while there are verbs that require semantically plural subjects (*numerous*), these verbs can never take grammatically plural but semantically singular NPs. So, in *The scissors are sharp*, the subject can be either semantically singular (one pair of scissors) or semantically plural (several pairs). But in *The scissors are numerous*, it can only be semantically plural. This means that the grammatical feature [+pl] never figures in cooccurrence, and in general, no grammatical features do: cooccurrence is all semantic.

Third, subject of and object of are not directly relevant for semantic interpretation. The only reason they are necessary is so that there is some way to keep apart *dog bites man* and *man bites dog*, for as has been realized for a long time, there are many kinds of interpretation of subjects and objects. Compare, for example,

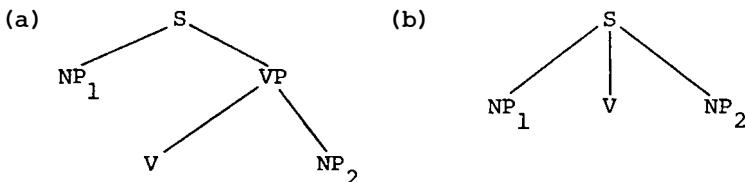
<u>John</u> tortured Max	(John = Agent)
<u>John</u> underwent torture	(John = Patient)
I wrote a <u>poem</u>	(the poem came into existence through my activity)
I examined a <u>poem</u>	(the poem existed before and after my activity)
I destroyed the <u>snowball</u>	(the snowball ceases to exist through my activity)

All that is necessary is that subject and object be kept distinct. But they are in surface structure (through different cases) or in the semantic representation, and we see no reason for singling out the level fixed by A above for special merit. The subject and object defined at this level seem to have no semantic or syntactic relevance, so why base a theory on them?

To be sure, A defines a level of representation, but if this level--the level of structure to which transformations can be most simply applied--has no systematic interconnections with any other facts of language, why invent the term "deep structure" for it? Why not reserve that term for the level of representation that results after Passivization or any other arbitrary rule, for that matter, has applied? At present, inventing a term to apply to any such level seems to us to make no claim whatsoever about language, and we therefore suggest purging this term forthwith from linguistic theory.

What follows from the above observations? If there never was any reason why syntax had to be generative and semantics

interpretive, and if there is no reason to suppose that the levels of representation defined by A-D coincide or have any significance singly, what is the matter with making semantics generative? As a matter of fact, there is a great deal in common between semantic interpretations, if these are conceived of (roughly) as formulas in predicate calculus, and deep syntax. Propositions are deep sentences, functions are verbs, and arguments are noun phrases. Other differences between deep syntactic representation and formulas in predicate calculus seem to us to be superficial. For instance, in the latter, there is nothing that corresponds to the category "noun". Lakoff has recently pointed out that there seems to be no syntactic rule that refers to *N* that could not just as easily refer to *NP*. Another apparent difference, the fact that deep syntax uses *VP*, while predicate calculus has no use for such a construct, can be reconciled, as Lakoff has observed, because apparently there are no rules that must refer to *VP* that could not equally well refer to a *S* whose subject has been deleted. In other words, there seems to be no syntactic reason to group *V* and *NP<sub>2</sub>* more closely together than *NP<sub>1</sub>* and *V*; diagram (a) can be replaced by diagram (b) in deep structure.



One final difference, the fact that quantifiers have been analyzed as predeterminers in deep syntax but as a special entity of their own in predicate calculus, can be dispensed with by discarding both analyses. The following two sentences must be kept apart somehow:

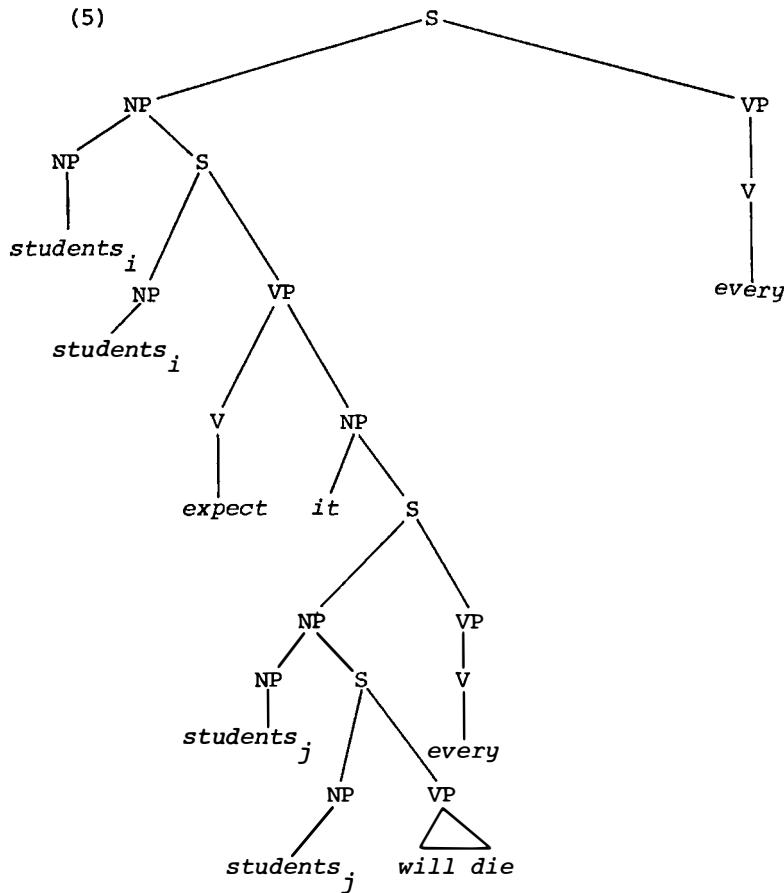
- (1) *Every student expects every student to die.*
- (2) *Every student expects to die.*

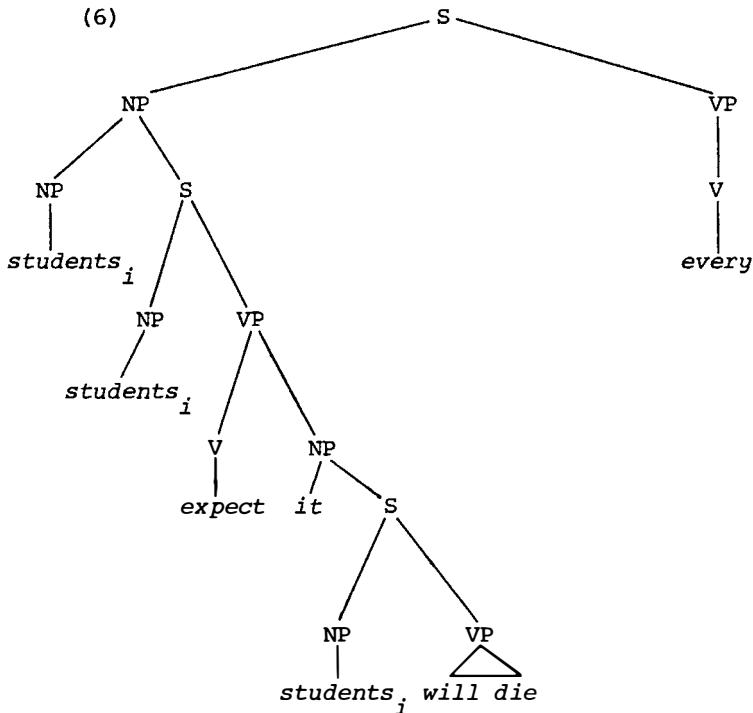
and it is obvious that the predeterminer analysis is unequal to the task. What seems to be necessary is an analysis, in syntax as in semantics, that recognizes *every* (and all other predeterminers) as being simply a kind of adjective, and that converts (3) into (4) by some obligatory transformation.

- (3) \**The students who will die (are) every.*
- (4) *Every student will die.*

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If this is right, then (1) and (2) will have deep structures that look like those of (5) and (6) (except for the reactionary VPs).





The only remaining disparity is negation, which we believe to be always represented as a feature on stative verbs, although we have only scant evidence for this as yet.

So the theory of language provides (somehow) the universal set of rules and well-formedness restrictions that generate the correct set of concepts (i.e., well-formed predicate calculus formulas), and every grammar consists of a set of transformations that map each concept (somehow) into the large set of surface structures that can be used to express each concept. Just as no intermediate level of taxonomic phonemics is necessary or possible, no intermediate level of deep structure is necessary (or, we will claim, even possible). However, saying something substantive about the two occurrences of *somehow* in the first sentence of this paragraph will still require a little work.

## PRO-SENTENTIAL FORMS AND THEIR IMPLICATIONS FOR ENGLISH SENTENCE STRUCTURE

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*This paper is dated June 21, 1967, and was written while Anderson was a graduate student at M.I.T. and a research assistant at Harvard University. It was supported by grants GN-329 and GN-554 from the National Science Foundation to Harvard University and appeared in report NSF-20 of the Harvard University Computation Laboratory in May 1968. A mimeographed edition of it was distributed by Indiana University Linguistics Club in 1971.*

*It represents a significant advance over G. Lakoff and Ross [1966 (paper 6 of this volume)]. Anderson is able to identify the do and the so of do so with other uses of those words and to explain all peculiarities of do so on the basis of his rules of DO-deletion and Adverb-lowering. Much of the analysis overlaps with a later and better-known paper (Ross, 1972a). This paper is also noteworthy for the extent to which it raised the previously undistinguished craft of example construction to an art form.*

*Anderson touches on (but does not contribute to) a controversy that raged then as it does now, the controversy as to the principles determining how grammatical rules interact. At the time this paper was written, Lakoff and Ross (and Anderson along with them) had rejected the notion of cycle, though they soon resurrected it; see Kimball (1972a),*

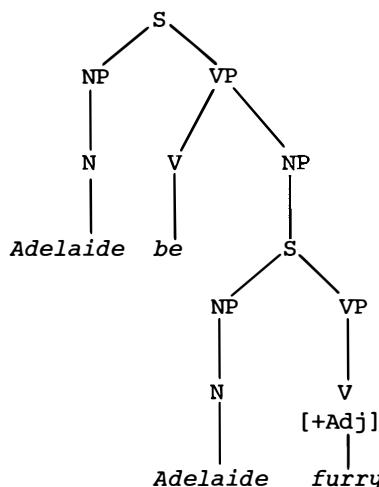
*Grinder (1972), G. Lakoff (1972), G. Lakoff and Thompson (1975), Thompson (1975), and Jacobson and Neubauer (1975) for further discussion of the notion of "cycle" in syntax and of the notion of "linear cycle", which appears in its place in this paper. Footnote 1 contains a hint of the notion of "local ordering", which, in the context of generative phonology, figures prominently in Anderson's later work (Anderson, 1969, 1974).*

*Adverb-movement, which Anderson touches on briefly here, has since been treated more extensively in Keyser (1968) and Jackendoff (1972). It has become an area of major dispute in view of Jackendoff's arguments that the interpretation of adverbs is determined by their surface position and not by their deep-structure position.*

Ross (1969c) has presented arguments in support of the position that adjectives are represented in the underlying structure of English sentences as embeddings, the complements of the verb *be*\*. Thus, Ross argues, that sentence (1) should have (2) as its deep structure:<sup>1</sup>

(1) *Adelaide is furry.*

(2)



After Equi-NP-deletion (and morphological rules irrelevant to the constituent structure) have applied, the desired surface structure is obtained.

There exist constructions that suggest by analogous arguments that a large class of other verb phrases should

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be represented as embeddings, the complements of the verb *do*. For example, nonrestrictive relative clauses can be formed on verb phrases, giving sentences such as:

- (3) a. *They said Lamb should come out with a new stratum this year, which he did.*  
b. *You were told this course would presuppose fiber-bundle theory, which it does.*

In many languages, including English, there exist apparent proforms for verb phrases that, like those for adjectives, are identical with proforms for noun phrases. For example,

- (4) a. *Sydney delights in breaking Radcliffe parietal rules, but I wouldn't do it for the world.*  
b. *Les français ont avoué qu'ils avaient tort en Indochine, mais les américains ne peuvent le faire.*  
c. *Fido frisst oft meine Schuhe, weil er ein Hund ist, aber wenn er eine Katze wäre, würde er es nicht tun.*

Pseudocleft sentences of the sort used for giving added emphasis to noun phrases can occur also with verb phrases. For example,

- (5) *What you can do with that turkey is stuff it.*

Similarly, just as equative clauses with colons can have an adjective phrase after the colon, they can also have a verb phrase in this position:

- (6) *He did what he had always wanted to do: give up linguistics and become a professional motorcycle driver.*

These complements of *do* are noun phrases, and as such can be questioned or explicitly indicated as unknown, in which case they appear in the surface structure with the forms expected of noun phrases in these positions, although they represent verb phrases:

- (7) a. *What could a nice girl like you be doing in a place like this?*  
b. *Father, will you please do something about the unicorn in the garden?*  
c. *Why can't we ever do anything I want to do?*

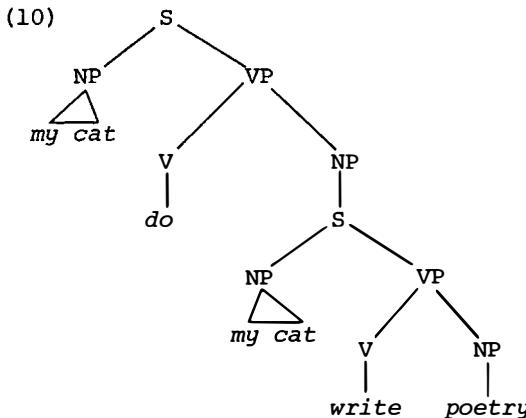
Apparently, when the object of *do* is not a fully realized complement sentence in (7), the sentence of which this is the main verb may itself be embedded as the complement of another sentence with main verb *do*; witness the grammatical, if somewhat inelegant:

- (8) *If he wanted to make his work more acceptable to the modern reader, what Hegel could do is do something about the chapters on phrenology.*

On the basis of these facts, it seems reasonable to posit a sentence with main verb *do* and noun phrase objects realized by complement sentences as the sources of at least a great many verb phrases in English, and perhaps in other languages as well. In this analysis, the structure underlying

- (9) *My cat writes poetry.*

would be somewhat as given in (10):



The rule of complementizer introduction will apply to the structure in (10), inserting an abstract element \$.<sup>2</sup> The rule of Equi-NP-deletion will delete the instance of *my cat* in the embedded sentence, and \$ will be deleted by complementizer deletion. Since the element *do* does not normally appear in surface structures except in constructions such as those shown in sentences (3)-(7) above, it is necessary to posit a rule of *Do-deletion* that applies anywhere after the rules mentioned so far:

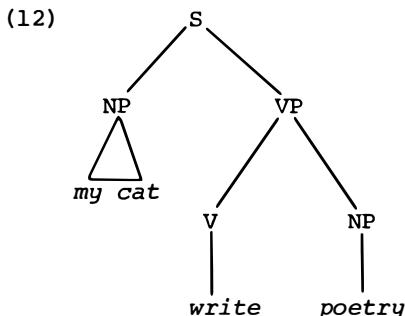
- (11) *Do-deletion*

SD:	X	do	VP	Y
	1	2	3	4

SC:	delete 2

This rule will remove the element *do* when it appears directly before a VP; i.e., in all those cases where the operation of some other rule has not removed the constituent containing the main VP as in the formation of constructions (3)-(7). It must somehow be stated that the VP that causes the deletion, term 3 of the SD, must be in the same sentence as the *do* that is term 2; the deletion does not occur in sentences such as 8, where the *do* is followed by the verb phrase of a higher sentence.

After the deletion of the embedded subject *my cat*, the inner node S will remain because of the complementizer \$. When this element is deleted, however, the S will become a VP by universal principles of constituent labeling<sup>3</sup> and disappear (since it is now redundant). At this point, the same process will eliminate the node NP that formerly dominated the node S. After the operation of *Do*-deletion, the higher node VP will also disappear, yielding a derived structure such as:



Thus, with the addition of no apparatus to the grammar but the rule 11, we can provide correct derivations for sentences such as 9 starting from the deep structures it is apparently necessary to assume that they have in order to account for their relation to the constructions shown in (3)-(7).

It will be noted that not all verbs can occur in the constructions (4)-(7).<sup>4</sup> In particular, only those that have the feature [-stative] are possible.<sup>5</sup> Thus, all of the sentences in (13) are ungrammatical:

- (13) a. \**Atheistic communists do not believe in mother, although they ought to do it.*

- b. \**What this lemma does is imply the Gödel incompleteness theorem.*
- c. \**The machine did what no machine had ever done before: appreciate a sunset.*<sup>6</sup>

In addition, acceptable answers to (14a) and (15a) include (14b) and (15b), but not (14c) and (15c):

- (14) a. *What are you planning to do in my bed?*
- b. *Learn what sort of person you are.*
- c. \**Know what sort of person you are.*
- (15) a. *Oscar, do something for your poor father.*
- b. *I will, I'll listen to his labored breathing.*
- c. \**I will, I'll hear his labored breathing.*

In the corresponding constructions with adjectives, however, the sentences are grammatical regardless of the value of the feature of stativity. Thus, both (16a) and (16b) are acceptable:

- (16) a. *What orgies are is noisy.* ([+Stative])
- b. *What Franklin said older women are is grateful.* ([+Stative])

Interestingly enough, the sentences with [+Stative] adjectives can appear embedded as the complements of *do* (where the adjective itself is in a sentence immediately below a main verb *be*); thus one gets sentences such as

- (17) a. *What everyone would like the president to do is be frank with the press.*
- b. \**What the United States apparently expects all smaller nations to do is be grateful for our intervention.*

These facts can be easily accounted for if we assume that *do* has the feature [//[-Stative]]; that is, it requires that the main verb of the next sentence down be [-Stative]. The verb *be* that appears with adjectives as suggested by Ross is transparent to this restriction, enabling the stativity of the adjective below it to determine the well-formedness of sentences such as (17), in which only the sentence with [+Stative] adjective (17a) is well formed for most speakers. Thus, only sentences with active verbs will contain the extra sentence with main verb *do* in their underlying structure. On the basis of the

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suggestion that [+Stative] main verbs are to be treated as embedded in the NP subject of a sentence with main verb *be*,<sup>7</sup> Perlmutter has suggested that this provides an account of the fact that every verb that is exceptional in that it requires identity of its subject with that of its complement sentence in deep structure also requires that the main verb of this complement be [-Stative]. If every main verb is embedded either in the subject of a sentence with *be* or in the object of a sentence with *do*, the only cases in which deep structure identity of subjects can possibly hold is if the complement is of the latter type; in the former case, the subject of the embedded sentence will itself be a sentence, rather than simply the NP subject of the embedded (surface) main verb. Recalling that *do* itself is [//[-Stative]], it is seen that the requirement of deep-structural identity entails this added restriction as well.

It has been observed (Lakoff and Ross, 1966) that the class of verb phrases that can be replaced by *do so* under identity with a previously occurring verb phrase is also those with main verbs that are [-stative]. Since exactly these will always appear in embedded sentences that are complements of *do* in deep structure, it seems preferable to account for the formation of *do so* in terms of the replacement of these complements by *so*, rather than by replacing the verb phrases in question directly by *do so*. This latter formulation would require the introduction of an element (*do*), which would in every case cause the deletion of an identical element preceding it (by *Do*-deletion, rule 11). The element *so*, which thus substitutes for the complement sentence, cannot, apparently, be identified as a constituent of any particular type; thus, it cannot be a VP, or it would cause the deletion of the preceding *do*; there is no motivation for calling it an S, since in particular it does not extrapose;<sup>8</sup> neither does it behave in any way like an NP. It seems, then, that the rule should be formulated as replacing an S with an unlabeled *so* (a constituent directly dominated by the node formerly dominating the S in question, just as any grammatical formative that is transformationally introduced), leaving it to general conventions to eliminate the node NP.

The process that replaces sentential complements by *so* appears to be more general than this, however; not only *do*, but also a large class of "epistemic" verbs in English, such as *think*, *believe*, *understand*, *guess*, *wish*, *imagine*, which Kiparsky has called *propositionals*, can have their complements replaced by *so*. An additional class, which Kiparsky has called *contentives* and which includes verbs such

as *hope*, *pretend*, *complain*, is also subject to this replacement but behaves slightly differently with regard to other operations. Thus, we get all of the sentences in (18):

- (18) a. *Phillip wants us to play Sputnik doubles and Roman Gerber, but I don't think we should do so until we learn to count high-card points.*
- b. *The president of the republic thinks that he can get away with murder, and his military advisers evidently think so, too.*
- c. *Your wife was under the impression that you would be away tonight, and as you can see, I imagined so, too.*
- d. *You want to know if a mongoose can really out-fight a cobra, and I can only say I guess so.*
- e. *Thales was really very profound when he said that all is water, though he didn't pretend so at the time.*

Since the structures proposed for the complements of all these verbs contain sentences dominated by S, it seems reasonable to posit a process of Prosentialization that can replace a sentence by *so* under conditions of identity with an earlier sentence. Not all verbs can have their complements so replaced, however; the verbs that Kiparsky has called factives are not subject to the rule. Thus, the sentences (19) are ungrammatical.

- (19) a. *\*Edwin was convicted of having exhibited himself in a public place, although he vehemently denied so.*
- b. *\*Although we pointed out to Janet that her boat would inevitably be torpodoed by the Chinese, she persistently ignored so.*

One could capture this fact by claiming that the verb of the sentence in which the complement is embedded is mentioned in the rule of prosentialization itself and thus governs this rule. Then, the verbs in (18) would be marked with the feature of [+prosent], and those in (19) with [-prosent]. However, independent facts motivate the setting up of a structural distinction between these two sets of complements, such that the sentential complements in (19) are relative clauses on nouns such as *fact*, *contention*, (whatever the structure of these words may be) in deep structure, while

the complements in (18) are either directly dominated by VP or exhaust the NP of which they are a part.<sup>9</sup> It seems more reasonable to build this difference into the rule somehow, rather than to mention the verb itself and thus miss the generalization that whether or not the complement of a verb is subject to prosententialization is directly predictable in terms of the type of complements it takes.

This rule is subject to another constraint, which George Lakoff (personal communication) has pointed out is similar to that which Ross (1967b) proposed for Pronominalization. Specifically, Prosententialization can always apply to a complement sentence to the right of the sentence to which it is identical, but can only apply from right to left if the sentence replaced is dominated by another sentence that does not dominate the sentence on the right. Thus, the following paradigm is obtained:

- (20) a. *People who want their cats to stay out of the garbage can usually get them to do so.*
- b. *People who want their cats to do so can usually get them to stay out of the garbage.*
- c. *Cats will stay out of the garbage if people want them to do so.*
- d. *\*Cats will do so if people want them to stay out of the garbage.*

[Some discussion of the order of application of Prosententialization and other rules, and its relationship to the notion of cycle, is omitted here.]

The operation of Prosententialization, as has been pointed out above, is rather similar to Pronominalization. The latter rule can apply to complement structures which are dominated by an NP node, such as factives and propositional, replacing them with *it*. In the case of propositional, one can thus apply either rule, getting besides (18a-c) for example:

- (23) a. *Philip wants us to play Sputnik doubles and Roman Gerber, but I don't think we should do it until we learn to count high-card points.*
- b. *The president of the republic thinks that he can get away with murder, and his military advisors evidently think it too.*
- c. *Your wife was under the impression that you would be away tonight, and as you can see, I imagined it too.*

In the case of factives such as (19), Prosentialization cannot apply, but pronominalization can.

- (24) a. *Edwin was convicted of having exhibited himself in a public place, although he vehemently denied it.*  
b. *Although we pointed out to Janet that her boat would inevitably be torpedoed by the Chinese, she persistently ignored it.*

Additionally, in contentives such as the use of *guess* in (18d), only Prosentialization can apply; there is no NP for Pronominalization to apply to.

- (25) \**You want to know if a mongoose can really out-fight a cobra, and I can only say I guess it.*

Both of these rules that produce proforms for sentences apply in contexts other than complement constructions. The full range of cases of Prosentialization cannot be considered here; only two others will be considered briefly.

Let us consider the construction exemplified in (26):

- (26) a. *We all said the Romans would destroy the Carthaginians in another Punic war, and so they did.*  
b. *Each year Linus expects that the Great Pumpkin will rise up out of his pumpkin patch, and this year so he did.*

The superficial resemblance of these sentences to those containing *do so* is contradicted by several facts. In the first place, the element *do* that appears in these sentences cannot be the same as that which appears in *do so* sentences, as is shown by the appearance of both these elements together in sentences such as the grammatical (if somewhat inelegant).

- (27) *Ermintrude has been asking her father for years to see a specialist about his receding hairline, and do so he did last week.*

In fact, the *do* that appears in these sentences is the element that is introduced transformationally by the rule of *Do-support* that is discussed in Chomsky (1957a, 1962).

In addition to the *dos* of *do so* and *Do-support*, there is another type, the main verbs of sentences such as

- (28) a. *Primitive peoples do their dishes with cold water and clean sand.*

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- b. *We have only twenty minutes to do Chartres cathedral--you do the inside and I'll do the outside.*

It is unclear how many lexical items must be posited to account for the full range of semantic interpretations of these verbs; they seem to be essentially empty semantically, specifying only that the "most appropriate action" be performed with respect to the object. Whether it is possible to capture this notion in a principle of semantic interpretation is moot; since the "most appropriate action" for any given object will vary with culture and linguistic community, it is clearly a language-specific fact that, for example, we *wash* dishes when we *do* them rather than, say, smash them on the ground to prepare for a totemistic ceremony. Whether this constitutes an argument for a language-specific semantic interpretation rule or only for an enormously complex set of entries for the phonological form /dō/ remains to be considered in detail. Philosophers' discussion of the issue has been fragmentary and inconclusive.

In any event these instances of *do* are all main verbs, and are distinguished from the *do* of *Do-support* by not attracting *not* (*n't*), not taking sentential complements of any sort, etc. There are instances in which all three types of *do* show up simultaneously:

- (29) *What your friends didn't do yet is do it in a telephone booth.*

The construction illustrated in (26) can take verbs that are [+stative] in the sentences for which *so* substitutes, as in

- (30) a. *Any thinking person generally hopes that the Emperor Ming will know what Flash Gordon is up to, and so he does.*  
b. *Heidegger claims that lack of a point of view precludes understanding, and so it does.*

This fact, of course, follows from the fact that the *do* of *Do-support* does not restrict the stativity of its embedded verb.

There are other sentences of the same sort with auxiliary elements such as *be*, *have*, and modals:

- (31) a. *Inspector French says the man is alive, and so he is for our purposes.*  
b. *The British claim to have abandoned their pretensions to empire, and so they have.*

- c. *Alonzo insisted that he would break his neck if we made him go skiing, and so he might if he did.*

The *do* of *Do-support* does not occur if any other auxiliary element does. Further, if more than one auxiliary does occur, the part of the sentence that is replaced by *so* cannot contain any of them:

- (32) a. *\*They all say Bobby Fischer can beat anyone at mumblety-peg, and so he does [where do = can beat, etc.].*  
b. *\*The whole class said Floyd would have been a fool to break the glass, and so he would [where so = have been a fool].*

There are also no sentences of this form in which the second clause has a subject other than that of the first, as might be expected if the process of forming the construction were parallel to that of Prosentialization that can occur after Equi-NP-deletion:

- (33) a. *\*I have always claimed that Matisse was the most important painter of this century, and so most authorities did.*  
b. *\*Naomi often lies down in fields to rest, and so her lover does.<sup>10</sup>*

It will be noted that exactly the same set of facts adduced in connection with the construction of (26) holds true for the closely related construction shown in (34).

- (34) a. *The Regent told his men to collect taxes, and collect taxes they did.*  
b. *The whole school hoped that Lunko Dullbrain, the all-star halfback, would pass the physics quiz, and pass it he might have if they had let him take his roommate's notes with him to the exam.*

These sentences appear to involve the permutation of an embedded sentence that is the complement of an auxiliary verb to the front of a higher sentence. The conditions under which this permutation can be applied are not completely understood, though they appear to include the following: (1) the sentence permuted must be identical to some earlier sentence; (2) the main verb of the next sentence up has the feature [+aux]; and (3) the main verb of the sentence permuted has the feature [-aux]. Conditions 2 and 3 exclude

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sentences such as:

- (35) a. \**An anonymous caller threatened to put a fish in our medicine cabinet, and have put one in there he would if we hadn't been vigilant.*
- b. \**The postman claims that our mailbox falls down when he puts a magazine in it, and that it does I believe.*

The other conditions on this operation are accounted for by requirement 1 and the distributional constraints on auxiliary verbs, such as the requirement that the deep structure subject of the auxiliary be identical with that of its complement. The permutation rule must apply before Equi-NP-deletion in order to exclude sentences similar to those in (33). It should be mentioned that in this analysis the *do* of *Do-support* is simply another auxiliary verb, which occurs in exactly those structures that contain no other auxiliary verb and is subject to rule 11 (*Do-deletion*), just as is the *do* of *do* so when they appear before a VP in derived structure.

The sentences above with preposed *so*, (26, 30, 31), then are to be derived by way of the intermediate structures [which themselves underlie such sentences as (34)] produced by the rule of auxiliary-complement-preposing sketched above. Once these sentences have been preposed, they are subject to Prosentialization. The fact that they are not subject to this operation until then implies that the structure of auxiliaries, and particularly of their complements, is in need of further investigation. Presumably the fact that Prosentialization cannot apply directly to the complement structures should be reflected in some formal differentiating feature, as is the corresponding property of factives, but no candidates for this feature are immediately evident.

Once the sentence is preposed, however, whether it undergoes the Prosentialization rule or not appears to be dependent on its complexity. There appear to be no cases in which the rule cannot apply; however if the preposed sentence is at all complex, the rule apparently must apply. Thus (36) is vastly more awkward than (26a).

- (36) ??*We all said the Romans would destroy the Carthaginians in another Punic war, and destroy the Carthaginians in another Punic war they did.*

Complexity here is anything but well defined at present, though it clearly depends heavily on length. It would appear that the appropriate way to account for these data

is to make Prosentialization optional, and to relegate the rejection of infelicities such as (36) to a stylistic component, which deals with constraints on acceptable surface structures.

Another position in which *so* appears as a proform is as a proadjective in some constructions. Consider, for example,

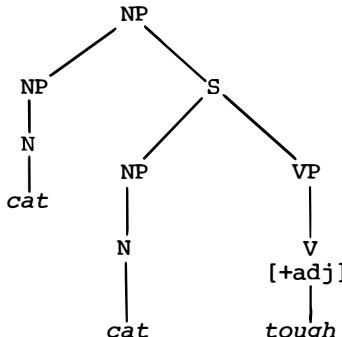
- (37) a. *The rain god is angry and will continue to be so until we placate him.*  
 b. *Our maid is pregnant, but she won't be so for long.*

If we regard the adjectives in these sentences as derived from embedded sentences, these occurrences of *so* can be produced by the same rule as Prosentialization. *Be* clearly does not take factive complements, which would cause the rule to block. Note, incidentally, that adjectives modifying nouns are not subject to this rule:

- (38) a. \**My neighbor's cat is very tough, and only a {so cat} could survive on our block.*  
 b. \**The hole I buried your radio in is very deep; a {so hole} that you can't dig into without an earth-mover.*

This is, however, exactly what would be expected if the relative clauses that are the source of these modifying adjectives do not include the layer of embedding with *be*. Thus, if the structure of the noun phrase underlying the subject of the second clause of (38a) is approximately

(39)



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then the structure is formally the same as that of factive complements, which must already be excluded from the operation of the rule.

Consider now complements in subject position. As long as these are not extraposed, they cannot in general be subjected to Prosentialization:

- (40) \**The cookie jar was full when I left, and so remained until I got back* (where *so = the cookie jar is full*).

Since these subject complements also have the same structure (approximately) as factive object complements, they will also be protected by the same constraint. When the clauses are extraposed, however, they are no longer part of a complex NP and hence no longer protected. They would be expected to be Prosentializable in this case, and indeed, we do get sentences such as

- (41) a. *The cookie jar was full when I left, and it remained so until I got back.*  
b. *Reese's bid means he holds four hearts, but it wouldn't seem so if you couldn't see his finger signals.*

This explanation only holds for intransitive true verbs such as *seem, appear, remain*. Some other explanation must be found for the fact that sentences extraposed from the subjects of adjectives, such as *be obvious, be unpleasant*, and transitive true verbs, such as *annoys me, causes trouble, arouses the masses*, are not subject to Prosentialization. The restriction can apparently be stated as follows: if a sentence is dominated by VP (without another sentence node intervening) it must be the only constituent other than the verb which this VP dominates if Prosentialization is to apply. This does not pretend to be a solution, but only a fairly precise statement of what the problem of characterizing these structures is.

To return to the parallels between pronominal and prosential replacement of complement clauses, it will be seen that only the latter can apply to the extraposed complements of intransitives discussed above, because these are not NP and hence not pronominalizable. Thus, we do not get:

- (42) a. \**That Percy would fail to pass his generals was actually a foregone conclusion, but it didn't seem it to the rest of us.*

- b. \*Alonzo has never realized that he could swim across Lake Michigan if he were really to try, but it appears it to me.

Pronominal replacement of sentences applies in a much wider class of environments than prosentential replacement, however, including a number of positions apparently unrelated to verbal complements. Thus, we get the a sentences but not the b ones in (43)-(45).

- (43) a. Throneberry would never have thought of catching the ball if you hadn't given him the idea of it.  
b. \*Throneberry would never have thought of catching the ball if you hadn't given him the idea of so.
- (44) a. Arnold is embarrassed about having pushed his mother overboard, and I'm a bit upset about it, too.  
b. \*Arnold is embarrassed about having pushed his mother overboard, and I'm a bit upset about so, too.
- (45) a. Mandeville is really quite facile at distorting the facts to prove a point, but I can never bring myself to it.  
b. \*Mandeville is really quite facile at distorting the facts to prove a point, but I can never bring myself to so.

Thus, we see that though these rules share many features, neither can be regarded as a special case of the other. Some languages, such as French, appear to have no equivalent of Prosententialization, and the only constructions that are possible are those that can be formed by Pronominalization, such as

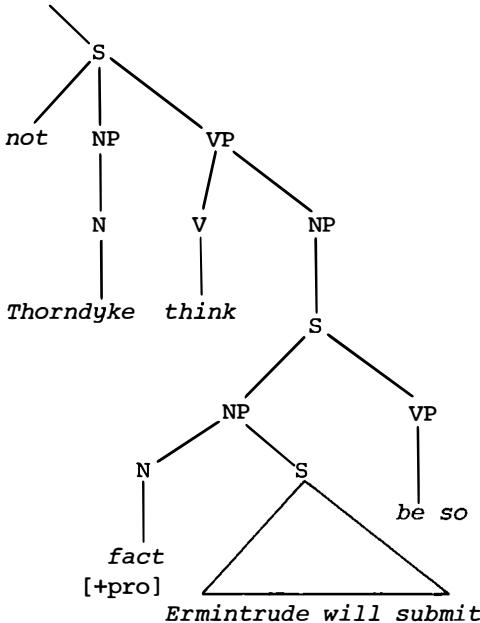
- (46) a. Jean a donné un coup de pied au chien de berger, et je l'ai fait aussi.  
b. Notre domestique pense qu'elle est enceinte, et nous le pensons aussi.

It might be suggested that the source of the element *so* in sentences such as (18b-e) is not a rule such as Prosententialization at all, but rather a very late rule that deletes *it is* from a sentence *it is* *soll* formed by Pronominalization. This suggests that underlying the second clause of (47) is a structure like (48):

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- (47) *I still believe that Ermintrude will submit,  
though Thorndyke doesn't think so.*

(48)



Even though such a rule is needed in the grammar of English anyway, it does not remove the need for a rule of prosententialization that can apply to produce sentences (18b-e). These two possible sources of *so* are stressed differently, with the one derived from a structure like (48) given stronger stress in most cases than a *so* arising from Prosententialization. In some cases, in fact, ambiguity is possible depending on which source has provided the *so*; for example, (49) has at least two main interpretations.

- (49) *Lord Russell said that two and two make eleven,  
though it didn't seem so at the time.*

In one of these interpretations (when the *so* is the product of Prosententialization), the speaker asserts that at the time, Lord Russell didn't seem to be making this foolish assertion, which in fact he did make; in the other (where the *so* represents a reduction of *it is so*), he merely asserts that at the time it did not seem correct to claim that two and two make eleven. It appears that the rule that reduces *it is so* also applies to *it is not so*, where a

subsequent rule reduces *not so* to *not* in such positions, giving such sentences as

- (50) a. *Two and two do not make eleven, and it seemed not when Lord Russell said it.*
- b. *That undergraduate claims he has proven Fermat's last conjecture, but I think not.*

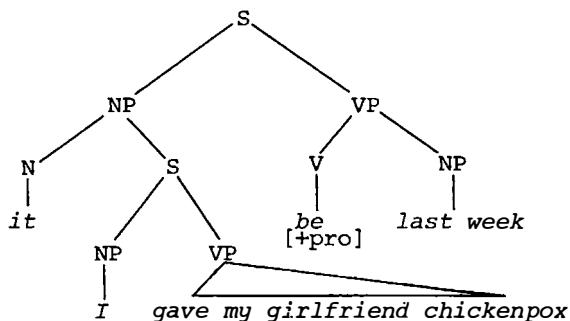
In the event that the rule of *Not-transportation* (which gives *I don't think I will go* from *I think I won't go*) has applied to a sentence such as (50b) to yield *I don't think so* (\**I think not so*), the *so* will no longer reduce, since it no longer follows *not* when the rule applies.

In G. Lakoff and Ross's (1966) analysis, the rule that replaces verb phrases by *do so* was put forward as a test to determine the constituency of verb phrases; in particular it was intended to differentiate between those adverbs that can be said to be inside the VP and those that are outside it. Before the conclusions reached there can be evaluated in terms of the analysis proposed in this study, however, and the tenability of their position examined, it is necessary to consider the question of the structure of sentences containing adverbs and the transformational mechanism that accounts for their placement in derived structures.

In Appendix F of G. Lakoff (1965), a number of arguments are adduced for considering that many classes of adverbs are to be derived from the main verbs of higher sentences. It is proposed there that sentences such as (51) have underlying structures such as (52):

- (51) *I gave my girlfriend chickenpox last week.*

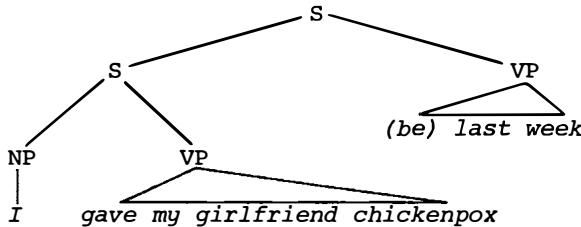
(52)



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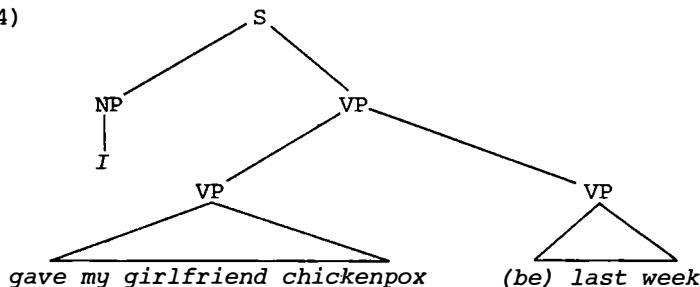
This analysis explains a number of otherwise puzzling facts concerning the relations between various sentences with adverbial elements, and it will be accepted here. However, the mechanism by which such structures are to be related to surface structures is not as incontrovertible as the deep structures themselves. Lakoff suggests that the derived structure of such a sentence should be

(53)



Whether a node NP remains in the subject dominating the sentence that contains the main verb or not, this structure is still highly counterintuitive. There are, further, a number of syntactic facts that support the contention that the structure should rather be like that given in (54).

(54)



This structure contains only one S node and a more complex verb phrase than that in (53). Supporting the conclusion that there should be only one S node are the following:

If the adverbial and the main verb phrase are never in the same simplex sentence the structural description for the rule of Reflexivization will not be met in a number of cases, producing the ungrammatical (55b) instead of (55a):

- (55) a. *Felicity goes on deceiving her father in spite of herself.*  
           <sup>1</sup>  
       b. \**Felicity goes on deceiving her father in spite of her.* (where *her* = *Felicity*)

In addition, the extra S node in (53) will permit the structural description for right to left pronominalization (Ross, 1967b) to be met, producing the incorrect (56b) sentences rather than only (56a):

- (56) a. *Lucina called her mother a fool on her birthday.*  
b. i. *\*She<sub>i</sub> called her<sub>i</sub> mother a fool on Lucina<sub>i</sub>'s birthday.*  
ii. *\*Lucina<sub>j</sub> called her<sub>i</sub> a fool on her<sub>j</sub> mother<sub>i</sub>'s birthday.*

Similarly, this node would permit right to left Prosententialization as discussed above, yielding the ungrammatical (57b):

- (57) a. *I expect you to take out the garbage when I tell you to do so.*  
b. *\*I expect you to do so when I tell you to take out the garbage.*

His analysis also forces Lakoff to a completely ad hoc modification of the notion of "main verb" (G. Lakoff, 1970a, pp. 170-171); this difficulty is completely avoided if the adverbials associated with the main verb in surface structure do not constitute separate sentences. While syntactic facts force one to the conclusion that the main verb of a sentence is generally deeply embedded at the level of underlying structure at which grammatical relations are defined, cooccurrence relations expressed, etc.,<sup>12</sup> to make the counterintuitive claim that this is also true of surface structure is simply to propose a new use for the term and does not alter the facts concerning the level that has traditionally been called surface structure.

It would also be very difficult to express the late optional minor rule that permutes certain adverbials around the VP structure below them. Thus, (58b) is synonymous with (58a) and is derived from it:

- (58) a. *Ethelyn speaks in an inaudible murmur often.*  
b. *Ethelyn often speaks in an inaudible murmur.*

In the analysis typified by the structure in (53), these have radically different surface structures, and it is not even clear that such a rule could be stated. If the analysis

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in (54) is chosen, however, they differ only in the order of constituents, being related by a rule such as

- (59) *Adverb permutation*

SD:  $X [VP VP [VP V (NP)]] Y$   
1 2 3 4 5

SC: exchange 2 and 3 + 4

This rule should be governed by the verb in the (ad)verb phrase being permuted (i.e., constituent 3), since it is the case that some adverbs, such as *often*, can permute, and not that some verb phrases can have their adverbs permuted around them. It will be noted that this rule can apply more than once to the same structure if several layers of permutable adverbs are present in it. Thus, (60a-d) are synonymous, but (60e) is not a possible variation:

- (60) a. *The prisoner protests his innocence loudly often.*  
b. *The prisoner loudly protests his innocence often.*  
c. *The prisoner often protests his innocence loudly.*  
d. *The prisoner often loudly protests his innocence.*  
e. \**The prisoner loudly often protests his innocence.*

In Lakoff and Ross's analysis of sentences with *do so*, further problems are created by this extra S node. If *do so* replaces a VP, it is impossible to account for the sentences in (61), since the deleted elements do not even form a constituent:

- (61) a. *Alonzo pores over the dictionary in search of dirty words, and his brother did so before him.*  
b. *Matisse made collages with cut paper up until the time of his death, and rising young artists think it will increase their sales if they do so, too.*

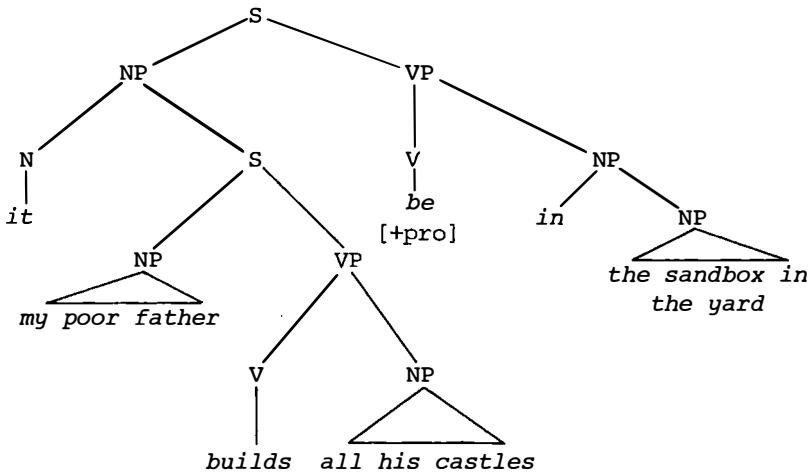
Notice that the adverbial itself cannot be analyzed as a VP for the purpose of applying their rule unless the entire included structure also forms part of the VP. Thus, only (62a,b) are grammatical, and not (62c).

- (62) a. *Maurice tried out for the hammer throw team yesterday, and even though he didn't make it, Ottokar did so, too.*  
b. *Maurice tried out for the hammer throw team yesterday, and even though he didn't make it, Ottokar did so today.*

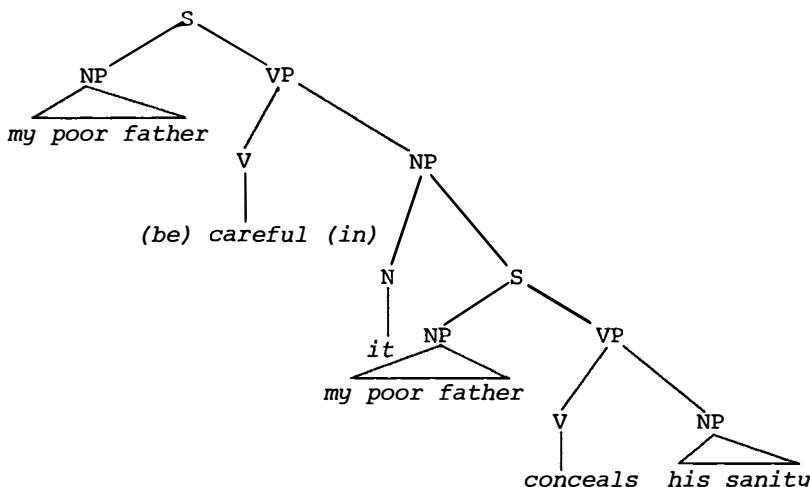
- c. \*Maurice tried out for the hammer throw team yesterday, and even though he didn't make it, Ottokar tried out for it did so.

In view of the above facts, it seems necessary to state a rule that incorporates adverbs into the VP containing the main verb, giving structures like (54) from underlying (52). Before stating such a rule, however, it should be noted that the adverbs to be lowered can come from two different types of underlying structures, shown in (63) and (64).

(63)



(64)



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Structures such as (64) are motivated by the necessity of imposing selectional restrictions on the kinds of subjects that can appear in sentences with modifying manner adverbials like *carefully*, *wilfully*. Adverbs derived from structures like (63), on the other hand, have restrictions that apply to the verbs of the embedded sentence rather than to their subjects. Such adverbs as *carefully* require deep structural identity of subject with the embedded sentence and hence that the embedded verb be [-stative] as discussed above, but do not generally restrict this verb further (Lakoff, 1968a). It is therefore proposed that the facts of adverb incorporation be expressed in the following rule, in which the same structural change may be wrought upon either of two types of structures:

(65) *Adverb-lowering*

SD: (i)  $[S_{NP_{[+pro]}}^N [S_2 NP_3 VP_1]] [VP_4 V_5 (NP)]]$

or

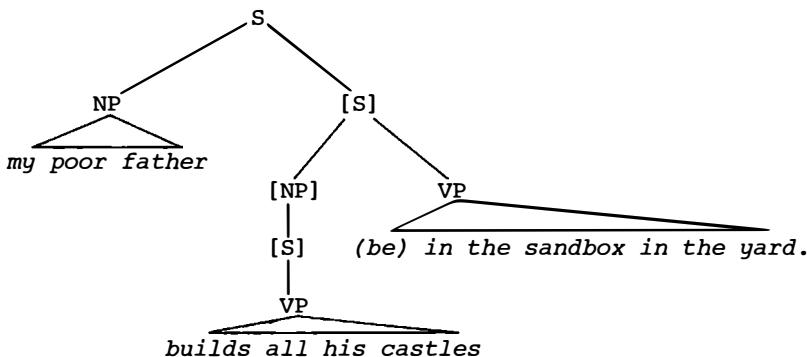
(ii)  $[S_6 NP_{[+pro]}^V [NP_4 [S_1 N_2 VP_3]]]$

SC: a. delete 1

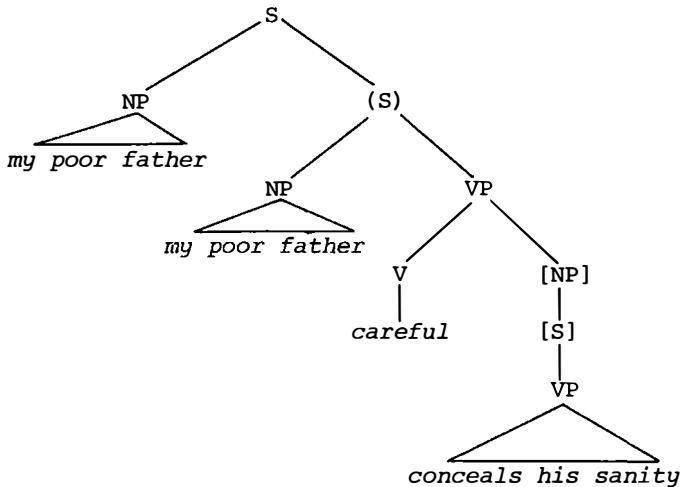
b. Chomsky-adjoin 2 to the higher S

Structures such as (63) can be analyzed as meeting (65i), while those like (64) meet (65ii). When the rule is applied to these structures, (66) and (67) result.

(66)

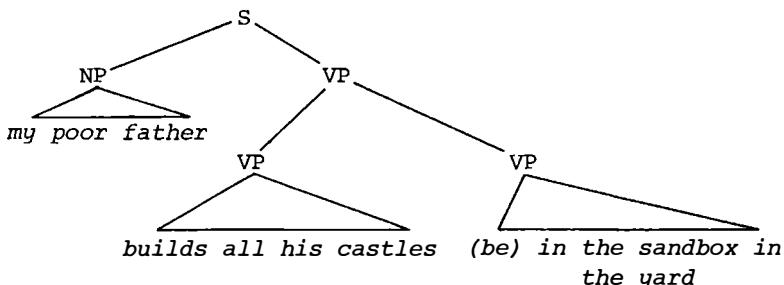


(67)

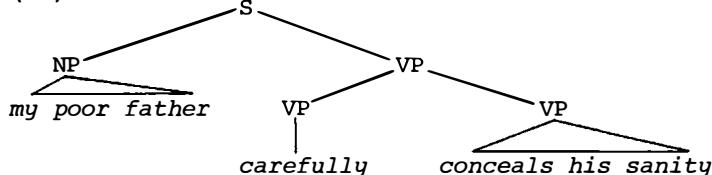


At this point in the derivation, universal conventions will progressively change the nodes enclosed in [ ] to VP and delete redundant ones. The second instance of the subject in (67) can be eliminated either by Equi-NP-deletion, at the cost of enclosing the V in the SD of that rule in ( ), or by addition of another line to the SC of (65): "c. delete 6". After this operation, the S in parentheses will become a VP and be deleted as redundant, giving the correct surface structures (68), (69) (after *careful*  $\Rightarrow$  *carefully*):

(68)



(69)



### Pro-Sentential Forms

The process of deletion of the pro-N must be stated as a part of this rule, rather than as normal *It*-deletion, since after the rule applies the SD for *It*-deletion (which clearly applies much later) will no longer be met. As suggested above, the deletion of the inner subject may similarly be part of this rule. The justification for stating the rule in this way, rather than as a rule that takes the VP of the higher sentence and incorporates it directly in the lower one comes from adverbials of the second type (*carefully*, etc.). Such a treatment for adverbials of this sort would require a much more radical alteration of constituent structure, and it is far from clear how such a rule could be stated. In addition, it seems semantically more plausible that the occurrence of the subject NP in surface structure be derived from the NP that was subject of the (surface) main verb in deep structure, rather than from one that is simply referentially identical with it (the subject of the manner adverbial). If the mutual relationship between these two NP is not reversed by a process such as that given here, it is the former occurrence of *my poor father* (the subject of *builds* + NP in deep structure) which will somehow be deleted by Equi-NP deletion. If some such device as that used here is allowed for the statement of these two processes in one rule schema, the obvious similarities of the two can be expressed. The subject of abbreviatory notations in syntax and the general question of evaluation metrics defined over syntactic systems has been little investigated to date; any such notational system should allow the capturing of such similarities of operation as that discussed here.

In considering the structures of sentences containing adverbials such as those discussed here, it is apparent that at least part of the facts concerning their behavior under *do so* formation (by Prosentialization of the complement of underlying *do*) can be explained by assuming that they constitute layers of embedding above that with main verb *do*. Thus, the adverbs in the second clauses of (70a,b) remain after this rule applies, because they are not part of the sentential complement of *do*, which is the structure which is replaced by *so*.

- (70) a. *My poor father builds all his castles in the sandbox in the yard, while my mother does so in the air.*
- b. *Arthur made his way through the enchanted forest while the wizard was asleep, and if I'm lucky I'll do so then, too.*

Thus we see that the notion that an adverbial of a certain type is outside the VP is adequately captured by the claim that such adverbials constitute the main verbs of sentences higher than that containing the *do* associated with the VP in question. As one would expect, such elements as the NP direct object are inside the VP by this criterion, since they occur only at the level of the main verb, which is below the *do*. This analysis also permits an account of the fact that auxiliary elements seem to be "outside the VP" in sentences such as (71).

- (71) a. \**Lloyd can blow bubbles through his right ear, and Benjy does so, too.* (where *do so* = *can blow bubbles* etc.).
- b. \**If God had made the world for metaphysicians, the absolute would have vibrated in the ether, and perhaps even the contingent does so.* (where *do so* = *would have vibrated* etc.).

This analysis shows auxiliaries to be outside the VP; it is thus quite consistent with Ross's claim (1969b) that they constitute the main verbs of higher sentences. These sentences are above the *do*, as is also indicated by their appearance with it when the sentence below is dislocated, as in the formation of the pseudocleft construction:

- (72) *What Renoir should have done was quit while he was ahead.*

The above considerations raise the question of the treatment to be accorded those adverbials that Lakoff and Ross's criterion designates as inside the VP.<sup>13</sup> It seems reasonable to treat them as layers of embedding between that of the element *do* and that of the sentence containing the (surface) main verb. If they are thus part of the embedded sentence that is the complement of *do*, they will, of course, always be deleted when Prosententialization replaces this complement by *so*, thus explaining the nonoccurrence of sentences like (73).

- (73) a. \**Vincent felt he had to remain in France during the war, though he could have done so in America.*
- b. \**Wittgenstein threw metaphysics out the window, and all his followers then did so into the fire.*

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- c. \**The captain of the Queen Maude swam to shore when it went down, though the first mate did so to the lifeboat.*

Lakoff (personal communication) has suggested that all these adverbials can be analyzed as the product of more complicated structure. Thus, he would analyze (74a,b) as derived from the structures that underlie (75a,b).

- (74) a. *I remained in the jungle.*

- b. *I swam to shore.*

- (75) a. \**For me to be in the jungle remained.*

- b. *My swimming enabled me to*  
$$\left. \begin{array}{c} \text{succeed in coming to be at} \\ \text{get to} \end{array} \right\} \text{shore.}$$

Aside from the queasy feeling produced in one's stomach by such an analysis, there seem to be good syntactic reasons why neither of these can be maintained. First, the occurrence of (76) implies that the subject of *remain* in underlying structure must be *I* rather than a sentence, since sentences cannot be the subjects of adverbials such as *intentionally*.

- (76) *I remained in the jungle intentionally.*

Similarly, if the same structure underlies both (74b) and (75b), we would expect to get such nonsentences as

- (77) \**Last year I could only float to shore, but this year my swimming did so.*<sup>14</sup>

The only argument in favor of analyzing sentences like (74b) as having the same deep structures as those like (75b) is the existence of sentences such as

- (78) *The captain swam to shore, but the first mate got there by rowing.*

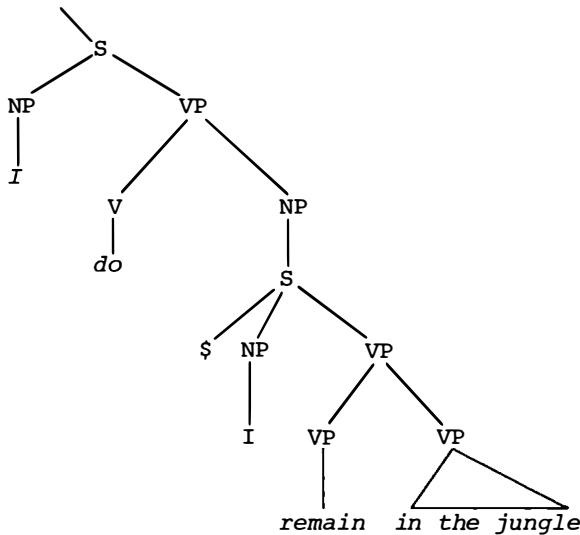
If one assumes that there is some sort of constraint that requires that conjuncts have "parallel structure", one might interpret this constraint as sufficiently strong to require the first clause of (78) to be derived from a structure like (75b). But in fact this constraint is very little understood; the existence of sentences such as (79) implies that it cannot be so strong as to require identity of structure.

- (79) *The captain of the Queen Maude swam to shore, but the first mate drowned.*

Surely *drown* is not to be derived from *fail to come to be at the shore by swimming (by drowning)*.

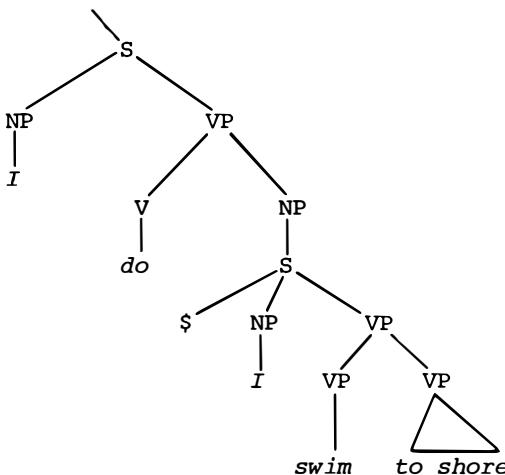
In any event, whatever may turn out to be the deepest structure underlying inside the VP adverbials, their only known peculiarity (compulsory deletion under *do so* formation) is adequately accounted for by positing them as layers of embedding between *do* and the main verb of the embedded sentence. The rules that incorporate adverbs into VP must apply before Equi-NP-deletion, or the latter rule will delete the embedded subjects of structures such as (64) before adverb-lowering can apply to them. If we constrain Prosententialization to apply after at least adverb-lowering (probably it can be constrained to apply after Equi-NP-deletion though neither of these "after rule n" constraints affect the point at issue) and before *Do*-deletion the structures of (74a,b) will be as shown in (80a,b) throughout the time when Prosententialization can apply (assuming they are present in some more complex structure in which Prosententialization can apply at all).

(80) a.



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(80) b.



If Prosententialization applies to either of these structures, it can only yield the phrase *I do so (too)*, and cannot leave the adverbial element out of account.

The analysis suggested above, in which *do so* is created by the very general rule of Prosententialization, appears to account for the facts with very little extra apparatus. Lakoff has proposed a different analysis (Lakoff and Ross, 1966; Lakoff, personal communication) on which the element introduced replaces a VP rather than a sentence. He proposes to account for the optional deletability of adverbs that are "outside the VP" by allowing this rule to affect any level of VP so long as it also affects all those embedded under it [a similar condition on NP is called pied-piping in Ross (1967a)]. This analysis, however, has several serious defects. In the first place, the condition referred to above (hereafter called VP-piping) still does not prevent the rule from applying to only part of the embedded structure in sentences such as (80a,b) if the analysis of adverbs given in this paper is substantially correct. Only the right or the left branching VP (of the two dominated by the VP under S) might be chosen without violating VP-piping, producing such nonsentences as

- (81) a. \*Arnold remained in the jungle while I did so in the city.
- b. \*Arnold remained in the jungle and I remained (do) so too.
- c. \*The captain swam to shore and the first mate did so to the lifeboat.

- d. \**The captain swam to shore and the first mate swam (do) so too.*

Somehow, it is necessary to state that the whole of the largest possible single VP immediately below but not dominating *do* is the minimal unit that can be replaced with *so*. The statement of such a constraint is not possible within the present theory of grammar.

Even if this is somehow avoided, however, at the points at which *do so* formation can occur, outside the VP adverbials are dominated all by the same VP that dominates the element *do* itself. Thus, if *so* replaces the embedded VP and some of the external adverbials, the material deleted will not, in general, form a constituent unless all the external adverbials associated with this VP are deleted and the element *do* as well. Since this would not produce *do so* anyway, but only *so* (unless a subsequent rule or another part of this rule inserted another *do*, which would destroy much of the reason for assuming its presence in deep structure to begin with), it is clear that the VP-piping solution will not avail here.

In addition, such a solution fails to account for the fact that exactly the same phenomena of adverb deletion occur when a sentence is Pronominalized, replaced by *it*. Thus, we get the sentences in (82).

- (82) a. i. *Arnold remained in the city until Thursday, but I only did so until Wednesday.*  
ii. *Arnold remained in the city until Thursday, but I only did it until Wednesday.*  
b. i. *Arnold remained in the city until Thursday, and I did so, too.*  
ii. *Arnold remained in the city until Thursday, and I did it, too.*  
c. i. \**Arnold remained in the city until Thursday, and I did so in the country.*  
ii. \**Arnold remained in the city until Thursday, and I did it in the country.*

Any analysis that accounts for the adverbial ellipses in (82a, b.i) in terms of the rule that forms *so* is forced to posit an additional rule to account for exactly the same deletions of external adverbs after *it* as are provided for after *so* by the rule introducing it. This additional rule, of course, totally misses the fact that it is the same thing that is going on in both cases. Apparently, the deletion

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rule cannot be stated as part of either Pronominalization or Prosentialization (since to do so would be to state the same process twice), and must be accounted for by another rule that is independent of either but explains the facts of both. The facts concerning internal adverbials are already adequately accounted for, since both rules must delete the entire complement of *do* in order to form either *do so* or *do it*; the complement will, of course, contain the internal adverbials as outlined above in either case.

A clue as to the possible fate of these deleted external adverbials is provided in part by the observation that there must exist in the grammar a rule that creates proforms for adverbials when they are identical with ones occurring earlier:

- (83) a. *I write my papers with a typewriter, and Suzie writes hers that way, too.*
- b. *I write my papers with a typewriter, and Suzie does so that way, too.*
- c. *I write my papers in the office, and Suzie writes hers there, too.*
- d. *I write my papers in the office, and Suzie does so there, too.*

The range of adverbials for which proforms exist includes all those that can occur as external to VP. Some adverbials however, do not have proforms, such as negatives. These also cannot be deleted under *do so/it* formation. Thus, one does not get

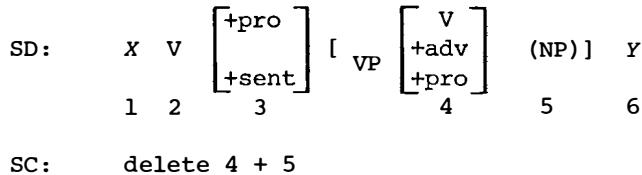
- (84) a. \**Ottokar never beats his mistress, and I do so (too).* (where *do so* = *never beat* etc.)
- b. \**Ottokar never beats his mistress, and I do so then, too.* (where *then* = *never*)

A much similar situation prevails in German; Kiparsky has proposed (class lectures at M.I.T., Spring 1967) a rule called discourse deletion, which deletes adverbials from left to right under identity with others. This rule is subject to very much the same constraints.

Since any adverbial that could be deleted in *do so/it* formation is also subject to Proadverbialization, it would seem reasonable to posit these proadverbs as intermediate steps on the road to oblivion for these adverbials. If we then assume a rule that deletes a string of these adverbials if they follow a proform that represents an underlying sentence (the feature bundle [+pro, +sent] will express this, though some other characterization of the feature common to these forms alone should be found), the facts of (82) will be

explained. Such a rule can be stated iteratively, deleting them one at a time if they are immediately after the proform.

(85) *Adverb-ellipsis*



This rule is optional, as shown by the existence of sentences such as (83b,d), and minor, being governed by the verb that is constituent 2. That the rule is governed is shown by the failure of proadverbs to delete after *think so*, *hope so*, etc.

- (86) a. *Alonzo thought Goldwater would win before the election, and Felicity thought so then, too.*  
 b. \**Alonzo thought Goldwater would win before the election, and Felicity thought so, too.*  
 (meaning *Felicity thought so before the election.*)

This rule appears to account for the facts of external adverbial deletion with the addition of minimal apparatus to the grammar. While another account might well be given, this appears to suffice in view of the data known at present; it provides, apparently, the relevant mechanism to allow the Prosentialization rule discussed in this study to do its work in peace.

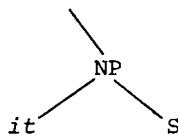
NOTES:

\*I have benefitted much from discussions with George Lakoff and John R. Ross, who have reached many conclusions similar to those reached in this paper independently. I am indebted to them and to Susumu Kuno for discussion of these problems and comments on an earlier version of this study. None of these people are responsible for errors in this work, of course.

<sup>1</sup>The general grammatical framework assumed in this paper includes the main points of the analysis of English syntax

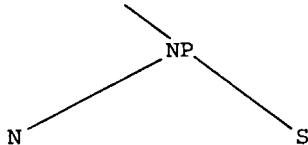
### Pro-Sentential Forms

presented by Ross and Lakoff in class lectures during 1966-1967. In particular, I assume a noncyclic theory of grammar, with iterative rules whose order of application is specified in terms of statements of applicability such as "anywhere before rule i" and "anywhere after rule j". In many cases, these restrictions will be sufficiently confining to give the impression of a strict linear sequence of rules. For more background on questions of rule ordering, see my forthcoming study of the subject. I depart from Ross and Lakoff primarily in assuming the analysis of complements suggested in class lectures at M.I.T., in the Spring of 1967, by Paul Kiparsky. Kiparsky classifies complements into three types on the basis of several criteria of syntactic behavior. While the analysis given originally by Rosenbaum and maintained by Ross and Lakoff assumes that all complements have the structure



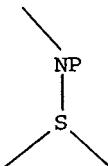
Kiparsky's three structures are:

Factive type:

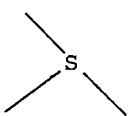


Fact, Idea, Contention  
etc.  
[+PRO]

Propositional type:



Contentive type:



I will occasionally use *it* in this paper for the head noun of a factive construction; this is not to be taken to imply an undifferentiated structure.

<sup>2</sup>The symbol \$ represents the abstract complementizer element that is inserted in the complements of certain verbs and prevents their S node from being subject to node deletion conditions but it is always deleted by Comp-deletion and hence can be given no concrete phonetic shape. This is, of course, only a notational expression of the fact that the nodes in question remain until a late stage of the derivation. If a more general account of this phenomenon can be given, the element \$ would, of course, be superfluous; until then it remains an essentially ad hoc statement of an apparently independent fact.

<sup>3</sup>These principles, which we hope can be stated universally, determine the conditions under which a node may bear a given label. A preliminary approach to these problems was made in Anderson (1967a). Much more work remains to be done on the problem, and the conclusions reached there can by no means be accepted in their entirety.

<sup>4</sup>This is not true of the construction illustrated in (3), since the *do* here is a different item (the *do* of *do*-support, which will be discussed briefly below).

<sup>5</sup>The importance of the feature [+Stative] in the classification of verbs (including adjectives) is discussed at length in G. Lakoff (1966).

<sup>6</sup>Many apparently [+Stative] verbs appear in constructions that normally require [-Stative] verbs. Perceptual statives are especially prone to this behavior. Further analysis shows in these cases that an abstract proverb, such as the inchoative and causative discussed in G. Lakoff (1965), is present in the deep structure and is subsequently deleted or reduced to a feature on the main verb. S. Fischer (1967) has studied these phenomena, among other proverb deletions, in some detail.

<sup>7</sup>D. Perlmutter (1969) discusses in detail the motivations for this construction, as well as many others related to deep-structural constraints that may constitute exception features of individual lexical items.

## Pro-Sentential Forms

<sup>8</sup> For discussion of the extraposition rule and other aspects of the transformational component of a grammar of English incorporating Kiparsky's suggestions concerning the structure of complements, see Fodor (1967).

<sup>9</sup> [See now Kiparsky and Kiparsky (1971), ed.]

<sup>10</sup> These sentences are, of course, all right if the *so* is the element that means, roughly, 'also'. This element is quite different from the *so* of Prosentialization, however. For one thing, it causes Auxiliary attraction to apply, although apparently no question element is involved. Thus, with this *so*, (33a) would be *I have always claimed that Matisse was the most important painter of this century, and so did most authorities.* This element appears to be totally unrelated to Prosentialization *so* and will not be further considered in this study.

<sup>11</sup> This, of course, begs the question of the source of the *so* in *it is so*. This element does not seem to be prosential, and the behavior of the construction seems to indicate that it is an adjective; but if so, it is a most bizarre one. This *so* cannot be compared (\**soer*, \**soest*), reduced (*thing which is so* → \**so thing*), etc. I have no idea where it comes from. These facts were pointed out to me by John Robert Ross.

<sup>12</sup> For a discussion of the criteria for the definition of the level of deep structure and their interaction with each other and with other aspects of grammar, see G. Lakoff (1968a).

<sup>13</sup> Many of the same adverbials that are called "internal to the VP" in English share transformational peculiarities in other languages. Thus, in Samoan, certain adverbials (including directionals) can, by their presence in the VP, inhibit the operation of the rule of particle-deletion (which removes a subject or object particle from an NP directly after the VP). For details, see my unpublished paper "Some Syntactic Rules in Samoan"; further discussion will be forthcoming in my "Why You Can't Do So into the Lagoon Either".

<sup>14</sup> Sentence (77) might be excluded in any case by not allowing the rule of *do so* formation (or Prosentialization)

**Stephen R. Anderson**

to apply until after these structures had been simplified to approximately their surface forms; however, in this case, the correct sentences could only be generated if the "inside" and "outside" adverbials were differentiated approximately as I suggest in this paper. Whatever the deepest possible structure of adverbs may be, I claim that the level of structure assumed in this study must be reached at some point, and this is the point at which the rules proposed here apply.

## LINGUISTIC ANARCHY NOTES

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PAUL M. POSTAL

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*These notes were circulated in 1967, in photocopies that Postal mailed out to his drinking companions and in numerous second- and third-order copies that were made subsequently. It is not clear whether Postal then discontinued the series or whether he simply ceased labeling his papers as belonging to the series.*

*The notes represent a major departure from the then-current tradition of dead-horse flogging, in which works by transformational grammarians were expected to contain re-enactments of battles with structuralist linguists, presumably as an assertion of their title to recently conquered territory. By 1967, Postal's interest in controversies with structuralists had largely waned and had been replaced by an interest in enlarging the factual domain of theoretical linguistics and developing an awareness of the respects in which transformational grammatical theory as it then stood failed to contribute to (let alone provide) the solutions to important problems.*

*This change in attitude brought with it a second major departure from the existing transformational tradition; whereas previously transformational grammarians had virtually always confined their discussion of specific examples to cases where they had explicit rules that generated the "grammatical" examples and failed to generate the "ungrammatical" ones, Postal's discussion was concerned with examples for which he proposed no*

*explicit "generative" analysis, where the problems raised by the examples revolved not so much about "generating the right sentences" as about accounting coherently for their semantic interpretation. See Dougherty (1974) for criticism of this particular aspect of work by generative semanticists (including Postal), and McCawley (1975a) for a rebuttal of Dougherty's criticism.*

*The facts discussed in the third note provide an argument for a further departure from the transformational tradition, though one that Postal at that time did not make, namely, the outright rejection of the notion of "ungrammaticality"; see McCawley (1972b) for an argument that the notion "grammatical" is at best worthless, based in part on Postal's data. The point is that if a distinction between "ungrammatical" and "unacceptable" is to be made, the ungrammatical items are those unacceptable items whose unacceptability is for a reason that the linguist takes to be in his province. That means that in order to tell whether an unacceptable item is ungrammatical, one must identify why it is unacceptable. But if one can identify why it is unacceptable, nothing is gained by in addition classing it as grammatical or ungrammatical. A grammar that specifies what is grammatical and what is ungrammatical but does not enable one to pinpoint what is wrong with all unacceptable sentences (or better, unacceptable uses of sentences) is of questionable value; and if a grammar performs the latter task, there is no obvious reason why one should care whether it performs the former. Particularly important is Postal's observation that the exact same sources of unacceptability may be at work in instances of "faulty agreement" as in instances of arithmetic foulups (John are tired versus Five of my three brothers), and thus that a grammar that "generates the right sentences" as far as agreement is concerned must incorporate a sizeable part of arithmetic.*

*Many of the issues touched on in the notes were topics of discussion at one or other of the San Diego Syntax Festivals, a series of informal conferences that were held annually at the University of California at San Diego from 1967 to 1970. Some of the issues were raised first in Postal's notes, others are represented here by Postal's reactions to discussions at the preceding Festival.*

*Kuroda (1970) explores in detail the relationship between relative clauses and certain kinds of adverbs (which Kuroda dubs "Postalian adverbs") that Postal brings up in the first note; the rule of Telescoping proposed by Kuroda to account for some of Postal's facts, which performs reductions like his leaving in the manner in which he left → the manner in which he left, is shown in McCawley (1975b) to play a role in*

### Linguistic Anarchy Notes

a much wider class of structures than Postal and Kuroda discuss. The observations about reference contained in the second note demonstrated that the notion of coreferentiality, which figured in much discussion of anaphoric devices, could not be applied as blindly as it had been and required deeper analysis; see G. Lakoff (1968b), McCawley (1971b), and Morgan (1970) for discussion of problems involved in formulating a linguistically adequate notion of coreferentiality.

The discussion in the third note of the relationship between conjoining, numerals, and grammatical number meets head on a problem that had up to that time not been given any attention, namely, that of distinguishing ambiguity from non-specificity. Postal took a position that virtually all linguists have rejected, namely that many linguists are insane, Tom and Dick own twelve houses between them, etc. are ambiguous rather than unspecified as to the specific numbers involved (e.g., as to how many houses Tom owns, how many Dick owns, and how many they own jointly). At the time Postal made that claim, no one could offer more than visceral feeling as a reason for or against it. This impasse led to the development of tests for ambiguity (basically, ways in which linguistic phenomena might respect or ignore the difference among supposedly different senses), first reported in G. Lakoff (1970d) and reviewed critically in Zwicky and Sadock (1975).

## I. INTRODUCTION

This is the first in a random, possibly nonfinite series of communications designed to show beyond any doubt that there exists no linguistic theory whatever. There are apparently endless numbers of fact types not incorporable within any known or imaginable framework. In particular, what has been called the theory of transformational grammar, seems to have only the most partial relation to linguistic reality. (That is not to say, of course, that its competitors are right. In general, these vary from the almost totally empty to the absurd. This fact may have led to more faith in transformational grammar than is warranted by its actual ability in any version to provide grammars capable of representing the actually discoverable linguistic facts.)

The communications will be divided into many subdivisions, which will appear at opportune moments over the next four decades. These include:

Series A      Horrors of Identity

Paul M. Postal

Series B	Temporal Monstrosities
Series C	Coordinate Mind Snappers
Series D	Selectional Impossibilities
Series E	Other Linguistic Wonders

Further series may be added as required.

Although personally I find it hard to appreciate, there may be those living who doubt the conclusions of the first paragraph. We have not neglected such individuals. Quite the contrary. For them and them alone we have prepared proposals for Nobel Prize awards and are ready to fill in at once the appropriate lines with the names of anyone who can deal adequately with any reasonable portion of the facts revealed in these notes. All applications for these awards must, however, be postmarked on or before midnight January 1, 2150 A.D. and must include fifty cents handling charges.

It is perhaps necessary to take note of a possible objection at this point in view of what will be our unflinching methodology in these reports. Namely, we absolutely refuse to discuss any theories whatever. We hug closely the ground of true fact. The defenders of various particular so-called linguistic theories may then wish to object that there is a big difference between facts not explained and cases where a theory actually claims something false. They may wish to distinguish, that is, between situations of the form:

- (1) *Theory T says nothing about facts X and X exists.*
- (2) *Theory T says A about facts X when in fact all observed X reveal not A.*

And they may wish to claim that the facts being brought forward in these notes are of exclusively the former type and hence not really indicative of the falsehood of any theory but only of their incompleteness. Technically, this distinction and its associated ideas are quite valid. But there is much ignored here by anyone who takes such a stand with respect to linguistic theory today. For what is implicitly suggested is that the particular theory defended can be extended naturally to handle the set of facts X in (1) situations. What I am suggesting is that there is not the slightest reason to believe this, since the class of facts not handled thus far are in nature quite different from those for which any linguistic framework has been constructed to deal. Moreover, if one looks at the set of all known

linguistic facts, even restricting this set to English, and English syntax-semantics at that, as we shall in these notes, it will be found that most fall under (1) and not under (3).

- (3) *Theory T says B about facts X and in fact observed X reveal B.*

Furthermore, a value judgement. The facts not covered are in general the most interesting ones.

A final word. Our goals seem quite negative. In fact, however, in a deeper way, they are entirely positive. Many people today are engaged in the attempt to construct linguistic theories. My view is that an important difficulty with all such attempts is that there is not a good a priori statement of the full range of known facts which a theory must handle. To the extent that theories are formulated in the absence of explicit awareness of this range of facts, they are dreamlike.

#### SERIES A. Horrors of Identity

##### Number 1. *Some Requisite Equivalences in Instrumental Phrases*

Workers in the transformational grammar framework are already long since well versed in the fact that in complement constructions there are often identity requirements of some sort between an NP in the complement and some NP in the "main" clause. These are usually requirements that in some sense the NPs be identical referentially. But requirements of nonidentity are also findable:

- (1)        *I demand that Schwartz leave.*  
(2)        *\*I demand that I leave.*

Maybe this restriction is representable in terms of an obligatory shift to infinitive yielding (3) from the structure underlying (2).

- (3)        *I demand to leave.*

But this seems dubious in view of the fact that the meaning of (3) seems to involve the notion of 'X let me leave' while no such 'let' component is part of the interpretation of (1). Such an explanation would be doubly desirable, though, since these examples are special not only in involving nonidentity conditions but in involving any kind of identity conditions into that clauses, normally free of such restrictions. All of this is irrelevant to the deeper point toward which we move inexorably. I note only that if obligatory shift to infinitive were right, no linguistic theory known provides a way to state it.

Often ignored is that identity requirements in grammar are of at least two fundamentally different sorts quite independently of the division into equal and unequal types. One must distinguish between requirements of this sort that are natural or deep constraints as against those that are arbitrary or superficial. The distinction is revealed by the contrast between:

- (4)            a. *I tried to win.*  
                b. *\*I tried (for) Nasser to win*
- (5)            a. *I hope to win.*  
                b. *\*I hope (for) Nasser to win.*

In each case one might, and at one time some did, speak of an identity requirement. But the conditions are different in the (4) and (5) cases. The requirement of identity with infinitives of *hope* is arbitrary. This reveals itself in at least two different ways. First, (5b) is unacceptable only for some speakers of English, including the writer, but not including P.S. Rosenbaum. Second, even for those who, like me, reject (5b), it is perfectly well formed semantically. It is not anomalous and is interpretable literally in a way exactly analogous to types like (5a).

In (4), the restriction is natural. That is, it is a function of the meaning of the verb *try*. There are thus no speakers of English who will regard the two forms of (4) as equally well put together. More generally, I would claim that any language has a verb with exactly this meaning must embody this restriction. Once you learn that the Gzorpiān form for *try* is *noaf*, you don't also have to find out if *noaf* requires this identity of its complement. In passing, one can observe that no known linguistic theory provides any way of incorporating such semantically dependent referential identities in its descriptions. These are cases that seem to be maximally embarrassing for any who wish to claim that there is a completely semantics-free syntax. It seems reasonable if relatively empty to assume that natural and arbitrary identity restrictions will be represented in very different parts of a grammar. The natural suggestion is that the former are constraints of semantic representation or of deep structure if this is different from that. The arbitrary restrictions should likely be represented as properties of lexical items in regard to those "transformational" rules that relate semantic representations to the superficial forms of sentences. They should be represented in a way similar to an account of such facts as that *want* has no passive or that the plural of *man* is *men*. It is, of course,

exactly facts like these latter where foreigners will make mistakes.

To the real point. Consider the identity restriction between the grammatical subject of certain active verbs and the grammatical subject, usually deleted,<sup>1</sup> of a complement sentence inside a *by* phrase of the instrumental type.

- (6) a. *I found Jones by looking in the pyramid.*  
b. *\*I found Jones by Bill's looking in the pyramid.*

These constructions offer major problems besides those I wish to stress primarily. In particular, how one can represent their incompatibility with passivization:

- (7) a. *\*Jones was found by me by looking in the pyramid.*  
b. *\*Jones was found by me by my looking in the pyramid.*

or their relations to sentences of the form:

- (8) *My looking in the pyramid annoyed Jones.*

when the main verb of the (6) type sentences is one of a class of psychological predicates:

- (9) *I annoyed Jones by looking in the pyramid.*

Then there are the restrictions as to which class of verbs allows these constructions in the first place, i.e., what verbs can be main verb, what main verb of complement, etc.

All of this is difficult enough. But consider further examples of a type first brought to my attention by Jane Robinson:

- (10) *Jones annoyed me by the abrupt manner in which he left.*

The fact is that the grammatical subject of the main clause here must be identical to the grammatical subject of the apparent restrictive relative clause on *manner*. Hence,

- (11) *\*Jones annoyed me by the abrupt manner in which*  
*{ Shirley }*  
*{ you }*  
*{ Tony's cousin }* *} left.*

Like the identity in previously mentioned examples such as (6) and (9), and related ones not previously mentioned such as (12) and (13),

- (12) *Jones annoyed me by leaving { in an abrupt manner abruptly }*.

- (13) *Jones annoyed my by the abrupt manner of his leaving.*

the identity in (10) is natural. That is, the examples in (11) are uninterpretable literally. They are screwed up semantically.

The identity revealed in examples like (10) is, as far as I know, a unique type. Outside this class of cases, roughly characterized presently, we have not encountered identity restrictions between one NP and another inside a relative phrase, where the latter is not the pivot on which the relative is based. The identity in cases like (6) seems, on the other hand, to fall under the more general class of to be sure poorly understood identity restrictions between NP in main clauses and NP, usually grammatical subjects, inside of complement sentences within these main clauses. The unique class in which (10) falls seems to be characterized very roughly by the fact that the head noun of the apparent restrictive phrases is one of those nouns, like *manner*, that typically form prepositional phrases that function as adverbials, whatever that means. Hence:

- (14) a. *I surprised John by the degree to which I understood astrology.*
- b. *I surprised John by the frequency with which I sneezed.*
- c. *I surprised John by the time I wasted in searching for gold.*
- d. *I surprised John by the speed with which I poked him in the nostril.*
- e. \**I surprised John by the dogfood with which I fed him.*
- f. \**I surprised John by the baseball bat with which I broke it.*

For some reason, the locative adverbial forming nouns seem to be exceptional:

- (15) a. \**I surprised John by the place where I lived.*
- b. \**I surprised John by the location to which I took him.*

Perhaps this has something to do with the relatively concrete meaning of these. But even forgetting about these exceptions what has been said does not really begin to characterize the restrictions here as to the noun or the construction in which the noun can occur. For instance,

- (16) a. *I astonished John by the amount of time I spent sleeping.*  
b. \**I astonished John by the amount of time I investigated.*<sup>2</sup>  
c. *I astonished John by the amount of time I wasted.*

Earlier examples together with (16b) suggest that that noun inside the apparent restrictive that forms the pivot must be inside an adverbial and not a subject or object. But what of (16a,c)? Is this a subtle test for adverbials that look like objects?

The heart of the inexplicable has not yet been reached however. To reach this, consider some of the restrictions on the apparent relative phrase in examples like (10). First, there is the unique identity, which would be bad enough even were it not the case that these restrictions are largely identical to those in the ordinary instrumental complement cases, i.e., those in (10) mirror those in (12). Observe that in (10) the second relative *in which he left* is not ommissible:

- (17) \**Jones annoyed me by the abrupt manner.*

But this is by no means generally true of restrictives, one good reason to doubt that these things are restrictives. It is not even generally true of restrictives in adverbial prepositional phrases:

- (18) *I left in an abrupt manner.*

However, the restriction revealed by (10) and (17) is no doubt related to that revealed in definite cases parallel to (18):

- (19) a. *I left in the manner I planned to.*  
b. *I left in the calm manner I planned to.*  
c. \**I left in the manner.*  
d. \**I left in the calm manner.*

The natural path to search for an explanation of these restrictions is, of course, to suggest that in sentences like (10) and (19) the apparent preposed adjective actually originates as part of a manner adverbial in the sentence that shows up as the second relative. Hence, the nonomissibility of the latter. This suggests, as do the many weird restriction on identity alone, that the structure in sentences like (10) is not a real restrictive relative but somehow

derived from a complement form. That is, the structure of (10) type forms should be derived from that like (12) type. How this might happen eludes me. Observe, for instance, that there is a shift from indefinite to definite.

Ponder, moreover, the amusing fact that while (10) has a fairly exact paraphrase into (12), sentences like (20) are only paraphraseable in complement terms as (21).

(20) *Jones annoyed my by the manner in which he left.*

(21) *Jones annoyed me by leaving in the manner he did (leave in).*

Here there are two forms of horror. First, what kind of grammar can formally relate at once both (10)-(12) and (20)-(21) type pairs? Second and more interesting, there is a kind of identity in (21) never seen before. The sentence underlying *Jones leaving* that occurs before *in the manner* must be identical in some very strong sense to that underlying the following repetition. Not only same morphemes, constituent structure, meanings, etc., but also the indexing of the NP must be the same to indicate reference to same objects and that of the verbs must be the same to indicate the reference, or whatever purists want to call it, of these. That is, not only do the two occurrences of *leave* refer to the same type of occurrence of an event of leaving, but to the very same token, i.e., they are "cotemporal" and "colocal". This type of identity is again characteristic of instrumental expressions involving the same class of adverbial nouns.

- (22) a. *By leaving at the time I did (leave at), I avoided being eaten by the grizzly.*  
b. *By running at the speed I did (run at), I overtook Batman.*  
c. *By living at the location I do live at, I avoid having to rub elbows with swine.*

Here, the locational ones are, for some reason, all right.

We have by no means exhausted all of the special facts that are manifested by this one small class of English expressions. But even the limited set considered is enough to suggest, at least to me, that the very terms we now use to conceptualize syntacticosemantic phenomena are inadequate.

## Linguistic Anarchy Notes

### Number 2. Coreferentiality and Physical Objects

Suppose Karnofsky is an English-speaking alligator describing his life to a "Time" reporter. He might say:

- (1) *My tail fell off, but it grew back.*

He might also reveal that:

- (2) *My wife likes my tail, but the kids think it is too short.*

In each of these cases there seems to be pronominalization linking the underlined forms. It has been proposed (Chomsky, 1965, pp. 145-146) that the coreferentiality involved in this be analyzed in terms of the identity of underlying reference indices.<sup>3</sup> The idea is that these indices keep track of identical entities. The trouble is that the notion of entity and hence of reference being reconstructed is quite unclear. Nothing shows this more than (1) and (2). For although pronominalization seems the same in both, the referential notions linking entities are evidently very different. In (2), the tail beloved by the wife and disparaged by the kids is the same tail; i.e., it is a chunk of tailhood filling a continuous portion of space-time. This object is thus a decent relatively well-behaved type of entity of the sort typically taken to be a physical object. It meets the conditions for physical objects as specified, for example, by Katz (1967, pp. 129, 168):

Consider the idea each of us thinks of as part of the meaning of the words "chair", "stone", "man", "building", "planet", etc., but not part of the meaning of such words as "truth", "togetherness", "feeling", "shadow", "integer", "departure", etc. --the idea that we take to express what is common to the meaning of the words in the former group and that we use to conceptually distinguish them from those in the latter. Roughly, we might characterize what is common to our individual ideas as the notion of a spatially and temporally contiguous material thing. The semantic maker (Physical Object) is introduced to designate that notion.

For example, (Physical Object), although not presently definable, should eventually be replaced by some formal configuration of symbols whose internal structure represents the notion of some

physical entity constituted of spatio-temporally contiguous parts which endures in form unless its permanence is terminated by outside influence.

But these conditions are not met by the "entity" referred to in (1). Clearly, in one obvious sense, the tail that fell off and the one that grew back are different. For instance, assuming judicious use of preservatives, at a later date someone might pick up the first tail and give the new one a sharp rap. This would hardly be describable as

- (3) \**He rapped the tail with itself.*

which can at best be interpreted to involve bending a tail and striking one part with another.

One's first reaction is that the mysteries here have something to do with body parts, or perhaps more generally with whatever things are involved in part-whole relations. But this is wrong. The same contrast can be found in

- (4) *Bugatti's house burned down, but he rebuilt it.*

- (5) *Bugatti's house is expensive, but it is still ugly.*

Again, the underlined forms in (5) both refer to something filling the same continuous portion of space-time. Not so in (4). It is also not so that genitives are necessarily involved in this phenomenon:

- (6) *The boat was completely destroyed by the explosion, but they rebuilt it.*

- (7) *The boat is heavy, but it can still float.*

Actually, what seems to be crucial in permitting coreferentiality between nominals that refer to what are in physical reality distinct objects<sup>4</sup> is the presence of what might be called Negative Verbs of Result, i.e., verbs that describe events that, when occurring to an entity, more or less cause it to cease to exist, *destroy*, *tear down*, *fall off*, *burn up*, *demolish*, *smash*, etc.

Suppose we refer to pronominalization and identity affairs generally of the sort previously known as "ordinary coreferentiality" and to the type in sentences like (1), (4), and (6) as "destruction coreferentiality". There are then two possibilities. (a) Both types are representable in terms of underlying nominals with identical reference indices. The result is that the notions of reference and entity, already unclear though strangely often considered straightforward, are thereby clouded severely. (b) The two types are represented differently. In this case, it is not

### Linguistic Anarchy Notes

at all clear how to begin to do the formal linguistic job of representing the relations. If ordinary coreferentiality is accounted for by identical indices, what represents destruction coreferentiality?

To show the latter problem in its true seriousness, one must emphasize that the laws of ordinary pronominalization hold for destruction coreferentiality in a straightforward way. For instance,

- (8) a. *After his house burned down, Harry rebuilt it.*
- b. *After it burned down, Harry rebuilt it.*
- c. *Harry rebuilt his house after it burned down.*
- d. *\*Harry rebuilt it after his house burned down.*

Especially observe that there can be one nominal which enters into two different sorts of coreferentiality, ordinary and destruction:

- (9) *I saw the house Harry built before it burned down*  
*but you / only saw it after he rebuilt it.*



Here solid lines indicate ordinary coreferentiality, broken ones destruction coreferentiality.

It seems clear, then, that the same rules of pronominalization apply in both cases, suggesting that the underlying identity required should be the same in both cases. The implication is, then, that the notion of reference, that supposed clear link between linguistic form and entity in the world, is even muddier than might have been thought. And what is most ironic is that this mud should appear in exactly that domain where reference is taken to be most clear, that typically taken as a paradigm case for reference, namely, physical objects.

But on the contrary, one must note in closing only that the differences between ordinary and destruction coreferentiality cannot be attributed to the nebulous land of real world-language relations. They must be built into the linguistic structure of sentences. This follows most clearly from the fact that one can derive absurdities by assuming that what follows from one kind of identity follows from another. Thus, take (a) and (b) to be premises of two arguments (10) and (11).

- (10) a. *My tail fell off but it grew back.*
- b. *What fell off me was a certain (physical) object X.*

- c. *What grew back on me was a certain (physical) object Y.*
  - d. *X is the same entity as Y.*
  - e. *Therefore the (physical) object that fell off me is the same entity as the (physical) object that grew back on me.*
- (11) a. *My wife likes my tail but the kids think it is too short.*
- b. *What my wife likes is a certain (physical) object X.*
  - c. *What the kids think is too short, is a certain (physical) object Y.*
  - d. *X is the same entity as Y.*
  - e. *Therefore, the (physical) object that my wife likes is the same entity as the (physical) object that the kids think is too short.*

Although both arguments have apparently identical forms, evidently only (11) is valid. The crucial step in both arguments is (d), which establishes the identity between entities. What emerges then is that the identity is different in the two cases, since making it the same justifies invalid arguments like (10). It follows that somehow the semantic representation of sentences involving destruction coreferentiality must specify a different relation of identity between nominals that undergo pronominalization than the relation of identity normally required. The apparently inconsistent conditions for explaining these facts are met by the linguistic theory proposed by \_\_\_\_\_? on \_\_\_\_\_?

#### *Explanatory Addendum*

I have already detected certain, to be sure, inevitable misunderstandings of previous numbers, which, perhaps, it is best to purge at an early moment. Some, particularly Mediterranean, individuals have taken the comments to indicate some despair about the possibilities of linguistic formulation. This does not exist. Others, usually with beards, have taken them to involve giving up the search for generalizations and explanations. This is both false and curious. It would seem that this accusation should be laid at the feet of those maintaining the rightness of some particular theory in the face of endless numbers of ever impinging data to the contrary.

I have simply wished in these notes to suggest with supporting data that, for instance, the theory of grammar presented in Katz and Postal (1964) is, from the point of view of present knowledge not just slightly in error and rather incomplete, but in deep ways hopelessly far from linguistic reality. This fact has not, however, I am pleased to be able to report, affected sales, which continue at an enriching level. Furthermore, subsequent worthy dickerings of this theory have improved it, to be sure, but not to the extent required to blister reality by any extensive contacts. Would anyone in his right mind try to construct a grammar of English today in the sense Lees tried in the late fifties and early sixties? If you understand why they would not, you understand the theoretical basis of these notes. If not, not.

\SERIES F. That Much-Beloved Semantics-Free Syntax

Number 1. "Plus 1" or "How about Arithmetic?"

A. The cardinal-ordinal hangup

A seventh in (1a) is ambiguous as to whether it refers to a seventh crook like (1b) or to a seventh member of some other set of stabbables not mentioned in (1a) itself:

- (1) a. *Six crooks were stabbing a seventh.*
- b. *Six crooks were stabbing a seventh crook.*

Consider then

- (2) a. *Six crooks were stabbing an eleventh (one).*
- b. *\*Six crooks were stabbing an eleventh crook.*

(2a) is perhaps all right, but is unambiguous; an eleventh cannot refer to one of the set of crooks to which the six previously mentioned thugs belong. Only the "list" interpretation is possible. Correspondingly, (2b) is out.

The generalization is elementary; such sentences with the nonlist interpretation must meet the condition

$$X \text{ Numeral } N_i Y \text{ Numeral}' + th \text{ } N_i Z, \quad \text{where} \\ \text{Numeral}' = \text{Numeral} + 1.$$

This is a perfectly decent condition, which could be formalized in a number of ways. All have in common their erosion of the syntax-semantics border, at least with respect to arithmetic.

One should also note that sentences like (1b), with the interpretation that all seven crooks belong to one set, do not have passives and are thus another of the many cases showing that the usually assumed generality of the Passive rule is unfounded:

- (3) \**A seventh (crook) was being stabbed by six crooks.*

A sensible use of (3) would involve reference to at least thirteen crooks. More generally, such NPs do not undergo a variety of other rules that whip NPs from one place to another:

- (4) a. *It was tough for the six crooks to stab the seventh (crook).*  
b. \**The seventh (crook) was tough for the six crooks to stab.*
- (5) a. *I talked to the six crooks about the seventh (crook).*  
b. \**I talked about the seventh (crook) to the six crooks.*
- (6) a. *It seemed to the six crooks that the seventh (crook) was a fink.*  
b. \**The seventh (crook) seemed to be a fink to the six crooks.*

B. Ordinal anaphora

Sentences like the following are good nuts for theory advocates to crack:

- (7) a. *Three men entered the room, but John insulted only the first.*  
b. *John, Bill, and Harry entered the room, but Schwartz only knew the second.*  
c. \**John, Bill, and Harry entered the room, but Schwartz only knew the eleventh.*
- (8) a. *I talked to the seventh of the eight men who were successively rescued.*  
b. \**I talked to the ninth of the eight men who were successively rescued.*  
c. ???*I talked to the seventh of the eight men who were rescued simultaneously.*

C. Subsets of sets containing fewer members than they do

It is well known that in pure-syntax syntaxes, such beauties as (10) are unstoppable.

- (10) *Nine of my three friends are linguists.*

Again, the restriction is elementary, roughly that Numeral of Det Numeral' N Y must meet the condition that Numeral  $\leq$  Numeral'. I allow equality here so as not to exclude

- (11) *All (twelve) of my twelve friends are Bedouins.*

It is ineffable, is it not, that there should exist a non-null class of linguists who wish to maintain that (10) is grammatical, while (12) is not?

- (12) *Sincerity is annoyed with Harry.*

D. Two or three

As I was reminded by M. Gross (personal communication during dinner at the most excellent Sheila Chang's Chinese Restaurant), we also have:

- (13) *I am losing two or three friends every month by writing things that bug them.*

with an interpretation distinct from that of the propositional calculus. There is also (14) but not (15).

- (14) a. *three or four*

- b. *fifty or fifty one*

- (15) a. *\*three or five hundred and twelve*

- b. *\*six or two*

- c. *\*nine or two-thirds*

i.e., in general, just  $J$  or  $(J + 1)$ . Actually, this is not precisely true, because of examples like:

- (16) *fifty or sixty*

But the general point holds in view of:<sup>5</sup>

- (17) a. *five × 'ten' = fifty*

- five × 'hundred' = five hundred.*

E. Lists

Another good instance of the pervasive role of arithmetic in sentence formation is provided by such examples as:

- (19) a. \**Mary, I would like to introduce you to my two friends, John, Billy, Sally, Jack, Tom, Peter, Schwarz, and Thmug.*  
b. *Mary, I would like to introduce you to my two friends, John and Billy.*  
c. *Mary, I would like to introduce you to my three friends, John, Billy, and Thmug.*
- (20) a. \**Eleven men were sitting in the room, Harry and Jack.*  
b. *Two men were sitting in the room, Harry and Jack.*
- (21) a. *Those three men own one, two, and three cars respectively.*  
b. \**Those sixty six dogs ate one, two, and three cats, respectively.*

F. Reciprocals

Consider some positions of the English plural morpheme; only interpretations in which *others* refers to the initial NP are considered in these data:

- (22) a. *John is tough for Bill to visit.*  
b. *It is tough for John and Bill to visit each other.*  
c. \**John and Bill are tough for each other to visit.*  
d. *John and Bill are each tough for the other to visit.*  
e. \**John and Bill are each tough for the others to visit.*  
f. *John, Bill, and Mary are each tough for the others to visit.*  
g. \**John, Bill, and Mary are each tough for the other to visit.*

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- h. *The two men are each tough for the other to visit.*
- i. \**The two men are each tough for the others to visit.*
- j. *The three men are each tough for the others to visit.*
- k. \**The three men are each tough for the other to visit.*

As W. Plath perceptively points out, the *other* constructions in (22) are no doubt to be regarded as reductions of expressions of the form:

- (23) a. *John and Bill are each tough for the other one to visit.*
- b. *The two men are each tough for the other one to visit.*
- c. *John, Bill, and Harry are each tough for the other two to visit.*
- d. *The three men are each tough for the other two to visit.*

For some speakers, these are sentences, for others, perhaps only intermediate forms. Probably everyone has things like:

- (24) *Each of the three men is tough for the other two to visit.*

Again, ignoring the conjunction-plural difference for the moment, the condition on these constructions is roughly

X Numeral  $N_i$  Y other Numeral' Z,

where Numeral' = Numeral - 1.

G. Predicate numbers

We find:

- (25) a. *Johnson and Balsworthy are two of the nicest guys you would ever want to meet.*
- b. \**Johnson, Rusk, and Ho Chi Minh are six of the cruelest devils on Earth.*

H. Languages with dual number

Much of the syntactic nature of number is obscured in English by the fact that it has only singular-plural inflections. This permits much numerical work to be done by a pure-syntax-appearing division into singular-plural. In languages like Mohawk, where there is singular, dual, and plural, this fails, and syntax must demonstrably count to three for such gross syntactic facts as agreement. This is true marginally in English as well:

- (26) a. \*All two of my neighbors are necrophiles  $\Rightarrow$   
Both of my neighbors...  
b. All three/four/... of my neighbors are  
necrophiles.
- (27) a. Any of those three/four/... razors might be  
good for other uses...  
b. \*Any of those two  $\Rightarrow$  either of those two

I remember dimly that there are languages with trial numbers as well. This places the defender of nonarithmetical syntax in the curious position of defending a maximum 4 syntax. Why four should have the magic property of terminating syntactic description eludes me.

I. Conjunction<sup>6</sup>

A nice challenge for the defender of maximum 4 syntax is provided by sentences like

- (28) Harry and Thmug married seven women (between them).

If such are to come from sentence conjunction, where the conjuncts have nonconjoined Harry and nonconjoined Thmug as individual agents, then arithmetic ( $>4$ ) must be included in the grammar. If it is claimed that the deep structure of (28) is more or less its surface structure, i.e., that it is a case of NP conjunction, it must be faced that the interpretation that (28) is not the usual joint interpretation of other, more standard cases of what is often claimed to be NP conjunction (I don't believe in this anywhere, if anyone cares) such as,

- (29) Harry and Bill wrestled (with each other).

In items like (29), there is one predicate token jointly associated with the compound subject. But observe the contrast between this kind of thing as in

(30) *Harry and Bill wrestled* { a Korean  
seven Koreans } (together).

(31) *Harry and Bill wrestled seven Koreans* (between  
them).

If the deep structure of (31) is essentially the surface structure, what is that of (30)? I would suggest that (31) comes from sentence conjunction and is six ways ambiguous. What the maximum 4 syntax defender would say eludes me.

J. Number coordination

In general, conjunction and disjunction are parallel.<sup>7</sup>  
But observe under coordination reduction:

- (32) a. *Jack bought six books or Jack bought seven books.*  
b. *Jack bought six books and Jack bought seven books.*
- (33) a. *Jack bought six books or seven books.*  
b. *Jack bought six books and seven books.*
- (34) a. *Jack bought six or seven books.*  
b. \**Jack bought six and seven books* ⇒ b'. *Jack bought thirteen books.*

It seems to me important to observe that (34b') is in fact ambiguous in the way such a derivation predicts, namely, over the number of different sales events involved, which varies in this case from one to thirteen.

K. Why?

Obviously, we have merely scratched the surface of the phenomenon of arithmetical restrictions in syntax. This raises the question as to why there shouldn't be a syntax that includes arithmetical principles rather than principles of sentence formation, which yield mostly drivel in arithmetical cases, plus an appeal to syntactic principles up to 4 but a fix-up semantics thereafter putting in just what was left out of the syntax?

A good ground for believing that arithmetical properties are not to be excluded from the syntax is that the information required seems to be provided by the natural correspondence between the unquestioned syntactic property of number of conjuncts and numbers. This is shown by the "twohood" of

*John and Bill*, "threehood" of *John, Bill, and Thmug*, etc., as illustrated, for example, in (20). See also (7). Other well known examples are obvious.

My suggestion is, then, that all plurals are derived from the conjunction of distinct singulars, usually referentially distinct, and that numbers are a way of indexing the number of underlying conjuncts.<sup>8</sup> Schematically: *two men* = *man<sub>1</sub>* and *man<sub>2</sub>*. To make this more natural, one requires the further insight that all nouns are deformed relative phrase predicates, but that is another story. This is not a theory or anything like it, of course, simply a suggestion of the direction in which to look for one. Its advantage consists first of forcing one to come to grips with facts like those noted above, facts that maximum 4 syntax has in historical fact led to the ignoring of.

NOTES

<sup>1</sup> Except in a limited number of cases that seem to involve intransitive constructions if not intransitive verbs:  
*I annoyed Jones by my complaining; \*I annoyed Jones by my complaining about Communism; I annoyed Jones by my running; \*I annoyed Jones by my running of the race.*

<sup>2</sup> (16b) must be interpreted with *time* as object of *investigate*, not as an adverb modifying it, i.e., not as a paraphrase of 'amount of time is spent investigating X'.

<sup>3</sup>

Chomsky actually proposed more, namely, that the indices be associated with lexical nouns that are the heads of nominals. Hence, pronominalization and other operations involving referential identity would involve not only index identity but lexical noun identity as well. This can be shown to be impossible, a point argued in my forthcoming paper "Noun and Pronoun in Universal Grammar" to appear in S. Lamb (ed.), "The Linguistic Wisdom of S. Lamb: Papers Published on the Occasion of the Publication of 'The Linguistic Wisdom of S. Lamb'; etc.". Chomsky also seems (although I am really not sure about this) to regard the indices as, in the logical sense, constants or constantlike, whereas there are many grounds for taking them as logical variables over which, for instance, quantification can be defined. Part of the difference here is whether one takes deep structures, semantically interpreted, to make (in the declarative case) an infinite number of assertions or whether one takes them to

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be the equivalent of propositional functions without truth values, receiving the latter only when values for variables are provided.

<sup>4</sup>The appeal to physical reality here is not empty. It can be pointed out that Schwarz in 1911 and "the same man" in 1967 are physically different; in fact, no two molecules probably occur in both objects. But there is a physical continuity in this typical situation lacking in the cases of (1), (4), and (6).

<sup>5</sup>The fact that coordination reduction works in cases like *five hundred or six hundred*  $\Rightarrow$  *five or six hundred*, but not in cases like *fifty or sixty*  $\Rightarrow$  \**fif or sixty* is, I believe, a special instance of the universal principle that conjunction reduction does not operate below the level of words, a fact closely linked to the deeper principle that word boundaries correspond to constituent boundaries in surface structures. Although I have been told of some German and Japanese counter-examples to the special principle, I believe that, in the terminology of the eminent Bar Hillel, this constraint is worth enforcing. There are, after all, minor English examples too, such as *pro and anti Castro speeches*. But I would seek another explanation for these, such as deletion rather than conjunction reduction. This would yield a bracketing of the form (i) rather than the structure (ii), which would result from real coordination reduction:

- (i)         $((\text{pro} \ (\text{and} \ (\text{anti} \ \text{Castro}))) \ \text{speeches})$
- (ii)         $((\text{pro}) \ (\text{and} \ (\text{anti})) \ \text{Castro} \ \text{speeches})$

And (i) seems quite correct to me. Further study of the proposed German and Japanese examples is in order, for the principle does too much work to be discarded lightly.

<sup>6</sup>This and the following section barely skim the top of arithmetic facts in the domain of coordination reduction. For one further example,

- (iii) a. *nice boys and nice girls*  $\Rightarrow$  nice boys and girls.
- b. *three boys and three girls*  $\Rightarrow$  \**three (boys and girls)*.
- (iv) a. *nice boys and mean girls*  $\Rightarrow$  nice and mean boys and girls, respectively.
- b. *three boys and four girls*  $\Rightarrow$  \**three and four boys and girls, respectively*.

b'. seven boys and girls.

<sup>7</sup>I suspect disjunction is derived in a logical way from combinations of negation and conjunction, the latter being the only deep type of coordination. Some support for this seems to me derivable from the obvious greater perceptual difficulties of otherwise parallel to conjunctive disjunctive structures. I have also observed some contexts in which the two appear not to contrast semantically:

- (v) a. *I didn't know that John or Bill lived in Chicago.*
- b. *I didn't know that John and Bill lived in Chicago.*

<sup>8</sup>McCawley (1968b) accepts the derivation of some plurals from conjunction but not all. His grounds include the existence of statements about an indefinite number of individuals, i.e., those with *roughly*, *approximately*, etc. This argument seems to me anything but compelling. Sentences like (vi,a) might have a deep structure of the form (vi,b):

- (vi) a. *Approximately 300 men volunteered.*
- b. *[it S] is approximate*

where the S contains precisely 300 conjuncts. I also see nothing wrong with letting indefinite quantifiers like *many*, *few*, receive infinitely many readings with respect to number, i.e., nothing wrong with allowing sentences containing them to be infinitely ambiguous over individuals. McCawley also takes it as a counterargument to this view that sentences containing enormous numbers must involve deep structures with enormous numbers of conjuncts. But why this is a counter-argument he does not say. Possibly he has some perceptual argument in mind. Perhaps the most interesting apparent counterargument is given by sentences with terms like *infinite*, *boundless*, in them that would require infinitely long deep structures. But I see no reason to take this as a difficulty of any greater scope than that faced by the mathematician who wishes to represent an infinite set. He simply devises a finite notation for it. There is no reason why the theory of grammar cannot contain deep structure schemas for these cases that provide a finite representation for those infinitely long structures. I thus raise the possibility that not only is there an infinite number of sentences each of finite length, but there are also sentences of infinite length

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(unwise to try to pronounce fully). The beginning of one such is:

- (vii) English is an infinite set of sentences which consist respectively of the morpheme strings

a. ...

b. ...

.

.

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## LINGUISTIC HARMONY NOTES

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*The single note that appears here, dated November 1, 1967, was circulated as photocopies and, like Postal's "Linguistic Anarchy Notes", was distributed to Postal's drinking companions. No other notes are known to belong to the series; however, in view of Kuroda's introductory note and the uncertainty as to what works of Postal's belong to the "Anarchy Notes", it is conceivable that other works by Kuroda should be considered to belong to the "Harmony Notes". Indeed, if I am interpreting Kuroda's introductory note correctly, Kuroda (1970) constitutes "Linguistic Harmony Notes. Series A. Number 1".*

### SERIES A. Charms of Identity<sup>1</sup>

#### Number 2. *A Proof That Pronominalization Is Not A Transformation*

Assume pronominalization is a transformation. Assume time adverbials follow the main part of the sentence when pronominalization applies. Without loss of generality we can assume John says,

S. Y. Kuroda

*I had finally divorced my wife in 1957,  
only one year before I married her sister.*

The underlying form of this sentence would be

*I had finally divorced my wife in 1957,  
only one year before I married my wife's  
sister.*

But, of course, "to marry his wife's sister", that is precisely what John wanted to avoid.

Assume time adverbials precede the main part of the sentence when pronominalization applies. We can assume John says,

*In 1958, only one year after I had finally  
divorced my wife, I married her sister.*

The underlying form of this sentence would be

*In 1958, only one year after I had finally  
divorced my wife, I married my wife's sister.*

But, of course, "to marry his wife's sister", that is precisely what John wanted to avoid. Q.E.D.

Remark

Postal's celebrated alligator (Postal, 1967) refers by the pronoun *it* to *my tail*, which is qualified to be called *my tail* but which is not physically identical with the entity that is referred to by the noun *my tail*, which apparently pronominalizes *my tail*. Our favorite John refers by the pronoun *her* to *my wife*, who is not qualified to be called *my wife*, but who is physically identical with the entity that is referred to by the noun *my wife*, which apparently pronominalizes *my wife*.

NOTES

<sup>1</sup>The "Linguistic Harmony Notes" are arranged into series that will stand in a natural one-to-one correspondence with the series of Postal's "Linguistic Anarchy Notes". Since the names of the series and the assignment of notes to a series will be predictable by a trivial rule, series titles will henceforth be omitted as superfluous.

## ON THE HISTORICAL SOURCE OF IMMEDIATE CONSTITUENT ANALYSIS

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*This paper was presented at a meeting of the Madison Linguistic Circle at the University of Wisconsin, December 12, 1967, and in revised versions, at the conference on the history of linguistics held under the auspices of the Wenner-Gren Foundation at the Newberry Library, Chicago, February 14-15, 1968, and the annual meeting of the Societas Linguistica Europaea, Poznán, August 18, 1973. It was also circulated in mimeographed form.*

*It is of importance as much for its elegant demonstration that traditional grammar was not what most twentieth century American linguists have taken it to be, as for its demonstration that immediate-constituent analysis was a conscious innovation by Wundt and became a part of the American linguistic tradition by being lifted bodily from Wundt's works into Bloomfield's. Percival's paper heavily influenced the discussion of traditional grammar in my paper (1973a) on William Dwight Whitney's conception of syntax.*

There is at present a widespread view that immediate constituent analysis is a modern version of traditional syntactic analysis.<sup>1</sup> Zellig Harris, for example, has recently asserted (1965, p. 363):

"Traditional grammar established various distinguished segments of sentences which were hierarchically subdivided into smaller

segments (in a manner made explicit by Leonard Bloomfield, as the method of immediate constituents)". Similarly, John Lyons sees "an obvious parallelism between immediate constituent analysis and the traditional procedure of parsing sentences into subject and predicate, and each of these, where appropriate, into words, phrases, and clauses of various types" (1968, p. 210). I shall argue in this paper that traditional grammar and immediate-constituent analysis are logically incompatible, and that immediate-constituent analysis has a non-traditional origin.

Traditional grammar is the family of linguistic theories represented in the grammars written before the advent of scientific linguistics. I use the expression "family of theories" rather than the word "theory", since traditional grammar is not a single, unchanging conceptual object. I assume, however, that it has certain fairly constant defining features. For convenience I take many of my examples from the Latin grammar of Allen and Greenough (1931) and the Greek grammar of H.W. Smyth (1916), since both these works are still in print and can be consulted by interested readers.

The aim of traditional syntactic description is, to quote Smyth, to show "how the different parts of speech and their different inflectional forms are employed to form sentences" (1956, p. 255). The sentence, it may be noted, is regarded here as a combination of words, i.e., it is defined synthetically. In fact, the four basic units of traditional grammar - letter, syllable, word, and sentence--form a straightforward ascending hierarchy,<sup>2</sup> and the Greek word "syntaxis" itself suggests the idea of arranging things in an ordered array.<sup>3</sup>

Thus, sentences are thought of in traditional grammar as combinations of words, not combinations of phrases. However, certain phrasal elements are recognized by most traditional grammarians. For instance, periphrastic verb forms of the type *amatus est* 'he was loved' are treated as single words for morphological purposes and are listed in paradigms along with forms consisting of single words like *amatur* 'he is loved'. It is as if such periphrastic forms are considered to be substitutes for nonexistent single words. In grammars of the vernacular languages, this notion is sometimes made explicit. For example, Adelung in his "Deutsche Sprachlehre für Schulen" defines auxiliary verbs as "diejenigen Verba... welche die mangelhafte Deutsche Conjugation in Vergleichung mit den vollständigern anderer Sprachen ergänzen helfen" (those verbs that help to make up for the deficiency of the verb morphology of German in comparison with the more complete morphologies of other languages) (1806, p. 263).

Another type of phrasal constituent that has been recognized by traditional grammarians, especially in the last century or so

### Historical Source of IC Analysis

can be exemplified by the English expression *near the window* in a sentence such as *He was standing near the window*. This type of expression is said to function as a single syntactic unit but to consist formally of a preposition and a noun. It is useful to draw a distinction between "form" and "function" since the same form may have several different functions. Prepositional phrases, for instance, occur as predicate complements (as in *the carriage is in good condition*), as objective complements (as in *he found the carriage in good condition*), and as adjectival modifiers (as in *the lass with the delicate air*).

But note that in traditional grammar, the head and its attribute are not said to constitute a phrase. In the last example quoted, *with a delicate air* may be called a phrase, but neither *the delicate air* nor *delicate air* are referred to as phrases. There is in fact no such thing in traditional grammar as a noun phrase in the sense this term is used today by professional linguists. Traditional grammarians do not divide sentences into phrases without residue; traditional grammar knows nothing of phrase structure.

In most traditions, both classical and vernacular, the sentence is said to contain two necessary elements, namely, a subject and a predicate, or in some traditions three - subject, verb, and object. However, there has always been a persistent tendency to think of these essential elements as single words, not as strings of words. For instance, Allen and Greenough (1931, p.164) cite *canis currit* 'the dog runs' as a minimal complete sentence, and similarly, Smyth (1956, p. 255) quotes *ēlthe kēryx* 'a herald came'. At the same time, however, the terms "subject" and "predicate" are usually defined semantically - the subject as the person or thing spoken about, and the predicate as that which is said about the subject.<sup>4</sup> One might reasonably expect, therefore, that where the subject noun or predicate verb is accompanied by modifiers, the entire resultant phrase would constitute the subject or predicate, as the case might be. But this has for the most part not been the case.<sup>5</sup> In a sentence such as *vir fortis patienter fert* 'a brave man endures patiently', the subject is the word *vir* 'man', not the phrase *vir fortis* 'a brave man', and the predicate is *fert* 'endures', not *patienter fert* 'endures patiently'. Quoting this sentence Allen and Greenough (1931, p. 166) state "the adjective *fortis* 'brave' modifies the subject *vir* 'man'." Thus, not only is the expression *vir fortis* not a subject, it is not a phrase either, a phrase being defined by Allen and Greenough (1931, p. 166) as "a group of words, without subject or predicate of its own, which may be used as an Adjective or an Adverb." *Vir fortis* is a group of words without subject or predicate of its own, but it is being used

here neither as an adjective nor as an adverb. Similar arguments apply to the expression *patienter fert*; it is neither a predicate nor a phrase.

It should also be noted that a subject is a subject with respect to some finite verb, not with respect to the sentence as a whole. Thus, a student attempting to construe an unfamiliar Latin sentence is told to "look for the finite verb, and then find its subject". Note that he is not invited to try dividing the sentence in two and to call one portion the subject and the other the predicate.

In addition to these principal sentence elements, other subordinate elements are recognized in traditional grammar, namely, the so-called modifiers and complements. Adjectives are said to be modifiers when they appear attributively in close association with a substantive; direct objects are considered complements, as also are most prepositional phrases.

The notion of modification has an interesting peculiarity. An adjective is said to modify the substantive it accompanies, and an adverb the adjective it accompanies. In certain circumstances, therefore, an adverb may modify an attributive adjective, i.e., an adjective that itself modifies another word. Thus, in an expression such as *very hot water*, the adverb *very* is said to modify *hot*, which itself modifies *water*. The result, then, in cases of this type is a hierarchy of modification. But it is also possible for a word to be modified by several words between which no relation of modification exists. For example, in the expression *an old man with leprosy*, the substantive *man* is said to be modified by the adjective *old*, by the indefinite article *an*, and by the prepositional phrase *with leprosy*. In such cases, no hierarchical structure of modification is recognized.

So much for traditional syntactic theory. Let us now examine immediate-constituent analysis as developed for the first time in Bloomfield's "Language" (1933, p. 161) and further elaborated by Wells (1947) and Bazell (1953). In particular, I should like to focus attention on what are, I believe, three fundamental characteristics of this kind of syntactic analysis. These are the notions:

1. That any sentence breaks down or can be split binarily into a subject part and a predicate part. Thus, the sentence *poor John ran away* breaks down into *poor John*, the subject part, and *ran away*, the predicate part.
2. That some groups of words are syntactically equivalent to single words. Thus the group of words *very rich* is equivalent syntactically to the single word *poor* in the expressions *very rich man* and *poor man*.

### Historical Source of IC Analysis

3. That the analysis of a sentence yields a single unbroken hierarchy of groups. For example, the sentence *poor John ran away* is analyzed first into *poor John* and *ran away*. The first of these two constituent parts of the sentence is in turn analyzed into *poor* and *John*, and the second into *ran* and *away*. In no instance are discontinuous constituents recognized, say *poor... away*, nor do any constituents overlap, as they would if we posited *poor John* and *John ran* as constituents. Note also that two constituents are recognized each time the process of analysis is applied to a sequence. To divide a sentence such as *John loves Mary* into three immediate constituents (*John*, *loves*, and *Mary*) would not be considered a normal analysis by the practitioners of this theory.

If we scrutinize these three basic notions of immediate-constituent analysis from the vantage point of traditional grammar, we must conclude that the two theories are fundamentally incompatible. Let us consider first the notion of a binary split of the sentence into a subject and a predicate. This would make terminological sense to a traditional grammarian only for sentences consisting of two words (such as *Canis currit*). In all other instances, the traditional grammarian would baulk since he applies the terms "subject" and "predicate" to single words. Moreover, he has no way of referring to the constituents the immediate-constituent analyst calls by these same terms. This is because his terminology in the area of phrasal constituents is rudimentary.<sup>6</sup> Moreover, for the traditional grammarian, word order and syntax are separate topics. In Latin, for example, word order is relatively independent of syntactic relations, and the operation of isolating the constituents that the immediate-constituent analyst calls subjects and predicates would be a useless exercise in the few cases where it can be done. It is, therefore, no accident that immediate-constituent analysis does not form part of traditional syntax.

As for the syntactic equivalence of word groups and single words, this has some support in traditional grammar. Prepositional phrases are considered equivalent to adverbs or adjectives functionally, and periphrastic verb forms equivalent to nonperiphrastic ones. It is also noteworthy that periphrastic forms consist in most cases of two words, as do prepositional phrases (minus any modifiers, of course). But, as I have already pointed out, equivalence of noun to noun phrase or of verb to verb phrase is absent from traditional grammar.

Finally, let us consider the hierarchical features recognized in traditional grammar. While there is some conceptual affinity between the traditional notion of

hierarchies of modification and the hierarchical principle basic to immediate-constituent analysis, the two are nevertheless separate notions and lead to different analyses in concrete cases. In a phrase such as *very cold beer*, the grammatical tradition says merely that *beer* is a substantive, that *cold* is an adjective modifying the substantive *beer*, that *very* is an adverb modifying the adjective *cold*, and therefore that the same relation of modification that obtains between *cold* and *beer* obtains also between *very* and *cold*. Implied in the traditional theory is, of course, the notion that *cold* is the locus of two relations, one obtaining with *beer* and the other with *very*. In immediate-constituent analysis, on the other hand, *cold* has no relation to *beer* whatever, but rather the phrase *very cold* has a relation to the word *beer*, which parallels the relation holding between the single words *very* and *cold*.

These two analytical solutions are, I should like to suggest, logically incompatible. Either there is a relation of modification between the single word *beer* and the phrase *very cold*, or there is a similar relation between the single word *beer* and the single word *cold*. Both analyses cannot be true, one of them (or possibly both of them) must be false. I conclude, therefore, that immediate-constituent analysis is not a more explicit version of traditional syntactic theory but that the two are logically separate and distinct. Hence, immediate-constituent analysis, when it was first thought of, must have constituted a break with the grammatical tradition. I said above that immediate-constituent analysis was first formulated by Bloomfield in his 1933 monograph "Language". But was Bloomfield really the earliest spokesman for this type of analysis?

If we examine his earlier book, "An Introduction to the Study of Language" (1914a), what we notice first of all is that instead of giving the sentence its traditional synthetic definition as a combination of words, Bloomfield defines it analytically as "an utterance analyzing an experience into elements" (1914a, p.60). The relation between the various sentence elements has, according to Bloomfield, a special "psychological tone called the logical or discursive relation" (p.60). This special psychological tone "consists of a transition of the attention from the total experience, which throughout remains in consciousness, to the successive elements, which are one after another focused by it" (p.60). The picture is then the following: A sentence corresponds psychologically to a total experience, and each word in it to a constituent element of this total experience. The experience remains in consciousness as a totality while the sentence is being uttered, but the attention is focused on each successive

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constituent word as it is uttered. Bloomfield proceeds as follows: "We can attend to but one thing at a time. Consequently the analysis of a total experience always proceeds by single binary divisions into a part for the time being focused and a remainder. In the primary division of an experience into two parts, the one focused is called the *subject* and the one left for later attention the *predicate*... If after this first division, either subject or predicate or both receive further analysis, the elements in each case first singled out are again called subjects and the elements in relation to them, attributes" (1914a, p. 60).

I hardly need to point out that the notion of binary splits, the bipartite sentence, the hierarchical principle, the analytical approach from the sentence down to the individual syntactic units are all clearly expressed in this passage. It is also noteworthy that the terms "subject", "predicate", and "attribute" are used in ways at variance with their traditional meanings. This idiosyncratic use of traditional terms raises a further question. Where did Bloomfield get this analysis from if not from the grammatical tradition?

The answer is clear. The immediate source of Bloomfield's syntactic theory was Wilhelm Wundt. In the preface to his 1914 monograph Bloomfield writes: "It will be apparent that I depend for my psychology, general and linguistic, entirely on Wundt; I can only hope that I have not misrepresented his doctrine. The day is past when students of mental sciences could draw on their own fancy or on popular psychology for their views of mental experience" (1914a, p. VI).

Let us accordingly turn to Wundt's monumental "Völker-psychologie". The section we are concerned with bears the title "Die Sprache" and first appeared in two parts in 1900. In the second of these two parts, Wundt defines the sentence as "den sprachlichen Ausdruck für die willkürliche Gliederung einer Gesammtvorstellung in ihre in logische Beziehung zueinander gesetzten Bestandteile" (1900, p. 240), that is, "the linguistic expression for the arbitrary division of a total idea into its constituent parts placed in logical relations to one another". Here, then, we have an explicit analytical definition of the sentence, in contrast to the traditional synthetic one.

But one may ask at this point whether Wundt was aware that he was breaking with traditional grammatical theory in this regard. The answer again is clear. He devotes several pages to a critique of what he calls "die Definitionen der alten Grammatik" (1900, p. 222-226). There he argues against the traditional definition of the sentence as a combination of words on the following grounds. First, a sentence may

consist of a single word. Second, not just any combination of words is a sentence. For example, an enumeration of the signs of the zodiac is a combination of words but can hardly be said to constitute a sentence. Whether a combination of words qualifies as a sentence depends on how they are put together: "es müsste also hinzugefügt werden, wie das Ganze beschaffen sein muss, um als Satz zu gelten" (Wundt, 1900, p. 224). Third, the notion of "thought" that is normally invoked in traditional definitions ("A sentence is a combination of words that expresses a complete thought") is inherently vague (1900, p. 225).

Nor does it help to replace the notion "word" by "concept" and define the sentence as a combination of concepts. Hermann Paul in his "Prinzipien der Sprachgeschichte" (1880, p. 197) had offered such a definition, which reads as follows: "Das Wesen des Satzes besteht darin, dass mehrere Vorstellungskomplexe in Beziehung zu einander gesetzt werden durch Nebeneinanderstellung der Wörter, an die sie sich angeschlossen haben" ("The nature of the sentence consists in the fact that several conceptual complexes are placed in relation to one another by juxtaposition of the words with which they have become associated"). According to Wundt, this definition suffers from the first two defects mentioned in connection with the traditional definition and from a number of additional ones. One of these is the fact that the definition is worded in terms of the thought that generates the sentence. But the thought and the sentence are separate phenomena, since what one person thinks while he is uttering a particular sentence may be quite different from what another person might think when uttering the same sentence. Wundt draws the following conclusion: "Der Satz ist in erster Linie ein sprachliches Gebilde, ein psychologischer Vorstellungverlauf nur insofern, als dieser wirklich im Satze ausgedrückt wird, und vollends ein logisches Urteil nur unter der Bedingung, dass er direkt eine Aussage enthält" (The sentence is first and foremost a linguistic formation; it is a sequence of psychological concepts only insofar as such a sequence is in fact expressed in the sentence; and finally, it is a logical judgment only if it directly contains an assertion).

Indeed, Wundt prefers the traditional definition to the psychological one suggested by Hermann Paul, arguing that while in most cases a sentence is a combination of words, it is false to call a sentence a combination of concepts. For while a speaker is uttering a sentence the constituent concepts do not patiently wait to turn up in his consciousness until the corresponding words are about to be uttered. On the contrary, the sentence is a psychological unit present in the speaker's mind throughout the time he is uttering it. It is true that the word actually being uttered is usually in the

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focus of attention ("im Blickpunkt des Bewusstseins"), but the other word-concepts, or at least those essential for the meaning of the whole sentence, are in the middle ground of attention ("in dem weiteren Umfang des Bewusstseins").

Moreover, the principal constituent concepts of a sentence are already in consciousness the minute one starts uttering it.

Wundt, therefore, feels justified in asserting that the sentence has a twofold character - it is both simultaneous and successive. It is simultaneous in the sense that throughout its production the speaker is conscious of it in its entirety. It is successive in that the state of consciousness ("der Bewusstseinszustand") varies from moment to moment as particular constituent concepts pass into the focus of attention and others pass out.

According to Wundt, Hermann Paul's mistake was to carry over the outer grammatical form ("die äussere grammatische Form") into the area of consciousness, to assert that each particular grammatical form ("jede äussere Form") is a true reflection of the underlying psychological processes as they take place ("von Moment zu Moment ein treues Abbild der zugrunde liegenden psychischen Vorgänge"). When a sentence is uttered, it is, of course, the result of a set of psychological processes, but the latter are quite distinct from the sentence itself. Thus, Wundt advocates distinguishing between the psychological factors that bring about a particular concrete utterance and the external grammatical form ("die äussere grammatische Form") of the sentence in question, and he accuses Paul of confusing the latter with the inner psychological structure ("das innere psychische Gebilde"). Wundt's linguistic theory is, therefore, one of those in which the correspondence between inner form (in his case the psychological factors) and outer form is not one to one.

To recapitulate the argument so far, Wundt was the immediate source of Bloomfield's untraditional definition of the sentence, and he was fully aware that in this regard he was breaking with the long-standing synthetic definitions of sentencehood. Moreover, he presented psychological evidence to support his rejection of the grammatical tradition on this vital issue. But one may ask whether he was responsible for Bloomfield's notion of the binary sentence split and the idea of a single analytical hierarchy of sentence constituents. If we examine the further discussion in "Die Sprache" we find unmistakable evidence that he in fact was.

Having established the simultaneous character of the sentence, Wundt goes on to discuss its character of being a sequence of successive elements. Here he emphasizes that a sentence is a set of elements among which certain relations obtain; it is not merely an aggregate of individual items.

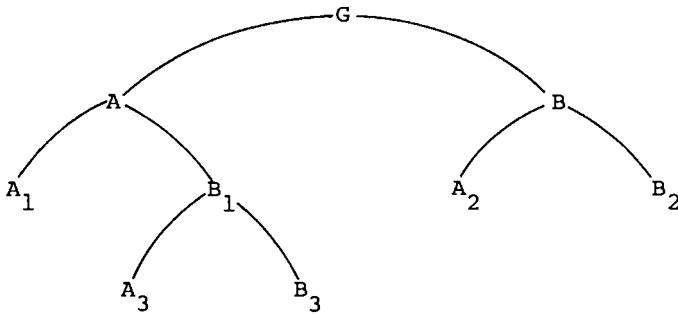
The basic relations among the words of a sentence are the ones familiar to the grammarian, i.e., subject, predicate, attribute, adverbial, direct and indirect object. If these relations are divested of their logical character and regarded from a purely formal point of view, it becomes obvious, according to Wundt, that they invariably obtain between two words: subject and predicate, verbal predicate and object, nominal subject or object and its attribute, and finally, verb and adverbial modifier. These combinations occur in their most typical form when the subject, or predicate, or object, etc. is a single concept. Then other concepts can be associated with these primary ones and be related to them by coordination or subordination.

Coordination introduces a new element into sentence formation in that it can be extended over indefinitely many members. All other grammatical relations are exclusively binary. If one asks why this is so, Wundt provides the following rationale. First, a logical relation is by its very nature restricted to the two concepts between which it obtains. Similar relations may, of course, obtain between some third concept and one of the two members of a logical relation. However, the process of establishing such a relation requires an extra act of thought that in turn is of the binary variety. Therefore, any analytical relation is a mental act that embraces two and only two members. This again follows from the duality of the principal syntactic constituents.

For example, a sentence such as *Ein redlich denkender Mensch verschmäht die Täuschung* 'a sincerely thinking person scorns deception' (Wundt, 1900, p. 319) can be regarded in all its parts as nothing more than binary combinations whose members are in turn binary combinations. The two major constituents are related as subject to predicate, all other pairs exemplify the same relation in a more compressed form ("in verdichteter Form"). Thus the subject includes the assertion ("Aussage"): *ein Mensch denkt redlich* 'a person thinks sincerely', and the predicate the assertion *die Täuschung wird verschmäht* 'deception is scorned'.

Wundt then goes on to provide a geometrical diagramming system to mirror these relations. The formula  $\overset{\wedge}{AB}$  represents the close subject-predicate combination, and  $G$  stands for "Gesamtvorstellung", the total concept embodied in the whole sentence. Thus the sentence *A sincerely thinking person scorns deception* can be diagrammed thus:

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A stands for a *sincerely thinking person*, B for *scorns deception*, A<sub>1</sub> for a *person*, B<sub>1</sub> for *thinks sincerely*, A<sub>2</sub> *deception*, B<sub>2</sub> for *is scorned*, A<sub>3</sub> for *thought*, and B<sub>3</sub> for *is sincere*.

It may be pointed out that Wundt thinks of the relation between the two members of a combination as logical rather than grammatical, for as he points out, it is necessary to subject the sentence to a variety of grammatical changes in order to bring out these underlying relations (e.g., the change of *scorns deception* to *deception is scorned*). The grammatical form of a particular combination depends on whether it is the principal assertion ("die Hauptaussage"), and, if not, in what relation it stands to the principal assertion.

That Wundt's linguistic theory is the source of Bloomfield's theory of immediate constituents is, I believe, too obvious to require further demonstration. Bloomfield may be complimented for relaying Wundt's theory so faithfully in his early book. The difference between the position he adopted in 1914 and the more familiar approach of the 1933 monograph deserves more study. Whether there are antecedents to Wundt's theory is another interesting question. It may be recalled that the primacy of the sentence over the word was emphasized by Wilhelm von Humboldt (see Leitzmann, 1907, p. 143). But it is not known at present whether Humboldt's ideas were in any way influential in Wundt's abandonment of the traditional synthetic definition of the sentence. It is clear, however, that Wundt did not develop his linguistic theory specially for his book on folk psychology. The same theory expressed in almost identical terms can be found in the first volume of his "Logik" (1880, p. 53-58). It would seem, therefore, that the gestation of the theory may have taken place around the time

when Baudouin de Courtenay was active in Kazan. If this is the case, we have one more reason to regard the 1870s as an unusually creative period in the history of linguistics.

NOTES

<sup>1</sup>I am grateful to many colleagues and friends for helpful comments and criticisms. Some time ago, for instance, James McCawley pointed out to me that Bloomfield's Wundtian conceptions of grammatical analysis are clearly reflected in two of his early articles, "Sentence and word" and "Subject and predicate", published in 1914 and 1916, respectively, now conveniently reprinted in Charles Hockett's "Leonard Bloomfield Anthology" (Hockett, 1970, p. 61-77).

<sup>2</sup>This notion was clearly expressed by Priscian (XVII, 2): "quem ad modum litterae apte coeuntes faciunt syllabas et syllabae dictiones, sic et dictiones orationem" (just as letters when they come together in an appropriate fashion constitute syllables, and syllables words, in the same way words constitute a sentence) (Keil, 1859, p. 108).

<sup>3</sup>Priscian explains the meaning of the term "syntax" as having to do with what he calls "ordinatione sive constructione dictionum" (the setting in order or arrangement of words) (Keil 1859, p. 108). In essence, Priscian, like Apollonius Dyscolus before him, approaches syntax from the parts of speech and aims at a set of restrictions on their combinability with one another. Thus, syntax started out as a crude calculus of word combinations; the question of sentence structure was not raised until the Middle Ages.

<sup>4</sup>The history of the terms "subject", "predicate", and "object", is a vast topic that still remains largely unexplored. The commonly held belief that all definitions of these terms were couched in exclusively semantic terms is erroneous. In many medieval and renaissance grammars of Latin, for instance, the major sentence constituents (three of them) are defined positionally as if they occurred in the natural order, namely, subject-verb-object, the subject ("suppositum") being defined as whatever precedes the main verb, the verb as the constituent occurring after the subject, and the object ("appositum") as whatever occurs after the main verb. We find an example of this system in the "Regulae" of Giovanni da San Ginesio (fourteenth or fifteenth century): "Quid est suppositum? Est

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illud de quo loquimur vel quicquid precedit verbum principale vel intelligitur precedere. Quid est verbum principale? Est illud quod ponitur post suppositum... Quid est appositorum? Est quicquid ponitur post verbum principale vel intelligitur poni" (What is the subject? It is what we speak about or whatever precedes or is understood to precede the main verb. What is the main verb? It is what is placed after the subject... What is the object? It is whatever is placed or is understood to be placed after the main verb) (Venice, Museo Correr, "Cicogna 1123", f. 1v-2r).

<sup>5</sup> Note that I say "for the most part". Some traditional discussions of these terms explicitly involve the modifiers. In an anonymous fourteenth century grammatical manuscript, for example, there is an interesting discussion concerned with how to identify the subject of a verb: "Primo ergo in assignatione suppositi debemus invenire verbum principale, deinde ipsius suppositum et ab ipso incipere. Ex parte vero suppositi debet ordinari adiectivum suppositi, relativum eiusdem, et relativum sui adiectivi, dictio iuncta supposito per appositionem vel per coniunctionem" (First, therefore, in identifying the subject we should find the main verb, then its subject and begin with it. On the subject side, one should arrange the adjective of the subject, its relative, and the relative of its adjective, and any word linked to the subject in apposition or in terms of conjunction) (Florence, Biblioteca Nazionale, "Magliab.", I. 2., f. 7v). Needless to say, there are traditional grammars of much more recent date that also divide the sentence into a subject and a predicate. In the early twentieth century, E.A. Sonnenschein, for instance, in a popular English grammar defined the subject as "the word or group of words which denotes the person or thing of which the *Predicate is said*" (underlines mine) (Sonnenschein, 1916, p. 12). This definition was in fact in perfect accord with the recommendations of the Joint Committee on Grammatical Terminology, which had been published five years previously. In the report of the committee, it was, among other things, suggested that "the first stage in the analysis of a sentence be to divide it into two parts, to be called the *Subject* and the *Predicate*, the *Subject* being the group of words or the single word which denotes the person or thing of which the *Predicate is said*, and the *Predicate* being all that is said of the person or thing denoted by the *Subject*" (Joint Committee, 1911, p. 8). It may be that linguists such as John Lyons have this recent school tradition in mind when they compare immediate-constituent analysis with traditional syntactic theory. As far as I can ascertain, however, this use of the terms "subject" and "predicate" does not reach very far back.

<sup>6</sup> It is interesting to note that many of the vernacular grammatical traditions have not developed separate terms for "sentence" and "clause", e.g., German "Satz", Russian "predlozheniye". A study of the history of such terms as "clausula", "oratio", "propositio", and their vernacular equivalents is an urgent desideratum. Note in this connection that in the Oxford English Dictionary the use of the term "phrase" in grammatical analysis is not attested before the middle of the nineteenth century.

MANUSCRIPTS CITED

Florence, Biblioteca Nazionale. Magliab., I, 2.,  
14th century. Begins f.1r: "Vocum alia literata, alia  
inliterata." Ends f.35r" "Et sic ordo accipitur a Donato,  
de quo satis patet."

Venice, Biblioteca del Museo Correr. Cicogna 1123.  
15th century. Begins f.1r: "Regule minores magistri Johannis  
de Sancto Genesio feliciter incipiunt. Quid est grammatica?  
Est scientia rette loquendi retteque scribendi origo et  
fundamentum omnium liberalium artium." Ends f.43r: "Que  
figura est excusabilis apud autores et substituenda (?) sed  
non imitanda. Magistri Johannis de Sancto Genesio Regule  
majores foeliciter expliciunt. Die xvi settembris 1464 in  
castro Vinci."

## MORE EVIDENCE FOR A CYCLE OF TRANSFORMATIONS?

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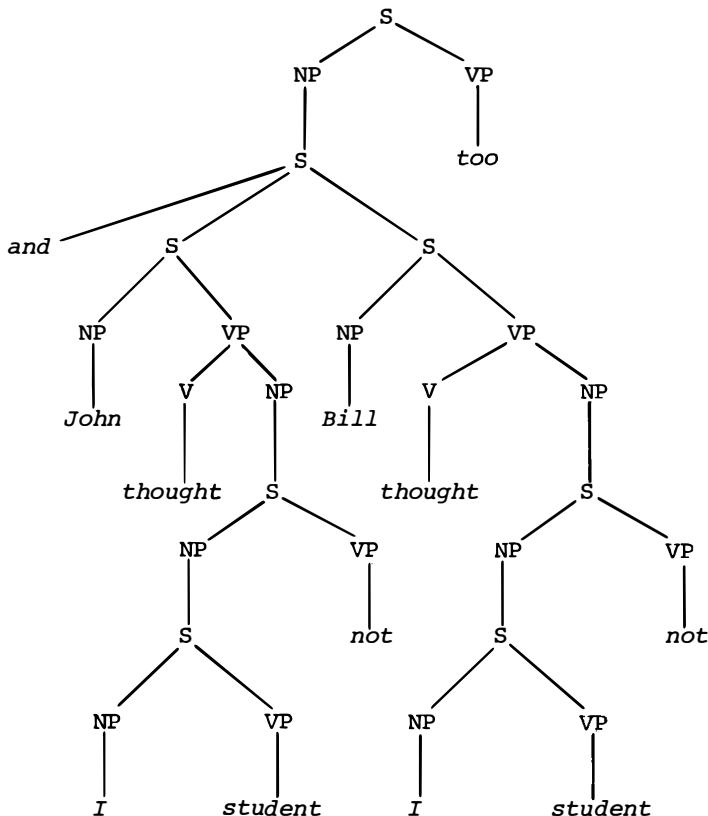
*This paper is in a tie with paper number 17 for the distinction of being the most underground paper in the volume. Indeed, to my knowledge, until the manuscript of this book was sent to the publisher, the only persons who had read it were the two authors and myself. The only known copy of it appeared under the door of my office some time in Spring 1968. It is noteworthy for being (a) an argument for a cycle in syntax that does not involve any of the rules that most commonly turn up in arguments for a cycle (Raising, Reflexivization), and (b) an argument that Negative-raising is in the cycle that antedates by a year the only other known arguments for that conclusion (R. Lakoff, 1969).*

Since in the most ordinary kind of emphatic conjoined sentence, *too-either* suppletion depends on whether the highest verb in the rightmost of the sentences that compose the subject of *too-either* is negated, *too-either* selection must follow the optional Negative-raising rule, in order to derive both:

- (1) (*John didn't think I was a student, and*) Bill  
*didn't think I was a student either.*

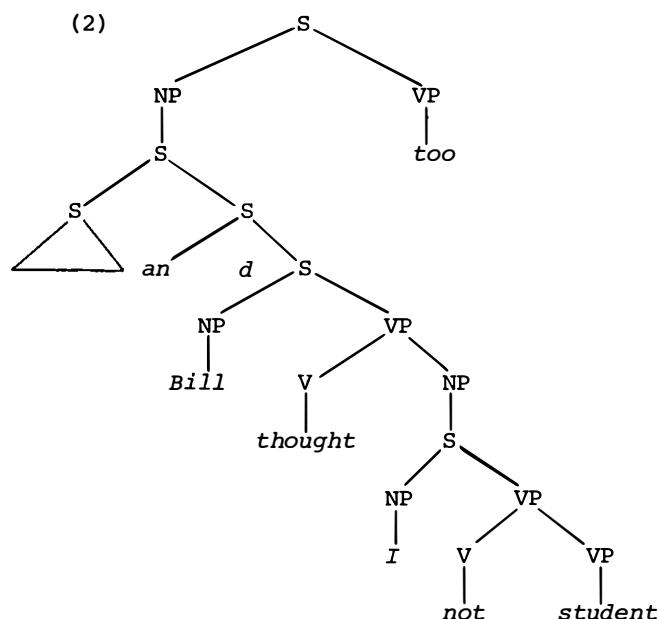
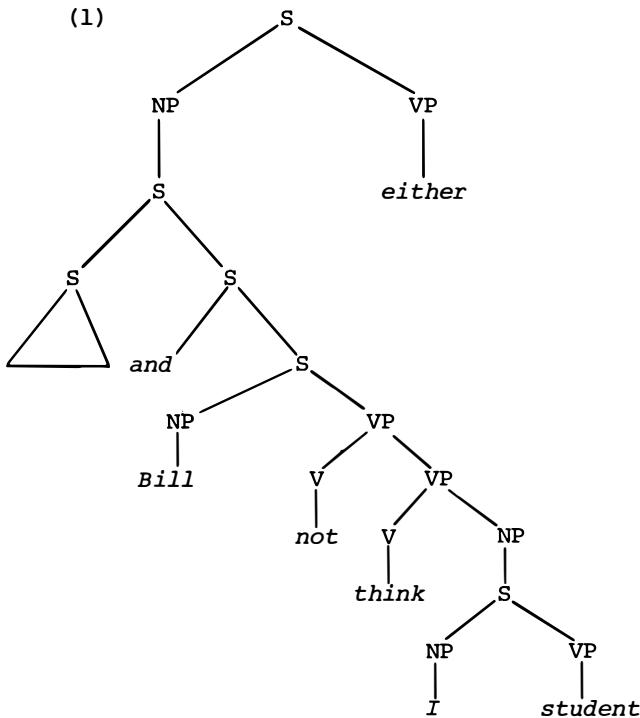
- (2) *(John thought I wasn't a student, and) Bill thought I wasn't a student too.*

from the deep structure:



yielding the two trees:

**More Evidence for a Cycle**

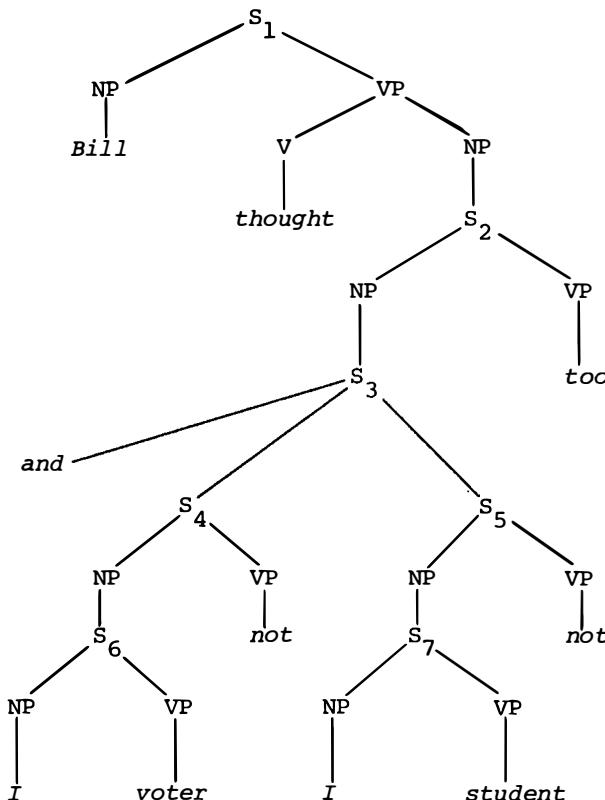


But to get both

- (3) *Bill thought (that I wasn't a voter, and) that I wasn't a student either.*

- (4) *Bill didn't think (that I was a voter, or) that I was a student either.*

with *either* in both sentences, regardless of the Negative-raising, from the deep structure



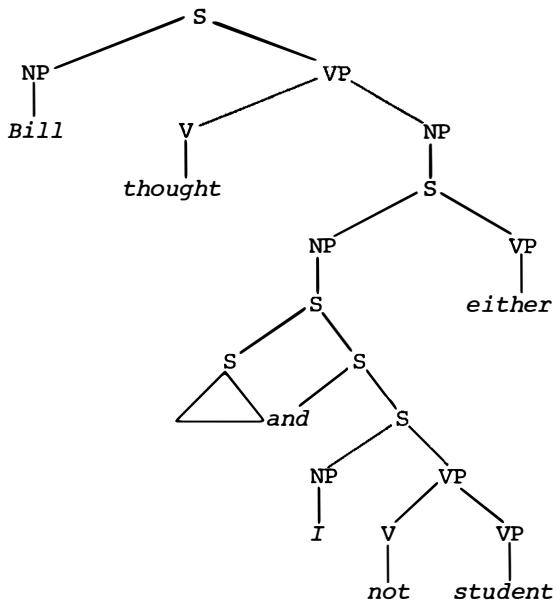
*too-either* selection must operate on  $S_2$  before the *not* in  $S_4$  and  $S_5$  are shifted into  $S_1$  presumably through the mediation of  $S_2$ , which, when it contains the *not* would yield:

- (5) *Bill thought that I was neither a voter nor a student.*

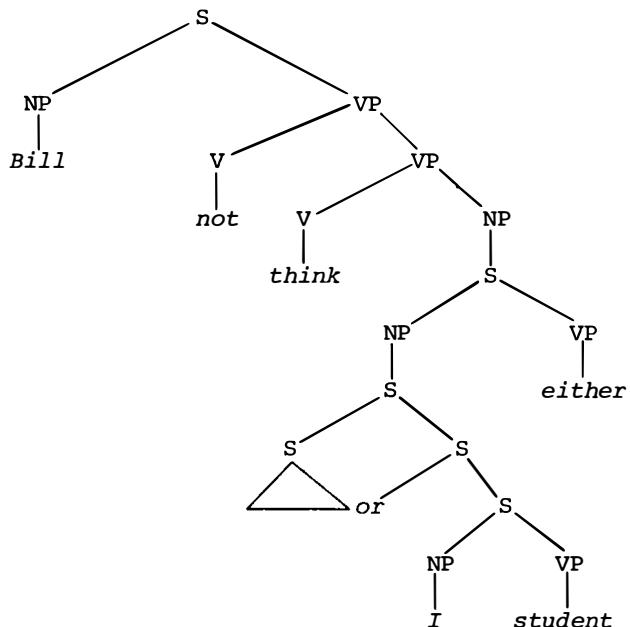
### More Evidence for a Cycle

to yield the two trees:

(3)



(4)



**J. L. Morgan and Georgia M. Green**

Since the rule determining *too-either* suppletion must both precede and follow *not-shift*, this appears to be evidence for cyclic (not iterative-cyclic) ordering of rules.

## CAMELOT, 1968,

being an account of some of the linguistic Events of that Year: wherein are detailed the Declarations of the New Court and the Weapons used in the Awefull Battle to repeal Certain Decrees of the Old Court. This History is humbly dedicated to those Valiant young Knights who, in quest of the Holy Grail, shed their Blood under the onslaught of Savage wild boars in the Forests of Lincoln and Grant, and in the Stone Valley of Michigan, In the Duchy of Czechago, Summer, 1968, Richard the Leatherbuttocked, Lord Mayor.

*Sir Lancelot of Benwick  
Morgan le Fay  
The Green Knight*

*This paper originated as a report on the syntax/semantics courses at the 1968 Linguistic Institute, held at the University of Illinois at Urbana, although the authors editorialized with abandon and added material and conclusions that did not appear in those courses. The authors attended the institute as exchange students from sixth century Britain (in the 1960s, the National Science Foundation had money for that sort of thing) and appear so far to have avoided deportation to their native century. The paper was circulated in mimeographed form in autumn 1968. The version printed here has been shortened significantly; some sections, which duplicate papers that are now readily available, have been replaced by summaries, and scurrilous accounts of interpretive semantics and lexicalist syntax have been removed along with some of the more pretentious rhapsodies over generative semantics, although a few of the latter have been retained to preserve the flavor of the original.*

### I. INTRODUCTION

1.1 Lectures in syntax and linguistic theory at the 1968 Linguistic Institute vividly demonstrated two things. First, that there is no one theory that could fairly be called the theory of transformational-generative grammar. The theory that used to go by this name has split sharply, and probably

irrevocably, into two schools - the "lexicalists" and the "transformationalists". And second, that an adequate theory of "grammar" must include many phenomena previously considered outside grammar, and even outside linguistics.

1.2 The most basic difference between the lexicalist position<sup>1</sup>, as formulated by Noam Chomsky and Ray Jackendoff, and the transformationalist position, is the belief of the lexicalists that there is a crucial difference between syntactic facts and semantic facts. Most other differences between the two theories follow from this one. More specifically, the lexicalists' belief in a sharp distinction between syntax and semantics leads them, for example, to generate quantifiers and negatives in base structures in positions as close as possible to their surface positions, and then, since they need transformations to move these items around, to permit transformational operations to affect the meaning of a sentence. (They avoid saying that transformations change meaning by saying that meaning is not fully determined until all transformations have applied, at which point semantic interpretation rules assign a reading to the sentence.) Since their base structures are not semantic structures but structures of syntactic categories, they require rules of semantic interpretation that operate "after" the attachment of lexical items and the operation of the transformational component.

One semantic interpretation rule is that which determines the meaning of a sentence after a quantifier has been moved so that its scope relations<sup>2</sup> have changed. The rule assigns scope by looking at the surface structure and moving the quantifier up one S node in the semantic representation (some sort of parallel tree?), provided that it isn't moved over another quantifier or negative. The scope of the quantifier is given by the resulting structural relations. If it is true that a quantifier is never moved out of the scope of a negative and vice versa in semantic interpretation, the semantic interpretation rule could be reformulated as a constraint on transformations involving quantifiers and negative, namely, that quantifiers cannot be moved into the scope of negatives and vice versa. Since similar translations are possible for the lexicalists' semantic interpretation of pronouns and a host of other cases, it is not out of order to ask how to tell the difference between a semantic interpretation rule and a transformation looked at from the other end. The constraints on semantic interpretation rules, for as many as have been proposed by the lexicalists, seem to be the exact inverses of constraints on corresponding transformations. If this is so, the lexicalists seem not to need transformations at all, since their semantic interpretation rules would do

exactly what transformations do, only in the opposite order, working from surface structure to semantic representation.

1.3 There is apparently nothing that would in principle prevent the lexicalists from transformationally relating *The wind hit the pillow* and *The pill hit the window*, to use an example attributed to Zellig Harris. The feeling of discomfort that linguists have with "relationships" of this sort stems from their deep-seated, if often inexplicit, desire for naturalness, a notion discussed in detail in Zwicky (1968).

In early transformational grammar, the main criterion of the metatheory was simplicity. Linguistic theory was to provide a formal measure of simplicity that would determine which of two grammars that were equally complete and equally self-consistent was the better. Three things eventually cast doubt upon this evaluation procedure. The first was that no complete grammar was forthcoming, and it was impossible to judge incomplete grammars in this schema. Yet judging grammars was what was in question. Second, a great controversy arose as to how to measure simplicity, and it soon became apparent that no external method existed. The third point is that for all their talk about explanatory adequacy, those who were concerned with simplicity wrote better-looking grammars than they deserved to. That is, their grammars looked better than they really were. For example, as Ross pointed out, in the affix-hopping rule in "Syntactic Structures", Chomsky says that what affixes hop over is the term

(1)	v
	M
	<i>have</i>
	<i>be</i>

Why the ad hoc feature v and not ! or \$? And why does this disjunctive set recur in so many rules? Intuitively we feel that ordinary verbs (v), modals (M), *have* and *be* are all members of a single set, verbs. But in Chomsky's theory, this is only an accident. It was only by reading too much into Chomsky's notation that we made any sense at all out of this disjunctive set, for, as Ross points out, the terms could as well have been

(2)	Adjective
	Article
	<i>toastmaster</i>
	<i>and</i>

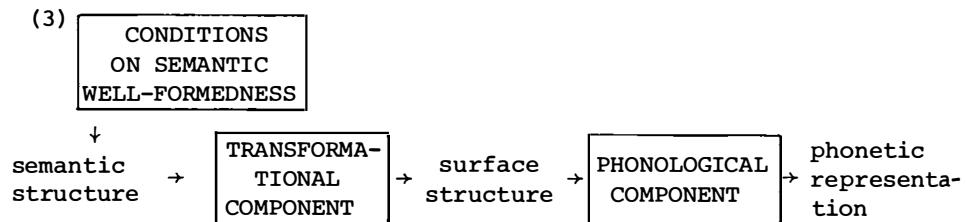
But what was most instrumental in pointing up the inadequacy of this aspect of Chomsky's theory was that he

placed so few restrictions on base and transformational rules that given alternative solutions, the choice between them was often arbitrary. Even today, many generative grammarians, including Chomsky, write as if it were a personal aesthetic choice whether to have a large base component and few transformational rules or vice versa. The notational system a theory provides is a direct reflection of the power and generality of the theory, not merely an ad hoc tool for writing down descriptions. A theory that has too powerful a notation approaches emptiness.

A scientifically interesting theory must be more than simple, more than complete, more than consistent. The fourth and overriding consideration is naturalness. The claims made by the grammar must be reflections of truth and generalizations about language. This, in turn, entails constraints on the grammar itself. For instance, if it turns out that most transformational rules need to operate only on constituents, then further investigation may show that all transformations must operate in this manner and show why they must. This introduces a very powerful constraint on the grammar, which is likewise a very powerful tool of research. At the same time, it makes a positive claim about how language works.

A grammar with only descriptive adequacy gives back no more than is put in, but a grammar with explanatory adequacy should do far more. One can look at sentences casually and see that they have subjects and predicates, but one cannot look at them casually and see that grammatical rules must apply only to constituents.

2.0 The other group of linguists seriously working in the theory that used to be called transformational-generative grammar (Ross, Lakoff, McCawley, Bach, Fillmore, etc.) are less concerned with generating structures that utterances of a language may be mapped onto than they are with characterizing how a speaker expresses what he does express. Their conception (after McCawley, 1968c) of this theory of grammar is describable by the diagram (3).



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The questions with which they are concerned include:

1. What will an adequate semantic representation have to include? What form will it have?
2. Whan can a transformation do? What does it look like?
3. At what stage and in what manner are semantic representations converted into words of the language? Is the answer to this question such as to account for the striking parallelism in the different uses of the same word in different languages? For example, *sad* and *warm* in

*John is sad about losing his dog.*

*"Gone with the Wind" is a sad book.*

*John is a sad case.*

*This room is warm.*

*I'm warm.*

*The weather is warm today.*

*This coat is warm. This is a warm coat.*

4. How can opacity and ambiguity of source of definite description be accounted for in such sentences as:

*John says that the man across the street from Max killed Tom.*

which could be a report of John saying *The man across the street from Max killed Tom* or it could be a report of John saying *Rupert Jones killed Tom* with the speaker describing Rupert Jones as *the man across the street from Max*.

5. What determines the form and possible positions, and even possibility of occurrence, of anaphoric terms (personal pronouns, reflexive pronouns, epithets, alternative descriptions)?

6. What are the deep semantic relationships of quantifier words like *all*, *every*, *some* (pl), *some* (sg), *many*, *most*, *few*, *each*, *any*?

This second group of linguists are pursuing the goal of understanding the nature of human language (rather than merely devising schemes for writing descriptions of particular languages) through examining in fine detail how one language (usually English) works. They are investigating phenomena, forming and testing hypotheses about them, and comparing these hypotheses with other phenomena in the language and similar phenomena in other languages. Many of their tentative conclusions, and more of the questions they are asking, are

are put forth in McCawley (1967), on which many of the following paragraphs depend heavily.

3.1 To return to the first question above, "What will an adequate semantic representation have to include"--because different groupings of semantic units have different meanings, an adequate semantic representation will have to represent groupings; in other words, constituent structure. For an example of different groupings having different meanings, consider the ambiguity of (4a) between the interpretations of (4b) and (4c).

- (4) a. *John doesn't beat his wife because he loves her.*
- b. *(not (John beats his wife)) ([because] John loves his wife)*
- c. *(John beats his wife) (not ([because] John loves his wife))*

Since sentences like

- (5) a. *John admires John*
- b. *John admires himself*

are not perfect paraphrases of each other, [(b) must be interpreted so that the admirer and the admired are identical; (a) allows, and for some people, requires an interpretation in which they are distinct], an adequate semantic representation will have to include some way of keeping track of referents of terms. Referential indices have been commonly assumed to be adequate for this, but indices alone will not satisfactorily handle sentences such as (6a), interpretable by some people as (6b) and by others as (6c).

- (6) a. *I dreamed that I was Margaret, and that I kissed me. (not myself)*
- b.  *$I_i$  dreamed that  $I_i$  was  $Margaret_j$  and that  $I_j$  kissed  $me_i$ .*
- c.  *$I_i$  dreamed that  $I_i$  was  $Margaret_j$  and that  $I_i$  kissed  $me_j$ .*

and indices cannot handle at all such sentences as

- (7) *John thinks that Nixon<sub>i</sub> and Humphrey<sub>j</sub> are different people, and that they<sub>i,j</sub> will campaign against each other and one of them<sub>i,j</sub> will lose, but I think that Nixon<sub>i?/k?</sub> and Humphrey<sub>j?/k?</sub> are the*

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*same person, and that he <sub>ij?</sub>/<sub>k?</sub> will win.*

G. Lakoff (1968b) has proposed that a theory of "counterparts" be incorporated into linguistic theory to supply the identity criteria needed to handle such problems. Furthermore, since there are distinctions in meaning within such sets of sentences as

- (8) a. *Everyone wants to go home.*
- b. *Everyone wants everyone to go home.*
- (9) a. *Only Lucifer pities himself.*
- b. *Only Lucifer pities Lucifer.*

it appears that a distinction must be made between constants and variables in semantic representation. Symbolic logic representation is quite adequate for the sentences in the first set:

- (10) a.  $\forall_x (x \text{ wants } (x \text{ go home}))$
- b.  $\forall_x (x \text{ wants } (\forall_y (y \text{ go home})))$

but only crude representations of the second set have been attempted, e.g., one in which *only* is taken as a two-place predicate with an individual and a propositional function as its arguments:

- (11) a.  $\text{Only}_x (\text{Lucifer}, x \text{ pity } x)$
- b.  $\text{Only}_x (\text{Lucifer}, x \text{ pity } \text{Lucifer})$

[Sections 3.12-3.13, here omitted, summarized points made in McCawley (1967) about the relevance of formal logic to the description of natural language and the conclusion that semantic structure and syntactic structure could be taken as having the same formal nature and as involving the same set of categories. Section 3.14, also omitted, related to an unpublished paper by Bever and Ross on discourse structure.]

3.2 The second question, regarding the characterization of the notion "transformation" has been considered in great detail in Ross (1967a). Although some of us may admit it only off the cuff, most of us are unhappy with transformations with more than five or six terms and with rules that involve disjunctive sets such as (1).

3.3 The third question, where and how real words materialize, was first discussed seriously in Gruber (1965), but even this treatment is rather vague. Later papers, particularly McCawley

(1968c) and Gruber (1967), contain more specific and more worked-out proposals. Some tentative conclusions are that lexical insertion takes place among the cyclic rules, after the operation of most transformations. (This is discussed in more detail in Section IV of this report).

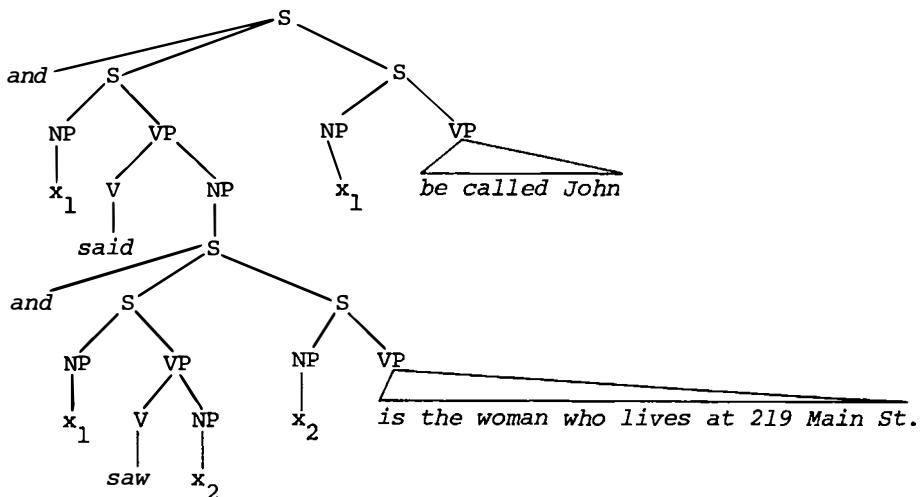
The second part of this question, the "different uses" of "the same word" in one language and its parallelism among languages has hardly begun to be explored. It is to this question that we hope to be able to devote a considerable amount of time and effort.

3.4 No fully satisfactory answers have been found for the problems of opacity, but the problems are stated clearly in McCawley (1970a) and in some independent (and unavailable) work of Paul Postal. The solutions proposed by Postal and McCawley are essentially the same - to account for referential phenomena by using indices as the arguments of predicates. These indices are defined or described in propositions conjoined to the tree at points varying with the origin of the description, i.e., the speaker or someone he is talking about. Thus, the two readings of the sentence

*John said he saw the woman who lives at 219 Main St.*

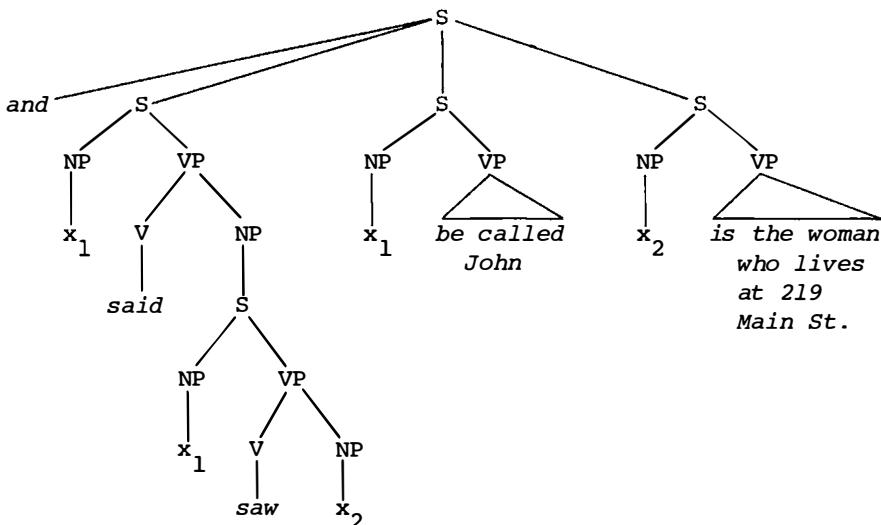
would have trees corresponding to

(12) a. Reading 1



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b. Reading 2



3.5 Lots of "answers" have been proposed for questions regarding the use of anaphoric terms, and linguists are concerned with the unhappy fact that none of them can account for the whole range of data. It seems fairly clear that structural relations between anaphoric expression and "antecedent", as well as left-to-right (temporal) order are relevant, but whether this is a result of the way rules apply, or an independent fact statable only as conditions on output, or what exactly, is an open question. The first solution is discussed in Ross (1967b) and the second in Lakoff (1968c). Another discussion that shows the complexity of the problem of dealing with anaphoric terms is found in Karttunen (1968).

3.6 Because quantifiers contribute to meaning, and are clearly not terms, they are generally taken to be predicates. But what they are predicates of, and how they get to where they turn up are problems occupying the attention of several linguists. The kind of data they are wrestling with includes the following:

I. (13a) is ambiguous between (13b) and (13c).

- (13) a. *John tried to kiss every girl at the party.*
- b.  $\forall_{x:x \text{ is a girl}} (\text{John tried } (\text{John kiss } x))$   
 $x: x \text{ is a girl}$   
 $\text{at the party}$

- c. *John tried (V<sub>x</sub> (John kiss x))*  
*x:x is a girl*  
*at the party*

II. (14a) is equivalent to (14b), but (15a) differs from (15b) in that (15a) has the readings (15c,d), while (15b) has only (15d).

- (14) a. *All of my friends drink Kool-Aid.*  
b. *My friends all drink Kool-Aid.*  
(15) a. *They all didn't go to the party.*  
b. *They didn't all go to the party.*  
c.  $\forall_x \sim(x \text{ went to the party})$   
d.  $\sim(\forall_x (x \text{ went to the party}))$

Furthermore, (16b) is a sentence of English, like (14b), but (16a), which parallels (14a) is not.

- (16) b. *Harry, John, and Bill all drink Kool-Aid.*  
a. *\*All of Harry, John, and Bill drink Kool-Aid.*

## II. CURRENT STATUS OF THE BASE COMPONENT

4.0 Chomsky and Halle have insisted that just as a universal alphabet of phonological primes (distinctive features) is necessary for an adequate phonological theory, there is a universal set of nonterminal nodes (syntactic categories) in syntax, from which individual languages pick a subset. But Chomsky gives only lip service to this idea and does not develop it. The research of Postal, McCawley, Lakoff, and Ross has led them to make a much stronger claim:

The rules of the base, as well as the node names, are universal, up to the left-to-right ordering of constituents.

Ross concludes from this proposition that the base is biologically innate.

4.1 What is the status of the "base component" itself? Beginning in about 1966, McCawley began to develop the idea that the base of a grammar need not be considered a set of rewriting rules, but could rather be considered as a set of conditions on the well-formedness of trees [Node Admissibility Conditions (NACs)]. Such conditions have the form <A: BC>,

which is read, "a node labeled A is well formed if it immediately and exclusively dominates a node labeled B and a node labeled C, in that order". Thus, a tree is well formed if every node in the tree satisfies some node-admissibility condition of the base component and if the root of the tree is labeled S.

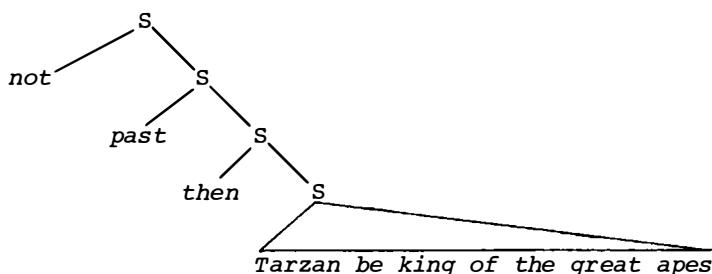
NACs, in contrast to rewriting rules, which produce strings from which trees could be derived, generate classes of trees directly.<sup>3</sup> They do not algorithmically "produce" trees. As the poet laureate of linguistics has said, "Grammars are written by fools like me, but only God can make a tree" - meaning, presumably, that linguists need not concern themselves with the origins of trees in order to deal with their properties. Node admissibility conditions, rather than creating trees, can be considered as a set of input conditions--conditions on the input to the transformations.<sup>4</sup>

4.2 Node names. As linguists have looked closer and closer at syntax, they have found more and more and bigger and bigger turtles.<sup>5</sup> To put it bluntly, they have been forced to conclude that underlying representations are abstract to the extent that all nodes that branch are labeled S; in other words, the basic structure of language is a predicate with its arguments. What kind of evidence is it that "forces" them to such a conclusion? For example, since they make the assumption, without which linguistic theory is so unconstrained as to be incapable of making reasonable predictions and generalizations, that pronouns can refer only to constituents, the analysis of the sentences

- (17) *Tarzan was not then the king of the great apes.*  
*That would come in later years.*

entails that "past tense" and *not* are not inside the constituent that contains the meaning 'Tarzan be king of the great apes', to which *that* in the next sentence refers. Accordingly, they postulate that the structure of the first sentence of (17) is, very roughly:

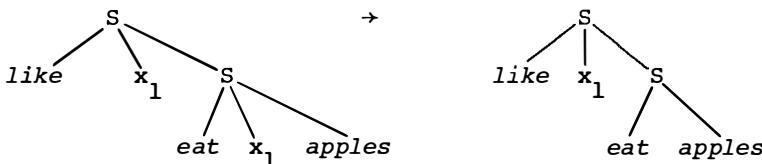
(18)



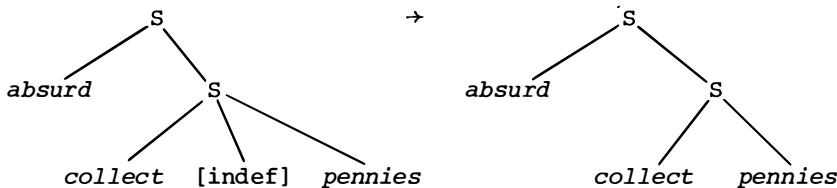
If all the nonterminal nodes are S, what are the terminal nodes of underlying representations? Predicates ("verbs") and arguments (noun phrases). Period. Some minds may boggle at calling *not* a verb, but there are languages (e.g., Finnish) where it is a verb and is inflected just like other verbs; the preposition *near* in English is also an adjective, and if the syntactic equivalence (Lakoff, 1966) is not immediately evident, the semantic equivalence of verbs and adjectives should be obvious to anyone who has ever translated anything from a foreign language. Arguments may be: (1) propositions (additional occurrences of S), (2) referential indices that refer, ultimately, to conceived objects (including human beings) or abstract ideas, (3) sets.<sup>6</sup>

Having predicates and arguments as the only underlying terminal nodes means that our beloved VP no longer exists as an underlying category. Ross and Lakoff have suggested that "verb phrases" are sentences that have lost their subjects - through deletion (under identity, or when indefinite), as in (19) and (20):

- (19) *John likes to eat apples.*

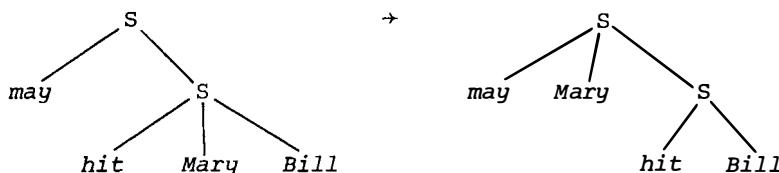


- (20) *Collecting pennies is absurd.*



or by the subject's being raised into the next higher sentences, as in:

- (21) *Mary may hit Bill.*



It is not clear how this treatment applies to "simple" sentences like

- (22) *Mary hit Bill.*

but it is clear from the meaning that more than one predicate and two arguments is involved and that the underlying structure of the elements involved is not a string.

### III. SECTIONAL ANOMALY

5.0 In earlier transformational grammar, selectional restrictions were held to be syntactic. Thus there was a feature [+Animate] for which the subject of the verb *pretend* had to be marked, so as to prevent sentences like

- (23) \**The rock pretended to be a cow.*

Similarly, there was a feature [-Directional Adverb], which the verb *sleep* was marked for; i.e., if *sleep* occurred in a sentence there could be no directional adverb. This prevented sentences like

- (24) \**John slept into the room.*

Notice that this claims (1) that such features are language particular, since there might very well, for example, be a language without the verb *pretend* or without directional adverbs per se, and (2) that such features are item particular, i.e., that it is a fact about the word *pretend* that its subjects must be animate.

Obviously there are generalizations being missed. One theory that hopes to capture them is that of George Lakoff, who claims that selectional anomalies, such as those in

- (25) \**The rock decided to buy a new cow.*

\**Harry rained.*

are semantic in the sense that basically they are contradictions. Such a theory claims that (1) the study of such contradictions is part of the general theory of contradiction and that these contradictions hold universally, and (2) that it is a fact about language, and not about *pretend* alone, that the English word *pretend* requires an animate subject.

5.1 Presupposition. Contradictions are not always apparent in a sentence. Thus, in

- (26) *The boy who is tall is not tall.*

the relative clause contains a presupposition contradicting the assertion of the clause of the main verb. Only assertions

can be denied, so that if the presupposition is false, one can place no truth value on the sentence. Philosophers have long been puzzled by the oddity of sentences like (27a), which presupposes the existence of a king of France at the present time, and (27b), which seems to assume or presuppose the existence of unicorns.

- (27) a. *The present king of France is bald.*  
b. *Unicorns don't exist.*

This is discussed, somewhat inconclusively, in Linsky (1967) and in Cartwright (1963).

Not only can parts of a sentence be contradictory, but presuppositions and the like can cause redundancies as well. Thus, in the sentences

- (28)      *The boy who is tall is tall.*  
              *The tall boy is tall.*

there is a redundancy.

This raises certain questions. Sentences about pregnant women may or may not contain a redundancy. Lakoff notes that while (29a) is not redundant, (29b) is:

- (29) a. *That person is a woman and is pregnant.*  
b. *That person is pregnant and is a woman.*

At once, this reminds us of the treatment of pronominalization--order is relevant--and ties in with the notion of specificity in discourse. Once we know a person is pregnant, we know that that person is female, but the reverse is not true. Thus, the hearer seems to assimilate information in a roughly left-to-right order. In any case, order matters in terms of conjunction of the two sentences above. For any assertion, it may be the case than that all previous assertions in the utterance or discourse act as presuppositions.

So far we have talked of conjoined clauses or sentences (e.g., in discourses). Returning to relative clauses, it is the case that for them order is likewise important. Thus (30a) is not redundant, whereas (30b) is:

- (30) a. *That person, who is {<sup>female</sup><sub>a woman</sub>}, is pregnant.*  
b. *That person, who is pregnant, is {<sup>female</sup><sub>a woman</sub>}.*

Thus earlier phrases, like earlier clauses and sentences, can act as presuppositions.

Drawing on this, Lakoff finds that words, too, act like conjoined sentences. That is, (31a) is redundant precisely

the way that (31b) is:

- (31) a. *That woman is female.*
- b. *That person who is female is female.*

Thus, in terms of redundancy and contradiction, items on many levels of grammar act alike. Any account of semantics, it is claimed, must take account of this.

5.2 Semantics and pragmatics. If this is the case, then selectional restrictions are not sentence-internal facts. There may be no presupposition within the sentence itself to render it infelicitous, but there may be in the real world (in the sense of one's beliefs about the real world). Selectional restrictions are then facts about whole discourses or systems of belief.

Consider the features [+Human] and [+Animate]. In a first approximation to the problem of why you can't say

- (32)           *The rock wanted to be a table.*

you could set up three syntactic features. *Rock* would be [-Animate] (and hence [-Human]); *cow* would be [+Animate, -Human]; *boy* would be [+Human]. [+Animate] things can want, [+Human] things can talk, etc. But notice the problem of amoebas; while we can easily speak of an amoeba (but not a zinnia) hiding, the status of an utterance such as

- (33)           *The amoeba wanted to hide.*

may not be so clear. The sentence

- (34)           *My cat believes I'm going to feed it.*

implies that cats can have beliefs. But what about goldfish? Lakoff notes that there seems to be a correlation between which animates we attribute human qualities like belief to and which we can use pronouns like *he* and *she* for. Probably what is involved here is not simple features attached to lexical items, but systems of belief. Bob Binnick mentioned in a discussion of this topic the quite different treatment of Pluto and Goofy in the Disney comics. Goofy is so human that many people in the lecture hall hadn't even noticed that he was in fact a dog.<sup>7</sup> Yet both *he* and Pluto (*it?*) are dogs. It would make no sense at all to claim this was a syntactic fact; yet pronominalization has always been held to be a part of syntax.

5.3 Performance. That factors that hitherto have been considered as merely part of performance, and have been excluded from linguistics, enter into syntax and semantics

is shown by the sentence

- (35) *John's cousin's sister's friend's... spouse is pregnant.*

Whether this contains a contradiction or not or a redundancy can only be determined by checking the entire noun phrase, which could be indefinitely long. In a sentence like

- (36) *John's former spouse's former spouse's.. former spouse is pregnant.*

(which could likewise be indefinitely long) the evenness or oddness of the number of occurrences of *former spouse* in the NP is the determining factor.<sup>8</sup>

For sentences with *but*, *too*, and *either* (discussed in Green, 1968), beliefs determine the felicity of sentences. Thus, (37a) reflects our cultural heritage, whereas (37b) is infelicitous for most of us:

- (37) a. *Mary is a blonde, and Sue is dumb, too.*  
b. *Mary is a blonde, and Sue knows syntax, too.*

5.4 Status of the theory of selectional anomaly as contradiction. This theory is new and not well developed. How selection relates to contradiction is still not well defined. It is also an open question whether features are ever needed at all. Lakoff, Ross, and Fraser seem to say yes; Green, Binnick, Morgan, and McCawley say no. Furthermore, what the universal categories (if any) are, is unknown. And Ross notes that there is still the familiar problem of grammatical gender.

#### IV. THE IMPLICATIONS OF SEMANTAX: LEXICAL INSERTION, THE NOTION "POSSIBLE LEXICAL ITEM", THE WELL-FORMEDNESS OF UNDERLYING STRUCTURES

6.0 Many questions arise if we have a grammar relating semantic and surface (syntactic) structures directly by a single set of rules, as sketched in Section I. How would the grammar work? How do lexical items come in? What are the semantic primes? Where do lexical items enter the derivation? The lexicon, long assumed to be a simple area, is now seen to be quite difficult.

6.1 Semantic primes.<sup>9</sup> To see how it is determined whether one item is more basic than another, consider the items *alive* and *dead*. McCawley argues that *alive* is more basic than *dead*, because to be dead, something must once have been alive. (Thus the dictionary definition of *dead* as "deprived of life"). *Dead* probably means 'having become not alive', which can be

formalized in terms of time reference as

$$(38) \quad "x \text{ is dead at time } t" = \\ (\exists t': t' < t) (Become_{t'} (\text{Not}(\text{Alive}(x))))$$

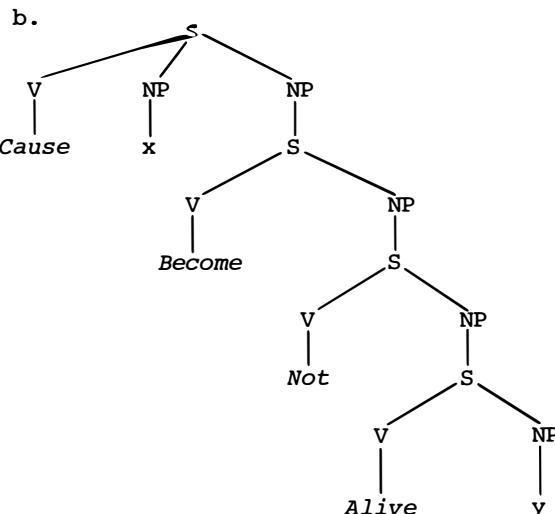
An analysis of *alive* in terms of *dead*, say, as 'not yet dead', is untenable, since it would imply that nothing could ever be immortal; nothing that will never be dead could then be alive. Furthermore, such a definition would render absurd such metaphors as *The statue is almost alive*.

If we accept (38), then "*x dies at time t*" should be analyzed as

$$(38) \quad Become_t (\text{Not}(\text{Alive}(x)))$$

To go a step further, "*x kills y at time t*" may then be analyzed as (40a), or in tree form, (40b):

$$(40) \quad \text{a. } Cause_t (x, (Become_t (\text{Not}(\text{Alive}(y)))))$$

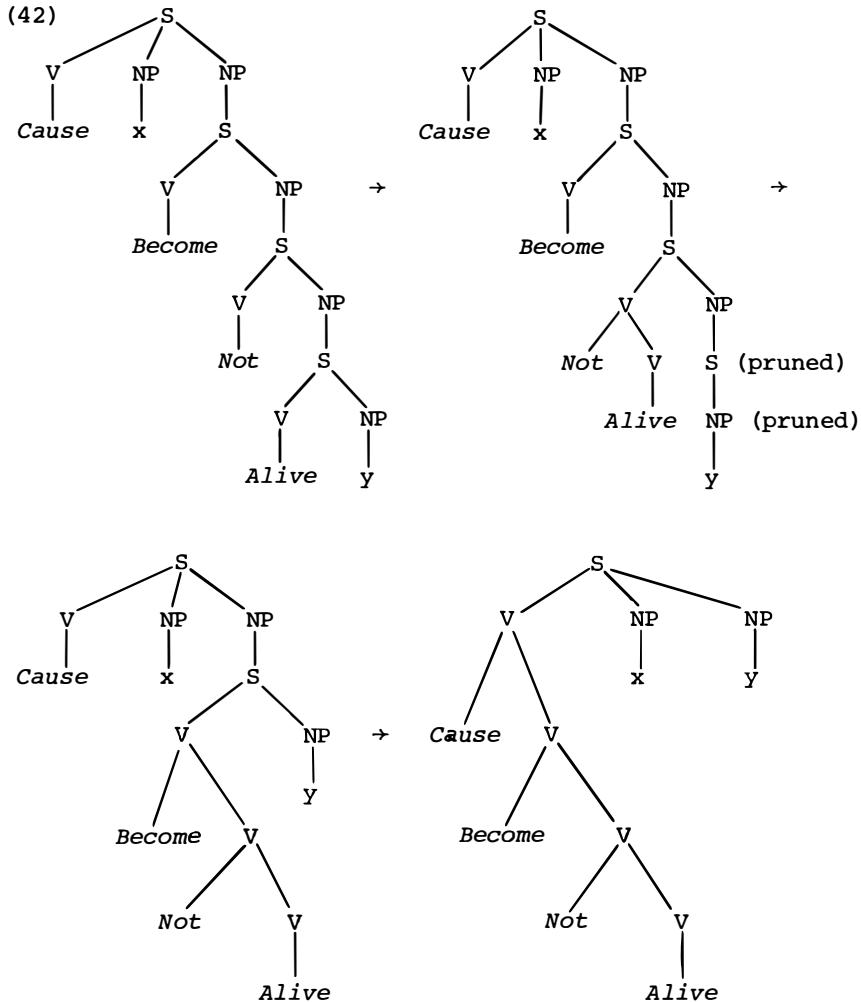


But the derived structure is probably

$$(41) \quad \begin{array}{c} S \\ \diagdown \quad \diagup \\ V \quad NP \quad NP \\ kill \quad x \quad y \end{array}$$

To get a derived structure like this from underlying structures like the above, McCawley has proposed an otherwise unmotivated

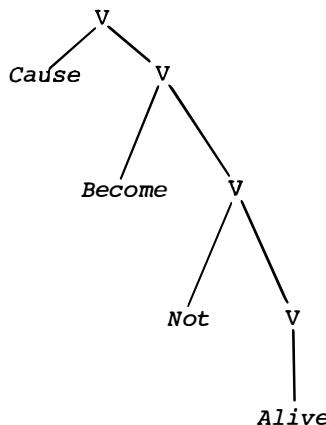
rule of predicate raising. By this optional rule, a V can be daughter-adjoined to the right of the next highest V. Thus we get a derivation:



At this point there is a constituent

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(43)



that can be replaced by the lexical item *kill*.

6.2 This treatment has the advantage of providing linguists with a framework for talking about different meanings of "the same word", e.g., ask in:

(44) *I asked them to take off my gloves.*

*I asked to take off my gloves.*

*I asked them when to take off my gloves.*

*I asked them to dinner.*

*I asked them for a dollar.*

and permits them to talk about these as representing semantic structures that are partly identical and partly different. It also permits them to talk about the notion "possible lexical item"--that is, what restrictions there may be on what semantic structures can be realized as a single lexical item. (A detailed discussion of this appears in Morgan, 1969.) If this notion causes mouths to gape and minds to boggle, or if it engenders only puzzlement, it is because it could not even be discussed in the terms of previous linguistic theories. Not until the development of the abstract linguistic theory that this year has seen were there concepts that could permit, let alone cause one to ask "what is a possible lexical item?", "why is an English word *smank* meaning 'I broke my arm yesterday' absolutely inconceivable?"

There are two obvious and powerful constraints on possible lexical items. The first is that lexical items replace only constituents. Thus, a lexical item could never mean anything like 'every broken'. The second is that lexical items must be

derived from well-formed semantic structures. It is obvious from this treatment that there may be gaps in the lexicon of a language, i.e., structures not replacable by lexical items. We must distinguish fortuitous gaps (e.g., \*agress) from systematic gaps, which might be due, for example, to a language's not having transformational rules that could combine certain pieces of semantic structure to form a single constituent.

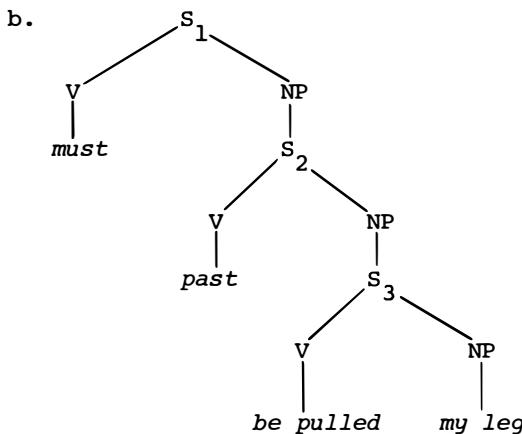
6.3 The place of lexical insertion. Considerations such as the above lead us to consider the ordering of lexical insertion rules relative to other transformation. Five possibilities are suggested for the place of lexical insertion in a grammar.

- (i) Wherever the structural description of the lexical insertion rule is met.
- (ii) At the absolute beginning of derivations.
- (iii) At the absolute end of derivations.
- (iv) After the cycle of transformations, at the beginning of the post-cyclic rules.
- (v) Among the cyclic rules.

The second possibility is inadequate if it is assumed that lexical insertion replaces only constituents, since several transformations that create new constituents that are then replaced by lexical items would have to precede it.<sup>10</sup> (iii) will not be adequate either, because some transformations treat separate pieces of single lexical items (e.g., particle movement) and would not be applicable until, for instance, the particle existed, and the particle would not exist until after lexical insertion. The interaction between idioms and cyclic rules--the fact that some idioms may undergo transformations--disqualifies (iv).<sup>11</sup> That is, in the derivation of (45a), lexical insertion on  $S_3$  must precede subject-raising on  $S_1$ , which permits *my leg* to become the subject of *must*:

- (45) a. *My leg must have been pulled.*

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This leaves (i) and (v) as candidates. (i), it should be noted, permits a much wider class of structures for lexical items to replace. (v), on the other hand, claims that no lexical items ever replace a constituent that comes about through the operation of postcyclic rules, and indeed, it is difficult to find a candidate for such an item. But large numbers of items depend on the application of cyclic rules. It is interesting to mention in this regard Kimball's observation that rules that apply cyclically all leave structures relatively intact, and rules that radically change structure (e.g., relative-clause formation, extraposition) all turn out to be postcyclic--after lexical insertion, if it is a cyclic rule.

**6.4 Well-formedness of underlying structures revisited.** The considerations of Section 6.3 bring us back to the notion "well-formed semantic structure". It is clear that the number of arguments a predicate can take is not unlimited, and not all combinations and permutations of types of arguments are possible for all predicates. That is, we do not find autonomous "sentences" like

- (46)      \**I told the hatrack a bookcase.*
- \**The man heard the dog the fern.*
- \**The man struck the dog that the Russians had arrived at O'Hare Airport.*
- \**John resembles that Chomsky wrote "Syntactic Structures".*
- \**That syntax may be more abstract than even Postal thinks sewed a red corduroy dress.*

Since it is not obvious that these kinds of anomalies are the result of contradictions, are we to have general node admissibility conditions that define which arguments a predicate can have? Certainly there are generalizations that can be made. For example, psychological predicates like *believe* and *imagine* have referential animate arguments that become their subjects and sentential arguments that become their object complements. Supposed counterexamples like

- (47)     *John believed Harry.*  
            *John believed that hypothesis.*  
            *I can't imagine eyeless people.*  
            *Solomon decided the issue for the people.*

are not valid counterexamples; from their meaning (try to paraphrase them), it is clear that they are more complex than sentences like:

- (48)     *John believed that Dewey would win.*  
            *I imagine the police will start a riot.*  
            *Solomon decided to remain silent.*

But writing general node admissibility conditions based on generalizations like these leads to the counterintuitive expansion of predicate classes, with words simultaneously being members of several classes, that Lees had in his pre- "Aspects" grammar of English nominalizations, unless the hypothesis is accepted that words, even words considered to be one "morpheme" like *hit* and *kill*, have a considerable amount of internal structure.

In trying to discover the predicates internal to specific lexical items one finds that certain predicates keep recurring: *Cause*, *Become*, *Permit*, *Intend*. Trying to discover their transformational properties and privileges of occurrence has led some linguists to hypothesize that ultimately the constraints on the relationships of a semantic predicate to other predicates and the privileges of occurrence of various argument types with it reflect not facts about particular languages, or even facts about particular predicates alone, but facts about possible beliefs about possible words; deep structure equals semantic representation, these linguists would like to claim, and is limited ultimately only by the bounds of human imagination. The use of lexical items in which these predicates occur is a different matter however. Whether a particular lexical item can be used to express a given configuration of predicates reflects more than the conceptual ability of the speaker. There are formal and

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general (possibly universal) constraints on lexical insertion that are not bound to any limitation on possible concepts.

For example, in Portuguese, the complements of verbs that mean "begin", "stop", "continue", "cease", "be in the habit of", "be able", "know how", "need to", "have to", "try to", "dare to", "manage to", "forget", "remember", "condescend", "decide", "want", "learn", "be late", and others with similar meanings are a certain kind of infinitive that contrasts in form with the infinitive complements of verbs that mean "force", "persuade", "permit", "prohibit", "behoove", "be important to", "benefit", "thank", "pardon", "censure", "see", "hear", "believe", "know", "show", "regret", "like to", "be surprised", "be frightened". This is a syntactic fact. It correlates with the [semantic] fact that the verb-complement constructions of the first type are all of the form (49a),

- (49) a.  $x_i \underline{\hspace{1cm}} [x_j [do] \underline{\hspace{1cm}}]$

while the constructions of the second type are of the form (49b),

- b.  $x_i \underline{\hspace{1cm}} [x_j [do] \underline{\hspace{1cm}}]$

where  $x_i$  may be the same as  $x_j$ , but need not be. This is paralleled in English by the fact that while we can say

- (50) a. *I began to write a novel.*  
b. *I am now able to tie my shoes.*  
c. *I forgot to do my homework.*  
d. *I managed to talk to Brutus Force.*

we cannot say

- (51) a. \**I began for you to write a novel.*  
b. \**I am now able for you to tie my shoes.*  
c. \**I forgot for you to do your homework.*  
d. \**I managed for you to talk to Quang Phuc Dong.*

The sentences of (51) are equally improbably utterances in English, Portuguese, or any other language imaginable, beyond the "fact" that the situations they appear to express are impossible, or at least difficult to conceive. What is being hypothesized is that in no language do speakers use verbs that mean the same thing as the English *begin to* (or *be able to*, *remember to*, *condescend to*, *try to*, and so on) with constructions expressing meanings such that their subject is different from the subject of the clause immediately sub-

ordinate to them. In saying that each of these sentences is exactly as improbable as each of the others in (51), the implication intended is that they are all uninterpretable; but to the extent that it is possible to assign any meaning to, or glean any meaning from any of them, as people may claim to be able to do, even those people will agree that the sentences in (51) are not the proper, appropriate ways to express those meanings. For example, (51d) might be claimed to mean "I managed to do something to permit (or cause) you to talk to Chairman Quang", but (51d) is still not considered a proper way to express this meaning.

NOTES

<sup>1</sup>The exposition here of the lexicalist position may contain unintentional misrepresentations of the nature of the hypothesis, for which we apologize. Our purpose here is to outline the basic points, as we understand them, of a poorly documented theory. [Times have changed. See now Chomsky (1972), Jackendoff (1972), and the references cited in those two works.  
- J.McC.]

<sup>2</sup>"Scope" refers to how much of a structure a quantifier or a negative operates upon, as illustrated in the following sentences:

*Only LBJ will vote for Hubert.*

*LBJ only will vote for Hubert.*

*LBJ will only vote for Hubert.*

*LBJ will vote only for Hubert.*

*LBJ will vote for only Hubert.*

*LBJ will vote for Hubert only.*

<sup>3</sup>McCawley gives the following statement of the conditions under which a tree  $T$  is well formed relative to a given system of node admissibility conditions.

1. The terminal nodes of  $T$  are labeled by terminal symbols.
2. The topmost node is labeled by  $S$ .
3. For every nonterminal node of  $T$ , there is a condition  $\langle X: X_1 \dots X_n \rangle$  in  $G$  such that the node is labeled  $X$  and its daughters are labeled  $X_1 \dots X_n$  (in order).

<sup>4</sup> Straight (1968) has made a fascinating suggestion that there is no separate component defining well-formed semantic representation; rather, he proposes that semantic representation is in fact conceptual structure, and the transformations themselves define well-formed input in that a derivation with an ill-formed input will always "hang up" somewhere and thus not yield any surface structure. Thus, grammar is a filtering mechanism that relates only certain configurations of "thought" to linguistic utterances.

<sup>5</sup> The reference is to a story about William James, quoted in Ross (1967a). It is said that after a lecture on cosmology and the structure of the solar system, James was approached by a little old lady, who said, "Your theory that the sun is the center of the solar system, and that the earth is a ball which rotates around it, has a very convincing ring to it, Mr. James, but it's wrong. I've got a better theory".

"And what is that, madam?" inquired James politely.

"That we live on a crust of earth which is on the back of a giant turtle."

Not wishing to demolish this absurd theory by bringing to bear the masses of scientific evidence he had at his command, James decided to dissuade his opponent gently, by making her see some of the inadequacies of her position.

"If your theory is correct madam," he asked, "what does this turtle stand on?"

"You're a very clever man, Mr. James, and that's a very good question," she replied, "but I have an answer to it: the first turtle stands on the back of a second, far larger turtle who stands directly under him."

"But what does the second turtle stand on?" persisted James patiently.

To this, the little lady crowed triumphantly, "It's no use, Mr. James--it's turtles all the way down."

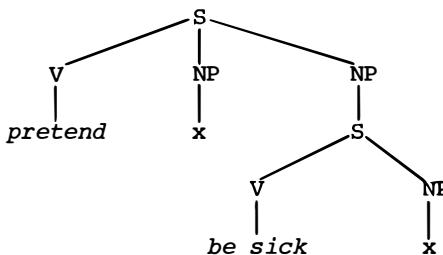
<sup>6</sup> Nominalizations are considered to originate as indices with relative clauses; so, for example, *John's invention* is at an early point in its derivation representable as 'the *x* such that John invented *x*' and *John's invention of the frammis* as 'the event *y* such that in *y* John invented the *frammis*'.

<sup>7</sup> [Contrary to popular belief, Goofy is a horse. He just looks like a dog and indeed has grown to look more and more canine as the years have passed - J. McC.]

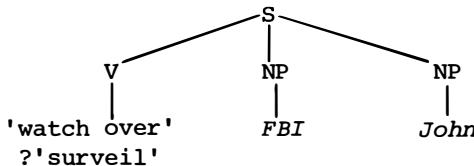
<sup>8</sup> [This is false if one admits the possibility of sex-change surgery, in which case a woman who was formerly a man can have a lesbian affair with her former spouse. Keith Donnellan has observed that this possibility implies that many supposed selectional violations are in fact perfectly normal ways of talking about bizarre but possible situations; e.g., if your father has undergone a sex-change operation, you could say *My father has hurt herself* to report that your father has suffered an injury. - J. McC.]

<sup>9</sup> The discussion in Section 6.1 and Section 6.3 draws heavily on McCawley (1968c) and on McCawley's lectures at the Linguistic Institute.

<sup>10</sup> For instance, equi-NP-deletion must operate on



to yield a constituent for which *maligner* can be inserted. Likewise, the passive must apply to



to permit the *by*-phrase of *John is under surveillance by the FBI* to be identified with the passive *by*-phrase (example due to Postal).

<sup>11</sup> [While this discussion is "based on" McCawley (1968c), the authors correctly reject here one of the principal conclusions of McCawley (1968c). - J. McC.]

## PRONOUNS AND REFERENCE

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*This paper originated in class lectures at Harvard in Spring 1968 and at the 1968 Linguistic Institute at the University of Illinois at Urbana. It was originally to have contained the following sections:*

1. *Some constraints on pronominalization*
  - 1.1 *Output conditions*
  - 1.2 *Transformational constraints*
2. *Types of identity*
3. *Pronouns and abstract syntax*
4. *Pronouns and referential opacity*

*Appendix. The cycle.*

*A duplicated version of Section 1.1 was circulated in late 1968, and Sections 1 and 2 were later distributed by Indiana University Linguistics Club; the remaining sections were never written.*

*"Pronouns and reference" is probably the most widely quoted of the papers contained in this volume; numerous references to it are to be found throughout the by now massive literature on*

*pronoun-antecedent relationships. It is particularly important for the sobering effect that it had on the investigation of anaphora by generative grammarians. It brought home to many people the idea that pronoun-antecedent relationships cannot be accounted for adequately just in terms of conditions on the application of a pronominalization transformation. The analysis that Lakoff presents here involves the sort of separation of factors that is typical of his later work involving global rules. He argues that the Ross-Langacker constraint cannot be part of a pronominalization transformation, and indeed, while all anaphoric devices are subject to that constraint (or rather, to a refined version of it), only certain types of anaphoric devices are derived from copies of their antecedents. This paper also presents an early instance of the "nondiscrete grammar" that was later developed in such works as Ross (1972b, 1973); note the use Lakoff makes in Section 1.1.5.2 of an "anaphora hierarchy" and its relationship to degrees of acceptability.*

## 1. SOME CONSTRAINTS ON PRONOMINALIZATION

### 1.1 *Output Conditions*

#### 1.1.0 Introduction

In the past few years, several pieces of evidence have come to light that suggest that pronominalization cannot be a surface-structure phenomenon; instead, this evidence suggests that the constraints on pronominalization must be stated before certain transformational rules apply. The facts fall into two classes:

- (I) Cases where a transformational rule must be ordered after pronominalization.
- (II) A class of cases where pronominalization, wherever ordered, must apply cyclically; that is, it must apply on an earlier cycle than some other transformation (which might be ordered earlier, but would apply afterward on a later cycle).

In the arguments that have sought to establish (I) and (II), a critical assumption has been made, namely, that pronominalization can always apply freely left-to-right (forward) and that any constraints on the application of pronominalization must be placed on right-to-left (backward) pronominalization. The cases mentioned in (I) and (II) all involve sentences where

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forward pronominalization is impossible in surface structure. The claim made is that in each case there is a more abstract level of analysis where forward pronominalization is always possible. In what follows, I shall attempt to show that the assumption that there are no constraints on forward pronominalization is false and that the phenomena of (I) can be handled only by imposing such constraints. In addition, I shall present evidence to the effect that the constraints necessary to handle the cases in (I) must be stated as output conditions rather than as conditions on some transformational rule. I will also present evidence indicating that the facts of (II) do not show that pronominalization is cyclic, and also that they cannot be handled by output conditions, even allowing constraints on forward pronominalization. I conclude that there are at least two types of constraints on pronominalization:

- (I) Output conditions, i.e., constraints stated at the level of surface structure that indicate in what configurations pronouns and their antecedents can appear.
- (II) Transformational conditions, i.e., general constraints that forbid certain types of transformational rules from applying to structures that contain pronoun-antecedent pairs.

### 1.1.1 Adverb-preposing

1.1.1.1 The Rule-Ordering Argument. There is a rule of English that moves adverbials to the front of the sentence, deriving (2) from (1)

- (1) *John ate supper before Bill left town.*
- (2) *Before Bill left town, John ate supper.*

Ross (1967b) argues that this rule of Adverb preposing must precede Pronominalization, on the basis of the following examples:<sup>1,2</sup>

- (3) *John ate supper before he left town.*
- (4) \**He ate supper before John left town.*
- (5) *Before John left town, he ate supper.*
- (6) *Before he left town, John ate supper.*

Ross suggests that Pronominalization may apply right-to-left (backward) only if it goes down into subordinate clauses. This condition holds in (6), which is grammatical, but not in

(4), where *He ate supper* is a main, not subordinate clause. In (6), Adverb preposing has applied before Pronominalization, so that the condition on backward Pronominalization will hold at the time Pronominalization applies. Had Pronominalization applied first, it would have been impossible to block (4) while permitting (5). Thus, we have the ordering Adverb-preposing-Pronominalization. Ross, in agreement with Langacker (1969), claims that Pronominalization from left-to-right (forward) is always possible. In the face of sentences like

- (7)        John saw a snake near him.
- (8)        \*He saw a snake near John.
- (9)        Near him, John saw a snake.
- (10)      \*Near John, he saw a snake.

it was proposed (by Postal, I believe) that (9) be derived from (7) by a second preposing rule that followed Pronominalization. If the rule precedes Pronominalization, then there is no way to stop (10) while maintaining the principle that Pronominalization can always go forward. Thus, we have the ordering Adverb preposing<sub>1</sub> < Pronominalization < Adverb preposing<sub>2</sub>. In what follows, I will show that Adverb preposing<sub>2</sub> does not exist, that (9) must be derived by Adverb preposing<sub>1</sub>, and that the generalization that Pronominalization can always go forward is incorrect. Moreover, since Adverb preposing<sub>2</sub> was the only rule thought to have to follow Pronominalization, a demonstration that it does not exist will make it possible for us to entertain two hypotheses--either Pronominalization is the last rule in the grammar or the constraints on Pronominalization are stated as output conditions. Consider the sentences

- (11)      John smokes pot in his apartment.
- (12)      \*He smokes pot in John's apartment.
- (13)      In his apartment, John smokes pot.
- (14)      \*In John's apartment, he smokes pot.

Here we find the same paradigm as in (7)-(10), so presumably, (13) would be derived from (11) by Adverb preposing<sub>2</sub>. Now consider

- (15)      *John smokes pot in the apartment, which he rents.*
- (16)      \*He smokes pot in the apartment, which John rents.
- (17)      *In the apartment, which he rents, John smokes pot.*
- (18)      *In the apartment, which John rents, he smokes pot.*

### Pronouns and Reference

In these cases, we find the same paradigm as in (3)-(6).

Presumably, (17) would be derived from (15) by Adverb preposing<sub>1</sub>.

Note that in (13) and (17) the same type of adverbial is being moved, presumably by different rules. The only difference is that the adverbial in (17) has a clause (an embedded S) in its derived structure, while that in (13) does not. So one might be tempted to say that Adverb preposing<sub>1</sub> only moves adverbials containing clauses, while Adverb preposing<sub>2</sub> moves only adverbs not containing clauses. This is a curious complementarity, and leads one to think that the postulation of two complementary rules misses a generalization.

Now consider

- (19) *John<sub>i</sub> gives Mary<sub>j</sub> pot to smoke in his<sub>i</sub> apartment,  
where she<sub>j</sub> stays.*
- (20) *\*John<sub>i</sub> gives her<sub>j</sub> pot to smoke, in his<sub>i</sub> apartment,  
where Mary<sub>j</sub> stays.*
- (21) *\*He<sub>i</sub> gives Mary<sub>j</sub> pot to smoke in John's<sub>i</sub> apartment,  
where she<sub>j</sub> stays.*
- (22) *\*He<sub>i</sub> gives her<sub>j</sub> pot to smoke in John's<sub>i</sub> apartment,  
where Mary<sub>j</sub> stays.*
- (23) *In his<sub>i</sub> apartment, where she<sub>j</sub> stays, John gives  
Mary pot to smoke.*
- (24) *In his<sub>i</sub> apartment, where Mary<sub>j</sub> stays, John<sub>i</sub> gives  
her<sub>j</sub> pot to smoke.*
- (25) *\*In John's<sub>i</sub> apartment, where she<sub>j</sub> stays, he<sub>i</sub> gives  
Mary<sub>i</sub> pot to smoke.*
- (26) *\*In John's<sub>i</sub> apartment, where Mary<sub>j</sub> stays, he<sub>i</sub> gives  
her<sub>j</sub> pot to smoke.*

The crucial sentences here are (20) and (24). How can we block (20) while permitting (24)? Is (24) derived by Adverb preposing<sub>1</sub> or Adverb preposing<sub>2</sub>? Suppose (24) is derived by Adverb preposing<sub>1</sub>, which precedes Pronominalization. Then *her* in (24) can be derived by forward Pronominalization. If (24) is derived by Adverb preposing<sub>2</sub>, which follows Pronominalization, then *her* in (24) cannot be accounted for, since it would have to be derived by backward Pronominalization in a context where it cannot apply [compare (20)].

However, if (24) is derived by Adverb preposing<sub>1</sub>, then

*his* in (24) cannot be accounted for. Since Adverb preposing<sub>1</sub> precedes Pronominalization, *his* must be derived by backward Pronominalization. However, if backward Pronominalization can only go into subordinate clauses, this is impossible. Note that we could account for *his* in (24) if (24) were derived by Adverb preposing<sub>2</sub>. But, as we mentioned above, we could then not account for *her*.

We seem to be caught in a paradox. Given the Ross-Langacker constraints on Pronominalization, (24) cannot be derived by either Adverb preposing<sub>1</sub> or Adverb preposing<sub>2</sub>. What is going on here? If one looks at each of the starred sentences in (19)-(26) and asks what goes wrong in each one, things become clearer. In each of these cases, the restrictions are the same as those in the simple cases of (11)-(14) and (15)-(18). In (20), (21), and (22), backward Pronominalization is occurring where it shouldn't [as in (12) and (16)]. (25) and (26) are out for the same reason as (14), namely, forward Pronominalization is not permitted when the antecedent is in a preposed adverbial with no embedded clause. Note that in both (25) and (26), it is *he* that has gone wrong, not *her*. Moreover, *his* is permissible in (24) for the same reason as it is in (13) and *her* is permissible in (24) for the same reason as it is in (18).

Thus, the Pronominalization facts that we find in (19)-(26) are the same as those in (11)-(14) and (15)-(18), and should be explained in the same way. The fact that (24) cannot be accounted for by two complementary rules of Adverb preposing separated by Pronominalization indicates that such a description is inadequate for (11)-(14) and (15)-(18) as well. Instead, there should be a single rule of Adverb preposing, the one that moves the adverbial to the front in (24), since this single rule, however it is stated and wherever it is ordered, must produce the same results in both (11)-(14) and (15)-(18).

Should this single, general rule of Adverb preposing be ordered before or after pronominalization? If it follows Pronominalization, then there would be no way of deriving (18) without also deriving (16). In order to derive (18), we would first have to derive (16) and then apply Adverb perposing. But Adverb preposing is an optional rule; if it optionally does not apply, then we derive (16) as grammatical, which it is not. One might propose that Adverb preposing be made obligatory if backward Pronominalization has applied as in (16). This would be wrong for two reasons. First, such a condition on a transformation would be unique; no other such conditions are known, and so the theory of grammar would have to be changed in order to state it for this one case. Second,

### Pronouns and Reference

there is the much stronger objection that a clear generalization would be missed by such a rule ordering. In order to derive (18), we would first have to generate (16) "incorrectly" by backward Pronominalization and then make Adverb preposing obligatory just in this case to prevent ungrammatical sentences. Now consider just how we would have to constrain backward Pronominalization in order to get this result. Clearly, we could not lift all restrictions on backward Pronominalization since there are many that do not involve adverbials containing clauses at all; for these cases we would get incorrect results. For example,

(27) \*He said that John left.

(28) \*He saw the girl who likes John.

A possible restriction would be to allow free backward Pronominalization out of adverbials containing clauses. However, this won't work, since there are adverbials containing clauses that cannot prepose. For example, *remain* and *stay* take locative adverbs that cannot prepose.

(29) John remained in England.

(30) \*In England, John remained.

If one allowed such backward Pronominalization, one would derive

(31) \*He remained in the apartment which John rented.

This could not be patched up by later Adverb preposing.

(32) \*In the apartment which John rented, he remained.

Thus, backward Pronominalization would have to be restricted to just those adverbials containing clauses that could later be moved by Adverb preposing. That is, the restriction stating which adverbs could be moved by Adverb preposing would have to be state twice, once for Pronominalization and once for Adverb preposing. Clearly, a generalization is being missed.

For these reasons, Adverb preposing cannot follow Pronominalization and must therefore precede it. This being the case, the facts of (11)-(14) must be handled by a change in the conditions on Pronominalization. The scope of backward Pronominalization must be extended to permit (13); correspondingly, the scope of forward Pronominalization must be restricted to exclude (14).

1.1.1.2 The Subject-Nonsubject Division. Preposed adverbial constructions have some additional peculiarities. Consider

(33) In Mary's apartment, a thief assaulted her.

- (34) ?\**In her apartment, a thief assaulted Mary.*<sup>3</sup>
- (35) \**In Mary's apartment, she was assaulted by a thief.*
- (36) *In her apartment, Mary was assaulted by a thief.*

(35) and (36) are just like (13) and (14). In (35), Pronominalization cannot go forward from a nonclausal preposed adverb to a subject (*she*). In (36), Pronominalization can go backward from a subject (*Mary*) into a nonclausal preposed adverb. (33) and (34) reveal an asymmetry between surface structure subjects and nonsubjects. In (33), [compare (35)], we find that Pronominalization can go forward from a non-clausal preposed adverb to a nonsubject. In (34) [compare (36)], we see that Pronominalization cannot go backward from a nonsubject (*Mary*) into a nonclausal preposed adverb. Considering that Adverb preposing must precede Pronominalization, we see that only the subject cases deviate from the Ross-Langacker rules; they are the opposite of what one would expect. The nonsubject cases are entirely in accord with the Ross-Langacker conditions.

This phenomenon alone shows that it is utterly impossible to save, by the use of a rule-ordering argument, the claim that Pronominalization can always go forward. Sentences (33)-(34) act as though Adverb preposing followed Pronominalization, while (35)-(36) act as though Adverb preposing preceded Pronominalization. Thus, no matter where Adverb preposing is ordered with respect to Pronominalization, forward Pronominalization must be blocked in some environment, and the distinction between subject and nonsubject position must be stated in the conditions on Pronominalization.

1.1.1.3 *Main Clauses.* The subject-nonsubject division has been noted previously by Dwight Bolinger (personal communication) and Adrian Akmajian (personal communication) independently. We noted above in the cases of (3)-(6) that Pronominalization cannot go backward into main clauses. However, (3)-(6) involved only subjects of main clauses. If we look further, we will find that though Pronominalization cannot go backward out of subordinate clauses to subjects of main clauses, it can go backward out of subordinate clauses to non-subjects of main clauses.

- (37) *Mary hit John before he had a chance to get up.*
- (38) *Mary hit him before John had a chance to get up.*
- (39) *John was hit by Mary before he had a chance to get up.*
- (40) \**He was hit by Mary before John had a chance to get up.*

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(38) shows that Pronominalization goes backward to objects of main clauses; the following sentences show that the same is true of other nonsubjects.

- (41) *Mary gave him a dollar bill before Sam had a chance to refuse.*
- (42) *Mary placed a bowl of chicken soup before him before Sam had a chance to refuse.*
- (43) *Mary sacked out in his apartment before Sam could kick her out.*
- (44) *Mary butted in during his speech before I could tell her that John was a top C.I.A. official.*

Examples like these could easily be multiplied. They show that, aside from any considerations of rule ordering, any statement of the conditions under which Pronominalization can occur must take the subject-nonsubject distinction into account.

### 1.1.2 Topicalization

There are two rules of English that topicalize a noun phrase by moving it to the front of the sentence. One of these leaves a pronoun behind, as in (45); the other leaves no pronoun behind, as in (46).

- (45) *Bill's apartment, Harry always talks to Mary about it.*
- (46) *Bill's apartment, Harry always talks to Mary about.*

Ross has shown that these are separate rules, since they obey different constraints on movement transformations. The Topicalization rule that does not leave a pronoun behind cannot operate on embedded pronoun subjects.

- (47) *Him, I don't think he has a chance.*
- (48) *\*Him, I don't think has a chance.*

Since the difference between these two rules is irrelevant to the discussion that follows, we will consider them together, placing the pronoun in parentheses.

Postal noted that Topicalization produces a Pronominalization paradigm like that of (7)-(10).

- (49) *Bill always talks to Mary about his apartment.*
- (50) *\*He always talks to Mary about Bill's apartment.*
- (51) *His apartment, Bill always talks to Mary about (it).*

- (52) \*Bill's apartment, he always talks to Mary about (it).

Postal concluded, for the same reasons given in (7)-(10), that Topicalization had to follow Pronominalization. However, if one considers topicalized NPs containing clauses, one finds the same paradigm as for proposed adverbs with clauses.

- (53) Bill always talks to Mary about this apartment, which he rents.
- (54) \*he always talks to Mary about this apartment, which Bill rents.
- (55) This apartment, which he rents, Bill always talks to Mary about (it).
- (56) This apartment, which Bill rents, he always talks to Mary about (it).

As in (15)-(18), these cases suggest that there are two Topicalization rules, one preceding and one following Pro-nominalization; the first would apply to NPs with clauses, the second to NPs without clauses. But as in the case of Adverb preposing, we can construct examples parallel to those of (19)-(26) to show that this is impossible.

- (57) Bill<sub>i</sub> always talks to Mary<sub>j</sub> about his<sub>i</sub> apartment, where she<sub>j</sub> used to live.
- (58) \*Bill always talks to her<sub>j</sub> about his<sub>i</sub> apartment, where Mary<sub>j</sub> used to live.
- (59) \*He<sub>i</sub> always talks to Mary<sub>j</sub> about Bill's<sub>i</sub> apartment, where she<sub>j</sub> used to live.
- (60) \*He<sub>i</sub> always talks to her<sub>j</sub> about Bill's<sub>i</sub> apartment, where Mary<sub>j</sub> used to live.
- (61) His<sub>i</sub> apartment, where she<sub>j</sub> used to live, Bill<sub>i</sub> always talks to Mary<sub>j</sub> about (it).
- (62) His<sub>i</sub> apartment, where Mary<sub>j</sub> used to live, Bill<sub>i</sub> always talks to her about (it).
- (63) \*Bill's apartment, where she<sub>j</sub> used to live, he<sub>i</sub> always talks to Mary<sub>j</sub> about (it).
- (64) \*Bill's<sub>i</sub> apartment, where Mary<sub>j</sub> used to live, he<sub>i</sub> always talks to her<sub>j</sub> about (it).

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As in (19)-(26), this paradigm shows that there cannot be two Topicalization rules; rather, there must be one rule, which precedes Pronominalization. Forward Pronominalization must be blocked in (52) and backward Pronominalization permitted in (51).

Topicalization also reveals the subject-nonsubject asymmetry. Consider

- (65) *Mary always talks to Bill about his apartment.*
- (66) \**Mary always talks to him about Bill's apartment.*
- (67)?\**His apartment, Mary always talks to Bill about (it).*
- (68) *Bill's apartment, Mary always talks to him about (it).*

Compare (66) and (68) to (50) and (52). (52) does not permit forward Pronominalization to subjects; (68) does permit it for objects. (67) is more interesting. I find it marginally acceptable--better than (66), but worse than (68). Others I've questioned either agree with my intuitions or find (67) completely acceptable. For the latter dialect, there is an extra asymmetry. In forward Pronominalization, the subject-nonsubject asymmetry appears--(52) and (68) differ--whereas in backward Pronominalization, there is no subject-nonsubject distinction for this dialect--(51) and (67) work the same way. In this dialect, a rule-ordering explanation preserving unrestricted forward Pronominalization is doubly impossible.

### 1.1.3 Cleft Sentences

The first of the subject-nonsubject asymmetries was pointed out by Ross (personal communication). Ross noticed that cleft sentences display the same paradigms as (49)-(52) and (65)-(68).

- (69) *John bit his dog.*
- (70) \**He bit John's dog.*
- (71) *It was his dog that John bit.*
- (72) \**It was John's dog that he bit.*
- (73) *John's dog bit him.*
- (74) ?*His dog bit John.*
- (75) ?*It was his dog that bit John.*
- (76) *It was John's dog that bit him.*

As in the corresponding Topicalization, I find (75) marginal

[compare (67)]--better than (74) and worse than (76). Some agree, and others find (75) completely acceptable. Ross realized that these facts were a serious anomaly for the theory of Pronominalization presented in Ross (1967b) and Langacker (1969). They seem to indicate, as do the Topicalization facts, that such a theory is out of the question and that constraints will have to be placed on forward Pronominalization. Moreover, any rule-ordering explanation for the cleft-sentence facts is ruled out, since cleft-sentences show the same clausal-nonclausal asymmetry as Adverb preposing and Topicalization. Compare (72) with (77).

(72) \**It was John's dog that he bit.*

(77) *It was this dog, which John owns, that he bit.*

(77) shows that forward Pronominalization is permitted out of clauses that are inside clefted elements.

As with Adverb preposing and Topicalization, one might think that there are two rules of cleft-sentence formation; one for clauses, preceding Pronominalization; and the other, for nonclauses, which would follow Pronominalization. But, as in the other cases, it is possible to construct a paradigm disproving this.

(78) *John<sub>i</sub> told Mary<sub>j</sub> about his<sub>i</sub> dog, which she<sub>j</sub> likes.*

(79) \**He<sub>i</sub> told Mary<sub>j</sub> about John's<sub>i</sub> dog, which she<sub>j</sub> likes.*

(80) \**John<sub>i</sub> told her<sub>j</sub> about his<sub>i</sub> dog, which Mary<sub>j</sub> likes.*

(81) \**He<sub>i</sub> told her<sub>j</sub> about John's<sub>i</sub> dog, which Mary<sub>j</sub> likes.*

(82) *It was his<sub>i</sub> dog, which she<sub>j</sub> likes, that John<sub>i</sub> told  
Mary<sub>j</sub> about.*

(83) \**It was John's<sub>i</sub> dog, which she<sub>j</sub> likes, that he<sub>i</sub> told  
Mary<sub>j</sub> about.*

(84) *It was his<sub>i</sub> dog, which Mary<sub>j</sub> likes, that John<sub>i</sub>  
told her<sub>j</sub> about.*

(85) \**It was John's<sub>i</sub> dog, which Mary<sub>j</sub> likes, that he<sub>i</sub>  
told her<sub>j</sub> about.*

For the same reasons mentioned in the discussion of (19)-(26) and (57)-(64), sentences (78)-(85) show that no simple rule-ordering solution is possible for the Pronominalization phenomena in cleft sentences. Pronominalization must follow, not precede, cleft sentence formation.

#### 1.1.4 Pronouns and Stress

The only rules that I know of that had been thought to follow Pronominalization are Adverb preposing, Topicalization, and Cleft sentence formation. As I have just shown, these rules cannot follow Pronominalization, and it seems that no transformational rule does, at least in English. Is this an accidental fact? Do there just happen not to be any rules that follow Pronominalization? Or is it a necessary fact? Could there in principle be no such rules?

I would like to claim that it is a necessary fact, a fact about the nature of anaphoric processes in language, not a fact about one rule in English. We have assumed, following Langacker and Ross, that the constraints on the occurrence of pronouns were to be stated as part of the rule of Pronominalization. Instead, I would like to suggest that these constraints are not part of any rule, but are instead well-formedness conditions on possible surface structures in English--output conditions, like those discussed by Ross (1967a, Chapter 3) and Perlmutter (1968). Assume that the rule of Pronominalization is separate from the constraints on pronominalization. Let the rule apply freely forward and backward, and let a set of constraints at the end of the grammar throw out certain combinations of pronoun and antecedent as ill-formed. Such notions can be incorporated into the theory of grammar in the following way.

- (86) a. Restrict the form of possible Pronominalization rules so that no structural conditions can be placed on them (i.e., they must apply freely).
- b. Widen the scope of possible output conditions to include the appropriate constraints on the occurrence of pronoun-antecedent pairs.

If the theory of grammar is changed in this way, then it will follow that no transformational rule could follow that point in the grammar where pronominalization constraints are stated. This is a much stronger claim than simply saying that the constraints are part of the pronominalization rule and that the rule just happens to be the last one in the grammar of English.

So far, I have shown that the constraints on pronominalization may be stated at the very end of the grammar of English. I have not shown that they must be stated there. However, there does exist very strong evidence to that effect. The evidence concerns stress. Whenever an NP serves as the antecedent to a pronoun, both the NP and the pronoun must be unstressed. Consider the following sentences, pointed out by David Perlmutter.

(87) When he entered the room, Mary kissed Jöhn.

(88) \*When he entered the room, Mary kissed Jóhn.

Direct objects normally take stress, but as (88) shows, a direct object cannot both be stressed and serve as an antecedent. This is true not only with pronoun-antecedent pairs, but also when a noun phrase is used anaphorically to refer back to another noun phrase.

(89) When Harry entered the room, Mary kissed the  
bästard.

(90) \*When Harry entered the room, Mary kissed the  
båstard.

In these examples, the bastard can refer to Harry only if it is unstressed, although a direct object would normally be stressed in that position. The same is true in the following cases.

(91) When Harry entered the room, Mary kissed the  
président.

(92) \*When Harry entered the room, Mary kissed the  
président.

(93) When Harry entered the room, Mary kissed Härry.

(94) \*When Harry entered the room, Mary kissed Harry.

This is true not only when a pronoun or noun phrase is used anaphorically, but also when the anaphoric expression is null.

(95) That Mary was going to marry someone else bothered Jöhn.

(96) That Mary was going to marry someone else bothered John.

In (95), the fact that John is unstressed indicates that it is being used as an antecedent. Thus, someone else in that sentence refers to someone other than John. That is, someone else has within it an understood anaphoric expression that has no phonetic representation. In (95), John is its antecedent. However, in (96), where John has stress and therefore cannot be used as an antecedent, someone else is understood as 'someone other than an unspecified NP' (which cannot be John). Thus, an NP must be unstressed if it is to take part in any type of anaphoric relationship.<sup>4</sup>

Now consider sentences like (38)

(38) Mary hit him before John had a chance to get up.

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Compare (38) with (97)

- (97) \**Mary hit him before John got up.*

in (38) and (97), *John* and *him* are in the same structural positions relative to one another. The only difference is that in (38) the verb phrase that follows *John* is long and in (97) it is short. This is true not only in these cases, but in general. The longer the VP, the relatively more acceptable these sentences become; the shorter the VP, the less acceptable they become. For example,

- (98) \**Mary hit him before John left.*

- (99) \**Mary hit him before John ate supper.*

- (100) \**Mary hit him before John left town.*

- (101) \**Mary hit him before John could leave.*

but,

- (102) *Mary hit him before John left in his Rolls Royce  
for a dinner engagement at the Ritz.*

- (103) *Mary hit him before John ate supper with the  
president of the company that his father had  
bought the previous week.*

- (104) *Mary hit him before John left town to visit his  
aged grandmother in a small village at the foot  
of Baldface Mountain.*

- (105) *Mary hit him before John could leave for the  
opening night of the play that had been reviewed  
so favorably in the "Times".*

And, as would be expected, such sentences are of questionable acceptability if the VP is of intermediate length.

- (106) ?*Mary hit him before John left in his Rolls Royce.*

- (107) ?*Mary hit him before John ate supper with the queen.*

- (108) ?*Mary hit him before John could leave town.*

If one pronounces these sentences, one can see that the length of the following verb phrase has an affect on the stress level of the subject. The normal English stress rule will assign *John* secondary stress in sentences like the above. But a later phonetic rule (which is probably universal) will reduce this stress further, depending on the length of the following VP. The longer the VP, the lower the stress on *John*. In (38), the stress on *John* is made low enough for *John* to be considered as possible antecedent. But in (97), *John*

retains secondary stress, which is too high to permit a noun phrase to be considered as a possible antecedent. If this interpretation of the data is correct, it would seem that possible pronoun-antecedent relationships are in part determined by a phonetic stress rule. This rule would apply after all the syntactic transformations and after all the phonological rules as well. It applies as closely to the output of the grammar as any rule I know of. If the phonetic stress reduction is really what is involved here, then we have a very strong argument for treating constraints on pronoun-antecedent pairs as being stated in output conditions, since the information necessary for stating these conditions would be available only in the output of the grammar (after all the syntactic and phonological rules have applied).

Though pronoun-antecedent constraints seem to involve stress, they cannot, of course, be stated only in terms of stress contours. As we have seen, such syntactic notions as "subordinate clause" and "main clause" are involved in these constraints. The above examples show that Pronominalization can go backward into a main clause from a subordinate clause just in cases where the antecedent NP has low stress. However, Pronominalization cannot usually go backward, no matter how low the stress on the antecedent. For example, consider (110),

- (110) \*He said that John had left town to visit his  
aged grandmother in a small village at the  
foot of Baldface Mountain.

But not only must such syntactic notions as "subordinate clause" be mentioned in these constraints, but as we saw earlier, the notion "subject" must also be mentioned. As we saw, Pronominalization can go backward from subordinate to main clauses if the antecedent has low stress--but only if the pronoun is not a subject. If the pronoun is the subject of the main clause involved, backward Pronominalization is impossible no matter how low the stress or how lengthy the intervening subject matter. For example, compare (102) with (111).

- (111) \*He was hit by Mary before John left in his Rolls  
Royce for a dinner engagement at the Ritz.

Moreover, increasing the length of the VP following he does not improve the sentence.

- (112) \*He was hit by Mary with a baseball bat found in a  
cellar in Roxbury before John left in his Rolls  
Royce for a dinner engagement at the Ritz.

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So it seems that the notion "subject" must also be mentioned in the output condition that states pronoun-anterior constraints. The examples mentioned in Section 1.2 above provide further evidence for this.

It is interesting that the question of phonetic stress reduction enters into pronoun-anterior constraints in exactly those places where the subject-nonsubject distinction is needed to state such constraints. This is true not only of backward Pronominalization into a main clause, but also of the cases discussed earlier of preposed adverbs, topics, and cleft sentences. Akmajian and Jackendoff have pointed out that if the length factor is taken account of in these constructions, then the possibilities for Pronominalization will vary with length, as in the sentences just discussed.

### Adverb preposing

- (14) \**In John's apartment, he smokes pot.*  
(113) *In John's apartment near the railroad tracks in the Pamrapo district of Bayonne N.J., he smokes pot.*

### Topicalization

- (52) \**Bill's apartment, he always talks to Mary about it.*  
(114) *Bill's apartment in that neighborhood of the Bronx where so many important literary figures grew up, he always talks to Mary about it.*

### Cleft sentences

- (72) \**It was John's dog that he bit.*  
(115) ?*It was John's dog with the large fangs and the unspeakably terrifying growl that he bit.*

It may be accidental that the two cases known to me where phonetic stress reduction plays a role in Pronominalization constraints are exactly the cases where the subject-nonsubject distinction plays a role. If this is not just a coincidence, then the theory of grammar must be changed in a way that I cannot at present imagine in order to account for the correlation. Pending further research on the subject, I will assume that it is sheer coincidence.

### 1.1.5 Changes in the Theory of Output Conditions

1.1.5.1 Some additions. If certain of the constraints on Pronominalization are to be stated as output conditions, then the theory of output conditions will have to be broadened to include:

- i. Variables
- ii. A definition of "main clause" and "subordinate clause"
- iii. A definition of "subject" and "nonsubject"
- iv. A specification of phonetic stress level
- v. A means of indicating identity of intended reference
- vi. The notion "command"
- vii. A limited use of quantifiers

A specification of the output condition needed to block the appropriate sentences containing preposed adverbs and topics would have to contain at least the following information.

(116) Structural description:

X - NP - X - NP - X  
1 - 2 - 3 - 4 - 5

The sentence is unacceptable if:

- a. 2 has the same reference as 4
- b. 2 commands 4
- c. 4 is [+PRO] and [-REL]
- d. 2 is above the appropriate stress level
- e. 4 is a subject
- f. there is at most one S node that dominates 4 but does not dominate 2

Condition f is necessary, since forward Pronominalization is blocked only if the pronoun is the subject of the highest sentence in question. Thus, (116) will block (117), but not (118).

(117) \*John's<sub>i</sub> house, he<sub>i</sub> always talks about it.

(118) John's<sub>i</sub> house, Mary says that he<sub>i</sub> always talks about it.

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To my knowledge, the constraints in (116) will handle the cases where forward Pronominalization is blocked for preposed adverbs, topics, and cleft sentences. (116) states the constraints in terms of structural conditions. However, there may be a different generalization at work here. Preposed adverbs, topics, and clefted elements are all elements that are being focused upon by the speaker, or given special prominence. Thus, it is possible that the appropriate output conditions should mention elements that are being given special prominence, assuming that some notion such as "prominence" can be formally specified. The theory of output conditions would then have to be broadened to include

### viii. The notion "prominence with respect to a given S node".

One might think that if one includes the notion "prominence" in the theory of output conditions, one might be able to avoid the use of quantifiers in stating output conditions. Condition f could then be done away with and replaced by a new condition that mentions "prominence". Unfortunately such a new condition would also have to use quantifiers. Thus, (116) could be replaced by (119).

### (119) Structural description:

$$\begin{array}{ccccccc} X & - & NP & - & X & - & NP & - & X \\ & 1 & - & 2 & - & 3 & - & 4 & - & 5 \end{array}$$

The sentence is unacceptable if:

- a. 2 has the same reference as 4
- b. 2 commands 4
- c. 4 is [+PRO] and [-REL]
- d. 2 is above the appropriate stress level
- e. there exists an  $S_i$ , such that 4 is the subject of  $S_i$  and 2 is dominated by a node that is prominent with respect to  $S_i$

(119) would, like (116), rule out (117), while permitting (118). In (117), *John* would be term 2 and *he* would be term 4. *John's house* would be prominent with respect to the  $S_i$ , *he always talks about it*. Since *he* (term 4) is the subject of  $S_i$  and since *John* (term 2) is dominated by a node (the NP dominating *John's house*) that is prominent with respect to  $S_i$ , condition e would be met and (117) would be

blocked.

In (118), *John* would again be term 2 and *he* would be term 4. But in (118), *John's house* would be prominent with respect to the  $S_i$ , *Mary says he always talks about it*. Thus, *Mary* is the subject of  $S_i$ , and *he* (term 4) is not. Therefore, condition e cannot be met, and (118) is not blocked. As should be clear from this example, quantifiers are needed to guarantee that the  $S$  with respect to which prominence is defined is the same as the  $S$  that 4 is the subject of. Thus, the addition of the notion "prominence" would add a new device to the theory of output conditions without allowing us to get rid of any of the old ones.

1.1.5.2 The Anaphora Hierarchy. As we mentioned above, full noun phrases can be used as anaphoric expressions just as pronouns can. And these sometimes obey the same output conditions as pronouns do.

- (120) *Mary kicked him when Fat Max insinuated that she had been sleeping with Algernon for several months.*
- (121) *Mary kicked the bastard when Fat Max insinuated that she had been sleeping with Algernon for several months.*
- (122) *\*He was kicked by Mary when Fat Max insinuated that she had been sleeping with Algernon for several months.*
- (123) *\*The bastard was kicked by Mary when Fat Max insinuated that she had been sleeping with Algernon for several months.*

Here the full NP, *the bastard*, obeys the same constraints as those on backward Pronominalization from subordinate clauses into main clauses. In such examples, *the bastard* must act like a pronoun and cannot act like an antecedent, and *Fat Max* must act like an antecedent and cannot act like a pronoun.

- (124) *Mary kicked Fat Max when the bastard insinuated that she had been sleeping with Algernon for several months.*
- (125) *Fat Max was kicked by Mary when the bastard insinuated that she had been sleeping with Algernon for several months.*
- (125) is grammatical since *the bastard* acts like a pronoun and since forward Pronominalization is possible in that environment.

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The question arises as to exactly when a full NP can act like a pronoun and when it cannot. One might think that NPs that can act as pronouns are limited to epithets like *bastard*, *bum*, *bitch*, *schmuck*; however, I believe that any definite description can function in that way.

- (126) *Mary slugged Dirksen when the Illinois Republican insinuated that she had voted for Lyndon Johnson.*
- (127) *Mary slugged the Illinois Republican when Dirksen insinuated that she had voted for Lyndon Johnson.*
- (128) *Dirksen was slugged by Mary when the Illinois Republican insinuated that she had voted for Lyndon Johnson.*
- (129) \**The Illinois Republican was slugged by Mary when Dirksen insinuated that she had voted for Lyndon Johnson.*

Here, *the Illinois Republican* is a definite description used as a pronoun. Lest readers consider this just another example of an epithet, let us consider some more innocuous examples. Assume that Dirksen is wearing a blue shirt.

- (130) *Mary slugged Dirksen when the man in the blue suit insinuated that she liked Lyndon Johnson.*
- (131) *Mary slugged the man in the blue suit when Dirksen insinuated that she liked Lyndon Johnson.*
- (132) *Dirksen was slugged by Mary when the man in the blue suit insinuated that she liked Lyndon Johnson.*
- (133) \**The man in the blue suit was slugged by Mary when Dirksen insinuated that she liked Lyndon Johnson.*

Here *the man in the blue suit* is clearly a definite description and not an epithet.

The generalization concerning the conditions under which an NP can serve as an anaphoric expression involves a distinction among four types of noun phrases.

- (134) 1. proper names (e.g., *Dirksen*)
2. definite descriptions (e.g., *the man in the blue suit*)
3. epithets (e.g., *the bastard*)
4. pronouns (e.g., *he*)

These types of noun phrases form a hierarchy as given in (134). In general, an NP with a lower number in the hierarchy may be an antecedent of an NP with a higher number, but not vice versa. An NP cannot be the antecedent of an NP with the same number, unless one is a repetition of the other or unless both are pronouns. For example,

- (135) Napoleon entered the room and Napoleon announced that Jean-Luc would hang.
- (136) \*Napoleon entered the room and Bonaparte announced that Jean-Luc would hang.

(135) and (136) show that a proper name can be an antecedent of another proper name only if the two are identical. As further examples, consider the following:

- (137) Napoleon entered the room and the emperor announced that Jean-Luc would hang.
- (138) \*The emperor entered the room and Napoleon announced that Jean-Luc would hang.
- (139) Napoleon entered the room and the bastard announced that Jean-Luc would hang.
- (140) \*The bastard entered the room and Napoleon announced that Jean-Luc would hang.
- (141) Napoleon entered the room and he announced that Jean-Luc would hang.
- (142) \*He entered the room and Napoleon announced that Jean-Luc would hang.

Although (138), (140), and (142) are all unacceptable, (138) is better than (140), which is better than (142). That is, there is a hierarchy of unacceptability here that mirrors the hierarchy of (134). The greater the difference in numbers with respect to the hierarchy of (134), the less acceptable the sentence.

Best	(138)	...	the emperor	...	Napoleon	...	ungrammatical sentences
			2		1		
Middle	(140)	...	the bastard	...	Napoleon	...	
			3		1		
Worst	(142)	...	he	...	Napoleon	...	
			4		1		

Just as there is a hierarchy of unacceptability here, so there is a hierarchy of acceptability as well. Though (137), (139), and (141) are all grammatical, (141) is the most acceptable,

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(139) less so, and (137) somewhat less. Again, the acceptability hierarchy mirrors the hierarchy of (134). The greater the difference in numbers with respect to the hierarchy of (134), the more acceptable the sentence.<sup>5</sup>

Best	(141)	... Napoleon ...	he	...	grammatical sentences
		1	4		
Middle	(139)	... Napoleon ... the bastard	...		
		1	3		
Worst	(137)	... Napoleon ... the emperor	...		
		1	2		

Let us now turn to definite descriptions. According to the hierarchy of (134), definite descriptions can be antecedents of epithets and pronouns, but epithets and pronouns cannot be antecedents of definite descriptions.

- (143) The emperor entered the room and the bastard announced that Jean-Luc would hang.
- (144) \*The bastard entered the room and the emperor announced that Jean-Luc would hang.
- (145) The emperor entered the room and he announced that Jean-Luc would hang.
- (146) \*He entered the room and the emperor announced that Jean-Luc would hang.

Moreover, the hierarchy of (134) predicts that a definite description cannot be the antecedent of a definite description unless the descriptions are identical.

- (147) The man with his hand in his vest entered the room and the man with his hand in his vest announced that Jean-Luc would hang.
- (148) \*The man with his hand in his vest entered the room and the emperor from Corsica announced that Jean-Luc would hang.

Epithets also follow the hierarchy of (134). Epithets may be antecedents for pronouns, but pronouns may not be antecedents for epithets.<sup>6</sup>

- (149) The bastard entered the room and he spat on the floor.
- (150) \*He entered the room and the bastard spat on the floor.

And, as the hierarchy predicts, epithets may be antecedents of other epithets only if they are identical.

(151) The bastard entered the room and the bastard spat on the floor.

(152) \*The bastard entered the room and the bum spat on the floor.

However, two different epithets referring to the same person may occur in the same sentence, provided that there is another noun phrase in the sentence that serves as an antecedent to both of them.

(153) After we let Sam into the house, the bastard entered the living room and the bum spat on the floor.

In (153), Sam is antecedent to both the bastard and the bum. This works not only for epithets, but for definite descriptions as well.

(154) \*The Illinois Republican entered the living room and then the man with the silver hair began to make a speech.

(154) is unacceptable, since a definite description cannot be the antecedent of another definite description. (154) is acceptable if we understand Dirksen to be the antecedent of both the Illinois Republican and the man with the silver hair. So, in (153) and (154) we have the following situation.

(155) ... Sam ... the bastard ... the bum ...

(156) ... Dirksen ... the Illinois Republican ... the man with silver hair...

The same is true with pronouns.

(157) After we let Dirksen into the house, he entered the living room and then he began to make a speech.

Here both occurrences of he refer back to Dirksen, as in (158).

(158) ... Dirksen ... he ... he ...

This situation arises not only within sentences, but also across sentence boundaries.

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- (159) *We let Dirksen into the house. He entered the living room and then he began to make a speech.*
- (160) *We let Dirksen into the house. The Illinois Republican entered the living room and then the man with the silver hair began to make a speech.*
- (161) *We let Sam into the house. The bastard entered the living room and the bum spat on the floor.*

Thus sentences like (152) and (154) are unacceptable only if it is assumed that one of the underlined noun phrases is the antecedent of the other. If, instead, we assumed that both are anaphoric expressions referring back to an antecedent in a previous sentence, then these sentences are acceptable. So sentences like

- (162) *He entered the room and then he spat on the floor.*

are acceptable if both occurrences of *he* are understood as referring back to some person in a previous sentence. The first *he* cannot be understood as the antecedent of the second *he*.

1.1.5.3 The General Notion "Antecedent of" The examples in the previous section indicate anaphoric noun phrases in general can be subject to the same constraints as pronouns. This means that output conditions must be stated not just for pronouns but for anaphoric noun phrases of all sorts. As we saw in the previous section, one cannot tell just from the form of a single noun phrase whether it is anaphoric. Instead, one must be able to pick out antecedent-anaphora pairs by a principle based on the hierarchy of (134) and output conditions must be formulated in terms of this principle. We can define the general notion "antecedent of" as follows:

- (162) Given two coreferential NPs,  $NP_i$  and  $NP_j$ , we will say that  $NP_i$  is the antecedent of  $NP_j$  (a) if  $NP_i$  ranks higher than  $NP_j$  in the hierarchy of (134) or (b) if  $NP_i$  and  $NP_j$  are identical in form and  $NP_i$  precedes  $NP_j$ .

(162b) is necessary for cases like (163).

- (163) *Dirksen was kicked by Mary when Dirksen insinuated that she had voted for Lyndon Johnson.*

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In (163), the first occurrence of *Dirksen* must be considered the antecedent of the second occurrence of *Dirksen*. In the case of repeated noun phrases, the first is always considered the antecedent of the second.

With a definition of "antecedent of". we can state the output condition for cases (120)-(133) and similar cases.

(164) Structural description

$$\begin{array}{ccccccc} X & - & NP_i & - & X & - & NP_i & - & X \\ 1 & - & 2 & - & 3 & - & 4 & - & 5 \end{array}$$

The sentence is unacceptable if:

- a. there exist  $S_a$  and  $S_b$  such that  $S_b$  is subordinate to  $S_a$ , and
- b.  $S_a$  dominates 2 and  $S_b$  dominates 4 and  $S_a$  does not dominate 4 and  $S_b$  does not dominate 2<sup>a</sup>, and
- c. 4 is the antecedent of 2, and either
- d. 2 is the subject of  $S_a$ , or
- e. 4 is stressed, or both

(164) will handle all the cases I know about of backward anaphora from a subordinate clause to a main clause.<sup>7</sup>

Similarly, we can account for the unacceptability of backward anaphora in coordinate clauses, as in (135)-(154), with an output condition like (165).

(165) Structural description

$$\begin{array}{ccccccc} X & - & NP_i & - & X & - & NP_i & - & X \\ 1 & - & 2 & - & 3 & - & 4 & - & 5 \end{array}$$

The sentence is unacceptable if:

- a. there exist  $S_a$  and  $S_b$  such that  $S_a$  and  $S_b$  are coordinate, and
- b.  $S_a$  dominates 2 and  $S_b$  dominates 4 and  $S_a$  does not dominate 4 and  $S_b$  does not dominate 2<sup>a</sup>, and
- c. 4 is the antecedent of 2.

### Pronouns and Reference

There are still other cases where the general notion of antecedent is necessary. (166) is an example of an output condition that applies only to anaphoric noun phrases that are not pronouns.

(166) Structural description

$$\begin{array}{ccccc} X & - & NP_i & - & X \\ & & 1 & & 2 & 3 & 4 & 5 \end{array}$$

The sentence is unacceptable if:

- a. 2 is the antecedent of 4
- b. 2 commands 4,
- c. 4 is not a pronoun.

(166) will account for the following sentences.

- (167) \*Johnson thinks that Johnson is popular.
- (168) \*Johnson thinks that the Texan is popular.
- (169) \*Johnson thinks that the bastard is popular.
- (170) Johnson thinks that he is popular.
- (171) \*Johnson likes people who like Johnson.
- (172) \*Johnson likes people who like the Texan.
- (173) \*Johnson likes people who like the bastard.
- (174) Johnson likes people who like him.

As (166) is stated, it will apply only when the antecedent precedes the anaphoric noun phrase. However, the same constraints hold when the anaphoric noun phrases precedes its antecedent.

- (175) ?That Johnson is unpopular bothers Johnson.
- (176) \*That the Texan is unpopular bothers Johnson.
- (177) \*That the bastard is unpopular bothers Johnson.
- (178) That he is unpopular bothers Johnson.
- (179) People who know Johnson hate Johnson.
- (180) \*People who know the Texan hate Johnson.
- (181) \*People who know the bastard hate Johnson.
- (182) People who know him hate Johnson.

Note that (179) is grammatical, since by the definition of antecedent in (162), the first occurrence of Johnson is the antecedent of the second. Because of this, condition (166) is not met, and thus it cannot rule out (179). Thus, (179) is acceptable for the same reason as (183) and (184), where the anaphoric noun phrase commands its antecedent.

(183) *People who know Johnson hate the Texan.*

(184) *People who know Johnson hate the bastard.*

(175) is not subject to condition (166) for the same reason as (179) is. In (175) the anaphoric noun phrase commands its antecedent. In my idiolect, I find (175) of questionable acceptability, which is also true of (185) and (186), which share the same condition.

(185) *?That Johnson is unpopular bothers the Texan.*

(186) *?That Johnson is unpopular bothers the bastard.*

(164), (165), and (166) show that the notion "antecedent of" is necessary for the general statement of output conditions. To my knowledge, the definition of "antecedent" given in (162) is universal, as is the hierarchy of (134).

#### 1.1.6 Dialect Variations

As I have pointed out above, the constraints we are dealing with are subject to some dialectal and idiolectal variation. Actually, there is a considerable amount of variation--more than I have mentioned so far. I noted that in my speech, (186) is unacceptable but (187) is acceptable.

(186) *\*He was kicked by Mary before John had a chance to get up.*

(187) *Mary kicked him before John had a chance to get up.*

Though the majority of the speakers I've asked share this view, there are some who find (186) and (187) both ungrammatical, and there are some isolated individuals who find both of them grammatical.<sup>8</sup>

I mentioned above that many people find (34), (67), and (75) grammatical. These individuals do not have the constraint that backward Pronominalization can go into topicalized elements only from subjects. Instead, they permit free backward Pronominalization into topicalized elements. Stanley Peters (personal communication) reports that there is a Texas dialect where sentences like (188) are grammatical.

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- (188) *It bothered him that John was sick.*

Variations like these can be described in terms of a theory of output conditions like that proposed in Section 1.1.5. If one can pick out the structures in which the variation occurs, they can be listed as extra conditions in statements like (116).

Paul Postal has pointed out an even more interesting case of variation from speaker to speaker. Some speakers find (189) acceptable, although it is unacceptable in my speech.

- (189) *His mother hates John.*

I have found that the same speakers who accept (189) will accept (190)

- (190) *In John's apartment, he smokes pot.*

These speakers will reject, as will all the speakers I have asked, (191) and (192).

- (191) *\*He hates John's mother.*

- (192) *\*Near John, he saw a snake.*

And these speakers like all others will accept (193) and (194).

- (193) *Women who know him hate John.*

- (194) *In the apartment which John rents, he smokes pot.*

If one groups speakers who accept (189) and (190) into what we will call Group A and those who do not accept them into Group B, and if we pick out as the relevant NP the leftmost underlined NP in the above sentences, one gets the following distribution:

(195)	Relevant NP	Group A	Group B
	Head NP	No good	No good
	Unembedded modifier NP	Okay	No good
	Embedded NP	Okay	Okay

The distinction between the two dialects seems to be a matter of how far down in the tree the relevant NP must be. Group B requires that it be embedded in a subordinate clause, while Group A will allow it to be an unembedded modifier. Since two different conditions are involved, this indicates that output conditions should include some notion like "sufficiently far down on the tree", which can vary from speaker to speaker in

its exact definition but would not vary from condition to condition.

If the constraints on Pronominalization are to be stated as output conditions, then it is not at all surprising that they should vary from speaker to speaker, since other output conditions (see Ross, 1967a, Chapter 3) are known to be subject to such variation.

## 1.2 Transformational Conditions

### 1.2.1 On the Noncyclic Nature of English Pronominalization

In Section 1.1 I argued that certain constraints on pronominalization could not be handled by rule ordering and had to be handled by output conditions of the Ross-Perlmutter variety. I also showed that it is false that forward Pronominalization is always possible in English and claimed that no known pronominalization constraints depend on the ordering of a rule of Pronominalization with respect to other rules of the grammar. To my knowledge, the only apparent counterexamples to this claim are involved in Ross' elegant argument that Pronominalization must be a cyclic rule. In this section, I shall argue that:

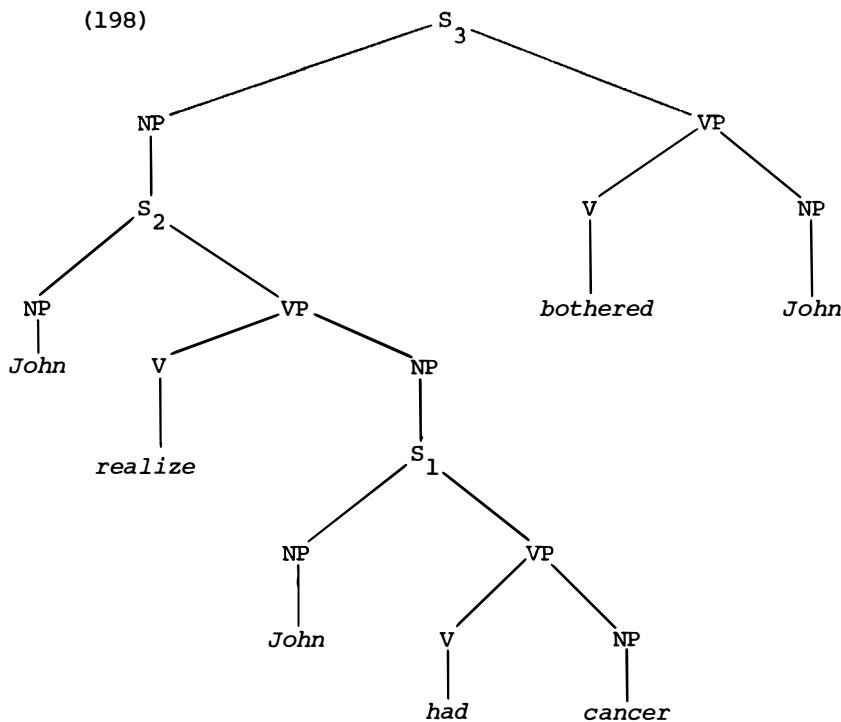
- a. Ross's examples do not show that pronominalization is a cyclic rule.
- b. Ross's examples cannot be handled by an output condition.
- c. Ross's examples cannot be handled by a constraint on deep structure.
- d. Ross's examples cannot be handled by a constraint on the Pronominalization rule.
- e. Therefore they must be handled by a transformational constraint not attached to the rule of Pronominalization.

Ross (1967b) argued that the following sentences indicated that pronominalization was a cyclic rule.

(196) *Realizing that he had cancer bothered John.*

(197) \**Realizing that John had cancer bothered him.*

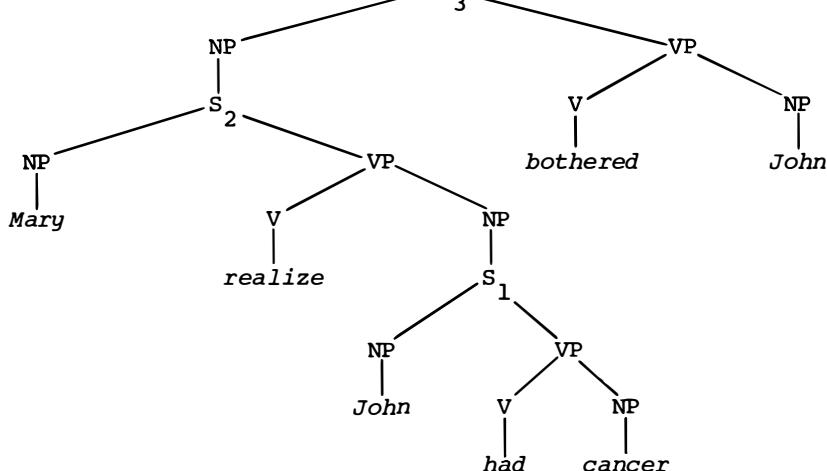
**Pronouns and Reference**



(199) *Mary's realizing that he had cancer bothered John.*

(200) *Mary's realizing that John had cancer bothered him.*

(201)



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In (197), Pronominalization cannot go forward, whereas in (200), which differs only by the presence of the subject *Mary*, it can. If Pronominalization were cyclic and obligatory, Ross argued, this fact could be explained beautifully. Cyclic Pronominalization in the (196)-(197) cases would have to apply first to the embedded sentence,  $S_2$ .

- (202)        John realized that John had cancer.

If pronominalization were obligatory it would apply to (202) to yield

- (203)        John realized that he had cancer.

but not

- (204)        \*He realized that John had cancer.

On the next cycle (on  $S_3$ ), the subject of (203) would be deleted by Equi-NP-deletion under identity with the object of *bother*, thus yielding (196). (197) could never be generated because (204), a necessary intermediate stage, could not be generated. If *John* is the subject of *realize*, then *John* cannot occur unpronominialized in the complement of *realize*.

This explanation of the ungrammaticality of (197) accounts, at the same time, for the grammaticality of (200). Since *John* is not the subject of the embedded subject clause of (200), *John* may occur unpronominialized in the object complement of *realize*. Since the intermediate stage (205) is grammatical,

- (205)        *Mary* realized that *John* had cancer.

it follows that the source of the ungrammaticality in (197) is not present in (200).

The appeal of Ross's argument is that it purports to show that a strange, anomalous, complex, and apparently isolated fact--(the ungrammaticality of (197))--actually follows from a well-known and relatively simple fact, the ungrammaticality of (204). [Compare (3)-(6)]. Moreover, it shows how what would have to be a new constraint on forward Pronominalization can be eliminated in favor of an independently needed constraint on backward Pronominalization.

It should be noted that the facts of (196)-(200) can be described without assuming that pronominalization is cyclical. One could simply add the following ad hoc constraint on the Pronominalization rule:

- (206)        Pronominalization cannot go forward out of a subject complement that has no superficial subject.

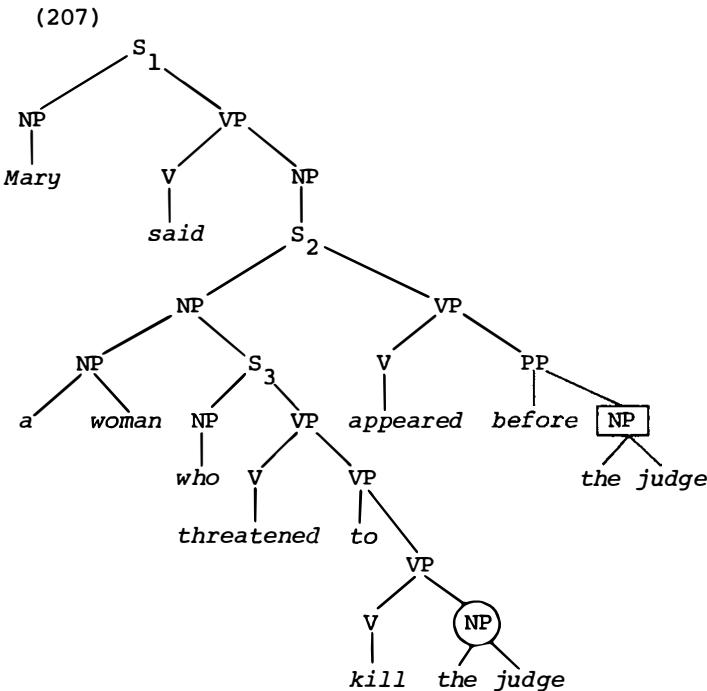
Putting aside the question of the formal status of (206), it is

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clear that for the examples cited so far, (206) could describe the facts without the assumption that pronominalization is cyclic. Since, in (197), *realizing* has no superficial subject, (206) would rule (197) out while permitting (200).

It is clear why, on the basis of the examples considered thus far, Ross's account is preferable to (206). The reason is that Ross's account seems to reveal a relationship between apparently unrelated phenomena, and seems to show that (206) can be eliminated in favor of an independently motivated constraint on backward Pronominalization. According to (206), (197) and (200) are entirely unrelated facts, and (206) has nothing to do with backward Pronominalization. Since Ross's description relates phenomena that (206) does not, it has greater explanatory value--especially since it obviates the necessity for (206). Here is a case where one chooses between descriptions on the basis of their explanatory value.

Shortly after Ross discovered this explanation for (197), two classes of anomalies that did not accord with cyclic Pronominalization were discovered. The first involved reordering transformations that could not be cyclic, but had to apply only on the last cycle. For example, Extraposition of relative clauses must be last-cyclic since it cannot apply before the last-cyclic rule of Question formation (see Ross, 1967a, Section 5.1.1.3). Consider (207).



If  $S_3$  does not extrapose, then forward Pronominalization can apply turning the boxed NP to *him*.

- (208) *Mary said that a woman who threatened to kill  
the judge appeared before him.*

Now suppose that pronominalization is cyclic; then it would have applied on  $S_2$ , yielding (209).

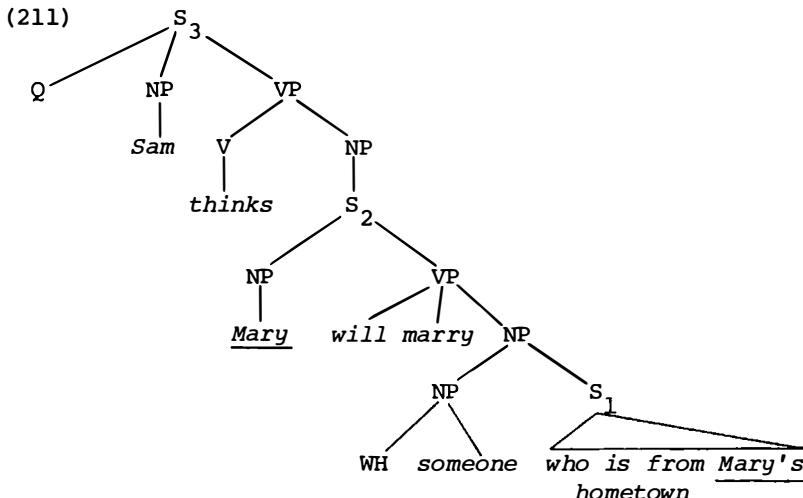
- (209) *A woman who threatened to kill the judge  
appeared before him.*

Since Extraposition is last-cyclic, it can apply only on the  $S_1$ -cycle--after Pronominalization has applied on the  $S_2$ -cycle (no matter where in the rules it is ordered). If extraposition (which, of course, is optional) applies after (209) has been produced on the  $S_2$ -cycle, then we will get the ungrammatical (210).

- (210) \**Mary said that a woman appeared before him who  
threatened to kill the judge.*

If pronominalization is cyclic, there is no way of avoiding such wrong results. In fact, cases like this will arise with every last-cyclic rule that moves one NP to the right over another NP. It should be noted that no such difficulty arises if Pronominalization is a last-cyclic rule or if the constraints on Pronominalization are stated in output conditions.

The second anomaly (noticed by Postal) involves question formation. Consider (211)



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Assuming that Pronominalization is cyclic, it will apply on  $S_2$ , yielding (212).

- (212) *Mary will marry WH someone from her hometown.*

Note that Pronominalization applying on  $S_2$  cannot yield (213)

- (213) *\*She will marry someone from Mary's hometown.*

Since Q is at the topmost level in (211), the rule of Question formation cannot apply until the cycle on  $S_2$  is finished. Assuming that (212) was produced on the  $S_2$ -cycle, Question formation, applying later, will yield (214).

- (214) *Who who is from her hometown does Sam think that Mary will marry?*

Although Extraposition of relative clauses would be obligatory in (214) for some speakers, there are many speakers for whom (214), with its unextraposed relative clause, is grammatical. For these speakers, Postal pointed out, (215) is also grammatical.

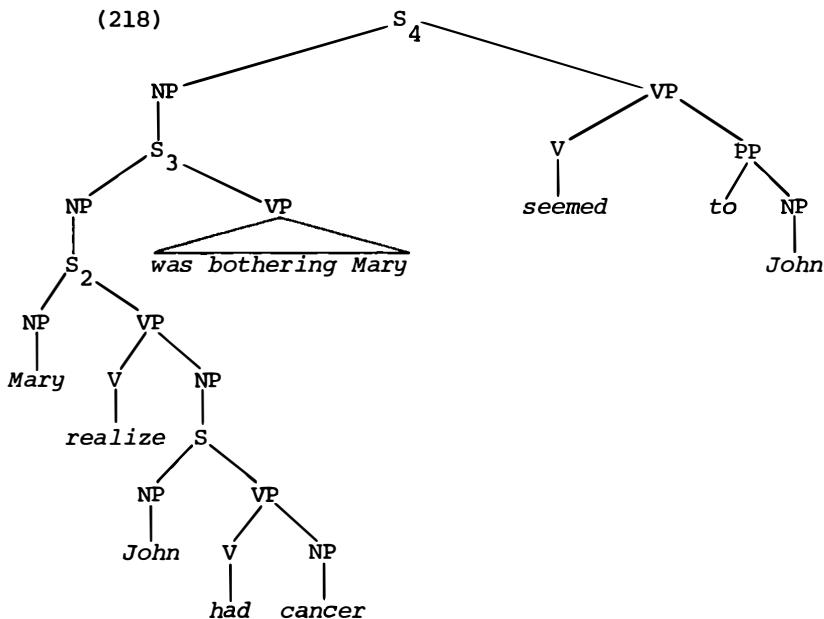
- (215) *Who who is from Mary's hometown does Sam think that she will marry?*

But, if Pronominalization is cyclic, (215) cannot be derived, since in order to derive it we would have to first derive the impossible intermediate stage of (213). (215) could be handled only if Pronominalization were a last-cycle rule or if the permissible occurrences of pronouns were determined by output conditions, as I have suggested.

These arguments provide very strong counterevidence to Ross's proposal. The latter argument of Postal's is especially damning, and I cannot imagine any way around it. In view of such arguments, one might be willing to give up Ross's explanation in favor of the rather uninteresting description of (206). Still there is a lingering doubt that perhaps Ross was right. The following examples, should, however, remove all such doubts.

- (216) *\*Realizing that John had cancer seems to him to have been bothering Mary.*

- (217) *My realizing that John had cancer seemed to him to have been bothering Mary.*



The difference between (216) and (217) is just the difference between (197) and (200). When the subject of *realizing* has been deleted, Pronominalization cannot go forward. The same phenomenon is operating in both cases. But in (216), the understood subject of *realizing* is *Mary* not *John*.

Therefore, Ross's cyclic pronominalization theory could not account for (216); the intermediate  $S_2$  stage [see (218)], *Mary realized that John had cancer*, is fully grammatical. If the same thing is going on in both (216) and (197), then Ross's theory is wrong, since it cannot account for both phenomena. The constraint on forward Pronominalization stated in (206) can describe (216) as well as (197). But despite its explanatory value in accounting for (197), Ross's cyclical theory cannot even describe the parallel case of (216). We must discount the cyclic Pronominalization theory both because there is decisive evidence against it and because it does not do the job that it was set up to do.

With the cyclical theory out of the way, it is natural to turn to some output condition such as (206) to account for facts like (216) and (197). But although (206) can account for these sentences, there are similar sentences that it cannot account for. Consider (218) and (219).

- (218) *The realization that he had cancer bothered John.*

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- (219) \**The realization that John had cancer bothered him.*

(218) and (219) are parallel to (196) and (197). These examples show that nominalized subject complements work the same way with respect to this phenomenon as ordinary subject complements. Since (206) refers only to subject complements and not nominalizations, it would have to be generalized to account for (219). Such a generalized version of (206) might account for (218) and (219), but it could not be extended to account for other nominalizations. Compare *realization* and *discovery*. *Realization* cannot have an unspecified subject. Consequently, (218) is unambiguous and the subject of *realization* in (218) is understood to be John. Since *realization* cannot have an unspecified subject, (220) is ungrammatical.

- (220) \**The realization that John might have cancer was anticipated.*

Compare (220) with (221), where there is a specified subject.

- (221) *Mary's realization that John might have cancer was anticipated.*

*Discovery*, on the other hand, may take an unspecified subject as in (222), as well as a specified subject, as in (223):

- (222) *The discovery that John might have cancer was anticipated.*

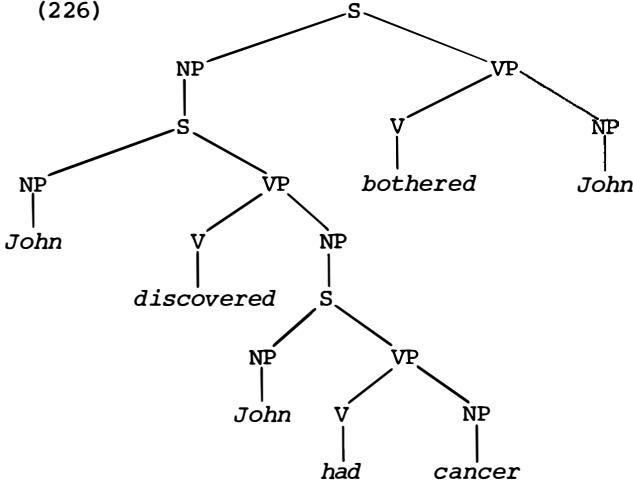
- (223) *Mary's discovery that John might have cancer was anticipated.*

Because of this difference between *discovery* and *realization*, we get rather different results when we substitute *discovery* for *realization* in (218) and (219).

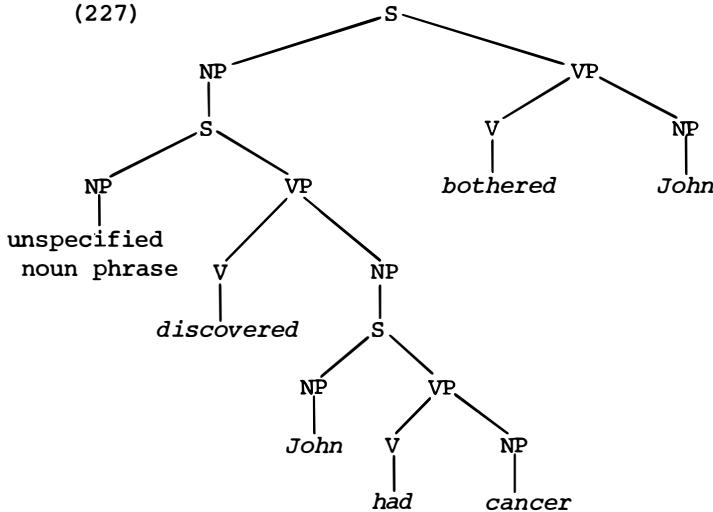
- (224) *The discovery that he had cancer bothered John.*

- (225) *The discovery that John had cancer bothered him.*

(226)



(227)



(224), unlike (218), is ambiguous; it may have either (226) or (227) as its deep structure. It may have either *John* or an unspecified NP as the subject of *discovery*. (225), unlike (219), is grammatical. But unlike (224), (225) is unambiguous. In (225), *John* cannot be the understood subject of *discovery*. Instead, *discovery* is understood only as having an unspecified subject. That is, the deep structure of (225) is (227), but not (226). Although (225) is grammatical, we find the same difference between (225) and (224) as we found between (219) and (218). In (225) and (219), *John* cannot be the understood subject of the nominalization, while in (218)

it can. Thus, (225) is unambiguous for the same reason that (219) is ungrammatical; in both cases the subject *John* has been deleted by Equi-NP-deletion.

If (219) is ungrammatical for the same reason that (225) is unambiguous, then we would expect the same constraint to apply in both cases. That is, we would expect that in these cases there would be a single constraint forbidding the possibility that *John* could be the understood subject; that is, forbidding the operation of Equi-NP-deletion. But now note that this constraint, whatever it is, cannot be an output condition. Output conditions apply to surface structure, to the output of the transformational rules. But one cannot account for the lack of ambiguity in (225) by surface structure information alone. The fact that (225) is unambiguous is a fact about the correlation of deep structure and surface structure; it is not a fact about surface structure alone. The surface structure of (225) is acceptable if its deep structure is (227), but not (226). Hence, the lack of ambiguity in (225) cannot be accounted for by an output condition. And if the same constraint holds in (219), (216), and (197), then none of these cases can be described by output conditions without the loss of a generalization.

So far, it has been shown that (a) Ross's examples do not show that Pronominalization is a cyclic rule and (b) Ross's examples cannot be handled by an output condition. Since (218) and (219) would presumably have the same deep structure, as would (196) and (197), it is clear that (c) Ross's examples cannot be handled by a constraint on deep structure. Let us now consider the possibility that these examples could be handled by some constraints on the rule of Pronominalization, provided that there is such a rule. We showed above that Pronominalization could not be a cyclic rule, but rather would have to apply last-cyclically. (i) Pronominalization is a last-cyclic rule. It can easily be shown that (ii) Equi-NP-deletion is a cyclic rule. Hence, (iii) Pronominalization must follow all occurrences of Equi-NP-deletion. Now consider (225). We must allow the deep structure of (227) to be realized as (225), but we must stop the deep structure of (226) from being realized as (225). The only difference between (226) and (227) is in the subject of *discover*. Equi-NP-deletion will apply to (226), deleting the subject of *discover* and effectively wiping out the distinction between (226) and (227). Since Equi-NP-deletion precedes Pronominalization, the distinction between (226) and (227) is lost before we reach the Pronominalization rule. Hence, it seems impossible that

a constraint on the Pronominalization rule could account for the fact that (227) but not (226) can be realized as (225). Thus, it seems reasonable that (d) Ross's examples cannot be handled by a constraint on the pronominalization rule. From (a)-(d), I conclude that (e) Ross's examples must be handled by some transformational constraint not associated with the rule of Pronominalization. I do not know how this constraint works; I only know some examples of how it does not work.

### 1.2.2 Postal's Crossover Principle

1.2.2.1 Crossover and Antecedents. It has been known for some time that the passive and reflexive rules are mutually exclusive. Thus, sentences like

(228)                   *\*John was shaved by himself.*

are ungrammatical. Postal recognized (1964, lectures at M.I.T.) that this was not an isolated fact. He proposed that there was instead some general principle referring to cases where two or more coreferential NPs appear in the same sentence. Under certain conditions, Postal claimed, an NP cannot be moved by a transformation in such a way that it passes over another NP that has the same reference. The ungrammaticality of (228) would follow as a special case of the general principle.

Since then, Postal has discussed the Crossover principle in great detail (see Postal, 1971) and has convincingly demonstrated that some principle of this sort must exist. Like the mysterious constraint discussed in Section 1.2.1, Postal's Crossover principle is in effect a transformational constraint on Pronominalization, and it provides independent evidence that such constraints must exist. Since a thorough discussion of the subject already exists, there is no need for me to review Postal's results here. However, I would like to entertain the possibility that Postal's treatment may be incorrect in one detail. Postal claims that the crossover phenomena involve the notion "coreferentiality". I would like to suggest that instead the notion "antecedent" is what is involved in these cases, and that "antecedent" and "coreferentiality" are two independent notions. I will attempt to show:

- I. a. There are coreferential NPs such that neither is the antecedent of the other.
  - b. There are pronoun-antecedent pairs that do not involve coreferentiality.
- II. a. In cases like (Ia), the Crossover principle does not apply.

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b. In cases like (Ib), the Crossover principle does apply.

III. The Crossover principle applies to pronoun-antecedent pairs, rather than to pairs of coreferential NPs.

1.2.2.1.1 Basic Crossover cases. Let us begin by considering some typical examples of the Crossover principle. Compare (229) and (230).

(229) *The man who thought that Joan would marry him*  
*was rich.*

(230) \**The man who he thought that Joan would marry was  
                        rich.*

In these sentences, *who* is assumed to be the antecedent of *he* and *him*, as the arrows indicate. Since the antecedent of a definite pronoun is always coreferential with it, we also assume that *who* is coreferential with *he* and *him*. (229) and (230) would be derived from sources like (231) and (232).

(231) *The man [S Wh-det man thought that Joan would him]<sub>S</sub>*  
*was rich.*

(232) *The man [S he thought that Joan would marry Wh-det  
                        man]<sub>S</sub> was rich.*

In (232), *Wh-det man* is to the right of *he*. Through the operation of Relative clause formation, *Wh-det man* moves to the front of the relative clause, crossing over *he* in the process, and then changes to the relative pronoun. The result is (230), where *who* is to the left of *he*. Since Postal's Crossover principle forbids an NP from crossing over a coreferential NP, (230) is ungrammatical. (229), however, is fully grammatical, since the Crossover principle does not apply. In (231), the source of (229), *Wh-det man* is to the left of *him*. In the process of Relative clause formation, it does not cross over *him*, and hence there is no Crossover violation.

It ought to be noted that the ungrammaticality of (230) is accounted for by both Postal's version of the Crossover principle and by the version that I am proposing, since both the notions "coreferentiality" and "antecedent" are involved in (229) and (230).

One might, however, object to such an account of the ungrammaticality of (230) on the following grounds. The

relative clause, as it is given in (232), would be ungrammatical if it occurred by itself.

- (233) \**He thought that Joan would marry the man.*

The ungrammaticality of (230) would then follow from the ungrammaticality of (233). What is wrong with this argument is that the ungrammaticality of (233) should be accounted for by an output condition. But the output condition that would rule out (233) would not rule out (230). Hence, such an objection would not be valid. Moreover, there are examples of crossover violations where such objections cannot be raised, although these examples, unlike the one above, are subject to dialectal variation. Consider (234).

- (234) \**The camera which the girl who wanted it  
desperately thought that she would never get  
was given to her.*

- (234) would come from the source

- (235) *The camera [S the girl who wanted it desperately  
thought that she would never get Wh-det camera S]  
was given her.*

Here, the relative clause taken as a sentence in isolation would be perfectly grammatical.

- (236) *The girl who wanted it desperately thought that she  
would never get the camera.*

Hence, the above objection would not arise. (234) would be ruled out for the same reason as (230), since *Wh-det camera* starts out to the right of *it* and then moves over *it* in the process of relative clause formation.

It should be noted that some speakers do find (234) grammatical, although they find (230) ungrammatical. For these speakers, the crossover principle applies only when the NP being crossed over commands the NP that is being moved (just before the movement rule applies). Since *he* in (232) commands *Wh-det man*, (232) will be ungrammatical for these speakers. But since *it* in (235) does not command *Wh-det camera*, these speakers will find (235) acceptable. Such speakers should find the following sentences acceptable for the same reason, although they are unacceptable in my speech.

- (237) \**The senator who girls who have dated him hate is  
exceedingly rich.*

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- (238) \*Any man who the claim that Sheila hated him  
would bother has no sense of dignity at all.

These sentences seem to show that some version of the Crossover principle is necessary, although the conditions under which it applies are subject to dialectal variation.

Another example of the Crossover principle that Postal cites involves the rule of *About-movement*.

- (239) I talked to Sue about Mary.

- (240) I talked about Mary to Sue.

This rule will invert the *about* phrase and the *to* phrase in (239) to yield (240). Since one NP is moving over another in this rule, the crossover principle applies.

- (241) I talked to John about himself.

- (242) \*I talked about John to himself.

As in the above cases, the ungrammaticality of (242) can be accounted for both by Postal's version of the Crossover principle and by mine, since both of the notions "coreferentiality" and "antecedent" are involved here.

1.2.2.1.2 The necessity of 'antecedent' Postal has, however, pointed out an anomaly in his version of the Crossover principle. Consider (243).

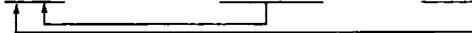
- (243) John talked to himself about himself.

Here there are three coreferential NPs. Postal's version of the Crossover principle would predict that the application of *About-movement* to (243) would produce an ungrammatical sentence, as in the case of (242). However, the sentence produced turns out to be grammatical.

- (244) John talked about himself to himself.

But let us now return to (243) and consider what the pronoun-antecedent pairs would be in that sentence. By the definition of "antecedent" in Section 1.1, the pronoun-antecedent pairs of (243) would be as shown in (245).

- (245) John talked to himself about himself.



John is the antecedent of both reflexive pronouns, but neither reflexive pronoun is the antecedent of the other. Thus the version of the Crossover principle that I am proposing would permit *About-movement* to apply to (245), since the two NPs that are crossing over one another are not in a pronoun-antecedent

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relationship. Thus, we have the situation described in (Ia) above, and we see that (IIa) holds.

If the Crossover principle applies to pronoun-anterecedent pairs regardless of coreferentiality, then we would expect it to apply in a case where the NPs involved are not coreferential, but are in a pronoun-anterecedent relationship. For example, consider Pronominalization with *one*.

- (246) *The senator from Kansas met one from Missouri.*

Here the pronoun *one* has *senator* for its antecedent, although there is no coreferentiality involved. If we embed (245) as a relative clause,

- (247) *The senator from Kansas [S Wh-det senator from  
Kansas met one from Missouri] told Tom a funny  
story.*

we get (248) through the application of relative clause formation.

- (248) *The senator from Kansas who had met one from  
Missouri told Tom a funny story.*

(248) is grammatical since there is no crossover involved. Now compare (248) with (249).

- (249) \**The senator from Kansas who one from Missouri had  
met told Tom a funny story.*

Since (249) would be derived from (250), the Crossover principle applies.

- (250) *The senator from Kansas [S one from Missouri had  
met Wh-det senator from Kansas] told Tom a  
funny story.*

In the process of relative clause formation, *Wh-det senator* crosses over *one*.

As in the case of (230), one might raise the objection that the relative clause sentence taken in isolation is ungrammatical.

- (251) \**One from Missouri had met the senator from Kansas.*

As in the above case, this objection is irrelevant since (251) should be ruled out by an output condition that would not rule out (249). And as in the above case, we can construct an example to get around this objection. Consider the sentences:

### Pronouns and Reference

- (252) *The rich professor* thinks that Sue will marry some-  
one who knows a poor one.

- (253) *Someone who knows a poor one* thinks that Sue will  
marry the rich professor.

Both are fully grammatical. Let us embed them as relative clauses.

- (254) *The rich professor* [<sub>S</sub> Wh-det rich professor thinks  
that Sue will marry someone who knows a poor  
one <sub>S</sub>] is upset.

- (255) *The rich professor* [<sub>S</sub> someone who knows a poor one  
thinks that Sue will marry Wh-det rich professor <sub>S</sub>]  
is upset.

If we apply relative clause formation to (254) and (255), *professor* will cross over *one* in (255) but not in (254). This accounts for the grammaticality of (256) and the ungrammaticality of (257).

- (256) *The rich professor who thinks that Sue will marry*  
*someone who knows a poor one is upset.*

- (257) \**The rich professor who someone who knows a poor one*  
*thinks that Sue will marry is upset.*

It should be noted that some speakers find sentences like (257) and (249) grammatical, though somewhat less acceptable than (256) and (248). For these speakers, the application of the Crossover principle in the case of the nonreferential pronoun, *one*, reduces acceptability much less than in the case of referential pronouns like *he*. Note that the Crossover principle is still necessary to account for the reduced acceptability of just these cases. In my speech, I find (257) and (249) ungrammatical, but not quite as bad as (230), (234), or (242). In general, crossover is worse with referential pronouns. These cases demonstrate (Ib) and (IIb), which, taken together, demonstrate (III).

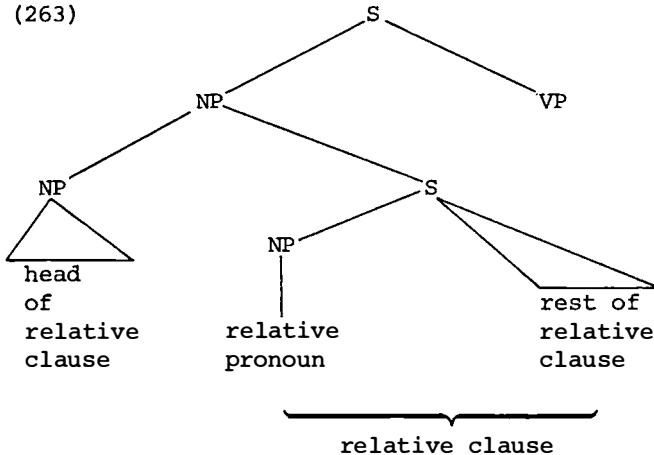
#### 1.2.2.2 Crossover and Equational Sentences

##### 1.2.2.2.1 Indeterminate cases Consider the following:

- (258) *The man who thought that Sue liked him* was tall.

(259) *The man who thought that Sue liked Sam was tall.*(260) \**The man who thought that Sue liked Sam was tall.*(261) \**The man who thought that Sue liked the emperor  
was tall.*(262) \**The man who thought that Sue like the bastard  
was tall.*

(263)



(258)-(262) all have the form of (263). In the relative clauses of these sentences, as in all relative clauses, the relative pronoun both precedes and commands all of the other elements of the relative clause. In particular, *who* precedes and commands *him* in (258), and *who* precedes and commands *Sam* in (260). In (258), *who* is the antecedent of *him*. There is nothing strange about this; in general, a pronoun may be preceded and commanded by its antecedent. The strange cases are those like (230) and (234), where Crossover applies and this is impossible. Now compare (258) and (260). Where there is a pronoun (*him*) in (258), there is a proper noun (*Sam*) in (260). But whereas *who* and *him* are in an antecedent-pronoun relationship in (258), there can be no such relationship between *who* and *Sam* in (260). *Who* cannot be the antecedent of *Sam* nor can *Sam* be the antecedent of *who*. This is true not only of *Sam* in (260), but also of *the emperor* in (261) and *the bastard* in (262). That is, it is true not just of proper nouns, but of all full NPs (non-pronouns). These facts follow from two independently motivated output conditions, which I state informally here.

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- (264) An anaphoric NP may not both precede and command its antecedent (except in the adverb preposing and topic cases cited in Section 1.1).
- (265) A full NP (nonpronoun) cannot both be preceded by and commanded by its antecedent. This is the same as (166).

(264) will rule out cases like

- (266) \*He thinks that Sam is sick.  
(267) \*The bastard thinks that Sam is sick.  
(268) \*The emperor thinks that Sam is sick.

(265) will rule out cases like

- (269) \*Sam thinks that the emperor is sick.  
(270) \*Sam thinks that the bastard is sick.

Now consider (260) again. (264) rules out the possibility that *Sam* might be the antecedent of *who*, since *who* both precedes and commands *Sam*. (265) rules out the possibility that *who* might be the antecedent of *Sam*, since *Sam* is a full NP and would then be both preceded by and commanded by its antecedent. The same is true of *the emperor* and *the bastard* in (261) and (262).

Because it is possible for a relative pronoun to serve as the antecedent of a pronoun inside its relative clause as in (258), it was possible for us to find pairs of sentences like (229) and (230) that provided empirical evidence in favor of the Crossover principle. In such cases, Crossover made the antecedent relationship impossible; while where there was no crossover, it remained possible. But in cases like (260)-(262), where there is a full NP rather than a pronoun inside the relative clause, it is impossible to confirm (or to disconfirm) the Crossover principle, since the antecedent relationship is impossible in all such cases. For example, consider (271).

- (271) \*The senator who girls who have dated the bastard  
hate is exceedingly rich.

(271) is ruled out both by output condition (265) and by the Crossover principle. But since (265), which is independently motivated, will rule out (271), it is not obvious that the Crossover principle contributes to the ungrammaticality of the sentence. Compare (271) with (237).

- (237) \*The senator who girls who have dated him hate is  
exceedingly rich.

(237) is ruled out only by the Crossover principle and so does provide evidence for that principle. Hence, we see that because of the interaction between output conditions and the Crossover principle, it cannot be determined whether or not the Crossover principle applies in certain classes of sentences.

#### 1.2.2.2.2 The presupposition versus the assertion of coreferentiality

1.2.2.2.2.1 The relationship between 'coreferentiality' and 'antecedent' We have seen cases where two NPs may be coreferential but not take part in an antecedent relationship and where two NPs may take part in an antecedent relationship but not be coreferential. However, the notions of coreferentiality and antecedent, though independent, are not unrelated. The relationship between them is given by the following principle.

- (272) Given two NPs - NP<sub>a</sub> and NP<sub>b</sub>:

If NP<sub>a</sub> is the antecedent of NP<sub>b</sub> and if NP<sub>b</sub> is definite, then NP<sub>a</sub> and NP<sub>b</sub> are presupposed to be coreferential.

Note that this is not an if-and-only-if statement; (245) would be a counterexample to such a statement.

- (245) John talked to himself about himself.

In (245), the two occurrences of himself are presupposed to be coreferential, but neither is the antecedent of the other. Similar counterexamples are given in Section 1.1.5.2, e.g., (153). (272) accounts for cases like the following:

- (273) John thinks that he is sick.

- (274) Johnson entered the room and the president spat  
            towards the spitoon.

- (275) A thief broke into my house and the bastard stole  
            my wok.

And (272) rules out coreferentiality in cases like:

- (276) A model from Boston met one from New York.

## Pronouns and Reference

In (276),  $NP_b$  is not definite. (272) will not apply in cases like the following where  $NP_a$  is not the antecedent of  $NP_b$ .

- (277) The emperor entered the room and Napoleon spat on  
 $NP_a$   $NP_b$   
the floor.

- (278) Napoleon hates the emperor.  
 $NP_a$   $NP_b$

- (279) A thief broke into my house and a thief stole  
 $NP_a$   $NP_b$   
my wok.

In (277) the possibility that  $NP_a$  is the antecedent of  $NP_b$  is ruled out by output condition (165). In (278), the possibility that  $NP_a$  might be the antecedent of  $NP_b$  is ruled out by output condition (166). The possibility of an antecedent relationship in (279) is ruled out by a condition on the definition of "antecedent" that we have not stated yet; namely, a full indefinite NP (nonpronoun) may not be anaphoric.

### 1.2.2.2.2.2 Equational sentences Compare (280) and (281).

- (280) A thief broke into my house and he stole my wok.  
↓

- (281) The thief who broke into my house was Max.

The principle of (272) applies in (280). A thief is the antecedent of he, and he is presupposed to be coreferential with a thief. In (281), on the other hand, there is no presupposition of coreferentiality; instead, the sentence is an assertion of coreferentiality. We will call such a sentence an "equational sentence". The basic fact about equational sentences is that they assert, but do not presuppose, coreferentiality between the subject and the predicate nominal. It is important to note that the fact that there is no presupposition of coreferentiality in (281) is consistent with the fact that the subject and the predicate nominal are not in an antecedent relationship. Thus, the thief who broke into my house cannot be the antecedent of Max, because of the antecedent hierarchy (cf. Section 1.1.5.2). And Max cannot be the antecedent of the thief who broke into my house because of an output condition that we have not stated yet, but that is independently needed to block cases like

- (282) \*The bastard hit Max.  
↓

- (283) \*The thief who broke into my house hit Max.  
↓

The difference between (280) and (281) may be summarized briefly as follows. Nonequational sentences like (280) may involve a presupposition of coreferentiality and, with it, the occurrence of an antecedent relationship between the two coreferential NPs. Equational sentences like (281) involve an assertion of coreferentiality, where the two coreferential NPs are not in an antecedent relationship.

The difference between equational and nonequational sentences is important because of cases like the following, which have been occasionally brought up as apparent counter-examples to Postal's version of the Crossover principle.

- (284) *The man who Sam thought Sue would marry was Sam himself.*

Compare (284) with (285).

- (285) \**The man who he thought Sue would marry was tall.*

In (284) *who* and *Sam* are not in an antecedent relationship, since (i) *Sam* cannot be the antecedent of *who*, since a pronoun cannot both precede and command its antecedent, and (ii) *who* cannot be the antecedent of *Sam* because of the antecedent hierarchy. Yet *who* and *Sam* are coreferential for the following reasons. *Who* and *Man* are presupposed to be coreferential, as is usual with relative clauses. The two occurrences of *Sam* are presupposed to be coreferential as is usual in the emphatic reflexive construction. The emphatic reflexive, *himself* in (284), is possible only with a repeated NP, as the ungrammaticality of (286) shows.

- (286) \**The man who Eddie thought Sue would marry was Sam himself.*

When *Eddie* replaces the leftmost *Sam* in (284) the sentence becomes ungrammatical. Thus, we have the following situation.

Presupposition (relative clause): man = who

Presupposition (emphatic reflexive): Sam = Sam (himself)

But now the main assertion of (284) is that *man* is coreferential with *Sam himself*.

Assertion: man = Sam (himself)

Hence,

Sam<sub>(on left)</sub> = Sam (himself) = man = who

The leftmost *Sam* in (284) is coreferential with *who*. Thus, if Crossover were defined in terms of coreferentiality, one would expect (284) to be ungrammatical, since *who* crosses over *Sam* just as *who* crosses over *he* in the derivation of (285). Thus, we have further evidence that the crossover principle cannot just be based on simple coreferentiality. What distinguishes (284) from the other cases we have considered is that it contains an assertion of coreferentiality, rather than a presupposition of coreferentiality that is involved in the notion of "antecedent". Thus it is no surprise that the Crossover principle should not apply in cases of asserted coreferentiality.

One might consider a revised version of Postal's Crossover principle, which would involve presupposed coreferentiality, rather than just any sort of coreferentiality. This would permit (284), while blocking (285), since in these cases it would be equivalent to a version of the Crossover principle based on the notion "antecedent". Of course, such a revised version would still fail for cases like (244) and (249), which require the notion "antecedent".

It should be noted that there is some difficulty with the notion of "presupposed coreferentiality". This notion, as it might be used in a revision of Postal's Crossover principle or as it appears in (272), is set up to account for cases of coreferentiality where there is no equational sentence in surface structure. The difficulty arises because there are cases of surface structure equational sentences which are presupposed to be true. Although such sentences, would, strictly speaking, involve the notion "presupposed coreferentiality", the antecedent relationship does not obtain and there is no coreferentiality. For example,

- (287) *Sheila regretted that the man who Sam thought Sue would marry was Sam himself.*

In (287) we have (284) embedded as the object of the verb *regret*. Since the object of the verb *regret* is always presupposed to be true, we have the case of a presupposed equational sentence. Here it is presupposed, not asserted, that *man* and *Sam himself* are coreferential. Since (287), like (284), is fully grammatical, the Crossover principle (and the notion "antecedent" in these cases) must involve more than simply presupposed coreferentiality. The appropriate notion seems to be something like "presupposed coreferentiality that is not given by a surface structure equational predicate". Horrible as this may seem, my guess is that it will be essentially correct when made precise in the appropriate fashion. I will leave the issue at this point and return in Section 4

to discuss the general problem in detail.

1.2.2.3 *The Elimination of Coreferentiality* In Section 1.1.5, it was assumed that the notion "coreferentiality" had to be mentioned in the statements of output conditions. For example, in (116), condition (a) reads "2 has the same reference as 4" and in (164) terms 2 and 4 are represented as " $NP_i$ " to indicate that they have the same referential index, i. Recall that principle (272) related the notions "coreferentiality", "antecedent", and "definiteness", by an if-then relationship. Given (272) it is possible for us to eliminate the notion "coreferentiality" altogether from output conditions, in favor of the notions "antecedent" and "definiteness". For example, in (116) we could replace condition (a) by condition (a'):

(116) a'. 2 is the antecedent of 4 and 4 is definite.

By principle (272), this will entail that 2 and 4 are coreferential. It should be noted that in (164), (165), and (166) the notion "antecedent" is needed anyway. One can eliminate coreferentiality from these conditions simply by indicating that the anaphoric NP must be definite.

It is important to note that although "coreferentiality" can be eliminated in favor of "antecedent", the converse is not true. The notion "antecedent" is needed in syntax whether or not the notion "coreferentiality" is used. This can be seen in output conditions (164)-(166) and in the case of the Crossover principle. This raises the question as to whether the notion "coreferentiality" can be totally eliminated from syntax in favor of "antecedent" and "definiteness".

We will see in Section 2 that (272) as presently formulated will not quite work in one case. But, as we will see in Section 4, (272) can be reformulated to avoid that pitfall. It is my opinion that some version of (272) can be formulated so that "coreferentiality" can be eliminated, at least from output conditions and perhaps from all syntactic rules. As it turns out, this must be done in the case of output conditions.

## 2. TYPES OF LINGUISTIC IDENTITY

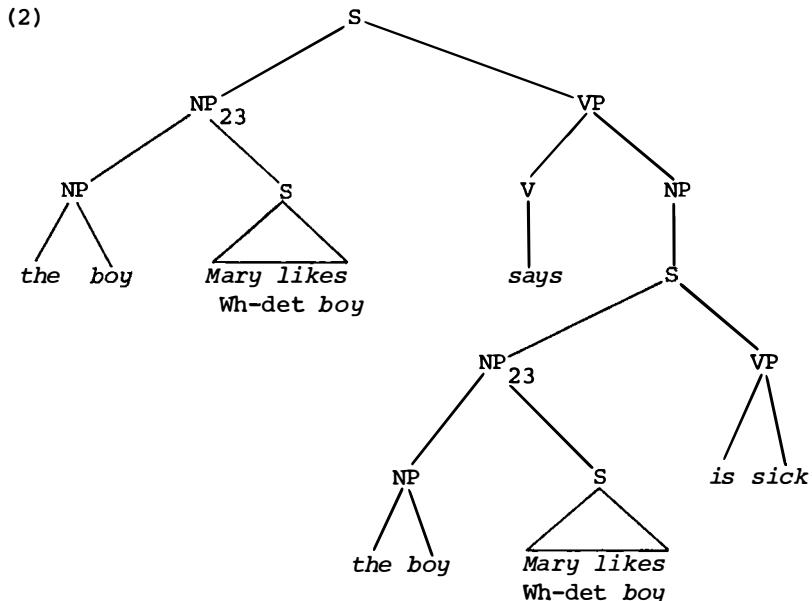
### 2.0 *Introduction*

In this section we will be concerned with several related questions concerning pronominalization and deletion operations in general. In the preceding section, we assumed that pronouns were derived by transformation from the full noun phrases to which they referred. This was assumed to be the case in most early work on transformational grammar. Langacker and Ross also

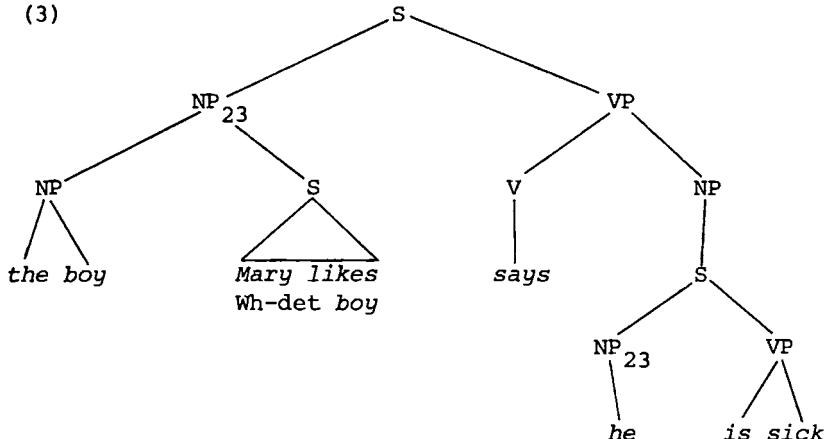
made the assumption that there existed a rule of pronominalization and discussed the question of where that rule might be ordered and whether it had to be ordered cyclically. In Section 1, we saw that all of the proposed arguments for the ordering of a pronominalization rule with respect to other transformational rules were faulty, and that there was no known evidence at all for the ordering of such a rule. Moreover, we saw that the constraints that were assumed to be part of the pronominalization rule could not be stated as part of any such rule. Either they had to be stated in output conditions or they had to involve other transformational rules. In short, we found that there was no syntactic evidence whatever that pointed to the existence of a rule of pronominalization. This might lead one to question the existence of such a rule, especially since there are alternative ways of handling pronominalization and since there is no a priori reason to choose one over the other. Let us consider three possible ways of handling pronominalization.

- (1) The boy who Mary liked says that he is sick.

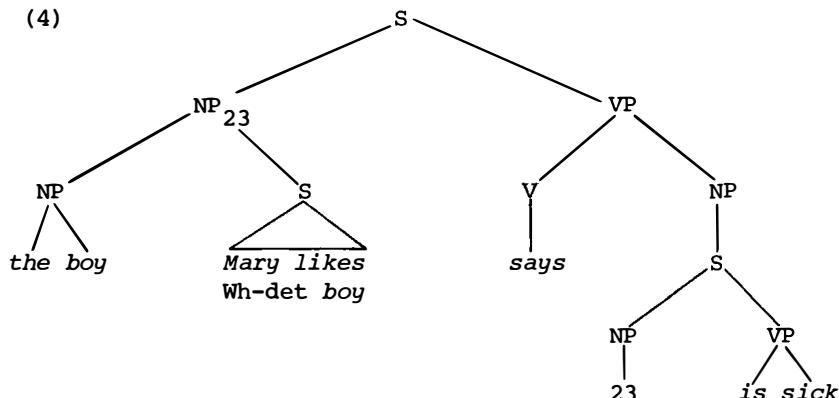
Assuming that deep structure determines semantic representation, we might choose any one of the following three methods of representing the deep structure of (1).



(3)



(4)



In (2), we assume that the pronoun *he* of (1) is derived from the full NP to which it refers. In order to indicate in deep structure that the two occurrences of *the boy who Mary likes* refer to the same individual, we will adopt Chomsky's suggestion of tagging the two NPs with the same referential indices, in this case, an arbitrarily chosen integer, e.g., 23. Two NPs with the same index would be assumed to be noncoreferential. Under this assumption, the only deep structure difference between (1) and (5) would reside in the referential indices.

- (5) *The boy who Mary likes says that the boy who Mary likes is sick.*

In the deep structure of (5), the second occurrence of *the boy who Mary likes* would have a different index than the first occurrence. Together with these assumptions about deep structure, we need to assume that there is some rule of pronominalization

that converts a repeated NP into the appropriate pronoun, leaving behind features indicating the gender, number, and person of the original NP.

We could just as well make the assumption that (3) is the deep structure of (1). Since *he* in (3) has the same referential index as *the boy who Mary likes*, the two NPs would be assumed to be coreferential and, as a result, (3) would have the same semantic reading as (2). The fact that pronouns have to agree with their antecedents in gender, number, and person could be stated in at least two ways, either as an output condition or a deep structure constraint: if any pronoun-antecedent pairs do not agree in these properties, the sentence would be blocked.

(4) is similar to (3) and differs from it only in that the gender, number, and person of the pronoun is not indicated in deep structure. Stripped of these properties, all that is left of the NP is the index. The gender, number, and person would be supplied by an agreement transformation, making the pronoun agree in these properties with its antecedent.

In the discussion that follows, the difference between (4) and (3) will not matter. We will group the two together as representing the no-full-NP hypothesis. (2) will exemplify the full-NP-hypothesis. There are a number of possible other variations on these hypotheses, but they are irrelevant to the discussion that follows. Similarly, we have been inexplicit with regard to many details of (2), (3), and (4). A full treatment would account for details such as those discussed in Postal (1966). I ignore them here since they are irrelevant to the discussion that follows.

In this section we will consider some evidence that supports the full-NP-hypothesis and some that supports the no-full-NP hypothesis. The full-NP hypothesis, if true, would require there to be a rule of pronominalization that in effect would delete a noun phrase if it is identical to its antecedent. As we shall see, the notion "identical to" is not an obvious one. Moreover, we shall see that there is no single notion of "identical to" that is used in transformational rules; instead there are a number of types of linguistic identity.

## 2.1 *The Bach-Peters Paradox*

### 2.1.1 Definite pronouns

Bach and Peters (see Bach, 1970) showed that the full-NP hypothesis led to a paradox in the case of definite pronouns. Consider (6).

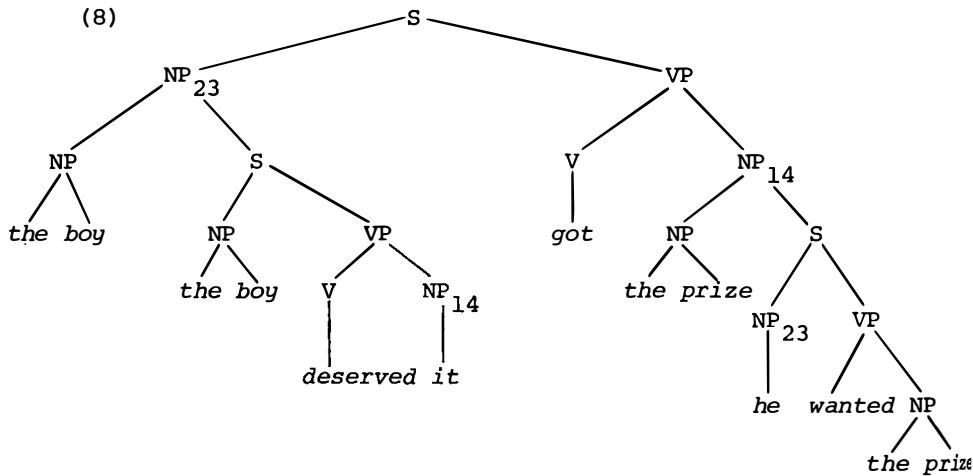
(6) *The boy who deserved it got the prize he wanted.*

If the pronouns in (6) are derived transformationally from the full NPs to which they refer, then (6) cannot have a finite deep structure. Thus, if one tries to construct a deep structure for (6) by replacing the pronouns with the full NPs, one would get (7).

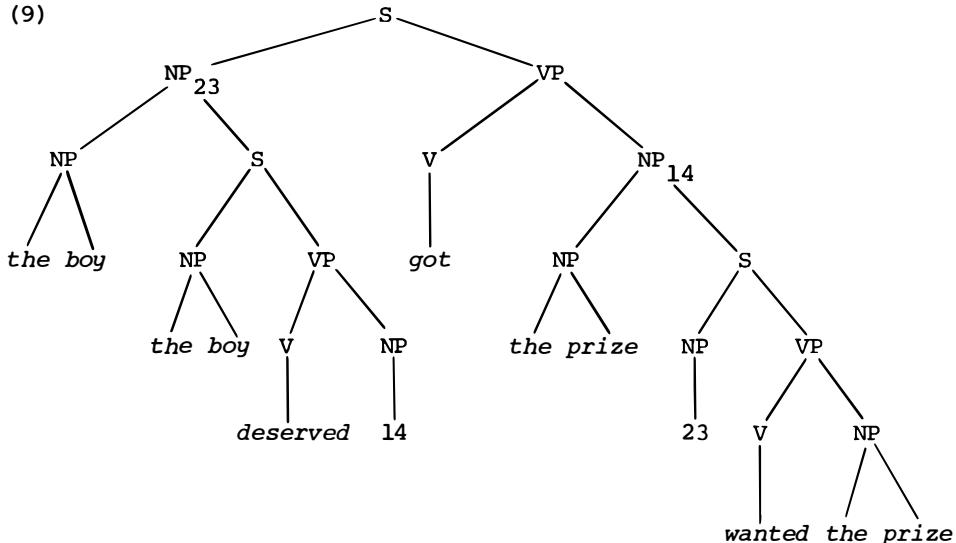
(7) *The boy who deserved the prize he wanted got the prize that the boy who deserved it wanted.*

Here the same underlined pronouns appear again. If we try once more to substitute the appropriate NPs for the pronouns, we get an even bigger sentence where the same two pronouns cannot be derived ad infinitum. The conclusion is that these pronouns cannot be derived by transformation from the NPs to which they refer. If meaning is to be determined at the level of deep structure, then there must be some way of indicating which pronouns refer to which NPs, e.g., by the use of reference indices. Thus, the deep structure of (6) might be represented as in (8) or (9), which resemble (3) and (4).

(8)



(9)



The Bach-Peters example shows that for definite pronouns, which are the most fundamental of anaphoric devices, the full-NP hypothesis leads to a paradox, which seems to be avoidable under the no-full-NP hypothesis. Since the no-full-NP hypothesis does not require a pronominalization rule that deletes one NP under identity with another, then it would seem that there is no one rule where constraints on pronominalization could be stated. Thus, the no-full-NP hypothesis gives further support to the claim in Section 1 that pronominalization constraints must be handled either by output conditions or transformational constraints such as the Crossover principle, which are not associated with any rule of pronominalization.

### 2.1.2 Propredicates

One might be tempted to conclude that since one anaphoric device, definite pronouns, cannot be derived by a deletion transformation, therefore no anaphoric devices can be derived in that way. That is, one might be tempted to assume that anaphoric devices must be derived in some uniform manner. However, it is not at all clear that this is true, since it can be shown that at least one type of anaphoric device must be transformationally derived. Consider the following.

(10) *If Max buys a car, Mildred will.*

- (11) *If Max does, Mildred will buy a car.*
- (12) *Mildred will buy a car, if Max does.*
- (13) \**Mildred will, if Max buys a car.*

In the above sentences, the absence of a VP following the auxiliaries *will* and *does* acts as an anaphoric device, referring to the VP *buy a car* in the other clause. The missing VP acts just like an anaphoric pronoun. And in (13) we see that it obeys basically the same constraint as anaphoric pronouns: The anaphoric expression cannot appear in a main clause when its antecedent appears in a following subordinate clause. This is essentially the same constraint as in (3)-(6) of Section 1: Pronominalization cannot go backward into main clauses. Clearly these are related phenomena, and (13) should be blocked by the same constraint that blocks (4) in Section 1. Thus, it would seem that this constraint should be stated by an output constraint that accounts for the operation of anaphoric devices in general.

It does not seem very surprising that different types of anaphoric devices are subject to the same surface constraints. This fact, however, becomes more interesting when one realizes that definite pronouns and omitted VPs have deep structures of an entirely different nature. The Bach-Peters case seems to show that definite pronouns cannot be derived from repetitions of the full NPs that they refer to. However, omitted VPs must be derived from the full VPs to which they refer. The omitted VP cannot just be represented by a blank or a reference index in deep structure. Although definite pronouns cannot be derived by a transformational rule, missing VPs must be.

The reason for this is fairly obvious. Missing VPs can refer to VPs that are derived by transformation, and are not present in deep structure. For example, consider the following:

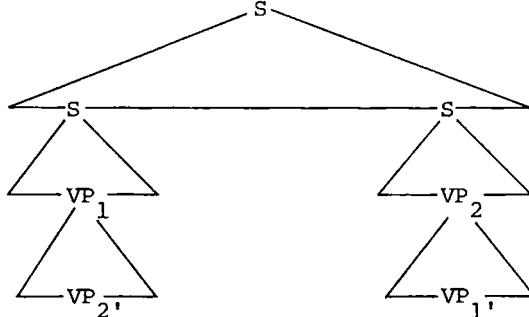
- (14) *If John is shot by Max, Harry will be.*
- (15) *If John is expected by Sam to be shot by Max, Harry will be.*
- (16) *If Shakespeare translates easily into Japanese, Marlowe will.*
- (17) *If John is likely to leave, Bill will be.*

## Pronouns and Reference

All of the underlined VPs in the preceding examples are transformationally derived; they do not occur as such in deep structure. Since they are not even constituents in deep structure, there is no way to refer to them on that level of analysis. Thus, there is no way of indicating in deep structure what the missing VP will refer to. So, a solution for missing VPs parallel to the no-full-NP solution for definite pronouns [see (8)-(9)] is not possible.

It is interesting to note, in this respect, that no sentences like the Bach-Peters case (6) are possible with omitted VPs in the role of the pronouns, that is, one cannot construct sentences of the form:

(18)



where  $VP_2$  is a missing VP referring to  $VP_1$  and  $VP_1'$  is a missing VP referring to  $VP_2$ . For example, in (19), the omitted VP after *will* cannot be *announce that someone had* if the omitted VP after *had* is to be *mention that Bill will*:

(19) *The boy who mentioned that Bill will Ø saw the girl who announced that someone had Ø.*

So far, we have given arguments for the following:

- (I) Some anaphoric devices (definite pronouns) must be introduced in deep structure, while others (missing VPs) cannot be.
- (II) Certain constraints apply to both of these anaphoric devices.

(II) suggests that there must be some general notion of "anaphoric device" in the theory of grammar. (I) shows that this notion cannot be defined exclusively on the level of deep structure or exclusively by the notion "pronominalization transformation". The theory of grammar at present has no way of defining the notion "anaphoric device".

ACKNOWLEDGEMENTS

My interest in pronominalization stems from research done by Paul Postal, John R. Ross, and Ronald Langacker. Postal and Ross have contributed immensely to the ideas presented in this work through their comments and criticisms, without which none of this would have been possible. Robin Lakoff, James D. McCawley, and David Perlmutter have provided invaluable assistance in providing examples and counterexamples. A considerable number of students and colleagues have provided assistance in discussing these matters with me, especially, Adrian Akmajian, Dwight Bolinger, Sylvain Bromberger, Guy Carden, Noam Chomsky, Keith Donnellan, John Haiman, Ray Jackendoff, Paul Kiparsky, Harold Koch, Susumu Kuno, Mark Liberman, Thomas Patton, Thomas Souers, and Joshua Waletzky.

NOTES

<sup>1</sup>In these examples, the underlined noun phrases are assumed to refer to the same individual. (4) is ungrammatical if *he* is understood as referring to *John*. It is, of course, grammatical if *he* is understood as referring to some other person not mentioned in the sentence. Thus, we are not discussing whether the sentence, taken in isolation, is grammatical or not. Instead, we are discussing whether the sentence with the interpretation imposed upon it by the underlining is grammatical.

<sup>2</sup>Some speakers will differ with my judgments as to the acceptability of these sentences and of many others that will be discussed below. This should not be surprising, since the constraints we are discussing are subject to dialectal and idiolectal variation. This variation will be discussed, though not in much detail, in Section 1.1.6.

<sup>3</sup>I find this sentence of marginal acceptability. Of the people I have questioned, some agree with my judgment, some find it fully acceptable, and some find it unacceptable. The notations ? and ?\* will be used to indicate such marginal sentences.

<sup>4</sup>Essentially the same observation was made independently by Akmajian and Jackendoff (1970).

<sup>5</sup> This hierarchy makes a claim with respect to possible dialect differences in the acceptability of these sentences. There are some people for whom (137), the "worst" case, is ungrammatical. That is, some people will consider as ungrammatical sentences that I consider as grammatical but perhaps somewhat awkward, like (137). But I know of no cases where someone will reject (139) as unacceptable while accepting (137). People will never reject what I call the "middle" cases while accepting the "worst" cases. To this extent, the hierarchy limits the range of possible dialectal and idiolectal variation in these cases.

<sup>6</sup> One might think that epithets can only be used anaphorically and can never appear as antecedents. However, as Robin Lakoff has pointed out, this is not so.

- (i) *Some bastard broke into my house and he drank up all the beer.*

As R. Lakoff notes, these cases are especially interesting, since in a sentence like

- (ii) *Some bastard drank up all my beer.*

the reason that I am calling that person a bastard is contained in the sentence, namely, because he drank up all my beer. This is not the case with definite epithets, as in (149). One might then conclude that only indefinite epithets can appear as antecedents and that definite epithets must be anaphoric. But, as (iii) shows, this is false.

- (iii) *The cops caught the bastard who drank up all my beer and they locked him up.*

<sup>7</sup> In (164), (165), and (166) the notation  $NP_i$  in the structural description is used to indicate that the two NPs are to be understood as having the same reference. No great significance should be attached to this choice of notation.

<sup>8</sup> Since I have not done an extensive serious study of these variations, the facts I present in this section can only be considered anecdotal. I think it is important that this subject matter be studied seriously, and I consider this section only as indicating a direction that such studies might take.



## CRYPTIC NOTE II AND WAGS III

---

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The two surviving notes of this series (see footnote 1 for the fate of the lost first note of the series and footnote 2 for the reason for the change in the title of the series) were written in late 1968 or early 1969. Their author attempted to circulate them by placing copies of them in my mailbox, in the belief that they would then automatically become part of an oral tradition. This attempt was successful in the case of Cryptic Note II [see McCawley (1973b) for one of many places where I repeat Morgan's arguments about again], though, appropriately enough for a paper about know and forget, I appear to have forgotten the contents of WAGS III, and indeed its very existence, within hours of reading it. While WAGS III has thus had no influence on linguistics (and its contents have not entered into linguistic folklore the way those of Cryptic Note II have), it is included here as one of the more interesting contributions to the controversy about lexical decomposition.

CRYPTIC NOTE II:<sup>1</sup> Again, and then again...

Again, like almost (see footnotes to McCawley, 1968c), seems to be a test for, and evidence of, predicates internal to lexical items. The meaning of again seems to be very roughly:

?

again(S) = (and) I(assert, or more likely, presuppose)  
that S occurred/was true before.

That *again* may be predicated of predicates internal to the word is apparent from sentences like the following:

*John came home at 3 and left again at 5.*

*When Harry finished his first sentence,  
another judge jailed him again.*

Notice that these sentences are ambiguous in respect to *again*. The first can mean either that John left for a second time or merely that John came to be away again, with *again* predicated only of *be away/gone/...*. Similarly, the second can mean either that another judge jailed Harry for a second time, having jailed him once before, or that another judge has caused it to be the case that Harry is in jail again. But this ambiguity can be resolved by context. For example,

*The old man, who had died a peaceful death,  
came back to life 300 years later as a  
vampire, but somebody killed him again.*

*The workers managed to open a hole through  
the rock, but a cave-in closed it again.*

CAVEAT: The *again* test seems wholesome at this point, but more futzing about with it needs to be done before it can be considered entirely trustworthy.

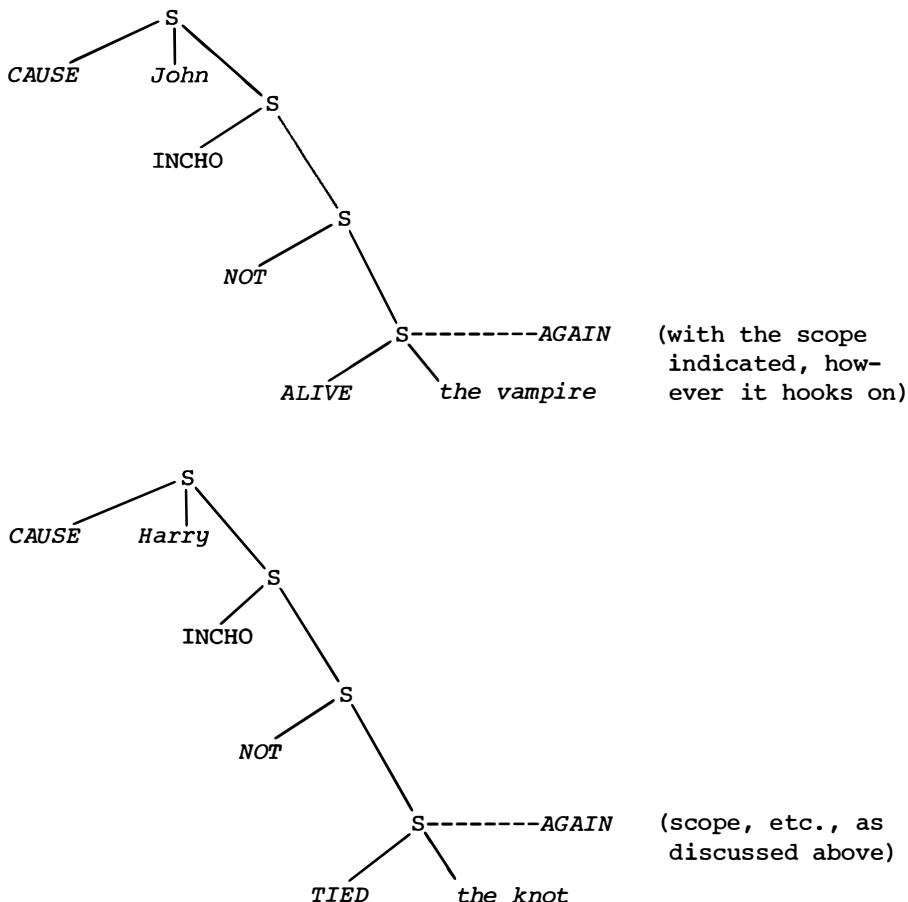
N.B. The raising of *again*, like *almost*, cannot take place over a *not*, probably not over a quantifier at all; cf. *John almost killed Harry*, which does not have the reading *John caused Harry to become not almost alive*. Thus,

*John killed the vampire again.*

*Harry untied the knot again.*

cannot come from, respectively,

Cryptic Note II and WAGS III



OTHER MESSIES: There are some discrepancies in relation to lexical items with covarying indices (cf. *All those men committed patricide/suicide/...*). For example,

*The old man, who had died a peaceful death, came back to life 300 years later as a lexicalist, but*

- {     *somebody killed him again*  
       *he killed himself again*  
       *\*he committed suicide again*  
       *\*his children committed patricide again*  
       *\*his only brother committed fratricide again*

J. L. Morgan

These probably can be solved by a close look at the indices in deep structure, but I haven't done it yet. Note also the following, whose solution is not obvious:

*When Mary broke her doll the first time, her father*  
    { *put it together again.*  
    { *\*fixed it again.*

NOTES

<sup>1</sup>"Cryptic Note I" contained the ultimate solution to the problems of pronominalization, reference, and identity, as well as an item of overwhelming and irrefutable empirical evidence against the lexicalist position. Unfortunately, it was handwritten on a package of Purina Hog Chow, and was eaten by a hungry Chicago policeman who tore it from me during a tear-gas attack on three jaywalkers, thereby being lost to mankind.

## Cryptic Note II and WAGS III

### WAGS III<sup>2</sup>

Consider the meaning of *know*. What does it mean to *know* something, not in terms of possibilities of occurrence of *know* in English, but on a more nearly philosophical or psychological level? In other words, what is it that I am doing or being when I know something? I would like to claim that whatever it is, it includes at least the following:

When I *know* x,

- (a) INFO--I have stored in my mind information somehow pertinent to x [N.B.: this is true, I would claim, but insufficient. A characterization of the status (place?) of the information and my attitude toward it must be included to account for the difference between *believe/think/suppose/guess/...* and *know*; in other words, something to characterize presupposition]. But having information pertinent to x stored in my mind is not a sufficient condition for *knowing*. It must also be the case that
- (b) ACCESS--I can access (in the IBM sense of the word) the pertinent information.

I emphasize that I am not merely engaging in the habit so dear to humanists of using sloppy metaphors to speculate about things one knows nothing about in order to avoid the commitment of making substantive claims. Rather, I am claiming that what is represented in (a) and (b) is really crucially involved in knowing, and that the only sloppy areas are in the precision with which the two factors are stated and possible errors in detail. I am making substantive claims. Moreover, I am about to claim that (a) and (b) are crucial factors (that is not to say the only factors, or even the only crucial factors) in the semantic representation of the English word *know*.

Consider the possibility that *know* can't be analyzed into INFO + ACCESS; i.e., that for a given x, at all times you either know x or you don't. This is untenable, since the following dialogue seems a quite felicitous use of *know*:

- A. Do you know what  $365 + 9,867,540$  is?
- B. Sure. Just a second while I add it up.

As further evidence that accessibility is crucially involved in *know*, consider utterances like:

*What is your name? I know what it is, don't tell me, I know it, I know it ... no, I've forgotten it after all.*

In this utterance, the speaker is saying, "I have the information and can access it, I can access it... no, the information is there, but I can't access it after all".

Now, what are the syntactosemantic correlates of this representation of *know*? De Rijk, in his beautiful paper on predicate raising (de Rijk, 1974), shows that the semantic representation of *forget* appears to be identical to *cease to know*, as evidenced by a wide range of syntactic properties that *know* and *forget* have in common:<sup>3</sup>

1. The selectional restrictions of *forget* are exactly those of *know*:

a. animate subjects, and the same semantic/pragmatic anomalies within the realm of animate subjects:<sup>4</sup>

- (1) *My brother/\*table knows where I am.*
- (2) *My brother/\*table has forgotten where I am.*
- (3) *The chicken/\*My brother knows how to lay an egg.*
- (4) *The chicken/\*My brother has forgotten how to lay an egg.*
- (5) *The chicken/\*My brother has ceased to know how to lay an egg.*

b. Both *forget* and *know* take as objects that-clauses, WH-clauses, and simple NPs--when simple NPs, they are, in the same manner for both *know* and *forget*, sometimes derived from WH-clauses; i.e., (6) is to (7) exactly as (8) is to (9):

- (6) *I know your name.*
- (7) *I know what your name is.*
- (8) *I have forgotten your name.*
- (9) *I have forgotten what your name is.*

2. Both admit the same range of possible interpretations with a simple NP object (see de Rijk's paper for details).

## Cryptic Note II and WAGS III

### 3. Factivity of complement:

- (10) \*Ed knows Pasternak wrote "Doctor Zhivago",  
but crazy Charley {doesn't know/has  
forgotten} that Shakespeare wrote it.

(11) \*I have forgotten that today is my birthday.

(11a) \*I  $\left\{ \begin{array}{l} \text{don't know} \\ \text{have ceased to know} \\ \text{don't know any more} \end{array} \right\}$  that today is my  
birthday.

(12) I  $\left\{ \begin{array}{l} \text{have forgotten} \\ \text{don't know} \\ \text{have ceased to know} \\ \text{don't know any more} \end{array} \right\}$  whether today is my  
birthday.

(13) \*Bill knows that he  $\left\{ \begin{array}{l} \text{has forgotten} \\ \text{doesn't know} \\ \text{has ceased to know} \\ \text{doesn't know any more} \end{array} \right\}$   
that today is his birthday.

and so on. This leads him naturally to the tentative hypothesis that *forget* is actually derived from

(BECOME (NOT (KNOW) ) )

(which also underlies *cease to know*) in a straightforward manner by the independently motivated rule of predicate raising, as set forth by McCawley. This is natural, plausible, and seemingly well motivated, since *cease to know* is in fact a paraphrase of *forget*; cf.

- (14) *Grace has ceased to know how to make won ton soup, but she still knows how to play the piano.*

(15) *Grace has forgotten how to make won ton soup, but she still knows how to play the piano.*

However, as de Rijk points out, there is a fly in the won ton soup. There are cases where *forget* is not a paraphrase of *cease to know* (pp. 66,67):

Suppose my friends have all gone off to Australia; then I can say (67a), but not (67b)

- (67a) *I have ceased to know where to look for help.*  
(67b) *I have forgotten where to look for help.*

[Similarly] If my son is not very constant in his appreciation of movie stars, we can appreciate the difference between:

- (72a) *I have ceased to know who my son's favorite movie star is.*

and

- (72b) *I have forgotten who my son's favorite movie star is.*

Faced with this baffling difference in meaning between *forget* and *cease to know*, de Rijk states (p. 70):

Our observation about the difference between '*cease to know*' and '*forget*' can now be stated as follows: '*forget*'-sentences contain additional information over and above that furnished by the corresponding '*cease to know*'-sentences, in that the lexical item '*forget*' has built into it a constancy of reference to a past state which may or may not continue into the present. That is, if an object of knowledge is subject to change in time, the use of '*forget*' requires that the previous knowledge and the present lack of it, are both about the same temporal slice of the object. The syntactic construction '*cease to know*' has no such property, and is therefore appropriate to describe some situations where '*forget*'-sentences cannot be used.

I would like to suggest that this difference in readings is accounted for correctly by the semantic representation I proposed for *forget*, in the following way:

*cease to know* is structurally ambiguous; *cease* can have in its scope INFO (meaning either "I no longer have information pertinent to x" or "the information I have is no longer pertinent to x", or perhaps both of these are possible, adding another ambiguity) or ACCESS, or both. In (67a) and (72a) the scope of *cease* is INFO, and, either formally or by implication (you can't access information you don't have), ACCESS. But it is logically possible, if both these factors are internal to *know*, for the scope of *cease* to be only ACCESS. And as a matter of fact, I propose that just this reading is involved in the semantic representation of *forget*--namely, something roughly paraphraseable as "I previously had in my mind information pertinent to x and had access to that information, but I no longer can access it".

In terms of a sloppy metaphor, I've lost the location of a file. Note that this phenomenon is the same "ambiguity of scope" found elsewhere in the structural representation of meaning and syntax.

An interesting question is whether the speaker, in using

## Cryptic Note II and WAGS III

*forget*, means that he no longer has the information at all. It seems to me that he probably does not mean this--rather, he means only that he "can't find it"--but this point is not entirely clear. Possible tests for this may be found in investigating questions like: If speech skills are centered in a certain area of the brain, and if a person loses that part of his brain, say through being shot in the head, can one properly say that that person has *forgotten* how to speak? Probably not, but this area is a bit fuzzy, and there are quite possibly dialectal (read: idiolectal) variations.

### *Conclusion*

If my analysis of *know* and *forget* is correct, then de Rijk's paper, which seemed to present serious counter-evidence to generative semantics, actually provides evidence that the constructs of the theory must be a good deal more abstract than previously supposed. I also note with hesitant (but hopeful) satisfaction that the abstract terms of the theory seem close to those of a theory of mental behavior. And I cannot resist pointing out that if my analysis is correct, then people have known for a long time what psychologists have only recently discovered, namely, that just because you have forgotten something, it isn't necessarily no longer in your head. Perhaps if psychologists wish to study how the human mind works, they should consider asking the experts.

### NOTES

<sup>2</sup> The title of this semiperiodical is herewith changed from "Cryptic Notes" to "WAGS" (Wild-Ass Guesses), in accordance with the contents of the present number.

<sup>3</sup> He does not consider certain senses of *forget*, as in *I forgot my wallet*. I have likewise ignored them.

<sup>4</sup> I use \* somewhat inconsistently to mark both ungrammaticality and logical and pragmatic anomaly. De Rijk's employment of shrieks (!, !!) is probably a better device.



## SYNTACTIC ORIENTATION AS A SEMANTIC PROPERTY

---

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*This paper was written in 1968-1969 while the author was a visiting faculty member at Harvard University. It appeared in Report NSF-24 of the Aiken Computation Laboratory, Harvard University, and was supported by grant GS-1934 from the National Science Foundation to Harvard University.*

*The notion of "orientation" that Dixon discusses can be seen lurking in Vendler's (1957) discussion of aspect: An "activity" terminates at the whim of the agent (i.e., it has "subject orientation"), whereas an "achievement" terminates in the culmination of an activity (i.e., it has "object orientation", though I find Dixon's use of the word "object" in this term a bit misleading). Vendler's paper and Dixon's each shed much light on the subject matter of the other. Dixon's discussion of John finished the book overlaps to a large extent with Newmeyer (1970), although Dixon and Newmeyer arrived at their conclusions quite independently and roughly simultaneously.*

What I take for granted throughout this paper is that a language contains a set of basic norms--semantic, syntactic, morphological, and maybe even phonological norms--from which it deviates in different ways and to different degrees a great deal of the time. Take a very simple example, the word *head*. Ask anyone what this means/refers to and they will talk about

a human or animal head. This is the "central" or "norm" meaning. Other meanings--the head of a cabbage, or a procession, of a company or a country or a university department--are extensions of meaning, from and with respect to the norm meaning. Similarly, items have norm patterns of syntactic behavior. They can have extensional syntactic function, differing in some way from the norm pattern, by analogy with the syntactic pattern of some other item, and so on. Sentences conforming to a norm pattern are accepted as grammatical by all speakers. There are other sentences whose grammaticality linguists argue about, each side trying to persuade the opposition that this definitely is grammatical or definitely is not, as if there could or should be any hard and fast division. What is to be explained is the fact that people do differ in their judgments of grammaticality of certain sentences; these are the nonnorm sentences, the extensions from the norm. Whether a particular extension is acceptable is a complex matter, depending on whether ambiguity or confusion would be likely to result, the structure of some part of the real world, interference from phonologically similar surfaces structures, the strength of the analogy on which the extension is based; and so on. Depending on the interrelation of these and other factors, different speakers draw the threshold of acceptability in different places in each particular case.

Some discussion of the norm-and-extension approach to word meaning is in Dixon (1971), and of its application to the syntacticomorphological phenomenon of noun classes in Dixon (1968). Burling (1965) applies the method to kinship terminology. This paper does not give detailed syntactic exemplification; it merely works within this theoretical framework, taking it for granted. Some incidental exemplification will, however, be found in Section 4.

The rather different meanings of *cease* and *finish* in English are demonstrated by the following sentences:

- (1) *John has ceased shelling the peas.*
- (2) *John has finished shelling the peas.*
- (3) *John has ceased reading the book.*
- (4) *John has finished reading the book.*

(2) implies that there are no more peas to be shelled, (1) that there probably are some peas unshelled but that John has decided he's had enough, at least for the time being. Similarly for (3) and (4). One way of describing this is to say that the sense of *cease* and the sense of *finish*

represented in these examples have the same basic semantic content but differ in their syntactic orientation. *Finish* involves "object orientation", that the discontinuation of the action is due to some property of the referent of the object (here, that it is all used up); *cease* involves "subject orientation", the discontinuation being due to the referent of the subject NP of the sentence.

Recognizing syntactic orientation as a part of the semantic representation of a lexical item is necessary not only for certain pairs of verbs in English, it is also needed for the semantic description of the class of adverbals in Dyirbal, a North Queensland language. It is probable that it will be necessary to deal with syntactic orientation in the semantic descriptions of many (or all) other languages. We next discuss Dyirbal adverbals, turning after that to the two quite different-- but probably related in some very deep manner--devices by which English parallels the Dyirbal constructions: first, pairs such as *cease/finish* and *start/begin*; and second, what we will call the "topic-manner" construction.

1. Besides closed, entirely grammatical, word classes such as pronoun and particle, Dyirbal has five open word classes-- noun, adjective, verb, adverbal, and time modifier. Of these adverbal is the smallest class (although it is still "open" in that it can be added to, in the same way that noun and verb can be and that pronoun and particle cannot be), there being only around two dozen adverbals in the writer's corpus of about three thousand dictionary items.

Any VP in Dyirbal can contain any number of verbs, provided they agree in surface transitivity and in (tense or other) inflectional ending, and provided they have simultaneous reference. Thus *wayn<sup>y</sup>d<sup>y</sup>in* is 'go up', *warin<sup>y</sup>u* is fly, and *wayn<sup>y</sup>d<sup>y</sup>in warin<sup>y</sup>u* or *warin<sup>y</sup>u wayn<sup>y</sup>d<sup>y</sup>in* (the order is free) is 'fly up'. Note that there are no overt markers of coordination anywhere in the grammar of Dyirbal. An adverbal, which has exactly the same morphological possibilities as a verb, can occur in a VP with any verb and serves to modify the meaning of the verb.

Most of the adverbals fall into pairs, where the members of each pair have a common basic semantic content but differ in syntactic orientation. For instance,

(a) Basic content 'do badly' occurs in the two transitive verbs *daran*, involving object orientation, and *ganbin*, involving subject orientation. *daran* implies that the event was unsatisfactory because of some property of the object,

*ganbin* that the unsatisfactoriness is due to the subject. For example, with *d<sup>y</sup>anganYu* eat, we get *daran d<sup>y</sup>anganYu* 'eat something that is, say, stale' as against *ganbin d<sup>y</sup>anganYu* 'eat sloppily'.

(b) Basic content 'discontinue' occurs in the transitive verb *d<sup>y</sup>aybin*, involving object orientation, and the intransitive *wudanYu*, with subject orientation. *d<sup>y</sup>aybin* indicates that an action is finished, since there are no more objects on which it could be performed (for example, finish spearing because there is nothing left to spear); *wudanYu* indicates that the subject finishes of his own accord and could have continued had he wished to (for example, stop washing, or stop singing, or the rain stops). Semantically, this pair appears exactly parallel to *finish/cease* in English.

There are other pairs; e.g., 'do slowly' either (i) with object orientation (because of the nature of the object, for example, a heavy load takes a long time to carry), or (ii) with subject orientation (the action being performed slowly at the whim of the subject); and also 'do quickly', 'do well', 'do first/start to do' (a rather complex concept that appears to be quite natural and unitary to speakers of Dyirbal but is difficult to render into English; a detailed discussion would be out of place here) and 'do something that shouldn't be done'.

In English we have nothing beyond our own intuition to tell us that *cease* and *finish* are closely related semantically. However, there is in Dyirbal a special "mother-in law" style of speech that provides support for many semantic decisions concerning verbs, nouns, and adjectives, as well as adverbials. Briefly, the "mother-in-law" style is obligatorily used in the presence of certain taboo relatives; the unmarked "everyday" style is obligatorily used in all other circumstances. The two styles have identical phonology and grammar but entirely different vocabularies; there are fewer words in mother-in-law, there existing a many-to-one relation between everyday and mother-in-law vocabularies. Thus, mother-in-law often has only a generic term, where the everyday style has only specific terms. Full mother-in-law data is not available for adverbials, but where it is available, it seems that mother-in-law has a single word corresponding to each adverbial pair in the everyday style. That is, mother-in-law does not have different items corresponding to different syntactic orientations, as does the everyday style, but merely has one item for each basic semantic content. Thus, in everyday

style we have both *nayn'yan* 'do first/start to do' with subject orientation, and *nunbiran* 'do first/start to do' with object orientation. For instance, with *nudin* 'cut' *nayn'yan nudin* is 'be first to start cutting trees down', whereas *nunbiran nudin* is 'make a small cut in a tree [to see whether the wood is hard or soft, say]'. Both *nayn'yan* and *nunbiran* are translated into mother-in-law by the same item, *nunin*. Thus, the mother-in-law correspondences for Dyirbal adverbals provide support for our grouping them into semantic pairs differing only in syntactic orientation. (For a fuller account of mother-in-law, and detailed data on verb correspondences, see Dixon, 1971.)

2. The types of semantic modification of verbs, interpreted with respect to either subject or object of the verb, that are achieved in Dyirbal by the single syntactic device of adverbial addition, are achieved in a number of different ways in English. Taking these in turn, we first have semantic pairs as in Dyirbal: the ideas 'commence' and 'discontinue' must be specified together with either subject or object orientation. The pair *cease/finish* was discussed above. Notice that *stop* appears to be synonymous with *cease* (and *stop* is a much commoner, and thus in some contexts more natural, word). However, *stop* has a more limited syntactic paradigm than *cease*, because of interference from the paradigm of the homonymous item indicating cessation of motion, as in *I stopped the night at Buffalo*. Thus, we can have *He ceased reading*, *He ceased to read*, and *He stopped reading* but not in this sense *\*He stopped to read*. The last sentence is already preempted by the paradigm of the other verb *stop*: *He stopped [at the library] [in order] to read*. Since it has a full paradigm, we use the less common *cease* in this paper.

It appears that the semantic difference between *begin* and *start* is exactly parallel to that between *finish* and *cease* (or *stop*). The underlying distinction is in many contexts neutralized, *begin* and *start* being used interchangeably rather more freely than *finish* and *cease*. However, their different syntactic orientations but identical basic semantic content can be seen from the sentences,

- (5) *I'm going to settle down tonight and start reading Chomsky's new book again.*
- (6) *I'm going to settle down tonight and being reading Chomsky's new book again.*

(6) implies that I shall commence tonight at page 1 again; in the case of (5), however, it is implied that I shall commence at page 187, or wherever I left off last week. *Begin*, like *finish*, involves object orientation--the commencement is with respect to the book; *start*, like *cease* and *stop* involves subject orientation--the commencement is with respect to the reader, not the book. Further support for this is given by the fact that *start at the beginning* is far more natural than *begin at the start*.

The pairing of *start* with *stop* and *begin* with *finish* is shown by sentences like:

- (7) *I don't like his driving, it's all starting and stopping.*

which has an entirely different meaning from

- (8) *I don't like his driving, it's all beginning and finishing.*

In one particular context there is an institutionalized pairing of *start* with *finish*: for races, such as horse races, motor races, and running events. The most likely explanation of this is that the commencement is at the volition of the official with the gun, which the riders obey; that is, the commencement is with respect to the subject; the finish, however, is when the race is completed; that is, it is with respect to the object, the race. Whether or not the reader accepts this or any other putative "explanation" is immaterial. The important thing is just to recognize that in this single specialized context there is an institutionalized pairing of *start* with *finish* that constitutes an exception to the normal pairings according to the underlying semantic structure of English.

3. Sentences like *He began reading the book, He finished reading the book* are normally assigned a deep structure containing two S nodes, with *begin* or *finish* in the higher sentence and *read* in the lower one. But in this case, the two sentences must have identical subjects, and we must have something of the nature of a "deep constraint" specifying this. Now in many languages modifying concepts like 'begin', 'finish', as well as 'try' and others may be realized by verbal affixes instead of or in addition to realization as separate words. In these cases, there is motivation for regarding the modifier as a part of the same deep VP as the main verb. Dyirbal, for instance, has one verbal affix 'do first/start to do' in addition to the adverbials mentioned; in Dyirbal, there are syntactic arguments

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for the single deep VP treatment. In view of this, it is natural to suggest that in English, adverbial verbs such as *cease*, *finish*, *begin*, *start*, *try*, and also *continue* should be regarded as modifiers within a VP in deep structure (having a status something like that of modals). Now, the rules that produce surface from deep structures will for sentences involving these verbs supply an extra S node, and so on. This is meant only as a suggestion and while its advantages are obvious--elimination of the deep constraint, and of equi-NP deletion here, similarity of treatment with that demanded by the grammars of other languages--more syntactic arguments would have to be given and syntactic details worked out before it could seriously be put forward. It is not crucial for the arguments of this paper. That this approach has not to my knowledge been suggested before may be due to a gratuitous assumption that appears to underlie recent work, namely, that a deep structure must have at least the S nodes of the corresponding surface structure. This can be traced to the fact that work on deep structure as it were grew out of work on surface structure and has always had more of an eye on surface patterns than on underlying (and often universal) semantic patterns.

The unmarked surface structure construction involving *begin*, *try*, and so on is with the main verb in -ing form; all but one of the verbs can also occur with to constructions. The semantic difference between -ing and to constructions is an important but elusive one; the best discussion to date is in Bolinger (1968), where the contrast between -ing and to is said to involve "reification" versus "hypothesis or potentiality". It might be possible to explain in these terms the fact that all the verbs of the *begin*, *try* set with the exception of *finish* occur in a to construction. Thus, we have *He ceased shelling the peas*, *He ceased to shell the peas*, *He finished shelling the peas* but not \**He finished to shell the peas*.

4. I am regarding the -ing construction as the unmarked form for a sentence involving *begin*, *finish*, *try*, etc. Partly because all these verbs occur in -ing constructions and only some in to constructions; partly because -ing seems intuitively more basic and seems intuitively the basis for NP-complement sentences discussed in the next paragraph. The to constructions are thus regarded as syntactic derivations from -ing forms, provided certain semantic conditions are satisfied (they are evidently not for *finish*).

Now we have

(16) *He began the book.*

(16) patently does not mean that he began doing to the book everything that one can do to a book. In each specific occurrence it will have a specific semantic interpretation - he began reading, or writing, or binding the book. This suggests that (16) is actually derived from sentence (17), (18), or (19).

(17) *He began reading the book.*

(18) *He began writing the book.*

(19) *He began binding the book.*

There is some rule specifying that a main verb in *ing* form can optionally be deleted following a verb of the *begin, try* set. Evidence for the main verb being present in underlying structure is not hard to find. For instance,

(20) *Tom finished my thesis today and he'll begin Fred's tomorrow.*

Each of the coordinated sentences in (20) is at least three ways ambiguous: Tom could be reading, writing, binding, etc. either thesis. But (20) itself is three ways and not nine ways ambiguous--whatever Tom did to my thesis, he'll do the same to Fred's.

There is a whole area of semantics around here, of the utmost importance, that does not fall within the scope of this paper but which might usefully be alluded to. Consider the sentence

(21) *John has finished the peas.*

This is at least three ways ambiguous, as the deleted verb is *shelling, cooking, or eating*. Similarly, in

(22) *Mary has finished the potatoes.*

the deleted verb could be *scraping, peeling, cooking, eating, or whatever*. However, the sentence

(23) *John has finished the peas and Mary (has finished) the potatoes.*

demands a similar deleted verb in each of its coordinate parts. Thus, John and Mary could be understood both to have finished eating, both to have finished cooking, or John to have finished shelling the peas and Mary to have finished scraping or peeling the potatoes. (23) could not imply that John has finished shelling the peas and Mary eating the potatoes. For eating or cooking, we can say that the same underlying verb is deleted in each case. But for the third possibility, different verbs must be involved.

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In each case, the preparation of the food is the issue; different verbs are used for the different types of preparation of the two vegetables. Furthermore, either *scraping* or *peeling*, which are, as it were, in complementary distribution for potatoes (which method is followed depends mainly on the age of the potatoes) corresponds to *shelling*. It is thus clear that we do not require identity of verbs, rather identity of semantic type.<sup>1</sup> The sanest conclusion to draw from these examples is that for (16) and (21), (22), we should not hypothesize an underlying verb, but rather an underlying partial semantic specification at the "main verb" node.

Returning, for present convenience, to the hypothesis that an underlying verb is deleted to derive (16), we can see that there are constraints on this deletion.<sup>2</sup> First, verbs *begin*, *start*, *continue*, *cease*, *finish* (but not *try*) can essentially only modify "durative verbs", that is, only actions that are noninstantaneous can have beginnings and endings. In fact, the verbs can modify nondurative verbs, but the resulting sentences are more awkward than durative sentences, showing that here there is an extension of syntactic usage from the "norm pattern". Thus,

- (24) *John (finally) finished buying the book.*

may only be fully comprehensible if we explain that there was a lot of bargaining involved and that it was extraordinarily protracted. *Finish* does not naturally modify *buy*, as it does naturally modify durative verbs such as *read*, *shell*. And an indication of the lack of naturalness of (24) is the fact that, unlike in the case of (17-19), *buying* cannot be deleted from (24). That is, main verb deletion is only applicable for durative verbs.

There are many other constraints. For instance, probably only verbs of a certain action set can be deleted. Verbs of other sets, such as *plan*, *decide*, *know*, *watch*, *hear* cannot be deleted. Thus, from *The generals finished planning the war* we cannot get *The generals finished the war*, and from *I began hearing the cuckoo in late March* we cannot get *I began the cuckoo in late March*.

Our suggestion thus far is that there is a certain set of verbs, *begin*, *continue*, and so on, that can in deep structure modify any verb, whether transitive or intransitive, of a certain semantic type. *Begin* and so on are not themselves marked for transitivity; thus, we avoid having to say, with P. Rosenbaum (1967), that they are intransitive verbs taking verb phrase complements. And we avoid Perlmutter's (1970) suggestion that there are two verbs *begin*, one transitive

and one intransitive.

Perlmutter's paper is interesting and provides important examples. All appear to be handlable within the framework of the suggestion here. For instance, sentences like *The doling out of emergency rations began* are derived from constructions like *They* (or unspecified plural subject) *began doling out emergency rations*. Note that the syntactic derivation only works if the subject is plural; thus, *Tom began grading papers* does not yield *The grading of papers began*, but *They began grading papers* does yield this.

There is a type of nominalization derivation that forms from *They* (or unspecified plural subject) *began fighting*, the sentence *A fight began*. This differs from the example of the previous paragraph in that the language does contain a noun *fight*, derived from the verb *fight*, and this appears in the subject NP of the derived sentence. Now Perlmutter points out that we can also have *A commotion began*. We could say, following recent work by Postal and others, that we have here to postulate an underlying verb *commote*, which is obligatorily nominalized. Thus, from the underlying \**They began commotting* is derived *A commotion began*. This is obviously the right kind of explanation. However, this particular formulation does not seem ideal. Rather we can make use of the norm-and-analogic-extension idea and say

1. *Fight* is basically a verb, which can occur with *begin*, as in *They began fighting*.
2. This sentence can yield *A fight began* featuring the derived noun *fight*.
3. *Commotion* is a simple noun, not a derived one like *fight*. However, *fight* and *commotion* are near-synonymous nouns, that is, they have a large common semantic factor.
4. Nouns that are similar semantically tend to have the same syntactic possibilities. *Fight* can occur in *A ----- began* because of its derivational history. The construction is extended to apply to *commotion* also, because of its great semantic similarity to *fight*.

I maintain that this type of argument has to be used at very many places in the grammar of any language. And this kind of explanation is preferable to postulating an underlying verb that never exists as a verb and a sentence such as \**They began commotting* that must obligatorily be changed into some other construction. However, the alternatives are largely equivalent, and the issue is quite irrelevant to the present

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discussion.

Other examples that might appear to give difficulty are expressions like *The thunderstorm began*. An explanation can be given for these; it is not too usual and needs more justification than would be appropriate here. Briefly stated, just because each surface structure sentence must have a main verb seems to me no reason for insisting that each deep structure sentence have some specified main verb. Rather, the assumption that deep structure sentences must have full main verbs seems a gratuitous carryover from surface structure. For instance, I suggest that *rain* is primarily a noun, as in sentences like *Rain is falling*. However, we can have a deep structure with the subject NP specified as *rain* and with the main V node unspecified; the semantic interpretation of this is that any verb that can normally occur with *rain*,<sup>3</sup> according to selectional/semantic/extrasemantic considerations, is "understood". Now each surface structure must have a surface verb, and so from deep *Rain is -----ing* is derived *It is raining*. *Rain* fills the surface verb slot, and *it* is brought in as a dummy surface subject. Now the deep structure can involve an adverbial like *begin* modifying the understood V node. Thus deep *Rain begin is -----ing*. The surface structure form of this is *The rain is beginning* or *It is beginning raining*. Or, in past tense, *The rain began* or *It began raining*. The first alternative is the most acceptable; here, *begin* fills the main V slot in surface structure and there is no need for *rain* to move out of the subject NP. The second alternative involves unnecessary *rain* movement, by analogy with *It is raining*. Note that for the derived to construction we must have *rain* movement. That is, *The rain began* is parallel to *He began reading the book*, and *It began to rain* is parallel to *He began to read the book*.

The class of nouns that behave like *rain*, i.e., that can have a dummy V in deep structure and noun movement to fill the V slot in surface structure, is a natural semantic class: *rain*, *snow*, *sleet*, *hail*, etc. *Thunderstorm* is a hyponym of *rain* and, as is often the case with hyponyms, has analogous syntactic possibilities. However, movement to V slot is largely restricted to the generic terms, and is denied their hyponyms. Thus, we can say *A thunderstorm began* but not so naturally *It is thunderstorming*. And note *The thunderstorm began to rain down on us*, where the hyponym fills subject slot and its generic correspondent flips over to fill the main V slot in the surface structure.<sup>4</sup>

We have already spent too long discussing the *begin* set. But before moving on to consider the other syntactic devices

in English that correspond to some of the Dyirbal adverbials, we should make one last remark. McCawley (1968c) has insightfully discussed the need for semantic representation to involve tree structuring. However, his example *kill* = *make* + *become* + *not* + *alive* suffers from taking no account of syntactic orientation. He relates *kill* to *make die* and *die* to *cease living*. However, *die* is clearly related to *finish living*, rather than to *cease living*.<sup>5</sup> This can be seen by comparison with sentences such as *The frost finished my roses*.

5. We began with the observation that there is in Dyirbal a set of adverbial concepts - *finish/start*; *do well/badly*; *quickly/slowly*; *do what shouldn't be done* - each concept being further articulated into a pair of verbs differing in syntactic orientation. Now English has pairs, *finish/start*, discussed at length above. But it has no similar pairs *do well/badly*; *slowly/quickly*; etc. However, English does have a syntactic device for allowing further adverbial modification of a verb, where the modification is interpreted with respect to either subject or object of the verb. In fact, English allows a wider range of syntactic orientation than does Dyirbal.

The device is simple. The relevant NP (that which the adverb is syntactically oriented to) is merely brought to the front of the sentence so that it appears to be surface subject, and the appropriate adverb is inserted (normally after the object, although there is some freedom of position). The original subject is obligatorily deleted. Thus we have

- (25) *John translated Shakespeare into Greek.*

With the adverb *well* we can have either subject orientation (26) or object orientation (27).

- (26) *John translated Shakespeare into Greek well.*

- (27) *Shakespeare translated into Greek well.*

Similarly, from (28) we can get (29) and (30).

- (28) *Mary washed the clothes.*

- (29) *Mary washed the clothes well.*

- (30) *The clothes washed well.*

Note that if we omit the adverb from (27) and (30) we do not get acceptable sentences. Since the only property *Shakespeare* in (27) and *the clothes* in (30) have in common with subjects in normal sentences is that they are sentence-initial, I prefer not to refer to them as subjects here, but to use the term "topic" instead. Since this topicalization depends on the

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inclusion of one of a limited set of manner adverbials, we can call (27) and (30) topic-manner construction.

Now NPs with a number of different underlying syntactic functions can be topicalized. For instance, we can have

- (31) *The engineer recorded King Oliver's band with a Smithson microphone in Studio B.*

If the results of this are pleasing, we may consider them due to one or more of four factors (here parentheses indicate optionality):

- (32) *The engineer recorded (King Oliver's band) well (with a Smithson microphone) (in Studio B).*
- (33) *King Oliver's band recorded well (with a Smithson microphone) (in Studio B).*
- (34) *The (/a?) Smithson microphone recorded (King Oliver's band) well (in Studio B).*
- (35) *Studio B recorded (King Oliver's band) well.*

Here either the object -- which in this sentence, unlike (27) and (30), can be topicalized without a manner adverbial being present--or the instrument or the location can be topicalized. Note that all of these are relevant factors for the success of the recording session. Generally, locationals cannot topicalize--certainly *to* and *from* locationals do not appear to, simply because they are never a crucial factor for the success of an event; *in* and *on* locationals can, however. Other examples of topic-manner sentences are: *This oven cooks well*, *This flour cooks well*, *These bricks build well*, *This jug pours well*.

To me, *This pan fries well* is an acceptable sentence, since the success of a frying enterprise does depend greatly on the pan that is used. However, I find *\*This kettle boils well* impossible, since boiling is not an operation of which there can be degrees of excellence, that the kettle could contribute to. However, *This kettle boils quickly* is perfectly acceptable (in British English, at least).

I have for some time looked for some syntactic pattern among topic-manner sentences. It seems that the criterion for whether an NP can be topicalized from a certain sentence, with a particular manner adverbial, is not syntactic but is rather semantic or extramsemantic. If the referent of the NP is relevant (along the dimension specified by the manner adverbial) to the action referred to by the verb, then it can be topicalized. Thus we cannot have *Detroit recorded well* from *The engineer recorded King Oliver's band in Detroit*,

although we saw above that we can have *Studio B recorded well*. And this accounts for the fact that we cannot topicalize the objects from *He saw the rock*, *He gave the book to Mary*, *He heard the waterfall*, *He lost the money*, *He found the wallet*, *He bought the car*, whereas we can in *He kissed the girl*, *He sharpened the axe*, *He sells Chevrolets*.

Notice that some pairs of verbs in the lexicon are in a special semantic relationship that is relevant to topicalization. Thus, we have *Chomsky taught McCawley well*, but we do not topicalize *McCawley* if we want the adverb to have *McCawley* orientation; instead of *\*McCawley taught well* we have *McCawley learnt well*.

Whether or not a verb can figure in a topic-manner construction is a function of the semantic content of that verb. For instance, it appears that a pure motion verb is not semantically suitable. We can have *It carries well*, *It handles well*, but not *\*It takes well*, *\*It brings well*, *\*It sends well*. A much fuller knowledge than we have at present of the detailed semantic structure of the lexicon is necessary before it would be profitable to embark on a full discussion of the semantic conditions determining whether a verb can appear in topic-manner constructions.

We began with a set of adverbial concepts in Dyirbal - start/finish; do well/do badly; do slowly/do quickly; do what shouldn't be done. English handles start/finish through verbs or quasiverbs, in a way similar to Dyirbal. For do well/badly; slowly/quickly, English uses the topic-manner construction. As we have described this construction so far, it might seem that all or many English adverbs could appear in such a construction. In fact, exactly as there are restrictions on verbs that can appear in topic-manner constructions, so are there restrictions on adverbs that can feature in the construction - severe restrictions in fact; it may be that the norm set is just well/badly; slowly/quickly (exactly the same four concepts as in Dyirbal). Admittedly, some other adverbs appear to occur in topic-manner constructions. For instance, *These clothes washed easily*. However, this is probably an extensional pattern by analogy with the norm pattern *These clothes washed well*. The norm constructions for *easily* are *It is easy to wash these clothes*, *It is easy to please John*, and *These clothes are easy to wash*, *John is easy to please*. Extensions from this pattern by analogy, etc. are limited; thus, we have *These clothes washed easily* but not *\*John pleased easily* (or even *\*John pleases easily*).

The other adverbial concept mentioned for Dyirbal 'do what shouldn't be done' is dealt with by modals in English. This suggests that syntactic orientation is a semantic

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Property of modals, too. This, in fact, appears to be the case. However, this could only be dealt with in terms of a full discussion of modals, as difficult an area as any in the grammar of English, and one into which it does not behoove this paper to venture.

In summary, then, we have discussed two quite different topics in English. Verbs (*finish/cease, begin/start, and so on*) that have well-defined syntactic behavior, which can be described by means of rules of a conventional type. And topic-manner constructions, like *This jug pours well, These cars sell well*, about which very little can be said syntactically. By analogy with Dyirbal, we have suggested that these are two different manifestations of the same (probably universal) semantic phenomenon - modification of a verb by an adverbial of a certain set, with a choice of syntactic orientations.

### NOTES

<sup>1</sup>And how much identity is required of the verb nodes depends upon how much is semantically common to the (subject and) object NP(s). Thus, peas and potatoes are both vegetables and can undergo similar sets of actions. However, there is little in common to peas and belfries, so that we would expect *John has finished the peas and Fred the belfry* to have a measure of ambiguity that is the multiple of the ambiguity of *John has finished the peas* and the ambiguity of *Fred has finished the belfry*.

<sup>2</sup>Notice that the main verb cannot naturally delete with *stop* and *cease*, but for different reasons in the two cases. In the case of *stop*, there is interference from the causative form of the homonymous item *stop*; thus, *He stopped the peas* would be understood as *He stopped the motion of the peas*, e.g., he stopped them rolling off the table (this is the same verb as *He stopped the night in Buffalo*). *Cease* cannot delete a following main verb since it is a relatively uncommon verb, and the less common lexical items have far narrower possibilities of syntactic, semantic, and morphological extension and behavior than do the more frequent ones (this is a matter that must be taken on trust by the reader for the time being, since this is clearly not the place to go into it in detail).

<sup>3</sup>That is, any verb that is likely to occur with *rain* in its dictionary/encyclopedia entry. This excludes verbs of motion, for instance. Thus *It is raining* is a paraphrase of *Rain is falling* but not of *Rain is coming*. Note that the natural set of verbs that behave in this way does not include *fog*. We can say *Fog is coming* but there is no *fog* sentence similar to *It is raining* (something like *The mirror is fogging up* is quite different).

<sup>4</sup>This and other sections of the paper have some similarity to the discussions in Fillmore (1968).

<sup>5</sup>Instead of talking of subject and object orientation, we could instead have referred to subject orientation and predicate (equals verb plus object) orientation. This would simplify the treatment of intransitive verbs, for example, which have not in fact been discussed in the paper. The decision concerning whether we refer to object or to predicate orientation seems a minor one; the arguments on each side will not be given here. In either case the extension to intransitives is relatively simple and is here left to the reader.

## DISCOURSE REFERENTS

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*Karttunen's paper can be described as a summary of the work on reference that generative grammarians were about to do for the next five years. It contains preliminary statements of Karttunen's work on the logic of complement constructions (Karttunen 1970b, 1971a,b) and of the notion of "context" that figures in his analysis of presupposition [namely "context" as the set of propositions that the speaker and addressee take for granted at the given point of discourse; see Karttunen (1973, 1974)]; it also presents an analysis of coreference in terms of possible worlds that foreshadows that of Morgan (1973). The analysis of the surface object of want that Karttunen sketches in Section 1.26 is discussed at length (and justified ad nauseam) in McCawley (1974). The most interesting idea in Karttunen's paper appears not to have registered on many linguists or logicians. That is the idea that existential quantifiers have the dual function of asserting existence (thus binding a variable) and of introducing a constant that*

can figure in subsequent discourse. This idea is a vindication of the informal notational practise of mathematicians, who will write an existentially quantified formula (say,  $(\exists e)(\forall x)(xe = ex = x)$ ), as one of a set of postulates for group theory) and thenceforth use the variable bound by the existential quantifier as if it were a constant [as when they will write the next postulate as

$(\forall x)(\exists x^{-1})(xx^{-1} = x^{-1}x = e)$ ]. Karttunen's observations provide a case for according this practice full status as part of a system of representing logical structure; that proposal allows one to cope with examples such as I have a proof of this theorem, but it won't fit in this margin, which are a horror to accomodate within standard logical notation (there is no "standard" logical representation of it that has a constituent corresponding to I have a proof of this theorem, though there must be such a constituent, since the sentence can be continued though Fermat says that he does and that it will fit in the margin of his copy of Euclid).

## 0. INTRODUCTION

Consider a device designed to read a text in some natural language, interpret it, and store the content in some manner, say, for the purpose of being able to answer questions about it. To accomplish this task, the machine will have to fulfill at least the following basic requirement. It has to be able to build a file that consists of records of all the individuals, that is, events, objects, etc., mentioned in the text and, for each individual, record whatever is said about it. Of course, for the time being at least, it seems that such a text interpreter is not a practical idea, but this should not discourage us from studying in abstract what kind of capabilities the machine would have to possess, provided that our study provides us with some insight into natural language in general.

In this paper, I intend to discuss one particular feature a text interpreter must have: that it must be able to recognize when a novel individual is mentioned in the input text and to store it along with its characterization for future reference. Of course, in some cases the problem is trivial. Suppose there appears in some sentence a proper name that has not been mentioned previously. This means that a new person is being introduced in the text and appropriate action must be taken to record the name of the person and what is said about him. Otherwise, the proper name is used to refer to an individual already mentioned, and the machine has to locate his file in the memory with the help of the name. This problem of identification will be more difficult where a definite

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description--a definite noun phrase such as *the man Bill saw yesterday*--is used, since there will, in general, not be any simple look-up procedure for associating the description with the right individual. With definite noun phrases, there is also the problem that it is not possible to tell just from the noun phrase itself whether or not it is supposed to refer to an individual at all. For example, it is clear that the phrase *the best student* is not used referentially in a sentence such as *Bill is the best student*. There are thus two problems with ordinary definite noun phrases: (i) whether it is a definite description at all and (ii) how a definite description may be matched with an individual already mentioned in the text. The first question is clearly of the kind linguists can be expected to solve, but it will not be discussed here. The only aspect of definite descriptions that interests us here is the fact that they carry an existential presupposition: to call something "the..." presupposes that there be some such thing.

While it is in general a straightforward matter to decide whether or not a proper name in a text introduces a new individual, indefinite noun phrases pose a more difficult problem. To put the question in a general way, given an indefinite noun phrase, under what circumstances is there supposed to be an individual described by this noun phrase? This need not be understood as some sort of ontological question subject to philosophical speculation. In this paper I intend to approach it from a purely linguistic point of view. It is in just those cases where the appearance of an indefinite NP implies the existence of some specific entity that our hypothetical text interpreter should record the appearance of a new individual.

What I have in mind can perhaps be made clear with the help of the following examples. It is a well-known fact about language that indefinite noun phrases cannot be interpreted as referring to expressions when they appear in the predicate nominal position.

(1) *Bill is not a linguist.*

(1) is obviously a statement about one individual. It is not a statement about some linguist and Bill. It is also well-known that in generic sentences, singular indefinite noun phrases play a peculiar role.

(2) *A lion is a mighty hunter.*

In its generic sense, (2) is a statement about lions in general, not about any lion in particular, unless we want to postulate a hypothetical entity "the typical lion" of whom all generic statements about lions are predicated. It is clear that indefinite noun phrases have a very special role in (1)

and (2), and it is not difficult to decide that they could not introduce any new individuals into a discourse. It is out of the question that a text in which (1) appears would contain a later reference to "the linguist which Bill is not" or that (2), in its generic sense, would justify a later reference to "the lion who is a mighty hunter".

But consider the following example. (3a) may be followed by any of the sentences (3b-d) that give us more information about a specific car first mentioned in (3a).

- (3) a. *Bill has a car.*
- b. *It is black.*
- c. *The car is black.*
- d. *Bill's car is black.*

On the other hand, (4a) cannot be followed by any of the alternatives (4b-d).

- (4) a. *Bill doesn't have a car.*
- b. *\*It is black.*
- c. *\*The car is black.*
- d. *\*Bill's car is black.*

The above examples show that just in case of (3a), the text interpreter has to recognize that the appearance of the indefinite NP *a car* implies the existence of a specific car that can be talked about again by referring to it with a pronoun or a definite noun phrase. But no car is introduced by (4a). The alternative continuations (4b-d) are inappropriate, since they presuppose the existence of something that is not there. To show that this is a linguistic and not an ontological fact, one only has to point out that examples (5) and (6) behave just like (3) and (4).

- (5) *Bill saw a unicorn. The unicorn had a gold mane.*
- (6) *Bill didn't see a unicorn. \*The unicorn had a gold mane.*

Let us say that the appearance of an indefinite noun phrase establishes a "discourse referent" just in case it justifies the occurrence of a coreferential pronoun or a definite noun phrase later in the text. In this paper, we will try to find out under what circumstances discourse referents are established. We maintain that the problem of coreference with a discourse is a linguistic problem and can be studied independently of any general theory of extralinguistic reference.

The present study was inspired by the notion of "referential

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"indices" in transformational grammar. Following a suggestion by Chomsky (1965), it has generally been assumed that the base component of a transformational grammar associates with each noun phrase a referential index, say, some integer. The purpose of Chomsky's proposal was not so much to account for the meaning of sentences, but to augment the notion of noun phrase identity. It seemed that the notion of referential identity was needed in addition to the two other types of identity, "structural identity" and "morphemic identity", for the structural descriptions of certain transformations. According to the standard theory, referential indices are merely formal indicators of coreference with no further semantic significance. They are not meant to imply the existence of discourse referents in our sense. This notion of coreferentiality has played an important role in recent syntactic arguments. It led to the study of pronoun-antecedent relations, largely ignored by traditional grammarians, which has revealed intricate constraints that have great theoretical importance. What we are studying in this paper can be looked at as further constraints on coreferentiality that extend beyond the sentence level.

### 1. CASE STUDIES

#### 1.1 A Note on Specificity

In the following, we are going to examine case by case certain aspects of sentence structure that play a role in determining whether an indefinite NP establishes a discourse referent. In the examples that are discussed, there is a possible ambiguity that has to be mentioned in advance, although it will not be discussed until later. In general, indefinite noun phrases have both a specific and nonspecific interpretation. Example (7) can be interpreted to mean either (8a) or (8b).

(7) *Bill didn't see a misprint.*

(8) a. *There is a misprint which Bill didn't see.*

b. *Bill saw no misprints.*

If (7) is understood in the sense of (8a), we say that the indefinite NP *a misprint* is interpreted specifically. (8b) represents the nonspecific interpretation. Of course, not all indefinite noun phrases are ambiguous in this way. We could disambiguate (7) by adding the word *certain* ("a certain misprint") or an appositive relative clause ("a misprint, which I had made on purpose"). These changes would allow only the specific interpretation (8a). The addition of the word *single*

("a single misprint") would allow only the sense (8b). There are also cases where the verbs involved partially disambiguate the sentence by making one interpretation far more plausible to the reader than the other. For example, the NP *a piano* in (9a) is naturally understood nonspecifically, that is, as meaning 'any piano', while the same noun phrase in (9b) suggests the interpretation 'a certain piano'.<sup>1</sup>

- (9) a. *John tried to find a piano.* [but he didn't succeed in finding one]  
b. *John tried to lift a piano.* [but he didn't succeed in lifting it]

It is something about the verb *lift* that suggests that a *piano* describes some specific object. On the other hand, (9a) is easily understood to inform us only about the kind of object John was trying to find. We note in passing that, if interpreted in the above manner, (9b) establishes a discourse referent, i.e., 'the piano that John tried to lift', but (9a) certainly does not justify a later reference to 'the piano that John tried to find'. Example (7) establishes a referent in its specific sense 'the misprint which Bill didn't see', but fails to do so in the sense of (8b).

Let us forget, for the time being, that indefinite noun phrases can also be understood specifically and consider first only nonspecific interpretations.

## 1.2 Complement Clauses

As pointed out above, an indefinite noun phrase does generally establish a discourse referent when it appears in a simple affirmative sentence. But if the sentence is negated, a nonspecific NP fails to establish a referent. Let us, tentatively, accept this finding for simple sentences and look at cases where an indefinite NP belongs to a complement clause. There are many other factors that play a role here besides negation.

### 1.2.1 Modal verbs

The following examples are anomalous in the intended sense, although there is no negation involved.

- (10) a. *You must write a letter to your parents.*  
      \**They are expecting the letter.*  
b. *Bill can make a kite.* \**The kite has a long string.*

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Traditionally, sentences with a modal auxiliary have been considered as simple sentences. However, it has been argued convincingly by Ross (1969b) and others that modals should be analyzed as main verbs of higher sentences. Therefore, let us assume that, even in the above examples, the indefinite NPs originate in a complement clause, just as they do in (11).

- (11) a. *John wants to catch a fish.* \*Do you see the fish from here?  
b. *Mary expects to have a baby.* \*The baby's name is Sue.

There is a great number of verbs that behave like *want* and *expect* in this respect, e.g., *try*, *plan*, *intend*, *hope*. What is common to all of them is that the complement sentence by itself is understood to represent a yet untrue proposition at the time specified by the tense and time adverbials in the main clause. The present problem, is in fact, another point in favor of the view that modals originate in a higher sentence, because it enables us to acknowledge the similarity of the anomaly in (10) and (11). The conclusion is that nonspecific indefinites do not establish discourse referents when they appear in a complement of a modal verb.

#### 1.2.2 Implicatives

There is a class of verbs that, if they are not negated, imply the truth of the proposition represented by their complement sentence. Let us call them "implicative verbs".<sup>2</sup> In English, this group includes verbs such as *manage*, *remember*, *venture*, *see fit*. An indefinite NP in the complement of an implicative verb establishes a referent, as shown by the following examples.

- (12) a. *John managed to find an apartment.* The apartment has a balcony.  
b. *Bill ventured to ask a question.* The lecturer answered it.

But if the implicative verb in the main sentence is negated, a nonspecific indefinite fails to establish a referent.

- (13) a. *John didn't manage to find an apartment.* \*The apartment has a balcony.  
b. *Bill didn't dare to ask a question.* \*The lecturer answered it.

There are also verbs that inherently have a negative implication. In English, this type includes verbs such as *forget*, *fail*,

and *neglect*. Consider the following anomalous discourses.

- (14) a. *John forgot to write a term paper.* \**He cannot show it to the teacher.*
- b. *John failed to find an answer.* \**It was wrong.*
- c. *John didn't fail to find an answer.* The answer was even right.
- d. *John didn't remember not to bring an umbrella,* although we had no room for it.

These implicative verbs have the very interesting property that, if there is double negation, the implication is positive, and an indefinite NP does, after all, establish a referent.

#### 1.2.3 Factive verbs

There is a group of verbs, called factive verbs (Kiparsky and Kiparsky 1971), that presuppose the truth of the proposition represented by the complement. For example, *know*, *realize*, and *regret* are factive. It is not surprising to find out that an indefinite NP does establish a referent in a complement of a factive verb, of course, provided that the complement itself is affirmative.

- (15) *John knew that Mary had a car, but he had never seen it.*

In contrast to the implicative verbs discussed above, negation in the main sentence has no effect at all.

- (16) *Bill didn't realize that he had a dime. It was in his pocket.*

The truth of the embedded proposition is presupposed even if the factive verb itself is negated. Consequently, (16) is quite acceptable as a continuing discourse.

#### 1.2.4 Nonfactive verbs

The class of verbs commonly called nonfactive (Kiparsky and Kiparsky, 1971) includes such verbs as *believe*, *think*, *say*, *claim*, *doubt*. In general, nothing is presupposed about the truth of the embedded proposition. Notice, however, that the following discourse would be contradictory.

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(17) *I doubt that Mary has a car. \*Bill has seen it.*

On the other hand, there is nothing wrong with the following example.

(18) *Bill doubts that Mary has a car. I have seen it.*

What makes these verbs difficult to handle is that there are two persons involved - the speaker and the subject of the non-factive verb--these roles may, of course, coincide. The speaker is not committed to any view whatsoever about the truth of the embedded proposition, although he may imply what his beliefs are as the discourse continues. For example, in (18), the speaker--unlike Bill--must hold that the complement is true. The nonfactive verb is binding for the speaker only in case he is talking in the first person as in (17). But even in case that the speaker withholds judgment or disagrees altogether, an indefinite NP in the complement of a nonfactive verb that implies positive belief does establish a referent of a peculiar sort. It can be referred to again in a complement of a similar nonfactive verb that has the same subject.

(19) *Bill says he saw a lion on the street. He claims  
the lion had escaped from the zoo.*

What this amounts to is that a text-interpreting device will have to sort out what belongs to the world as seen by the speaker and the world as seen by X. The same referents need not exist in all of these worlds.

A nonfactive verb that implies positive belief (*claim*, *think*, *believe*, *say*, etc.) allows an indefinite NP in the complement to establish a referent as far as the world of the subject person is concerned but need not have the same effect in the speaker's world. A nonfactive verb with negative implication (*doubt*) may still allow that a referent be added to the speaker's world, albeit not to the world of the subject person.

#### 1.2.5 General remarks

We can now generalize the previous observation about single sentences to cover also complement clauses. A non-specific indefinite NP in an affirmative sentence (single sentence or a complement) establishes a discourse referent just in case the proposition represented by the sentence is asserted, implied, or presupposed by the speaker to be true. A nonspecific indefinite in a negative sentence establishes a referent only if the proposition is implied to be false. This latter stipulation is needed because of negative implicatives discussed in Section 1.2.2. In general, discourse

referents exist in the realm - world as seen by the speaker. However, the nonfactive verbs discussed in Section 1.2.4 establishes referents in other realms and are ambiguous as far as the speaker is concerned.

In order to decide whether or not a nonspecific indefinite NP is to be associated with a referent, a text-interpreting device must be able to assign a truth value to the proposition represented by the sentence in which the NP appears. It must be sensitive to the semantic properties of verbs that take sentential complements; distinguish between assertion, implication, and presupposition; and finally, it must distinguish what exists for the speaker from what exists only for somebody else.

#### 1.2.6 An apparent counterexample

There is an interesting group of verbs that seem to provide a counterexample to the general rule. Consider the following discourses.

- (20) a. *I needed a car. \*It was a Mustang.*  
b. *Seymour wants a knife. \*It is sharp.*  
c. *John promised Mary a bracelet. \*The bracelet was very expensive.*  
d. *The casting director was looking for an innocent blonde. \*She was from Bean Blossom, Indiana.*

Provided that the indefinite NPs are interpreted nonspecifically, all examples in (20) are anomalous, although they look superficially identical to those in (21), which behave as expected.

- (21) a. *I owned a car. It was a Mustang.*  
b. *Seymour imagines a knife. It is sharp.*  
c. *John bought Mary a bracelet. The bracelet was very expensive.*  
d. *The casting director was looking at an innocent blonde. She was from Bean Blossom, Indiana.*

In (20), what appears to be an ordinary nonspecific object NP fails to establish a referent, although the sentence is affirmative assertion. There are many other verbs in addition to those in (20) that have this peculiar consequence, for example, *ask for, desire, expect, hope for, propose, request, suggest, wait for, yearn for*. It seems significant that most if not all of these verbs, in addition to ordinary noun phrase objects, also take sentential complements, as the

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following examples show.

- (22) a. *Seymour wanted to have a knife.*
- b. *I propose that you eat a bagel.*
- c. *John promised to give Mary a bracelet.*
- d. *Mary expects John to buy her a bracelet.*

In fact, these are the same modal verbs discussed above (Section 1.2.1) that imply that the proposition represented by the complement is not yet true. We can thus account for the peculiarity of (20a-d) by assuming that, in spite of the simplicity of the surface structure, the ordinary noun phrase objects of these verbs are derived from underlying representations that contain sentential objects. This is clearly one of those cases where semantic problems can be simplified by assuming a more abstract deep structure. But it is not entirely clear what kind of embedded sentence should underlie the surface object. There seems to be little evidence for deciding this question beyond the observation that it certainly should be some type of existential or possessive construction. This is because of many near paraphrases of the following type.

- (23) a. *John wants a car. John wants to have a car.*
- b. *I suggest an immediate halt in the bombing.  
          I suggest that there be an immediate halt  
          in the bombing.*
- c. *I expect no change in the situation. I expect  
          there to be no change in the situation.*

In some cases, an existential paraphrase seems more natural, in other cases, one prefers a possessive interpretation. Observe the difference between (23a) and (24a) and the two kinds of promising in (24b) and (24c).

- (24) a. *John wants a revolution. John wants there to  
          be a revolution.*
- b. *John promised Mary a bracelet. John promised  
          Mary that she will have a bracelet.*
- c. *John promised Mary a miracle. John promised  
          Mary that there will be a miracle.*

Whatever the correct solution is with regard to the exact nature of embedded sentence, there is no reason to consider the exceptional nature of verbs such as *want* and *need* as a serious counter-example to the general theory of discourse referents.

## 1.3 Short Term Referents

In the preceding sections, it was tacitly assumed that discourse referents are stable entities that are established once and for all. But we have to recognize that an indefinite NP that fails to establish a permanent referent may nevertheless permit the appearance of coreferential noun phrases within a limited domain. Consider the following examples.

- (25) a. *You must write a letter to your parents and mail the letter right away. \*They are expecting the letter.*
- b. *John wants to catch a fish and eat it for supper. \*Do you see the fish over there?*
- c. *I don't believe that Mary had a baby and named her Sue. \*The baby has mumps.*

In (25a), it seems that the indefinite NP *a letter* may serve as antecedent for a coreferential definite NP *the letter* provided that the latter is contained in a conjoined complement sentence, but not otherwise. Outside the scope of the modal *must*, '*the letter*' ceases to exist. Similarly, in (25b), there is no fish that could be talked about outside the scope of *want*. Within the pair of conjoined sentences in the complement it is a different matter.

In order to take care of these phenomena, a text-interpreting device apparently has to process complex sentences starting from the inside. For example, in case of (25c), it first has to consider the part *Mary had a baby and named her Sue*. On the basis of the first member of the conjunct, it can, tentatively, set up a referent corresponding to the NP *a baby* and accept *her* in the second sentence as coreferential. After considering the whole sentence beginning with *I don't believe that...*, it then may decide that there is no such baby after all. In short, a text interpreter must keep track of the status of referents it has established and delete them when necessary.

Notice also that the lifespan of a short-term referent is not always so neatly bound as the above examples suggest. Sequences of the following type are quite common.

- (26) *You must write a letter to your parents. It has to be sent by airmail. The letter must get there by tomorrow.*

At least in case of modals (and the future *will*), it is possible to continue discussing a thing that actually does not yet exist, provided that the discourse continues in the same mode. In this case, every successive sentence is prefixed by

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the same type of modal. Even the following example is possible.

- (27) *Mary wants to marry a rich man. He must be a banker.*

Under the nonspecific interpretation of *a rich man*, there is no specific individual yet that Mary wants to marry--and there may never be one. By continuing with another modal, however, it is possible to elaborate on the attributes of this as yet nonexistent individual.<sup>3</sup> In the following sections we will present other cases where the lifespan of a short-term referent may be extended.

#### 1.4 Suppositions

Another way to talk about what is not is to suppose that it is. Consider the following discourses.

- (28) a. *Suppose Mary had a car. She takes me to work in it. I drive the car too.*  
b. *If Mary has a car, she will take me to work in it. I can drive the car too.*  
c. *If Mary had a car, she would take me to work in it. I could drive the car too.*  
d. *I wish Mary had a car. She would take me to work in it. I could drive the car too.*  
e. *When Mary has a car, she can take me to work in it. I can drive the car too.*

All of the above examples elaborate a hypothetical situation that is based on the counterfactual or dubious premise that Mary has a car. The difference between the first and the second pair is that in (28c-d), the condition is implied to be unrealizable or hard to realize. There are clearly several ways in which a supposition may be introduced in a discourse. Essentially, however, all of the above examples reduce to the form

$$\text{If } S_0 \text{ then } S_1, S_2, \dots, S_n$$

Whatever referent is introduced by  $S_0$  exists for the sequence  $S_1-S_n$ , which apparently has no fixed length, although there obviously are certain conditions that all sentences belonging to it have to fulfill. The following discourse would be anomalous.

- (29) *I wish Mary had a car. \*I will drive it.*

That is, fictitious individuals may be referred to anaphorically only as long as the proper fictitious mode is sustained, but

when the illusion is broken, they cease to exist.

As the above examples show, a text interpreter must also be able to cope with short-term referents that owe their existence to some condition that in reality is not fulfilled. It must catch a supposition in whatever form it comes and recognize where the supposition ceases to be in force. Neither of the two tasks is likely to be easy. For example, what looks like a command may, nevertheless, be a supposition.

- (30) *Lend him a book and he'll never return it.*

### 1.5 Commands and Yes-No Questions

It is to be expected that indefinite noun phrases in commands and yes-no questions fail to introduce referents. The proposition corresponding to an interrogative or imperative sentence ordinarily is not assumed to be true. Thus, there is something missing in the following examples.

- (31) a. *Does John have a car? \*It is a Mustang.*  
b. *Give me a hotdog, please. \*It looks delicious.*

But it is again possible to have coreference within the imperative or interrogative sequence itself.

- (32) a. *Does John have a car and is it a Mustang?*  
b. *Give me a hotdog, please, but don't put any mustard on it.*

There are, however, ways to interpret the following examples as acceptable.

- (33) a. *Did you write a letter? Let me see it.*  
b. *Give me a hotdog, please. I will eat it.*

For example, the interrogative sentence in (33a) need not be taken as a true question at all, but as an expression of surprise prompted by a preceding assertion. (33b) could be understood as elliptic. What is implicit is "You will give me a hotdog". Discourses such as in (33) clearly are not counterexamples, since their acceptability is not due to the appearance of an indefinite NP in a command or yes-no question, but to other considerations.

### 1.6 Quantifiers

Indefinite noun phrases are generally ambiguous in sentences that contain quantifierlike expressions. The following examples can be understood at least in two ways.

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(34) a. *Harvey courts a girl at every convention.*

b. *Most boys in this town are in love with a go-go dancer.*

(34a) can mean that, at every convention, there is some girl that Harvey courts, or that there is some girl that Harvey courts at every convention. Let us call the above paraphrases the nonspecific and the specific interpretation of the NP *a girl*, respectively. (See the note on specificity in Section 1.1.) In the specific sense, Harvey always courts the same girl, in the nonspecific sense, it may be a different girl each time. Similarly, a *go-go dancer* in (34b) also has two interpretations. However, the following discourses leave no room for such ambiguity.

(35) a. *Harvey courts a girl at every convention.  
She is very pretty.*

b. *Most boys in this town are in love with a go-go dancer. Mary doesn't like her at all.*

In (35), only the specific interpretation is possible. There must be a unique girl and a unique go-go dancer. This fact indicates that a nonspecific indefinite fails to establish a discourse referent in case there is a quantifierlike term in the sentence, in spite of the fact that the sentence is an affirmative assertion.

But notice that the following example is ambiguous again.

(36) *Harvey courts a girl at every convention. She always comes to the banquet with him. The girl is usually also very pretty.*

(36) admits both the specific and nonspecific interpretation of *a girl*. The reason for the anomaly of the nonspecific interpretation in (35) and its acceptability here is apparently that, in (36), every successive sentence continues to have a similar quantifierlike term - *at every convention, always, usually*. There is also nothing wrong with the nonspecific interpretation of the NP *a book* in (37).

(37) *Every time Bill comes here, he picks up a book and wants to borrow it. I never let him take the book.*

We have to say that, although a nonspecific indefinite that falls into the scope of a quantifier fails to establish a permanent discourse referent, there may be a short-term referent within the scope of the quantifier and its lifespan may be extended by flagging every successive sentence with a quantifier of the same type.<sup>4</sup>

## 2. SPECIFICITY

Let us now return to the problem of specificity that was first introduced in Section 1.1. As we already pointed out, many of the examples above that were judged anomalous in the intended sense can also be given another interpretation that makes them perfectly acceptable. Although "nonspecific" indefinites do not permit coreference in (38), there is nothing wrong with these examples provided that the indefinite NP is understood "specifically".

- (38) a. *Bill didn't find a misprint. Can you find it?*  
 b. *John wants to catch a fish. You can see the fish from here.*

How should we represent this distinction? As the terms "specific" and "nonspecific" imply, transformational grammarians have traditionally assumed that there is a feature [ $\pm$  specific], just as there is a feature [ $\pm$  definite], and that indefinite NPs are to be marked with respect to specificity. Let us call this view, that goes together with Chomsky's original proposal that coreference be marked with integer-type indices, the classical theory. There is also another approach to these problems suggested by Emmon Bach (1968), James D. McCawley (1970b), George Lakoff, and others. The essential feature of their proposals is that referential indices are variables, bound by quantifiers that act like quantifiers in symbolic logic. What corresponds to the indefinite article is, of course, something very similar to the existential quantifier in predicate calculus. (Bach calls it "the some operator".) Base structures resemble formulas in symbolic logic. This approach to syntax has now become known as "generative semantics".

It is easy to see that in the framework of generative semantics there is no justification nor need for a feature such as [ $\pm$  specific]. The ambiguities in question are naturally accounted for by the fact that the quantifier-binding variable that underlies some indefinite noun phrase may be placed in different positions in the base structure. Specificity thus becomes a matter of the scope of quantifiers.

As far as the problems discussed in this paper are relevant to choosing a theoretical framework, they seem to argue in favor of adopting the Bach-McCawley proposals. It is rather difficult to see how one could achieve an adequate description of the facts in the classical theory. For example, consider the following case. Both (39a) and (39b) are ambiguous with respect to specificity.

- (39) a. *Bill intends to visit a museum.*

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- b. *Bill visits a museum every day.*

In the specific sense, both examples establish a discourse referent. It would make perfect sense to continue with a description of the museum Bill intends to visit or the museum Bill visits every day. In the nonspecific sense, there is no such museum at all. So far so good, we can say that the NP *a museum* can be [ $\pm$  specific]. But what about example (40)?

- (40) *Bill intends to visit a museum every day.*

It is clear that (40) is ambiguous in many ways. For example, the quantified time adverb *every day* could be assigned either to the complement or to the main clause. Let us now consider only the former case. The remaining ambiguities should be attributable to the indefinite NP *a museum*; in fact, we should have a two-way ambiguity between the specific and nonspecific interpretation. But example (40) is still ambiguous in more than two ways. It could be interpreted to mean (41a), or (41c).

- (41) a. *There is a certain museum that Bill intends to visit every day.*
- b. *Bill intends that there be some museum that he visits every day.*
- c. *Bill intends to do a museum visit every day.*

It is easy to see why this happens. What the feature [ $\pm$  specific] accomplishes in case of (39a) is that it clarifies the relation between the indefinite NP *a museum* and the verb *intend* in the main sentence: Is Bill's intention about some particular museum or not? In (39b), we employ the same device to characterize the relation between the quantified time adverb *every day* and the indefinite noun phrase: Is it the same museum every day or not? To do the work in (40) we would need two features, one to characterize the relation between *intend* and *a museum*, another for the relation between *a museum* and *every day*. Under the interpretation (41b), for example, *a museum* would be non-specific with respect to the verb *intend* but specific with respect to the quantified time expression. But to say that there are several varieties of specificity is a way of saying that there is no feature [ $\pm$  specific] at all. The classical theory clearly is not sufficient to account for the multiple meanings of (40).<sup>5</sup>

On the other hand, in the Bach-McCawley framework we are able to account for the ambiguities in a straightforward way. The three senses of (40) discussed above might be represented

roughly as in (42).<sup>6</sup>

- (42) a.  $(\exists x) [\text{museum}(x) . \text{intend}(\text{Bill}, (\text{every day}) \text{visit}(\text{Bill}, (x)))]$
- b.  $\text{intend}(\text{Bill}, (\exists x) [\text{museum}(x) . (\text{every day}) \text{visit}(\text{Bill}, x)])$
- c.  $\text{intend}(\text{Bill}, (\text{every day}) (\exists x) [\text{museum}(x) . \text{visit}(\text{Bill}, x)])$

Another advantage of generative semantics is that there is an explanation ready for the fact that (40) establishes a discourse referent under only one of the three interpretations we have considered, namely (42a). The rule is that an indefinite NP establishes a permanent referent just in case the proposition to which the binding quantifier is attached is assumed (asserted, implied, or presupposed) to be true, provided that the quantifier is not itself in the scope of some higher quantifier.<sup>7</sup> The first part of the rule accounts for the difference between (42a) and (42b-c), the second part is needed to explain why (39b) establishes a permanent referent only under one of the two possible interpretation. Notice that, in (42a), the quantifier underlying the NP *a museum* is attached to the main proposition. Since the main proposition is asserted to be true and there is no higher quantifier involved, (42a) establishes a referent corresponding to the NP *a museum*. Now, consider the other two interpretations of (40). The verb *intend* is one of the modal verbs discussed in Section 1.2.1. We know that the complement of a modal verb taken by itself is not implied or presupposed to be true. In (42b) and (42c), the quantifier underlying the NP *a museum* is attached to the complement. Therefore, the above rule correctly predicts that no referent corresponding to *a museum* is established under these two interpretations.

From the point of view of a text-interpreting device, the classical theory has little to recommend itself. The problems studied above clearly argue in favor of the Bach-McCawley framework. In processing a sentence, a text interpreter apparently has to associate an indefinite NP with a variable and attach the binding quantifier to some sentence above the NP using whatever clues there are present to assign the scope with as little ambiguity as possible. Clues that reduce scope ambiguity include the presence of an appositive relative clause or of special words such as *certain*, *single*, and *some* in the noun phrase itself and the surface order of quantifiers, negation, and articles in the rest of the sentence. Second, the interpreter has to keep track of the truth value of the

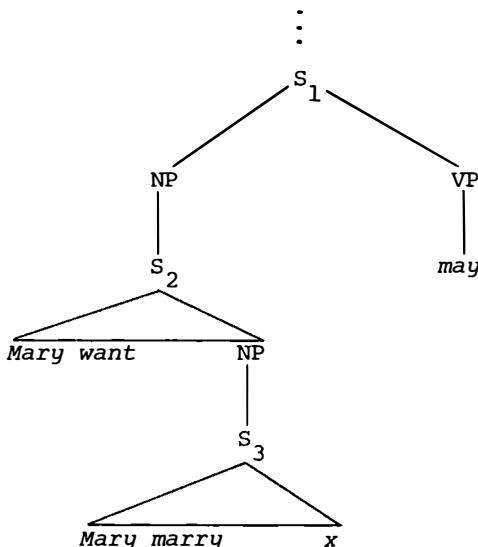
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proposition represented by the sentence to which the quantifier is attached. The following example demonstrates some of the difficulties that are involved. Let us start a discourse with (43).

- (43) *Mary may want to marry a Swede.*

Highly schematically, the underlying structure of (43) is something like (44).

- (44)



The quantifier that binds the variable underlying the NP a Swede may belong to any of the three sentences,  $S_1$ ,  $S_2$ , and  $S_3$ , which causes (43) to be ambiguous at least in the following three ways.

- (45) a. *There is some Swede whom Mary may want to marry.*  
 b. *It may be the case that there is some Swede whom Mary wants to marry.*  
 c. *It may be the case that Mary wants her future husband to be a Swede.*

Of the three sentences involved, only  $S_1$  is asserted by the speaker to be a true proposition. The two other sentences,  $S_2$  and  $S_3$ , are both commanded by a modal verb (*may* and *want*), therefore, their truth is not implied or presupposed. The indefinite NP a Swede establishes a discourse referent just in case its binding quantifier is attached to  $S_1$ . This

can be demonstrated easily by pointing out that, if the speaker continues the discourse with (46), the preceding sentence (43) can only be understood in the sense of (45a).

- (46) *She introduced him to her mother yesterday.*

However, the following continuation, where the pronoun *it* stands for  $S_2$ , permits both (45a) and (45b).

- (47) *Suppose that it is true, then she will certainly introduce him to her mother.*

As a final example, after some thought it should be obvious that a discourse consisting of (43) and (48), where the first *it* in (48) stands for  $S_2$  and the second *it* for  $S_3$  is three ways ambiguous just as (43) by itself. Since all three component propositions of (44) are now either asserted or supposed to be true, there is no way of resolving the inherent scope ambiguity by looking at the coreferentiality of a Swede and *him*.

- (48) *Suppose that it is true and that she does it, then she will certainly introduce him to her mother.*

Although the argument against the traditional feature [ $\pm$  specific] should leave no doubt about its uselessness in discussing anything but the simplest kind of scope ambiguity, it does not necessarily mean that the familiar terms "specific" and "nonspecific" should be rejected. They have proved quite useful and no harm is done, provided that they are understood in a relative sense and not as denoting some absolute property inherent in indefinite noun phrases. For example, consider interpretation (45b) of (43), which assigns the quantifier to  $S_2$ . One might want to say that, with respect to the verb *want* the indefinite NP a Swede is specific. On the other hand, if the quantifier is attached to  $S_3$ , as in (45c), a Swede could be called nonspecific with respect to *want*. In general, let us call an indefinite NP specific with respect to a given verb (or quantifier, or negation) if the latter is in the scope of the quantifier associated with the NP. It is nonspecific in case the verb commands the quantifier. This kind of definition seems consistent with the way these terms have been used in recent literature, and there is no reason to stop using them as long as the relative nature of specificity is understood.

### 3. SUMMARY

It is time to review the situation. We started by asking the seemingly naive question, "When is there supposed to be an individual associated with an indefinite noun phrase?" Naive

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as it may be, it must be answered in case there is ever going to be a device for interpreting written texts or everyday conversation with anything approaching human sophistication. There is also another reason to be interested in the subject. From a linguistic point of view, it is a problem of coreference constraints of a somewhat different kind than those studied under the label "Pronominalization". The present type of constraints are even more basic. It would seem that the question whether two noun phrases can be coreferential at all must precede the question whether a pronoun-antecedent relation may hold between them. Second, if relative clauses are derived transformationally from conjoined sentences by Relativization, as many linguists believe, the constraints discussed here are also a prerequisite for that transformation. For these reasons, the problems studied in this paper are of some theoretical interest quite independently from whether the results lead to any practical applications.

We found that in simple sentences that do not contain certain quantifierlike expressions, an indefinite NP establishes a discourse referent just in case the sentence is an affirmative assertion. By "establishes a discourse referent" we meant that there may be a coreferential pronoun or definite noun phrase later in the discourse. Indefinite NPs in yes-no questions and commands do not establish referents.

In studying more complicated examples, it was found necessary to replace Chomsky's integer-type referential indices by bound variables. In this framework, the traditional problem of specificity is treated as scope ambiguity. We studied several types of verbs that take complements and their semantic properties. We concluded that, in general, an indefinite NP establishes a permanent discourse referent just in case the quantifier associated with it is attached to a sentence that is asserted, implied, or presupposed to be true, and there are no higher quantifiers involved.

There are a couple of special problems - "other worlds" and short-term referents. Although discourse referents ordinarily exist for the speaker, there is a class of "world-creating" verbs, such as *believe*, that also establish referents of another kind. These exist for somebody else, not necessarily for the speaker. Therefore, we need to distinguish between the speaker's world and other realms and allow for the possibility that they are not populated by the same individuals. Second, there are short-term referents, whose lifespan may be extended by continuing the discourse in the proper mode. What this proper mode is depends on the circumstances. For example, every successive sentence may have to contain (i) a modal as the main verb, (ii) a quantifier of

a certain type, or (iii) be in the counterfactual mood. That is, it is possible to elaborate for a while on situations that are known not to obtain or that may or should obtain and discuss what sometimes or always is the case.

NOTES

<sup>1</sup>These examples are due to Baker (1966).

<sup>2</sup>I am indebted to Robert E. Wall for suggesting the term "implicative" to me.

<sup>3</sup>What remains unexplained here is the fact (pointed out to me by John Olney) that *must* in (27) has two meanings depending on the specificity of the NP *a rich man* in the preceding sentence. If the first sentence is about a specific man, then *must* in the second sentence is interpreted in a rather weak sense: 'It is likely that he is a banker'. But if the NP *a rich man* is nonspecific, the second sentence means: 'It is necessary that he be a banker'.

<sup>4</sup>George Lakoff (1970c) has suggested that quantifiers and negation be analyzed as verbs (predicates) instead of giving them a special status, as is usually done in symbolic logic. It is yet unclear to me whether there is any substantive issue involved or whether he is only proposing another notation.

<sup>5</sup>There are other good arguments against the feature [ $\pm$  specific] in Fodor (1968). Unfortunately, they did not persuade the author herself.

<sup>6</sup>The complement of *intend* is what W.V.O. Quine calls "opaque context". I ignore here his view that one should not be permitted to quantify into such a context. It seems to me that the objections he raises have to do with the double role names play in such contexts and only call for more sophisticated linguistic analysis. Notice that Quine approves of (i) while rejecting (ii) as meaningless (Quine 1960, p.166).

(i) ( $\exists x$ ) (*Tom believes x to have denounced Catiline*)

(ii) ( $\exists x$ ) (*Tom believes that x denounced Catiline*)

From a linguistic point of view, however, there is nothing but

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a superficial difference between (i) and (ii) due to subject raising that has applied in (i) but not in (ii).

<sup>7</sup> By "higher quantifier" I mean quantifiers such as *all*, *each*, *many*, and *few* - in fact, everything except the quantifier associated with the singular *some* and the indefinite article. The reason for making this distinction is the fact that, if there are two indefinite singular NPs in the same sentence, both establish a referent no matter what their order is.

(iii)                  *A dog was killed by a car.*

This example, of course, justifies a later reference both to the dog and the car.



## SOME NOTES ON ENGLISH MODALS

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*These three notes appeared in October 1969 in No. 4 of "Phonetics Laboratory Notes", an informal underground journal compiled by students and faculty connected with the University of Michigan phonetics laboratory, and circulated at irregular intervals in duplicated form. Larkin's observations about systematic differences in meaning between English modal auxiliaries and their supposed paraphrases have been cited in R. Lakoff (1972) and Ōta (1970). The particular question of how will and be going to differ has been studied subsequently in greater detail by Binnick (1971, 1972). The two notes were added by Larkin in 1975.*

### WILL

A variety of terms, such as "future", "volitional", "characteristic", "habitual obstinacy", and "predictive", have been used to describe the meanings of modal will. None of these descriptions seems to cover the case of will in the relative clause of sentences like those given in (1):

- (1) a. *John hires anyone who will tell him some old war stories.*

- b. *?John hires anyone who will pass his screening test.*
  - c. *John hires anyone who will put a portion of his pay back into the business.*
- (2) a. *John hires anyone who tells him some old war stories.*
- b. *John hires anyone who passes his screening test.*
  - c. *?John hires anyone who puts a portion of his pay back into the business.*

The sentences in (2) differ from those in (1) in that the action described by the main clause (hiring) follows the action described by the relative clause (telling a war story, passing a test, putting pay back into the business) in the case of the sentences in (2), but precedes it in the case of the sentences in (1). This sequence of events explains the oddness of (1b) and of (2c). One might expect that there is a future tense lurking in the first set of sentences that is absent from the second.

But there is more to it than that. For sentence (1a), telling an old war story is not a condition for being hired, but agreeing to tell a war story is. The sequence for (1a) is: agreement, hiring, telling of story. Paraphrases for (1a) and (2a) might well be:

- (1a') *If someone agrees to tell John some old war stories, then John hires him.*
- (2a') *If someone tells John some old war stories, then John hires him.*

It is not ordinarily possible to agree to pass a test (unless it is a ridiculously simple test), but it is possible to agree to put some of your pay back into a business. These observations would serve to explain why (1b) but not (1c) is strange. The oddity of (3a), and the naturalness of (3b), can be explained in a similar way.

- (3) a. *?John fires anyone who will tell him some old war stories.*
- b. *John fires anyone who tells him some old war stories.*

While it is not strange to get fired for something you have done, it is strange to do something so that you can be fired. And making the sort of agreement that *will* indicates in this

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sentence is doing something in order to be fired.

Sentence (4) is odd just because *be going to* does not imply that there is any such agreement.

- (4) *?John hires anyone who is going to tell him some old war stories.*

To make any sense, (4) would have to refer to a situation where John went about discovering people who intended to tell him a war story and then hired them. Note that *be going to* in (4) is just as volitional and just as indicative of the future as *will* is in (1a).<sup>1</sup>

CAN

Consider now such sentences as:

- (1) a. *You can anticipate more conspiracy indictments in the near future.*  
b. *We can look forward to fewer fluctuations in the market in the months ahead.*  
c. *Peter can expect to receive an important promotion before Wednesday.*

The speaker of a sentence like this is clearly not making an ordinary statement. As literal statements the sentences in (1) are next to meaningless. At best they are totally obvious, as the expected paraphrases of (1a) below show.

(1a') { You are able to  
          You are permitted to  
          It is possible for you to }

*anticipate more conspiracy indictments in the near future.*

As "totally obvious" statements, these sentences bear a certain resemblance to another class of "obviously true statements". Carol Feldman and Mike Shen have pointed out to me that people often make statements that are clearly true but that, in effect, mean something quite different from what they state. Sentence (2) is an example of such a sentence:

- (2) *Your husband can speak, Mrs. Westbrook.*

If (2) is the report of the decision of some assembly to allow Mr. Westbrook to address it, or if it is the report of a doctor on the outcome of an operation, then this sentence means what it appears to mean. But if (2) is an obvious statement of fact to both the speaker and the hearer (so

obvious, in fact, that it is clear to both of them that there is no point in making that particular statement), then (2) means something like:

(2') *Be quiet and let your husband talk for himself.*

That is, the point of saying (2) is not to make the obvious statement, but to insinuate something else.

The similarity between a sentence like (2) and the sentences in (1) is shown by the fact that the only possible predicates for type (1) sentences are verbs like *expect* and *anticipate*, but not, say, *await* or *schedule*. To state that someone *can anticipate* or *can expect* is to necessarily make a true statement, for these innate "abilities" are uncontrollable (unless, say, you have absolute power over someone's mind) and cannot be developed or learned (as the ability to swim can be, for example). That is, there is no way to constrain or improve an expectation or an anticipation.

These two sentence types differ, however, in that the speaker of a type (1) sentence is not mentioning anyone's abilities, nor is he saying something that the hearer already knows. Sentence (1c), for example, informs the hearer that Peter will get a promotion before Wednesday. If the hearer were to angrily respond *I know it* or *That's what you think* to (2), this response would be to the "obvious statement" that (2) makes, not to what it insinuates. The same response to (1c) would not be to any obvious statement made by that sentence, but rather to the proposition that Peter is going to be promoted. That is to say, a reply or evaluation of the factivity of a type (1) sentence is a response to or evaluation of the truth value of the information conveyed by the sentence embedded beneath the *expect*-type verb in the main clause. It is not a reply to or an evaluation of the factivity of the main clause, as it would be for a type (2) sentence.

Type (1) sentences, therefore, do not make "obvious statements", in the same sense that type (2) sentences do.

The following sentences also seem similar to those in (1):

- (3) a. *You can go to hell.*
- b. *Ralph can just forget the whole thing.*
- (4) a. *You can take these invoices up to the boss now.*
- b. *The patient in room four can get dressed now.*

Such sentences clearly are not statements; rather, they are "enabling" utterances of some sort. Those in (4) appear to

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give permission, but it is not the permission of *may*, *allow*, or *permit* (e.g., it is not the sort of permission that is usually requested). The speaker of a type (4) sentence presumes to have some authority or inside information. For example, (4b) would normally be said by a nurse or doctor, not by another patient.

The sentences in (1) have this same restriction. For (1b) the speaker must presume some knowledge of the economic situation and economics (i.e., he is not just making a wild guess). For (1c) the speaker must have some inside information on Peter's promotion. That information can't be common knowledge. The speaker also presumes that the hearer is not as knowledgeable as he. He is informing the hearer, not, say, reminding him.

Consider the following sets of type (4) and type (1) sentences:

- (5) a. *You can tell Winston to come in now, Miss Jones.*
- b. *Winston can come in now, Miss Jones.*
- c. *You can come in now, Winston.*
- (6) a. *You can expect Winston to get the loan he applied for.*
- b. *Winston can expect to get the loan he applied for.*
- c. *You can expect to get the loan you applied for, Winston.*

We might claim that the sentences in (6) parallel their (5) counterparts, and that just as (5a) and (5b) enable Miss Jones to send Winston in, (6a) and (6b) enable the hearer to know something (or, literally, to expect something) about Winston. Certainly, (6a) is no more a statement about the hearer than (5a) is about Miss Jones. I find (6a) and (6b) to be synonymous except that (6b) contains the presupposition that Winston (as well as the addressee) doesn't yet know that he will receive the loan, while (6a) need not have this presupposition. And we have seen above that both sets of sentences presuppose the same sort of restrictions on their speakers.

But, although the structure of the (b) and (c) sentences of (5) and (6) seem entirely parallel, the (a) sentences are not parallel except for the fact of their surface subjects.

More importantly, it would be inappropriate to respond to the factivity of a type (5) sentence (e.g., by agreeing with it or denying it), but, as we have seen, it is entirely appropriate to reply to the factivity of a type (6) [i.e., a

type (1)] sentence.

The underlying nature of a type (1) sentence, therefore, remains a mystery.

MUST

Consider the root modal *must* and its supposed periphrastic form *have to*:

- (1) a. *My girl must be home by ten.*
- b. *My girl has to be home by ten.*

Sentence (1a) implies that the speaker "goes along with" the prohibition that the sentence states, while (1b) is neutral in this regard. On certain occasions (e.g., while on a double date) using (1a) instead of (1b) might open the speaker to the ridicule of his peers.

- (2) a. *The garage must be cleaned up before we can use it.*
- b. *The garage has to be cleaned up before we can use it.*

Sentence (2a) could be used to express the speaker's belief that the garage is too dirty to use. But it would sound a bit strange if used to report a condition imposed by the landlord, unless the speaker also intended to indicate either his agreement with the landlord (i.e., that the landlord was acting reasonably or justly in imposing this restriction) or his eagerness for the job. Sentence (2b), like (1b), is neutral in this regard.

- (3) a. *Johnny must play in his own yard today.*
- b. *Johnny has to play in his own yard today.*

If a playmate of Johnny's used (3a) instead of (3b), we would know that he was assuming some parental attitudes, and was identifying with those who put the restriction on Johnny rather than with Johnny himself.

Examples like these are relatively easy to concoct. They all show that there is some presupposition present in a *must* predication that is absent for *have to*. Just exactly what this presupposition is is not exactly clear. The speaker seems to identify, in some way, with the source of the need that is being expressed by a *must* sentence. On the basis of the examples given above, we might hypothesize that the speaker presupposes that the requirement or compulsion is a necessary and just one. However, this formulation of the presupposition would not cover the following apparently related

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facts.

Jim Lindholm has discovered a very convincing case where there is a clear difference between *must* and *have to*. *Must* is excluded from sentences that indicate the necessity of engaging in some function of the human body or some act that satisfies some bodily need when the body itself is seen as the compelling force:

- (4) a. *I've got to vomit.*
- b. *Sam looked like he just had to laugh.*
- c. *Betty has to use a mouthwash.*
- d. *I have to { yawn  
          scratch }.*
- e. *Ralph has to lie down.*

Although the (a) sentences below are grammatical, the source of the compulsion is not so obviously physical as it is for the (b) sentences. Rather, social convention, propriety, a tyrannical parent, or some other consideration provides the rationale for the stated need.

- (5) a. *I must blow my nose.*
- b. *I have to blow my nose.*
- (6) a. *Adam must go to the john.*
- b. *Adam has to go to the john.*
- (7) a. *I must take a rest.*
- b. *I have to take a rest.*

The explanation for these facts most probably has something to do with the fact noted above - the speaker of a *must* sentence identifies himself in some way with the source of the compulsion. Presumably, we do not identify our "selves" in this way with our baser physical needs.

This "identification" does not work like other presuppositions. Compare (8a) and (8b) to (2a) and (2b):

- (8) a. *Henry assassinated Milo.*
- b. *Henry murdered Milo.*

Sentence (8a) contains a presupposition that (8b) doesn't, just as (2a) has a presupposition that (2b) does not. *Assassinate* indicates that the speaker of (8a) believes that Milo's murder was a political killing and that Milo was a powerful figure. These presuppositions are absent from (8b). Someone might well agree with or subscribe to (8b), but not

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(8a). In order to agree with (8a) someone would have to believe that the killing was political and that Milo was powerful; i.e., part of what someone agrees with, when he agrees with a particular utterance, are presuppositions of that utterance. This presupposition, then, is both a condition on "saying" (8a) and on "subscribing to" (8a).

However, if someone says (2b) is true, he seems logically bound to say (2a) is true, whether he believes that the extra condition (2a) carries is justified or not and whether or not he himself identifies with the source of the restriction in any way. That is to say, the presupposition that accompanies a *must* locution does not seem to affect the factivity of the statement made. It is a condition on "saying" a *must* sentence, but it is not a condition on "subscribing to" a *must* sentence.<sup>2</sup>

NOTES

<sup>1</sup>The particular property of *will* evidenced by these sentences shows up in other sorts of constructions as well. In an announcement like (i), for example, the use of *will* over *be going to* seems to imply that Peter was being asked or pressured to run (by a citizens committee, say) and had agreed to do so, rather than that he had decided on his own to throw his hat in the ring.

- (i) Listen, everyone. Peter  $\left\{ \begin{array}{l} \text{'ll} \\ \text{'re going to} \end{array} \right\}$  run for mayor.

But *will* does not just implicate agreements of this type, it's also more appropriate than *be going to* for proposing them

- (ii) If you  $\left\{ \begin{array}{l} \text{'ll} \\ \text{'re going to} \end{array} \right\}$  teach me karate, I'll teach you typing.

or making them:

- (iii) Whose job is it to do the dishes tonight?

I  $\left\{ \begin{array}{l} \text{'ll} \\ \text{'m going to} \end{array} \right\}$ .

- (iv) If no one else wants to, I  $\left\{ \begin{array}{l} \text{'ll} \\ \text{'m going to} \end{array} \right\}$  dig the trench.

## Notes on English Modals

This property of *will* is surely not unrelated to certain other aspects of *will* sentences, for example, that *will* is sometimes barred from talking about inevitable events:

- (v) *Hang on! We* { ?'ll  
          're going to } *crash!*

It's unclear to me exactly what unites the various uses of *will*, but it might well be that what distinguishes *will* from *be going to* here parallels the difference between *must* and *have to* noted below. We might say that a speaker of a *will* sentence is less talking about an already determined state of affairs than he is about one that still involves the decisions and attitudes of individual actors.

<sup>2</sup>Although I'd hesitate now to call it a "presupposition", and although the examples in this note have not been all that convincing, it still seems to me that the speaker of a *must* sentence identifies himself with the predication the modal makes in a way that the speaker of a *have to* sentence does not. This distinction can perhaps best be seen where the modal has an epistemic sense. Thus, where some strict or thorough process of reasoning is used to reach a conclusion, both *must* and *have to* seem okay:

- (i) *We've checked every other possibility. The trouble* { has to  
                  must } *be in the tubes.*

But where the deduction in a sense comes from the speaker rather than from the logically adduced nature of things, *must* seems more natural. So, for example, the guesses people make in attempting to deal with children's questions typically take *must* (as Mike O'Malley once pointed out to me):

- (ii) a. *I see the barn, Mommy. But where are the cows?*  
      b. *They* { must  
              ?have to } *be grazing somewhere else.*
- (iii) a. *Why is there salt in the ocean, but not in lakes?*  
      b. *Well, there* { must  
              ?has to } *have been more salt rocks where the oceans formed than where the continents did.*

Similarly, statements made about someone else's mental or physical state, where no firm conclusion is possible and the role of the speaker's suppositions is crucial, seem to prefer *must*.

- (iv) *That was a long drive. You must be tired.*
- (v) *Did you see the look Sandy gave Joe? She must really hate him.*
- (vi) *So Tom got a raise, did he? He must be happy.*

Using *have to* in sentences like these would make them more emphatic, since by failing to identify the speaker with what was being said it would tend to appear that the speaker was simply speaking about a logically necessary state of affairs. Other types of epistemic utterances where the speaker's involvement is crucial similarly prefer *must* over *have to*. Estimates, for example,

- (vii) *Boy, what a party. There { must  
have to } be twenty lawyers here.*

or some self-introductions and other sorts of suppositions

- (viii) *You { must  
have to } be Harriet. Hello, I'm Joe's mother.*
- (ix) *I { must  
have to } sound a little silly.*

With regard to the root usage of *must* and *have to*, the difference between them seems to show up best in scenarios where the speaker's feelings about the obliged undertaking are at issue. Since it overtly indicates the speaker's identification with what's being said, the modal *must* seems somewhat out of place in situations where the speaker wishes to maintain solidarity with the people who are adversely affected by the mentioned state of affairs. Most of the examples given in the text are like this.

- (x) *Sorry to break up our game, boys, but I { have to  
?must } go pick up my wife.*
- (xi) *It's time for us to go home now, Harry. It's 2:00 and the bartender { has to  
?must } lock up.*

In some cases, the use of *must* gives an utterance a self-righteous air. Compare (xii) with (xiii):

- (xii) *I understand your predicament, Mr. Butler. But I must always think of the company first.*
- (xiii) *I understand your predicament, Mr. Butler. But I have to always think of the company first.*

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By indicating that the speaker identifies himself with the necessity of putting the company first, the use of *must* here not only fails to show any solidarity with Mr. Butler, but it also tends to indicate that the speaker believes in what he's doing. This property of *must* sentences has an interesting outcome in utterances that are meant to indirectly accomplish certain speech acts. It usually turns out in such cases that modals are more natural than their periphrastic forms. Compare (xiv) with (xv):

(xiv) *I must ask you not to testify in the Jones case tomorrow.*

(xv) *I have to ask you not to testify in the Jones case tomorrow.*

In both cases, the speaker is attributing the necessity or motivation for asking the addressee not to testify to something or someone other than himself. But in (xiv) he identifies himself with it, he indicates that he goes along with it. It is reasonable to assume, then, that the speaker means to ask the addressee not to testify, and, consequently, to treat this particular utterance as sufficient for so asking. In (xv), however, the speaker does not overtly identify himself with the necessity of asking the addressee not to testify, and therefore the implicature is not so naturally pushed through. This sentence more easily leaves open the question of whether the speaker intends his utterance to make the possibly illegal request he says he's required to make. There is also a class of sentences like (xvi)

(xvi) *You must have some of Aunt Marie's pie.*

which seems to prefer *must* over *have to*. They work as polite utterances by verbally lifting the onus of making a decision or expressing a desire from the addressee and, with *must*, by indicating that the speaker himself is doing this and not, as with *have to*, simply talking about some externally mandated state of affairs. Consider also sentences where the speaker has just thought of something he takes to be a good idea (but has not yet thought it through). In such cases, *must* is again preferred over *have to*.

(xvii) *Speaking of Italian food, I* {<sup>must</sup>  
?have to  
'll have to} *ask my mother for her recipe for lasagna.*

The way the speaker's identification of himself with what is being said works out here is very reminiscent of the way it works out with the epistemic *must* of sentences like (ii)

and (iii), where the utterance is also very much off the cuff.

What remains interesting to me about this attribute of *must* is that it attaches to the act of uttering the modal and not to the logical meaning it encodes. The notion of how (or how much) a speaker is identified with what is being said turns out to be important for understanding the nature of communicative events in general, I think. Consider, for example, the difference between an advertisement that uses a testimonial from a product user and an advertisement that uses an announcer to deliver the same message. Or think of the difference between a group of pickets with obviously hand-lettered signs versus the same pickets each carrying commercially printed signs. Or the way we would understand the answers of a witness at a congressional hearing who checked with his lawyer before responding to each question, as compared to a witness who answered spontaneously. The connection we make between a speaker and the content of what he says seems to be crucial to how we take what is being said and, following that, how we understand the message itself.

## THE 2<sup>3</sup> VERBS *PRETEND*

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*This paper was written in 1970, while Neubauer was a graduate student at the University of Michigan, and was circulated in mimeographed form. The work was supported in part by grant GS-2939 from the National Science Foundation to the University of Michigan. The paper combines two areas of inquiry that were starting to receive great attention at the time - the logic of complement constructions and inter-speaker variation in syntax and semantics. The question that Neubauer raises about language acquisition in the final paragraph of the paper is particularly worth pondering - given the subtle nature of the facts that distinguish the eight idiolectal variants of the meaning of pretend, is there any way that such variation could have arisen other than through random variation in the way that children formed generalizations about pretend? Neubauer's conclusions about pretend are developed further, and in some important respects contested, in Rosenberg's (1975a,b) studies of "counterfactive" verbs.*

The point of this paper is threefold: (i) to attempt to clear up some of the confusion that has recently been circulating about the verb *pretend*; (ii) to point out an interesting case of syntactic dialect variation where there

seems to be a relatively large but apparently finite number of closely related dialects on a single item; and (iii) to provide some evidence that surface lexical items may be composed of more primitive elements at a deeper level of analysis.<sup>1</sup>

It was suggested in Karttunen (1970b) and G. Lakoff (1971) that the verb *pretend* carries a counterfactual presupposition. Thus the speaker of a sentence such as (1) is committed to the assumption that the complement of *pretend* is false, i.e., that (2) is true.

- (1) *Max is pretending that he is sick.*  
(2) *Max is not sick.*

In Lakoff (1971), the claim is made that there is a distinction between factive and counterfactual presuppositions in that factive presuppositions have the property of transitivity while counterfactual presuppositions do not. For example, compare (3) with (4).

- (3) *Max regretted that he realized he was sick.*  
(4) *Max pretended that he realized he was sick.*

The complement of both (3) and (4), (5), itself contains the factive predicate *realize* and thus presupposes (6).

- (5) *He [Max] realized he was sick.*  
(6) *He [Max] was sick.*

The phenomenon of factive verbs such as *regret* and *realize* is at least well known if not well understood, and it is commonly agreed that (3) presupposes (5) and (5) presupposes (6). Lakoff claims that *pretend* is counterfactual and thus (1) presupposes (2) and (4) presupposes (7).

- (7) *Max didn't realize he was sick.*

If the presupposition relation is transitive, then both (3) and (4) should presuppose (6), since (6) is a presupposition of their presuppositions, namely (5) and, according to Lakoff, (7), respectively. But Lakoff finds that, for him, (4) does not presuppose (6) and thus concludes that transitivity does not hold for counterfactual presuppositions. [He does note, however, that there is another dialect, which happens to include the present writer, wherein (4) does presuppose (6) and transitivity holds.]

This "failure of transitivity" prompted Bas van Fraassen to suggest (in a letter to Lakoff) that the "presupposition" of a sentence whose main verb is *pretend* might not be  $\sim S$

The 2<sup>3</sup> Verbs *Pretend*

(where S is the complement of *pretend*) but "it is not true that S" for those who share Lakoff's judgements. To see the point of van Fraassen's suggestion, consider (8).

- (8)      \*Ed { a. regrets  
              b. has found out  
              c. realizes } that the earth is flat.

The sentences of (8) are, of course, starred under the assumption that the speaker and/or the hearer believe that the earth is not flat. A member of the Flat Earth Society, for example, would see nothing odd about (8). However, in order to have some constant reference point, we will assume for the remainder of this paper that everyone concerned assumes that the earth is a sphere. Since the verbs of (8) are all factives, which presuppose the truth of their complements, the sentences of (9) are also infelicitous.

- (9)      \*Ed { does not regret  
              has not found out  
              does not realize } that the earth is flat.

But, notice the difference between (9) and (10).<sup>2</sup>

- (10)     It is not { true  
                  the case  
                  so } that Ed { \*regrets  
                  has found out  
                  realizes }  
                  that the earth is flat.

Now we are set for the crucial test of van Fraassen's hypothesis, which is given in (11).

- (11)     Ed is pretending that he { a. \*regrets  
                  b. %has found out  
                  c. %realizes<sup>3</sup> } that  
                  the earth is flat.

The speakers who find (11b) and (11c) good are exactly those who agree with Lakoff's judgment that (4) does not presuppose (6), a fact that strongly confirms van Fraassen's hypothesis that in Lakoff's dialect the presupposition of (4) is not (7) but (12), which does not commit its utterer to (6).

- (12)     It is not true that Max realized he was sick.

The interesting and important thing about (11) is that (in the appropriate dialects) the pattern of stars matches the pattern of stars in (10); i.e., although it is not completely predictable whether a given verb will produce a good or bad (10)-type sentence for a given speaker, the felicity of the corresponding (11)-type sentence can be

predicted from the (10)-type.

Another question that Lakoff does not adequately discuss is, what is the logical relation between the sentence whose main verb is *pretend* and its complement? Lakoff assumed that it was presupposition, but Karttunen (1970a) attempts to demonstrate that it is not. He points out the difference between sentences like (13) and (14).

(13) *Is John pretending to be a milkman?*

(14) *Does John realize that he is a milkman?*

Notice that (14) requires the assumption that John is a milkman, but that (for some speakers, obviously including Karttunen) (13) is neutral with respect to that assumption. Karttunen cites some additional examples, which, due to their complexity and varying amounts of relevance from dialect to dialect, will not be discussed here at all. The simplest examples showing what the appropriate logical relation(s) might be, and thus also the most revealing in the study of the dialects, are those such as (15) and (16), just a sentence and its negation.

(15) *\*Sam is pretending that the earth is a sphere.*<sup>4</sup>

(16) *%Sam is not pretending that the earth is a sphere.*

If a presupposition relation held, then (16) would be ungrammatical, read with normal intonation, in exactly the same way that (9) is. But, this is the case for only some speakers, interestingly (a minority that includes this writer). For most people, however, (16) is perfectly well formed and appropriate whether the earth is a sphere or not [which is not true of (15)]. For them, (16) indicates that the relation is not presupposition, but entailment.<sup>5</sup>

Karttunen (1970a) pointed out yet another problem with *pretend*, namely, the question of who must believe the complement of *pretend* to be false or not true. Karttunen hypothesizes the following situation: John is a milkman who is suffering from amnesia; he is persuaded to dress up in a milkman's uniform and carry out the duties of a milkman in the hope that this will jog his memory. Under these circumstances, would it be appropriate to report his actions with (17)?

(17) *John is pretending* {*to be*  
*that he is*} *a milkman.*

Karttunen finds this perfectly alright, but to some others (including the present writer), (17) would not be an

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appropriate report of that situation. Thus, we see that there is an additional point of differentiation, namely, whether or not the speaker must agree<sup>6</sup> with the subject of *pretend* that its complement is false or not true.

We have discussed three points with respect to which speakers may differ in their use of *pretend*. Those who find (16) grammatical have an entailment that the complement of *pretend* is (at least) not true, while those who find it ungrammatical have a presupposition. Those who find (11b) and (11c) grammatical merely require untruth of the complement of *pretend*, while those who find them ungrammatical have the stronger requirement of falsity. And finally, those who find (17) to be unacceptable in the circumstances have additional complications in terms of agreement of the speaker about the situation described in the lower sentence, where those who find (17) acceptable do not. As it turns out, these points are all logically independent, and, in fact, all possible combinations of the various choices seem to exist. In tabular form the eight possible dialects (resulting from three independent binary choices) are shown

(18)	a.	E	$\sim T(S)$	$\sim A$
	b.	E	$\sim T(S)$	A
	c.	E	$\sim S$	$\sim A$
	d.	E	$\sim S$	A
	e.	P	$\sim T(S)$	$\sim A$
	f.	P	$\sim T(S)$	A
	g.	P	$\sim S$	$\sim A$
	h.	P	$\sim S$	A

E indicates entailment; P, presupposition;  $\sim T(S)$ , that the complement is not true;  $\sim S$ , that it is false; A, that the speaker (or the subject of the next higher world-creating verb) must agree;  $\sim A$ , that he need not.

An important corollary of all this is that there can be no single atomic predicate, i.e., semantic concept, corresponding to the English word *pretend*, since in each of the dialects there would have to be a different set of meaning postulates associated with it. However, one would not want to say that there are eight different atomic predicates and that a given speaker merely picks one of them to associate with the word *pretend*, for to do so would be to claim that the difference between the various meanings of *pretend* lies in a single eight-way choice rather than three binary choices. But, if we accept that account, then we are left with no principled reason why there should be eight (and particularly those eight) dialects rather than five or thirteen or some other random number; any hypothesis that there is only a

single choice to be made among a number of independently existing atomic predicates forfeits any claim to the capability of explaining why those predicates are so closely related in simple, independently motivated<sup>7</sup> ways.

What is even more interesting about these dialects than the fact that they all exist, however, is their relative frequency and stability. Dialect (a) seems to be the most frequent and the most stable. It is the dialect toward which speakers tend to drift when pushed. This fact is not totally surprising. It is completely consistent with the facts found by Carden found that speakers in the NegQ and (to a lesser extent) NegV dialects tended to move into the AMB dialect when faced with a number of sentences over a period of time which were only grammatical in the other dialect. In other words, Carden found that when confronted with a mass of data which was not acceptable in his own current dialect, a speaker frequently liberalized his restrictions. This is precisely what seems to happen with respect to the *pretend* dialects. Dialect (a) is the most liberal of the eight possible; it allows (8b), (8c), (9), and (13), all of which would be ungrammatical in dialect (h) and some of which would be ungrammatical in any of the others.

That the above principle might be true is probably the most important suggestion raised by the present work. It is probably not true in its full generality<sup>8</sup>, but the question is to what extent is it true and what interesting generalizations might be made about that extent. Another question that is raised by this sort of work is, how do these dialects arise in the first place? Certainly there could not have been sufficient information in the form of crucial examples available to the child learning the language in the first place, so he must have made his decisions on the basis of insufficient evidence. Did he then simply make his choices completely at random, or did he have a strategy of some sort which might be discerned from some other features of his idiolect? There is obviously insufficient data at the present time to even attempt any sort of answer to these questions, but they seem to this writer to be potentially fruitful future lines of investigation.

#### NOTES

<sup>1</sup> I particularly wish to thank George Lakoff, John Lawler, and Andy Rogers for many enlightening discussions of this topic and for their criticisms of an earlier draft of this

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paper, which was uncirculated under the title "A *Pretend Paper*". They are not to be held responsible for any, much less all, of the inadequacies and inaccuracies in the final product.

<sup>2</sup> Note that, as usual, a given reader is not really expected to agree with a given writer's placement of asterisks. What is important is not the particular lexical items that correlate with asterisks, but the existence of a pattern of the claimed type.

<sup>3</sup> The symbol % is a nonstandard symbol recently introduced into the literature by Larry Horn and myself to indicate dialect variation that is important for the point being made.

<sup>4</sup> Some will at first rule (15) out for quite irrelevant reasons, namely, a difficulty in conceiving of someone pretending something that is not about him. The following situation may help such a reader imagine a non-equi-subject pretense. Suppose Tom enters wearing a raincoat, shaking water off his umbrella (or just pretending to), stamping his feet, etc. . If one knows that the sun is shining and it is a perfectly dry day outside, one might report the situation, I think, as (i).

(i) *Tom is pretending that it is raining.*

<sup>5</sup> The notions of presupposition and entailment as used here can be defined as follows:

$S_1$  presupposes  $S_2$  iff whenever  $S_1$  is true,  $S_2$  is true,  
and whenever  $S_1$  is false,  $S_2$  is true.

$S_1$  entails  $S_2$  iff whenever  $S_1$  is true,  $S_2$  is true.

Notice that the definition of entailment is just like that of presupposition, but without the second clause of the definiens, so that anytime  $S_1$  presupposes  $S_2$ , it also entails it, but not vice versa. Presupposition is a stronger relation than entailment and therefore fewer pairs of sentences will satisfy it.

<sup>6</sup> The notion of agreement seemed to be a handy one at first, but now it is clear that it is primarily useful as a

terminological rug for sweeping facts of the following sort under. Karttunen (1970a) pointed out the following situation. Suppose John is a patient in a mental institution because he thinks he is Napoleon Bonaparte; he realizes that the psychiatrists are not going to release him as long as they think he thinks he is Napoleon; therefore, he decides to act as if he no longer thinks he is Napoleon. Karttunen then asks if this is reportable as (ii).

- (ii) *%John is pretending that he is not Napoleon.*

He concludes that (ii) is acceptable under these circumstances, which is reasonable, since, as we already know, he is not in a dialect that requires agreement. But now consider (iii) instead.

- (iii) *John is pretending that he realizes that he is not Napoleon.*

To the best of my knowledge, (iii) is acceptable universally; in particular, it is acceptable in my own dialect. What is remarkable about that is that *John*, the subject of *pretend*, would dispute the felicity of the use of *realize* in the complement. For the speaker, in my dialect, it must be false that he realizes that he is not Napoleon, but for *John*, it is enough to think it not true. It may be the case that in all dialects, the subject of *pretend* need only believe that the complement is not true [or, as Karttunen (almost) pointed out, perhaps he need only not believe the complement to be true].

<sup>7</sup> Independently of the matter of *pretend*, there are other cases where there is variation on what the logical relation between two propositions related to a sentence is. Consider the analysis presented in Fillmore (1971): Take, for example, the verb *criticize*, which according to Fillmore asserts that a situation or act is bad and presupposes that the person being criticized is responsible for it. Fillmore's analysis predicts that (iv) should be appropriate only if the speaker assumes that Carol did, in fact, drop a dish.

- (iv) *Bob criticized Carol for dropping a dish.*

For some people, this may not be true, but their dialects are irrelevant to the discussion that follows. For me, Fillmore's analysis seems to be correct in that it is a presupposition, but there is another dialect in which the relation is not presupposition, but entailment. Therefore, I find (v) bad,

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unless Alice did drop a dish, while speakers of this other dialect [who do have the restriction in (iv)] have no such restriction for (v).

- (v) %*Ted didn't criticize Alice for dropping a dish.*

Similarly, there are cases where informants differ on questions of who must share certain opinions or beliefs in order for certain sentences to be appropriate in a given context. Thus, I find that my political views can affect my judgements about the appropriateness of (vi), while others may find it sufficient that Spiro thinks that "The Selling of the Pentagon" was blameworthy.

- (vi) %*Spiro accused CBS of claiming that the Pentagon spends too much money on public relations.*

At this time, I know of no other cases where the difference between "false" and "not true" is the subject of dialect variation, but I am confident that additional cases will be discovered in the near future. What this means is that at least two of the three parameters on which people vary with *pretend* are also subject to dialect variation with other verbs. This would seem strange to me if one were to accept the view that there are eight different, independent atomic predicates, of which each speaker selects one to pair with the word *pretend* and discards the other seven.

<sup>8</sup>See, for example, the discussion of SUPER-EQUI in Grinder (1970) and Neubauer (1970). I know of no cases where anyone has been influenced by exposure to my, more liberal, SUPER-EQUI dialect to shift over into it.



## ON A SURFACE STRUCTURE CONSTRAINT IN HUNGARIAN

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*This paper was read at the first annual conference of the New England Linguistic Society (now known as the North-eastern Linguistic Society) in November 1970, at M.I.T.; it appeared in report no. 3 of the Language Research Foundation, February 1971. It presents a strong contender for the title of the clearest known case of an output constraint and one of the most striking examples of how a morphological idiosyncrasy, because of its interaction with an output constraint, can be reflected in bizarre syntactic facts. Further work on the subject matter of this constraint, the definite-indefinite distinction in Hungarian conjugation, is presented in Szamosi (1974).*

This paper deals with the verb-object agreement rule and the wh-movement rule in Hungarian.\* The results of the interaction of these rules suggest the conclusion that there exists

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\* *I would like to thank David Perlmutter for many valuable comments and discussions relating to this work, one of which sparked the central idea in the paper. My thanks go also to Robert Vago for his time as my checking informant and his comments, and to Arlene Berman for her helpful criticisms.*

a surface structure constraint that restricts the co-occurrence of noun phrases and verbs in a clause. It is this constraint that renders some expressions ungrammatical.

First, some facts: Hungarian transitive verbs have two forms of conjugation. One, the indefinite conjugation, is used for intransitive verbs: verbs without an object, or i.e., a noun with an indefinite article *egy* (a, one), plurals without article, etc. . This conjugation is also used for intransitive verbs; verbs without an object, or with an object in a nonaccusative case. The other, the definite conjugation, is used with syntactically definite direct objects, i.e., with the definite article *a*, *az* ("the"), with possessive forms, proper names, etc. . Thus,

- (1) a. *Akart*      *egy*    *könyvet*.

*He wanted* <sub>Ind</sub> a book <sub>Acc</sub>

*He wanted a book.*

- b. *Akarta*      a *könyvet*.

*He wanted* <sub>Def</sub> the book <sub>Acc</sub>

*He wanted the book.*

- c. \**Akarta*      *egy* *könyvet*.

*He wanted* <sub>Def</sub> a book <sub>Acc</sub>

- d. \**Akart*      a *könyvet*.

*He wanted* <sub>Ind</sub> the book <sub>Acc</sub>

It is reasonable to suppose, then, that there exists a rule of verb-object agreement in Hungarian. The exact mechanics of the rule will not concern us here.

Sentential (direct object) complements are syntactically definite. That is, a verb that has a tensed *that*-clause as its direct object, is definite:

- (2) a. *János akarta, hogy (el)hozzak egy könyvet.*<sup>1</sup>

*John wanted* <sub>Def</sub> that I bring <sub>Ind</sub> a book <sub>Acc</sub>

*John wanted me to bring a book.*

- b. \**János akart, hogy (el)hozzak egy könyvet.*

wanted <sub>Ind</sub>

In ordinary relative clauses, where the relativized NP is a direct object (Accusative),<sup>2</sup> the verb always shows up in

## Output Constraint in Hungarian

its indefinite form, regardless of the definiteness of the head noun.

- (3) a. *Egy könyv amit akart.*  
*A book which<sub>Acc</sub> he wanted<sub>Ind</sub>*  
*A book which he wanted.*
- b. *A könyv amit akart.*  
*The book which<sub>Acc</sub> he wanted<sub>Ind</sub>*  
*The book which he wanted.*
- c. \**Egy könyv amit akarta.*  
*he wanted<sub>Def</sub>*
- d. \**A könyv amit akarta.*  
*he wanted<sub>Def</sub>*

Similarly, in wh-questions where the questioned element is a direct object NP, the verb is always indefinite:

- (4) *Mit akart/\*akarta János?*  
*What<sub>Acc</sub> he wanted<sub>Ind/Def</sub> John*  
*What did John want?*

In addition to the wh-words *mit* (what-Acc?) and *amit* (which-Acc), Hungarian also has *melyik(et)* (which-Acc?) and *amelyiket* (which<sub>2</sub>-Acc, the one which). When these are used in a question or a relative clause, the verb shows up as definite:

- (5) *Melyik könyvet akarta/\*akart?*  
*Which book<sub>Acc</sub> he wanted<sub>Def/Ind</sub>*  
*Which book did he want?*
- (6) *Ez az a könyv amelyiket akarta/\*akart.*  
*This that the book which<sub>2 Acc</sub> he wanted<sub>Def/Ind</sub>*  
*This is that book which he wanted, or  
This book is the one which he wanted.*

The facts of (3)-(6) can be captured by postulating that the wh-words *mit* and *amit* are syntactically indefinite, while *melyik(et)* and *amelyiket* are definite, at least at that point in the derivation where the verb-object agreement

rule applies.<sup>3</sup> Note, incidentally, that it is not the case that the verbs in (3)-(6) just agree with the accusative NP in their clause.

Consider:

- (7) *Ez az a könyv amelyiket János akarta  
This that the book which<sub>2</sub> Acc John wanted<sub>Def</sub>  
hogy elhazzam.  
that I bring<sub>Def</sub>  
This is the book which John wanted me to bring.*

Here, *akarta* is definite for the same reason it is definite in (2): it has a sentential direct object. *Elhazzam* is also definite, but this has to be attributed to *amelyiket*. Since it is unlikely that *elhazzam* in the embedded clause is agreeing with *amelyiket* in the matrix sentence, (7) suggests that verb-object agreement precedes wh-movement.

In the following, we shall not be concerned with *melyiket* and *amelyiket*. They were brought in to illustrate the above ordering, which would have been harder using *mit* and *amit*.

I will now turn to constructions using *mit* and *amit*, in which the NPs represented by these (i.e., the questioned or relativized NPs) originate in an embedded sentence. Some of these are grammatical, while others are not. First, consider a subject-embedding matrix verb *kell* (is necessary).

- (8) *Az, hogy elhazzam a könyvet, kell.  
It that I bring<sub>Def</sub> the book<sub>Acc</sub> is necessary.  
It is necessary that I bring the book.*

The fact that the embedded clause 'that I bring the book' precedes the verb, and the fact that the expletive *az* (see the *it* of Rosenbaum, 1967) is nominative, indicate that *kell* is a subject-embedding verb. (8) is grammatical if the sentence 'that I bring the book' is emphasized. Usually, however, this clause is extraposed:

- (9) *(Az) kell, hogy elhazzam a könyvet.  
(It) is necessary that I bring the book.*

Once this happens, the accusative NP, *könyvet*, can be freely questioned, or relativized:

- (10) *Mit kell, hogy elhazzak?  
What<sub>Acc</sub> is necessary that I bring<sub>Ind</sub>*

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*What is it necessary for me to bring?*

- (11) *A/egy könyv, amit kell, hogy elhozzak.*  
*The/a book which<sub>Acc</sub> is necessary that I bring<sub>Ind</sub>.*  
*The/A book which it is necessary for me to bring.*

So, we have no problem with wh-words pulled out of a subject complement.

Consider next clauses embedded under a NP that is in an oblique case. The verb *fél* (be afraid of) is an intransitive whose object is in a nonaccusative case. Thus, we have:

- (12) *Félsz a kutyaától.*  
*You are afraid the dog-of.*  
*You are afraid of the dog.*

Now, if instead of *kutya* (dog) we have a sentential object, we get

- (13) *Félsz, hogy ellgom a könyvet<sup>4</sup>.*  
*You are afraid that I steal<sub>Def</sub> the book<sub>Acc</sub>*  
*You are afraid that I will steal the book.*

Again, relativization and questioning of the object of the embedded sentence is quite free:

- (14) *Mit félsz hogy ellgom?*  
*What<sub>Acc</sub> you are afraid that I steal<sub>Ind</sub>?*  
*What are you afraid that I'll steal?*
- (15) *A/Egy könyv amit félsz hogy ellgom.*  
*The/A book which<sub>Acc</sub> you are afraid that I steal<sub>Ind</sub>*  
*The/A book which you are afraid that I'll steal.*

We begin to get into problems with the regular, direct-object-embedding verbs, like *akar* (want). Given a sentence:

- (16) *Akarta hogy elhozzam a könyvet.*  
*He wanted<sub>Def</sub> that I bring<sub>Def</sub> the book<sub>Acc</sub>*  
*He wanted me to bring the book.*

We find that the object of the embedded sentence cannot be relativized or questioned with *amit* or *mit*. So, in

opposition to (7) we have:

- (17) \*A/Egy könyv amit akarta, hogy elhozzak.  
*The/A book which<sub>Acc</sub> he wanted<sub>Def</sub> that I bring<sub>Ind</sub>*

*The/A book which he wanted me to bring.*

- (18) \*Mit akarta hogy elhozzak?  
*What<sub>Acc</sub> he wanted<sub>Def</sub> that I bring<sub>Ind</sub>?*

*What did he want me to bring?*

An indefinite matrix verb in (17), (18) is also ungrammatical, which is predictable, since we know from (2) that sentential direct objects require a definite matrix verb:

- (19) \*A/Egy könyv amit akart, hogy elhozzak.

wanted<sub>Ind</sub>

- (20) \*Mit akart, hogy elhozzak?<sup>5</sup>  
wanted<sub>Ind</sub>

We have to explain, then, why (17) and (18) are ungrammatical. Before jumping to premature conclusions, let us examine one more type of embedding, which will give us a clue to what is going on. The verb *kér* [or *megkér* (see footnote 1.)] (ask) appears in the following construction (*meg*)*kér* NP<sub>Acc</sub> [that S]<sub>NP</sub>. The NP dominating the complement sentence is in a nonaccusative case, which shows up if the expletive shows up, but we will be concerned with forms without an expletive for the reason explained in footnote 4. The important thing to note is that it is the lexical NP (NP<sub>Acc</sub>, above) that the matrix verb agrees with in definiteness (i.e., its direct object). Thus, we have the following alternation:

- (21) Megkérte ôt, hogy hozza el a könyvet.

*He asked<sub>Def</sub> she<sub>Acc</sub> that she bring<sub>Def</sub> the book<sub>Acc</sub>*

*He asked her to bring the book.*

- (22) Megkért engem, hogy hozzam el a könyvet.

*He asked<sub>Ind</sub> I<sub>Acc</sub> that I bring<sub>Def</sub> the book*

*He asked me to bring the book.*

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This alternation is due to the difference between  $\overset{\prime}{\alpha}$ <sub>t</sub> ( $\underset{\text{Acc}}{\text{she}}$ ) and  $\overset{\prime}{\alpha}$ <sub>t</sub> ( $\underset{\text{Acc}}{\text{me}}$ ). It is just one of those crazy facts about Hungarian, that the third person accusative form of the pronoun is syntactically definite, while the others are indefinite. So the alternation in (21), (22) is the same in

- (23)      Akarta                 $\overset{\prime}{\alpha}$ <sub>t</sub>.

*He wanted<sub>Def</sub> her*

*He wanted her.*

- (24)      Akart                engem.

*He wanted<sub>Ind</sub> me*

*He wanted me.*

which, of course, is the same as that exhibited in (1). The reason I introduced the minor wrinkle of using pronouns instead of nouns is that, for completely irrelevant reasons, (21) and (22) cannot be used for my purposes if they contain an overt direct object in the matrix clause. This can be gotten around by using pronouns, which are deletable:

- (25) Megkérte,                *hogy hozza el*                a könyvet.

*He asked<sub>Def</sub> (her) that she bring<sub>Def</sub> the book<sub>Acc</sub>*

*He asked her to bring the book.*

- (26) Megkért,                *hogy hozzam el*                a könyvet.

*He asked<sub>Ind</sub> (me) that I bring<sub>Def</sub> the book<sub>Acc</sub>*

*He asked me to bring the book.*

(25) and (26) are completely synonymous with (21) and (22), respectively; they contain no overt direct object, so we can proceed with illustrating the point. Consider now what happens when the direct object of the embedded clause is wh-fronted. From a structure parallel to (25), we get:

- (27) \*A/Egy könyv amit megkérte,                *hogy*

\*The/A book which<sub>Acc</sub> he asked<sub>Def</sub> (her) that

*hozzon el.*

*she bring<sub>Ind</sub>*

\*The/A book which he asked her to bring.

and

- (28) \*Mit      kérte meg,      hogy hozzon el?  
      What<sub>Acc</sub> he asked<sub>Def</sub> (her) that she bring?  
      What did he ask her to bring?

and from (26):

- (29) A/Egy könyv amit      megkért,      hogy hozzak el.  
      The/A book which<sub>Acc</sub> he asked<sub>Ind</sub> (me) that I bring<sub>Ind</sub>  
      The/A book which he asked me to bring.
- (30) Mit      kért meg,      hogy hozzak el?  
      What<sub>Acc</sub> he asked<sub>Ind</sub> (me) that I bring<sub>Ind</sub>  
      What did he ask me to bring?

Now, if we look at (17), (18), (27), and (28), which are all ungrammatical, as opposed to (29) and (30), which are fine, we find a very simple generalization: wh-fronting involving the wh-words *mit* and *amit* from an embedded clause results in an ungrammatical sentence if the matrix verb (the verb that is in the same clause as the head noun) is definite. This generalization will also account for the grammaticality of all the cases shown previously - (10), (11), (14), and (15). The matrix verbs in these sentences are intransitive; i.e., they lack a direct object, and consequently, they "take" the indefinite forms only. The generalization also reflects, to some extent, the native speaker's intuition about the ungrammatical sentences; the wrongness is "felt" to be centered, somehow, on the matrix verb--one doesn't quite know whether it should be definite or indefinite.

Having arrived at a generalization, our next problem is to represent it in the grammar. A rather ad hoc way of doing it would be to place a restriction on wh-movement.

(A) Wh-movement of a direct object from an embedded clause involving indefinite wh-words is blocked if the verb of the clause that contains the head noun is definite.

This, of course, is just a restatement of the generalization. Another point which shows up the ad hoc nature of this proposal is that wh-fronting is not the only rule that needs a condition like this. There exists in Hungarian a rule that I will call emph-movement, which takes any emphasized NP in a string and moves it to a position just in front of the main verb. So, from (31) we get (32).

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- (31) *János akarta, hogy menjek a moziba.*  
*John wanted<sub>Def</sub> that I go the cinema-to.*  
*John wanted me to go to the movies.*
- (32) *A moziba akarta János, hogy menjek.*  
*The cinema-to wanted<sub>Def</sub> John that I go.*  
*It was to the movies that John wanted me to go.*

This transformation, when applied to direct objects of embedded clauses, will have results similar to that of wh-movement. Operating on the structures underlying (9), (13), and (26), it will give (33), (34), and (35), respectively, which are grammatical.

- (33) *A könyvet kell, hogy elhazzam.*  
*The book<sub>Acc</sub> is necessary that I bring.*  
*It is the book that it is necessary for me to bring.*
- (34) *A könyvet félsz, hogy ellopom.*  
*The book<sub>Acc</sub> you are afraid that I steal.*  
*It is the book that you're afraid that I'll steal.*
- (35) *A könyvet kért meg, hogy hozzam el.*  
*The book<sub>Acc</sub> he asked (me) that I bring.*  
*It was the book that he asked me to bring.*

(33), (34), and (35) are also grammatical if we replace the definite NP *a könyvet* (*the book<sub>Acc</sub>*) with the indefinite NP *egy könyvet* (*a book<sub>Acc</sub>*). Now, when emph-movement operates on the structures underlying (16) and (25) we still have grammatical sentences:

- (36) *A könyvet akarta, hogy elhazzam.*  
*The book<sub>Acc</sub> he wanted<sub>Def</sub> that I bring<sub>Def</sub>*  
*It was the book that he wanted me to bring.*

- (37) A könyvet kérte meg, hogy hozza el.

*A book<sub>Acc</sub> he asked<sub>Def</sub> (her) that she bring<sub>Def</sub>*

*It was the book that he asked her to bring.*

But here, if we replace a könyvet by egy könyvet, we get ungrammatical sentences:

- (38) \*Egy könyvet akarta hogy elhozzak.

*A book<sub>Acc</sub> he wanted<sub>Def</sub> that I bring<sub>Ind</sub>*

*It was a book that he wanted me to bring.*

- (39) \*Egy könyvet kérte meg, hogy hozzon el.

*A book<sub>Acc</sub> he asked<sub>Def</sub> (her) that she bring<sub>Ind</sub>*

*It was a book that he asked her to bring.*

Although, if the matrix verb is indefinite, as in (29) or (30), the sentences are again grammatical:

- (40) Egy könyvet kért meg hogy hozzak el.

*A book<sub>Acc</sub> he asked<sub>Ind</sub> (me) that I bring<sub>Ind</sub>*

*It was a book that he asked me to bring.*

Thus, the situation is exactly analogous to that of the indefinite wh-words.

One could, of course, just as easily place a condition on emph-movement:

(A') Emph-movement of an indefinite direct object from an embedded clause is blocked if the main verb is definite.

It is obvious that the two conditions, (A) and (A'), are the same and that we are missing a generalization. The generalization seems to be that an indefinite accusative NP cannot end up in the same clause with a definite verb. One could argue, then, that what is needed is a general condition on movement rules which will prevent indefinite direct objects from being moved into a clause containing a definite verb. It can be shown, however, that such a constraint will not work unless we put a completely unmotivated condition on the constraint itself.

There is a consistent class of exceptions to the above generalization. It consists of those sentences in which the matrix verb is in the first person singular of the past indicative or in the first person plural of the present conditional. Sentences (17), (18), (27), (28), (38), (39),

which were ungrammatical above, turn out to be grammatical if their matrix verb is in one of the above forms. For example, to take just the counterparts of (17) and (38):

- (41) A könyv amit akarnánk, hogy elhozzon.

*The book which<sub>Acc</sub> we would want that he bring.*

*The book which we would want him to bring.*

- (42) Egy könyvet akartam hogy elhozzon.

*A book<sub>Acc</sub> I wanted that he bring.*

*It was a book that I wanted him to bring.*

At first this seems like a totally crazy fact. However, it is not an accident that it is these forms and only these forms that are grammatical. It is exactly in these cases, namely, in the first person singular of the past indicative and the first person plural of the present conditional, that the definite and indefinite conjugations collapse--they exhibit phonologically identical shapes. So, in (40) and (41), the forms *akarnánk* and *akartam*, belong to both the definite and the indefinite conjugations.<sup>6</sup>

In order to save the proposal for placing the conditions (A) and (A') on wh-movement and emph-movement, respectively, we have to put an identical exception clause on both:

the rules block under the circumstances indicated in the conditions, unless the matrix verb is in the first person singular of the past indicative or in the first person plural of the present conditional.

It should be clear that something obvious is being missed. The exception clause is the same in both (A) and (A'), it is totally unmotivated, and it fails to connect up in any way the fact that the very forms mentioned in it are the ones that exhibit no difference in the two conjugations.

This line of thought seems to have two consequences. First, it seems that the generalization that we are trying to express in the grammar has been somewhat loosely stated. Above, I stated that the generalization following from the two separate conditions seems to be that an indefinite accusative NP cannot end up in the same clause with a definite verb. But, given the class of exceptions that we have considered, it seems that they can be incorporated into a more correct generalization, namely, that an indefinite accusative NP cannot be in the same clause with a verb which is not in the indefinite conjugation. This formulation covers

the cases covered by the earlier generalization, and the sentences that were exceptions to the latter are no longer exceptions, since the verbal forms in them are in the indefinite conjugation (as well as in the definite one).

Second, if this is indeed the right generalization, then it is impossible to state it in the way that was suggested earlier. The generalization is a statement about a surface phenomenon; it makes crucial use of the accidental phonological collapsing of certain distinct forms. Since verb-object agreement precedes wh-movement,<sup>7</sup> we expect that all verbal forms, including the first person singular of the past indicative, and the first person plural of the present conditional, are, in some way, marked as definite by the time wh-movement applies. Thus, there is no way to constrain wh-movement or emph-movement except in the highly unnatural way outlined above. In fact, the generalization cannot be stated on a transformational level, since the transformation cannot "know" about the surface form of the verb.<sup>8</sup>

What I propose, then, is that there exists in Hungarian, a surface structure constraint, in the sense of Perlmutter (1968). The constraint states that:

- (43) *If a clause contains an indefinite NP in the accusative case and a finite verb, the verb has to be in the indefinite conjugation.*

Perlmutter's conception of a surface structure constraint, for which he has argued extensively, is that of a template that serves as a filter. In other words, at some level after the transformational component (in this case after the input to the phonological component), the surface phrase marker is matched against such a template. If it meets the conditions of the template, the sentence will be grammatical. If it doesn't, it won't. Applied in this way, (43) will correctly prevent (17), (18), (27), (28), (38) and (39) from being generated, while allowing (41) and (42), because the verbs in (41) and (42) are in the indefinite conjugation, which is what matters for "passing through" (43), regardless of the fact that they happen to be in the definite conjugation as well.

There is one more point that illustrates this proposal; a conjoined sentence is usually ungrammatical if either conjunct is. Thus;

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- (44) \*János elhozta azt a könyvet amit  
John brought<sub>Def</sub> that<sub>Acc</sub> the book<sub>Acc</sub> which<sub>Acc</sub>  
én akartam, hogy elhozzon, de nem azt  
I wanted, that he bring<sub>Ind</sub> but not that<sub>Acc</sub>  
amit te akartad, hogy elhozzon.  
which<sub>Acc</sub> you wanted<sub>Def</sub> that he bring<sub>Ind</sub>  
*John brought the book which I wanted him to bring,  
but not the one which you wanted him to bring.*

This ungrammaticality can be accounted for both by the "condition-on-the-rule" hypothesis and by the surface structure constraint. (44) is rather redundant. In Hungarian, as in many other languages, it is possible to delete parts of a conjunct that are identical to parts of the other conjunct(s). Unlike English, however, Hungarian permits the deletion of the verb. Thus, we get

- (45) János elhozta azt a könyvet amit  
John brought<sub>Def</sub> that<sub>Acc</sub> the book<sub>Acc</sub> which<sub>Acc</sub>  
én akartam hogy elhozzon, de nem azt  
I wanted that he bring, but not that<sub>Acc</sub>  
amit te.  
which<sub>Acc</sub> you.  
*John brought the book which I wanted him to bring,  
but not the one that you (wanted him to).*

In this sentence, the matrix verb, along with its complement, has been deleted in the second conjunct. (45) is grammatical, which is not predicted by the "condition-on-the-rule" hypothesis. Deletion in the derivation of (45) occurs after wh-movement, i.e., after the stage illustrated by (44). So there is nothing to "correct" the ungrammaticality of (44) in passing on to (45). According to that hypothesis, then (45) should be as ungrammatical as (44). The surface structure condition, on the other hand, predicts that (45) will be grammatical while (44) will not. The reason is that in deleting the verb of the second conjunct, we have eliminated the "offending element". There being no verb, the clause cannot run afoul of the surface structure constraint, so it

is grammatical.<sup>9</sup>

It seems, then, that we can do away with the straw-man "condition-on-the-rule" hypothesis and accept the proposed surface structure constraint. The statement of the constraint is far from exact, and its scope of operation is not quite clear. It seems that the greater the distance between the indefinite accusative NP and the verb, the less powerful the constraint. For example,

- (46) ?\**I*t van a könyv *a*mít      péntek este  
Here is the book which<sub>Acc</sub> Friday evening

megkérte                hogy hozzon el.

he asked (her) of that she bring<sub>Ind</sub>

Here is the book which on Friday evening he  
asked her to bring.

Assuming 'Friday evening' modifies 'ask', this sentence sounds much better than (27), in which there was no "material" intervening between *a*mít and megkérte. Obviously, the foregoing discussion only touches the tip of the iceberg; it is a tug at one little corner of the tangled mess of Hungarian grammar.

There remain a couple of interesting side issues worth remarking. As noted in footnote 5, (19) and (20), which have indefinite matrix verbs, sound somewhat better than (17) and (18). In fact, when a speaker starts to say a relative clause like (19) or (17), he will usually come out with the (19) version of it, although, if later confronted with (19), he will say that it is ungrammatical. The ungrammaticality of (19) stems from the fact, as noted above, that the verb-object agreement rule has been violated. The sentence fits the surface structure constraint, however, while in (17), it is the constraint that is violated. It seems that given the choice between violating a rule and conforming to the constraint, on the one hand, and conforming to the rule and violating the constraint, on the other, the speaker will opt for the former. What makes this interesting is that the same thing seems to be true in English. Perlmutter (1968) has argued for the existence of a surface structure constraint in English, that throws out any tensed clause that does not have a subject. This accounts for the ungrammaticality of (47):

- (47) \**I* used this butter, which I don't know whether  
is good.

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Here the NP *butter* appears, in deep structure, as the subject of the clause *whether this butter is good*. After wh-movement, this NP appears only as the wh-word *which*, which is moved into the matrix clause; the clause is left without a subject, and is thrown out by the constraint. Note that wh-movement in English does not leave a pronominal copy of the relativized NP in the relative clause. We have *the book which I read*, but not \**the book which I read it*. Nevertheless, when someone starts to say the sentence that is approximated by (47), he will almost invariably come out with

- (48) \**I used this butter which I don't know whether it's good.*

This is also ungrammatical, but to most speakers it sounds better than (47). Thus, when an English speaker is faced with the same choice, he will make the same decision.

Lastly, I would like to point out the peculiar nature of this surface structure constraint. What is interesting is that Hungarian has this constraint in addition to the verb-object agreement rule. The constraint seems to be checking up on the rule, but in one direction only. That is, this constraint refers only to indefinite NPs--it has no counterpart saying that definite NPs have to cooccur with verbs in the definite conjugation. I have a feeling that something is lurking behind this asymmetry, but I have no idea what it is.

### NOTES

<sup>1</sup>In (2), the form *el*, in parentheses, is a verbal affix, denoting aspect (more or less). The presence or absence of this affix and its position with respect to the verb are irrelevant and will not concern us. The same goes for the affix *meg* in (21).

<sup>2</sup>In the following, all references to relative clauses and wh-questions will be to forms in which the relativized or questioned NP is a direct object (accusative). These are the only type that I'm concerned with in this paper.

<sup>3</sup>On the definiteness versus indefiniteness of wh-words, see Browne (1970a,b).

<sup>4</sup>The NP dominating the clause, *that I will steal the*

book in (13) is indeed in the same oblique case as *kutya* in (12). This can be seen in the (near) variant of (13): *Attól félsz, hogy ellopom a könyvet.* *Attól* is the surface form of *az + tól*, where *az* is the same expletive that occurs in (8), and *tól* is the same case-marker as the one on *kutya* in (12). In fact, most embedded sentences have such an expletive, which is deleted under certain conditions. Obviously, I am interested only in the cases where it is deleted; otherwise, the embedded clauses considered here will be complex noun phrases, in which case wh-movement can't apply.

<sup>5</sup>(19) and (20) are somewhat better than (12) and (18) and, in some dialects, they are even grammatical. I will return to this point later.

<sup>6</sup> It has been pointed out to me by Stephen Anderson that, in Robert Vago's treatment of the morphology and phonology of Hungarian verbal endings (Vago, 1970), it was necessary to set up two ad hoc rules: (i) that the indefinite form of the first person singular in the past indicative takes an ending that in other tenses is taken only by the definite form; (ii) that the same goes for the first person plural of the present conditional. If the proper endings were taken, the resulting surface forms would be *akartak* and *akarnák*. These forms, however, exist already for the third person plural of the above tenses. Anderson has suggested that, in order to avoid ambiguity of person, Hungarian has opted to endure ambiguity of definiteness.

<sup>7</sup> Although I have not explicitly pointed it out, it is obvious that the verb-object agreement rule also precedes emph-movement. It is enough to note that we have a definite form of the embedded verb in (36) and (37) corresponding to the definite NP *a könyvet*, as opposed to an indefinite form in (40), corresponding to the indefinite NP *egy könyvet*.

<sup>8</sup> It can't even be stated as a derivational constraint. None of the proponents of this device have, to my knowledge, suggested the existence of "transcomponential constraints", which need to refer to both the syntactic and the phonological components. Even with such an unwarranted extension of the concept to account for the phenomena discussed above by a derivational constraint would be missing the point--these are surface phenomena. David Perlmutter has brought to my

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attention the existence of other cases in which the syntactic well formedness of an utterance depends on phonological information.

<sup>9</sup> This last argument is essentially the same in form as one of the arguments given in Perlmutter (1968) to establish the existence of a surface structure constraint on the order of clitic pronouns in Spanish.



## Glossary

Anaphoric device. An item that makes reference to another part of the sentence or discourse, as in

Everyone who knows him admires your brother.

The delegates want to nominate *Humphrey*, however, I'd prefer someone else.

Bill didn't burn *his draft card*, but Tom did  $\emptyset$ .

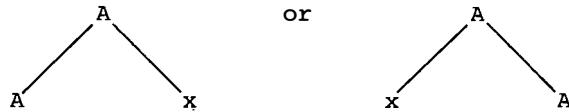
The word or expression that the anaphoric device refers to (here italicized) is called its "antecedent".

Anywhere-rule. A rule that is not extrinsically ordered with respect to any other rule and thus may apply at any point of the derivation at which its conditions for application are met.

Bach-Peters sentence. A sentence containing two anaphoric devices, each of which is contained in the antecedent of the other, e.g.,

The pilot that shot at it hit the MIG that chased him.

Chomsky-adjoin; Chomsky-adjunction. When an item  $x$  is Chomsky-adjoined to a constituent of category A, the result is a constituent of category A that consists of the original constituent plus the adjoined item, i.e.,



Clause-mate. Two constituents are clause-mates if every S node that dominates either of them dominates both of them, i.e., if they belong to the same "simplex S".

Command. A node of a syntactic structure commands all the nodes of the clause that it belongs to and all the nodes of all clauses subordinate to that clause.

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Cycle. a. A system C of rules such that (i) every constituent of a certain type or types (say, all Ss or all Ss and NPs) serves as a domain to which the rules of C may apply, and (ii) the rules of C apply en bloc to any such constituent before they apply to any superordinate constituent; e.g., if  $S_0$  consists of  $S_1$  and  $S_2$ , the rules of C first apply to  $S_1$  and to  $S_2$  individually and then apply to  $S_0$ .

b. Expressions like "the  $S_5$  cycle" denote the application of the rules of a cycle (in sense a) to the constituent that is indicated, e.g., "the complementizer is deleted on the  $S_5$  cycle" means "the complementizer is deleted during the application of the cycle to the domain  $S_5$ ".

Cyclic node. A node corresponding to a constituent that serves as a domain for the cycle.

Derivation. A sequence of linguistic representations (of a sentence or other linguistic unit) of which each is related to the preceding and following members of the sequence by grammatical rules; especially, a sequence of trees of which the first is the deep structure of a sentence, the last is the surface structure of the sentence, and each tree after the first arises from the preceding one through the application of a transformation.

Derivational constraint. A rule that specifies what may or may not appear at some stage of a derivation, or how different stages of a derivation may or may not be related.

Extended standard theory. The conception of grammar advocated in Chomsky (1972), which differs from that of Chomsky (1965) principally in that semantic interpretation rules are sensitive not only to details of deep structure but also to details of surface structure and details of what nodes of deep structure each node of surface structure corresponds to.

Global rule. A derivational constraint which relates non-consecutive stages of a derivation.

Governed rule. A rule that can apply only when an appropriate lexical item appears in a certain position; for example, Passivization is a governed rule, since its applicability in a given clause depends, among other things, on what the main verb of that clause is (e.g., *emulate* allows Passivization, but *resemble* does not). (G. Lakoff, 1965).

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Implicate. An occurrence of an utterance  $U$  implicates a proposition  $p$  if the hearer is justified in concluding that the speaker wished to convey the proposition  $p$  from the fact that he uttered  $U$  and the assumption that the speaker was being cooperative. What is implicated by uttering a particular sentence depends not only on the meaning of the sentence but also on the context in which it is uttered and on the principles of cooperative behavior (Grice, 1975).

Iterative cyclic. Linear cyclic (see Linear cyclic, below).

It-replacement. a. The transformation proposed by Rosenbaum (1967) that replaces *it* by the subject of an extraposed nonfinite clause, e.g., \**It seems for John to be tired* → *John seems (for + Ø) to be tired*.

b. The transformation proposed by George Lakoff and adopted in Ross (1967a) that applies to sentences containing [*it [for NP to VP]*]<sub>NP</sub>, replacing the *it* by the NP and moving the remainder to the end of the clause.

Last-cyclic. a. Belongs to the cycle but is allowed to apply only to the "topmost" clauses of a syntactic structure.

b. Belongs to the cycle but is allowed to apply only when the cycle applies to the "topmost" clauses of a syntactic structure.

Definition b, but not a, allows a rule that is not restricted to "topmost" clauses (e.g., Extraposition or "Affix-hopping") to be last cyclic provided its applications can be postponed until after the cycle has applied to all embedded clauses. Both notions of "last-cyclic" differ from the notion of "postcyclic" in that they allow last-cyclic rules to be interspersed among the rules of the cycle.

Logical structure. A structure that specifies what the "logical constituents" of a proposition are, i.e., the constituents of its content that can play a role in determining its truth conditions and determining how it can be used as a premise in valid inference. Generative semanticists have generally held that the content of a proposition can be analyzed in such a way that the same analysis of content serves both as "logical structure"

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as just defined and as the "deepest level" of syntactic derivations of sentences that express that proposition, although allowing for the possibility that things extraneous to that "deepest level" (e.g., factors of context, including speaker's beliefs) may play a role in determining what can occur later in the derivation (G. Lakoff, 1973).

Minor rule. A governed rule (see above) that is normally inapplicable, e.g., the deletion of *to* in *Mary made John wash the dishes* (cf. *John was made to wash the dishes*) applies only after *make*, a modal auxiliary other than *ought*, or certain uses of *need* and *dare*.

NEG-Q dialect, NEG-V dialect. These items refer to the way in which sentences with a quantified subject and a negated verb are interpreted in the dialect or idiolect in question: in a NEG-Q dialect, the negation is interpreted as having higher scope than the quantifier (e.g., *Everyone didn't leave* is interpreted as 'It is not the case that everyone left'), and in a NEG-V dialect, the quantifier is interpreted as having higher scope than the negative (e.g., *Everyone didn't leave* is interpreted as implying that everyone stayed). There are also dialects (AMB dialects) in which such sentences are ambiguous between these two interpretations. (Carden, 1970).

Node admissibility condition. A condition of the form "a node labeled *A* may directly dominate a sequence of nodes labeled *B<sub>1</sub>*, ..., *B<sub>n</sub>* if it is in environment *X*". A set of node-admissibility conditions defines a set of trees: A tree is included in the set if each of its non-terminal nodes satisfies one of the given conditions and if each of its terminal nodes has a terminal symbol as its label. It has been argued (McCawley, 1968a) that the base component of a transformational grammar should be taken to be a system of node admissibility conditions rather than a system of rewriting rules.

Output constraint. A derivational constraint that specifies a combination of items that is inadmissible in surface structures.

Postcyclic. A rule is postcyclic if it may not apply until after all applications of the rules of the cycle. Cf. Last-cyclic.

## Glossary

Presupposition. a. (Semantic presupposition). A proposition  $p$  (semantically) presupposes a proposition  $q$  if  $q$  must be true for  $p$  to be either true or false; if  $q$  is false, then  $p$  lacks any truth value.

b. (Pragmatic presupposition). A sentence  $S$  pragmatically presupposes a proposition  $q$  if it is normal to utter  $S$  only in circumstances where one can take  $q$  to be already established (Karttunen, 1974).

Rewriting rule; rewriting system. A rewriting system is a set of rules of the form  $\alpha \rightarrow \beta$ , where  $\alpha$  and  $\beta$  are strings of symbols; each rule of the system is called a rewriting rule. The system generates the set of all expression that can be obtained from a fixed initial symbol (say,  $S$ ) by replacing symbols by symbols in accordance with the rules of the system, provided that the expression obtained consists only of "terminal" symbols.

Selectional restriction. A restriction on what items may occur in a particular role in a syntactic construction, e.g., restrictions on what NPs may appear as the subject of occur or on what quantifiers may combine with wheat.

Sister. Two nodes in a tree are sisters if they are directly dominated by the same node, i.e., if they represent immediate constituents of the same item.

Strict cycle, (principle of the). The principle that an application of a cyclic rule must not involve only material in a constituent to which the cycle has already applied; e.g., you can passivize  $S_3$  only when the cycle applies to  $S_3$ , not when the cycle applies to a larger constituent  $S_2$  that contains  $S_3$ .

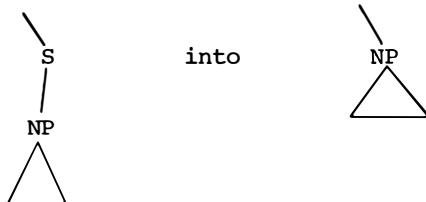
Strict subcategorization. Restrictions on what constituents an item is allowed to combine with; e.g., the restriction that put requires an object NP and a directional prepositional phrase, or the restriction that sleep allows neither an object NP nor a directional prepositional phrase.

Structure-preserving. A rule is structure preserving if the output structures that it gives rise to are of the same general form as could appear in the stage of derivations that provides its input (Emonds, 1970).

## Glossary

Surface structure constraint. See Output constraint.

Tree pruning. The elimination in the course of the derivation of nodes that have ceased to be functional, e.g., the conversion of



## References

The following abbreviations are used in this list of References:  
CLS (Chicago Linguistic Society) and IJAL (International Journal  
of American Linguistics).

- Adelung, J.C. 1806. Deutsche Sprachlehre für Schulen, 5th ed. Berlin: Vossische Buchhandlung.
- Akmajian, A., and Henry, F. 1975. An Introduction to the principles of transformational syntax. Cambridge, Mass.: MIT Press.
- Akmajian, A., and Jackendoff, R.S. 1970. Coreferentiality and stress. Linguistic Inquiry 1, 124-126.
- Allen, J.H., and Greenough, J.B. 1931. New Latin grammar for schools and colleges founded on comparative grammar (first published 1889). Boston: Ginn.
- Anderson, S.R. 1967. Concerning the notion "base component of a transformational grammar". This volume.
- Anderson, S.R. 1968. Pro-sentential forms and their implications for English sentence structure. This volume.
- Anderson, S.R. 1969. West Scandinavian vowel systems and the ordering of phonological rules. Unpublished M.I.T. dissertation.
- Anderson, S.R. 1971. On the linguistic status of the performative/constative distinction. Mimeo, Indiana University Linguistics Club.
- Anderson, S.R. 1974. The Organization of phonology. New York: Academic Press.
- Anscombe, G.E.M., and Geach, P.T. 1963. Three philosophers. Oxford: Blackwell.
- Apresjan, Ju. 1971. O nekotorykh polskikh rabotov po

## References

- lingvističeskoj semantike. Mašinnyj Perevod i Prikladnaja Lingvistika 14.
- Augustine, Saint. Confessions.
- Austin, J.L. 1962. How to do things with words. Oxford: Clarendon.
- Ayer, A.J. 1963. The concept of a person. In A.J. Ayer, The concept of a person and other essays, London: Macmillan.
- Bach, E. 1968. Nouns and noun phrases. In Bach and Harms (1968), pp. 90-122.
- Bach, E. 1970. Problominalization. Linguistic Inquiry 1, 121-123.
- Bach, E., and Harms, R.T. 1968. Universals in linguistic theory. New York: Holt, Rinehart, and Winston.
- Baker, C.L. 1966. Definiteness and indefiniteness. Unpublished University of Illinois M.A. essay.
- Bazell, C.E. 1953. Linguistic form. Istanbul: Istanbul Press.
- Bendix, E.H. 1966. Componential analysis of general vocabulary. Supplement to IJAL 32, 2.
- Binnick, R.I. 1971. Will and be going to I. CLS 7, 40-52.
- Binnick, R.I. 1972. Will and be going to II. CLS 8, 3-9.
- Bloomfield, L. 1914a. An introduction to the study of language. New York: Henry Holt.
- Bloomfield, L. 1914b. Sentence and word. Transactions of the American Philological Association 45, 65-75. Reprinted in Hockett (1970), pp. 61-69.
- Bloomfield, L. 1916. Subject and predicate. Transactions of the American Philological Association 47, 13-22. Reprinted in Hockett (1970), pp. 70-77.
- Bloomfield, L., 1933. Language. New York, Henry Holt.
- Bogusławski, A. 1966. Semantyczne Pojęcie Liczebnika. Wrocław-Warsawa-Krakow: Zakład Narodowy im. Ossolinskich.
- Bolinger, D. 1968. Entailment and the meaning of structures.

## References

- Glossa 2, 119-127.
- Borkin, A. 1972. Coreference and beheaded NP's. Papers in Linguistics 5, 28-45.
- Bouton, L.F. 1970. Antecedent-contained pro-forms. CLS 6, 154-167.
- Bresnan, J.W. 1974. The position of certain clause-particles in phrase structure. Linguistic Inquiry 5, 612-616.
- Browne, E.W. 1970a. Noun phrase definiteness in relatives and questions: evidence from Macedonian. Linguistic Inquiry 1, 267-270.
- Browne, E.W. 1970b. More on definiteness markers: interrogatives in Persian. Linguistic Inquiry 1, 359-362.
- Burling, R. 1965. Burmese kinship terminology. American Anthropologist 67, 106-117.
- Carden, G. 1970. A note on conflicting idiolects. Linguistic Inquiry 1, 281-290.
- Cartwright, R.L. 1963. Negative existentials. In C.E. Caton (ed.), Philosophy and ordinary language, Urbana and Chicago: University of Illinois Press, pp. 55-66.
- Chomsky, N.A. 1955. Semantic considerations in grammar. Georgetown University Monograph Series in Languages and Linguistics 8, 141-150.
- Chomsky, N.A. 1956. Three models for the description of language. IRE Transactions on Information Theory IT-2, 113-124.
- Chomsky, N.A. 1957a. Syntactic structures. The Hague: Mouton.
- Chomsky, N.A. 1957b. Logical structure in language. American Documentation 8, 284-291.
- Chomsky, N.A. 1958. A transformational approach to syntax. Unpublished paper, presented at Fourth Texas Conference on Problems of Linguistic Analysis of English.

## References

- Chomsky, N.A. 1959. On certain formal properties of grammars.  
Information and Control 2, 137-167.
- Chomsky, N.A. 1961a. On the notion "rule of grammar". In  
R. Jakobson (1961), pp. 6-24.
- Chomsky, N.A. 1961b. Some methodological remarks on generative  
grammar. Word 17, 219-239.
- Chomsky, N.A. 1962. A transformational approach to syntax.  
In A.A. Hill (ed.), Third Texas conference on problems  
of linguistic analysis of English, Austin: University  
of Texas, 124-158. Also in Fodor and Katz (1964),  
pp. 211-245.
- Chomsky, N.A. 1965. Aspects of the theory of syntax. Cambridge,  
Mass.: MIT Press.
- Chomsky, N.A. 1970. Deep structure, surface structure, and  
semantic interpretation. In Jakobson and Kawamoto (1970),  
pp. 52-91. Reprinted in Steinberg and Jakobovits (1971),  
pp. 183-216, and in Chomsky (1972), pp. 62-119.
- Chomsky, N.A., Halle, M., and Lukoff, F. 1956. On accent and  
juncture in English. In For Roman Jakobson, The Hague:  
Mouton, pp. 65-80.
- Curme, G. 1931. Syntax. Boston: D.C. Heath.
- Davidson, D., and Harman, G. 1972. Semantics of natural  
language. Dordrecht: Reidel.
- de Rijk, R. 1974. A note on prelexical predicate raising.  
In Seuren (1974), pp. 43-74.
- Descartes, R. 1641. Meditationes de prima philosophia. Paris.
- Dixon, R.M.W. 1968. Noun classes. Lingua 21, 104-125.
- Dixon, R.M.W. 1971. A method of semantic description,  
illustrated for Dyirbal verbs. In Steinberg and  
Jakobovits (1971), pp. 436-471.
- Dougherty, R.C. 1974. Generative semantic methods: a  
Bloomfieldian counter-revolution. International Journal

## References

- of Dravidian Linguistics 3, 255-286.
- Emonds, J. 1970. Root and structure preserving transformations. M.I.T. dissertation, published in extensively revised form as Emonds (1976).
- Emonds, J. 1976. A transformational approach to English syntax. New York: Academic Press.
- Fillmore, C.J. 1963. The position of embedding transformations in a grammar. Word 19, 208-231.
- Fillmore, C.J. 1968. The case for case. In Bach and Harms (1968), pp. 1-88.
- Fillmore, C.J. 1971. Verbs of judging. In Fillmore and Langendoen (1971), pp. 273-289.
- Fillmore, C.J., and Langendoen, D.T. 1971. Studies in linguistic semantics. New York: Holt, Rinehart, and Winston.
- Fischer, S. 1967. Time adverbials and deletions in French and English. Unpublished Radcliffe College A.B. thesis.
- Fodor, Janet D. 1967. Noun phrase complementation in English and German. Unpublished paper, M.I.T.
- Fodor, Janet D. 1968. Non-specific noun phrases in English. Report NSF-20, Harvard University Computation Laboratory.
- Fodor, Jerry, and Katz, J.J. 1964. The structure of language. Englewood Cliffs, N.J.: Prentice Hall.
- Geach, P.T. 1957. Mental acts. London: Routledge and Kegan Paul.
- Green, G.M. 1968. On too and either, and not just on too and either either. CLS 4, 22-39.
- Green, G.M. 1970. Whimperatives: schizophrenic speech acts. Unpublished paper: an extensive revision appears as Green (1973).
- Green, G.M. 1973. How to get people to do things with words: the question of whimperatives. In R.W. Shuy (ed.), Some

## References

- new directions in linguistics, Washington: Georgetown University Press, pp. 51-81, and P. Cole and J. L. Morgan (ed.), Syntax and semantics, vol. 3, New York: Academic Press, pp. 107-141.
- Grice, H.P. 1975. Logic and conversation. In P. Cole and J.L. Morgan (ed.), Syntax and semantics, vol. 3, New York: Academic Press, pp. 43-58.
- Grinder, J. 1970. Super Equi-NP deletion. CLS 6, 297-317.
- Grinder, J. 1972. On the cycle in syntax. In Kimball (1972a), pp. 81-111.
- Gruber, J. 1965. Studies in lexical relations. Unpublished M.I.T. dissertation.
- Gruber, J. 1967. Functions of the lexicon in formal descriptive grammars. Technical Memorandum 3770/000/000, System Development Corp., Santa Monica, California.
- Gudschinsky, S. 1959a. Mazatec kernel constructions and transformations. IJAL 25, 81-89.
- Gudschinsky, S. 1959b. Discourse analysis of a Mazatec text. IJAL 25, 139-146.
- Haas, W. 1959. Review of A.A. Hill, "Introduction to linguistic structures". Word 15, 231-239.
- Halle, M. 1959. The sound pattern of Russian. The Hague: Mouton.
- Halle, M. 1961. On the role of simplicity in linguistic descriptions. In Jakobson (1961), pp. 89-94.
- Harris, Z.S. 1946. From morpheme to utterance. Language 22, 161-183.
- Harris, Z.S. 1951. Structural linguistics. Chicago: University of Chicago Press.
- Harris, Z.S. 1952a. Discourse analysis. Language 28, 18-23.
- Harris, Z.S. 1952b. Discourse analysis: a sample text. Language 28, 474-494.

## References

- Harris, Z.S. 1957. Co-occurrence and transformation in linguistic structure. Language 33, 283-340. Reprinted in Fodor and Katz (1964), pp. 155-210.
- Harris, Z.S. 1965. Transformational theory. Language 41, 363-401.
- Hill, A.A. 1961. Grammaticality. Word 17, 1-10.
- Hockett, C.F. 1970. A Leonard Bloomfield anthology. Bloomington: Indiana University Press.
- Hofmann, T.R. 1969. Epistemicity. Unpublished paper.
- Horn, L.R. 1969. A presuppositional analysis of only and even. CLS 5, 98-107.
- Horn, L.R. 1972. On the semantic properties of logical operators in English. Unpublished UCLS dissertation.
- Householder, F.W. 1959a. On linguistic primes. Word 15, 231-239.
- Householder, F.W. 1959b. Review of C.F. Hockett, "A course in modern linguistics". Language 35, 503-527.
- Jackendoff, R.S. 1968. An interpretive theory of pronouns and reflexives. Unpublished paper, M.I.T.
- Jackendoff, R.S. 1969. Some rules of semantic interpretation in English. Unpublished M.I.T. dissertation.
- Jackendoff, R.S. 1972. Semantic interpretation in generative grammar. Cambridge, Mass.: M.I.T. Press.
- Jacobs, R., and Rosenbaum, P.S. 1970. Readings in English transformational grammar. Boston: Ginn.
- Jacobson, P., and Neubauer, P. 1975. Extraposition rules and the cycle. Unpublished paper, University of California, Berkeley.
- Jakobson, R. 1961. Structure of language and its mathematical aspects (12th symposium on applied mathematics). Providence: American Mathematical Society.
- Jakobson, R., and Kawamoto, S. 1970. Studies in general and

## References

- oriental linguistics: essays presented to Shiro Hattori.  
Tokyo: TEC Corp.
- Joint Committee on Grammatical Terminology. 1911. On the terminology of grammar. London: John Murray.
- Kachru, B.B., Lees, R.B., Malkiel, Y., Pietrangeli, A., and Saporta, S. 1973. Issues in linguistics: papers in honor of Henry and Renee Kahane. Urbana and Chicago: University of Illinois Press.
- Karolak, S. 1966. Zagadnienia rekcji przyimkowej w języka rosyjskim. Wrocław-Warszawa-Krakow: Zakład Narodowy im. Ossolinskich.
- Karttunen, L. 1968. What do referential indices refer to? Unpublished paper.
- Karttunen, L. 1970a. Is pretend counterfactual? Non-publication 6 of the 1970 MSSB Mathematical Linguistics Seminar, Ohio State University.
- Karttunen, L. 1970b. On the semantics of complement sentences. CLS 6, 328-339.
- Karttunen, L. 1971a. Implicative verbs. Language 47, 340-358.
- Karttunen, L. 1971b. The logic of English predicate complement constructions. Mimeographed, Indiana University Linguistics Club.
- Karttunen, L. 1973. Presuppositions of compound sentences. Linguistic Inquiry 4, 169-193.
- Karttunen, L. 1974. Presupposition and linguistic context. Theoretical linguistics 1, 181-194.
- Katz, J.J. 1966. The philosophy of language. New York: Harper and Row.
- Katz, J.J. 1967. Recent issues in semantic theory. Foundations of Language 3, 124-194.
- Katz, J.J., and Fodor, J.A., 1963. The structure of a

## References

- semantic theory. Language 39, 170-210. Reprinted in Fodor and Katz (1964), pp. 479-518.
- Katz, J.J., and Postal, P.M. 1964. An integrated theory of linguistic descriptions. Cambridge, Mass.: M.I.T. Press.
- Keil, H. 1859. Grammatici latini ex recensione Henrici Keilii. Vol. III: Prisciani institutionum grammaticarum libri XVIII ex recensione Martini Herzii. Vol. II, libros XIII-XVIII continens. Leipzig: Teubner.
- Keyser, S.J. 1968. Review of S. Jakobson, "Adverbial positions in English". Language 44, 357-374.
- Kimball, J.P. 1972a. Syntax and semantics, Vol. I. New York: Academic Press.
- Kimball, J.P. 1972b. Cyclic and linear grammars. In Kimball (1972a), pp. 63-80.
- Kiparsky, P., and Kiparsky, C. 1971. Fact. In Steinberg and Jakobovits (1971), pp. 345-369.
- Kisseberth, C. 1973. Is rule ordering necessary in phonology? In Kachru et al. (1973), pp. 418-442.
- Klima, E.S. 1964. Negation in English. In Fodor and Katz (1964), pp. 246-323.
- Kuhn, T. 1962. The structure of scientific revolutions. Chicago: University of Chicago Press.
- Kuroda, S.-Y. 1970. Some remarks on English manner adverbials. In Jakobson and Kawamoto (1970), pp. 378-396.
- Lakoff, G. 1963. Cycles and complex symbols in English syntax. Mimeographed, Indiana University.
- Lakoff, G. 1965. On the nature of syntactic irregularity. Indiana University dissertation; published as Lakoff (1970a).
- Lakoff, G. 1966. Stative adjectives and verbs in English. Report NSF-17, Harvard University Computation Laboratory.
- Lakoff, G. 1968a. Instrumental adverbs and the concept of

## References

- deep structure. Foundations of Language 4, 4-29.
- Lakoff, G. 1968b. Counterparts, or the problems of reference in transformational grammar. Mimeographed, Harvard University.
- Lakoff, G. 1968c. Pronouns and reference. In this volume.
- Lakoff, G. 1968d. Some verbs of change and causation.  
Report NSF-20, Harvard University Computation Laboratory.
- Lakoff, G. 1969. On derivational constraints. CLS 5, 117-139.
- Lakoff, G. 1970a. Irregularity in syntax. New York: Holt, Rinehart, and Winston.
- Lakoff, G. 1970b. Global rules. Language 46, 627-639.
- Lakoff, G. 1970c. Repartee. Foundations of Language 6, 389-422.
- Lakoff, G. 1970d. Pronominalization, negation, and the analysis of adverbs. In Jacobs and Rosenbaum (1970), pp. 145-165.
- Lakoff, G. 1970e. A note on vagueness and ambiguity.  
Linguistic Inquiry 1, 357-359.
- Lakoff, G. 1971. Linguistics and natural logic. Synthese 22, 151-271. Also in Davidson and Harman (1972), pp. 545-665.
- Lakoff, G. 1972. Discussion of Kimball (1972b) and Grinder (1972). In Kimball (1972a), pp. 113-115.
- Lakoff, G. 1973. Some thoughts on transderivational constraints. In Kachru et al. (1973), pp. 442-452.
- Lakoff, G., and Ross, J.R. 1966. Why you can't do so into the sink. In this volume.
- Lakoff, G., and Thompson, H. 1975. Dative questions in cognitive grammar. In R. Grossman et al. (eds.), Functionalism, Chicago: Chicago Linguistic Society, 337-350.
- Lakoff, R. 1968. Abstract syntax and Latin complementation. Cambridge, Mass.: M.I.T. Press.
- Lakoff, R. 1969. A syntactic argument for negative

## References

- transportation. CLS 5, 140-147.
- Lakoff, R. 1972. Language in context. Language 48, 907-927.
- Langacker, R.W. 1966. Semantic theory and the problem of supposition. Mimeographed, University of California at San Diego.
- Langacker, R.W. 1969. Pronominalization and the chain of command. In Reibel and Schane (1969), pp. 160-186.
- Lawler, J. 1971. A problem in participatory democracy. Unpublished paper. University of Michigan.
- Lees, R.B. 1957. Review of Chomsky (1957a). Language 33, 375-408.
- Lees, R.B. 1960a. The grammar of English nominalizations. Supplement to IJAL 26, 3.
- Lees, R.B. 1960b. A multiply ambiguous adjectival construction in English. Language 36, 207-221.
- Lees, R.B. 1960c. The grammatical basis of some semantic notions. Georgetown University Monograph Series on Language and Linguistics 13, 5-20.
- Lees, R.B., and Klima, E.S. 1963. Rules for English pronominalization. Language 39, 17-28. Also in Reibel and Schane (1969), pp. 145-159
- Leitzmann, A. 1907. Wilhelm von Humboldt's gesammelte Schriften, Vol. 7, Part 1. Berlin: B. Behr's Verlag.
- Levi, J.N. 1975. The syntax and semantics of nonpredicating adjectives in English. Unpublished University of Chicago dissertation.
- Lyons, J. 1968. Theoretical linguistics. London and New York: Cambridge University Press.
- Linsky, L. 1967. Referring. London: Routledge and Kegan Paul.
- Matthews, P.H. 1967. Review of Chomsky (1965). Journal of Linguistics 3, 119-152.
- McCawley, J.D. 1967. Meaning and the description of language.

## References

- Kotoba no uchu 2(9), 10-18, 2(10), 38-48, 2(11), 51-57.  
Also in McCawley (1973c), pp. 99-120.
- McCawley, J.D. 1968a. Concerning the base component of a transformational grammar. Foundations of Language 4, 243-269. Also in McCawley (1973c), pp. 35-58.
- McCawley, J.D. 1968b. The role of semantics in a grammar. In Bach and Harms (1968), pp. 124-169, and McCawley (1973c), pp. 59-98.
- McCawley, J.D. 1968c. Lexical insertion in a transformational grammar without deep structure. CLS 4, 71-80. Also in McCawley (1973c), pp. 155-166.
- McCawley, J.D. 1970a. Where do noun phrases come from? In Jacobs and Rosenbaum (1970), pp. 166-183. Also in Steinberg and Jakobovits (1971), pp. 217-231, and in McCawley (1973c), pp. 133-154.
- McCawley, J.D. 1970b. Semantic representation. In P. Garvin (ed.), Cognition: a multiple view, New York: Spartan Books, pp. 227-247, and in McCawley (1973c), pp. 240-256.
- McCawley, J.D. 1971a. Tense and time reference in English. In Fillmore and Langendoen (1971), pp. 96-113. Also in McCawley (1973c), pp. 257-272.
- McCawley, J.D. 1971b. Prelexical syntax. Georgetown University Monograph Series on Languages and Linguistics 24, 19-33. Also in McCawley (1973c), pp. 343-356, and in Seuren (1974), pp. 29-42.
- McCawley, J.D. 1972a. A program for logic. In Davidson and Harman (1972), pp. 498-544. Also in McCawley (1973c), pp. 285-319.
- McCawley, J.D. 1972b. On interpreting the theme of this conference. In D. Cohen (ed.), Limiting the domain of linguistics, University of Wisconsin at Milwaukee, pp. vi-xi.

## References

- McCawley, J.D. 1973a. William Dwight Whitney as a syntactician. In Kachru et al. (1973), pp. 554-568. Also in McCawley (1973c), pp. 320-332.
- McCawley, J.D. 1973b. Syntactic and logical arguments for semantic structures. In O. Fujimura (ed.), Three dimensions of linguistic theory, Tokyo: TEC Corp., pp. 259-376.
- McCawley, J.D. 1973c. Grammar and meaning. Tokyo: Taishukan.
- McCawley, J.D. 1974. On identifying the remains of deceased clauses. Language Research (Seoul, Korea), 9(2), 73-85. Also in D. Bornstein (ed.), Readings in the theory of grammar, Cambridge, Mass.: Winthrop (1976), pp. 288-298.
- McCawley, J.D. 1975a. Reply to Dougherty (1974). International Journal of Dravidian Linguistics 4, 151-158.
- McCawley, J.D. 1975b. Verbs of bitching. In D. Hockney et al. (eds.), Contemporary research in philosophical logic and linguistic semantics, Dordrecht: Reidel, pp. 313-332.
- McCawley, J.D. 1976a. ;Madison Avenue, si, Pennsylvania Avenue, no! In P. Reich (ed.), The Second LACUS Forum, Columbia, S.C.: Hornbeam, pp. 17-28.
- McCawley, J.D. 1976b. Notes on Jackendoff's theory of anaphora. Linguistic Inquiry 7.
- Moore, G. E. 1959. Wittgenstein's lectures in 1930-33. In G. E. Moore, Philosophical Papers, London: Allen and Unwin, pp. 247-318.
- Morgan, J.L. 1969a. On the notion "possible lexical item". Unpublished paper.
- Morgan, J.L. 1969b. On the treatment of presupposition in transformational grammar. CLS 5, 167-177.
- Morgan, J.L. 1970. On the criterion of identity for NP-deletion. CLS 6, 380-389.
- Morgan, J.L. 1973. Presupposition and the representation of

## References

- meaning: prolegomena. Unpublished University of Chicago dissertation.
- Morin, Y.C., and O'Malley, M.H. 1969. Multi-rooted trees in semantic representation. CLS 5, 178-185.
- Neubauer, P. 1970. On the notion 'chopping rule'. CLS 6, 400-407.
- Newmeyer, F.J. 1970. On the alleged boundary between syntax and semantics. Foundations of Language 6, 178-186.
- Newmeyer, F.J. 1972. The insertion of idioms. CLS 8, 294-302.
- Ōta, A. 1970. Hōjodōshi no imi to bunpō (The meaning and grammar of modal auxiliary verbs). Eigo seinen 116, 428-430.
- Paul, H. 1880. Prinzipien der Sprachgeschichte. Halle: Max Niemeyer.
- Perlmutter, D.M. 1968. Deep and surface structure constraints in syntax. M.I.T. dissertation.
- Perlmutter, D.M. The two verbs begin. In Jacobs and Rosenbaum (1970), pp. 107-119.
- Postal, P.M. 1964. Constituent structure. Supplement to IJAL 30.
- Postal, P.M. 1966. On so-called 'pronouns'. Georgetown University Monograph Series in Languages and Linguistics 19, 177-206. Also in Reibel and Schane (1969), pp. 201-224.
- Postal, P.M. 1967. Linguistic Anarchy Notes, Series A, No. 2. In this volume.
- Postal, P.M. 1968. Crazy notes on restrictive relatives. Unpublished paper, Yorktown Heights, N.Y.: IBM Thomas J. Watson Research Center.
- Postal, P.M. 1971. Crossover phenomena. New York: Holt, Rinehart, and Winston.
- Postal, P.M. 1974. On raising. Cambridge, Mass.: M.I.T.

## References

- Press.
- Quang Phuc Dong. 1966. English sentences without overt grammatical subject. Conneries Linguistiques 19, 23-31. Also in A. Zwicky et al. (eds.), Studies out in left field, Edmonton: Linguistic Research, Inc., pp. 3-10.
- Quine, W.v.O. 1960. Word and object. Cambridge, Mass.: M.I.T. Press.
- Reibel, D.A., and Schane, S.A. 1969. Modern Studies in English. Englewood Cliffs, N.J.: Prentice Hall.
- Reichenbach, H. 1966. Elements of symbolic logic. New York: Free Press.
- Rosenbaum, P.S. 1967. The grammar of English predicate complement constructions. Cambridge, Mass.: M.I.T. Press.
- Rosenberg, M. 1975a. Factuals that aren't so. CLS 11, 475-486.
- Rosenberg, M. 1975b. Counterfactuals: a pragmatic analysis of presupposition. Unpublished University of Illinois dissertation.
- Ross, J.R. 1967a. Constraints on variables in syntax. Unpublished M.I.T. dissertation.
- Ross, J.R. 1967b. On the cyclic nature of English pronominalization. In To honor Roman Jakobson, The Hague: Mouton, pp. 1669-1682. Also in Reibel and Schane (1969), pp. 187-200.
- Ross, J.R. 1969a. A proposed rule of tree-pruning. In Reibel and Schane (1969), pp. 288-299.
- Ross, J.R. 1969b. Auxiliaries as main verbs. Journal of Linguistics 1(1), 77-102.
- Ross, J.R. 1969c. Adjectives as noun phrases. In Reibel and Schane (1969), pp. 352-360.
- Ross, J.R. 1970. On declarative sentences. In Jacobs and

## References

- Rosenbaum (1970), pp. 222-272.
- Ross, J.R. 1972a. Act. In Davidson and Harman (1972), pp. 70-126.
- Ross, J.R. 1972b. The category squish: Endstation Hauptwort. CLS 8, 316-328.
- Ross, J.R. 1973. Nouniness. In O. Fujimura (ed.), Three dimensions of linguistic theory, Tokyo: TEC Corp., pp. 137-257.
- Russell, B. 1965. An inquiry into meaning and truth. London: Allen and Unwin.
- Seuren, P.A.M. 1974. Semantic syntax. Oxford: Clarendon.
- Smith, C. 1961. A class of complex modifiers in English. Language 37, 342-365.
- Smyth, H.W. 1956. Greek grammar, revised by Gordon Messing. Cambridge, Mass.: Harvard University Press.
- Sonnenschein, E.A. 1916. A new English grammar, Part I: Parts of speech and outlines of analysis. Oxford: Clarendon.
- Stockwell, R.P. 1959. Review of Studies in linguistic analysis. IJAL 25, 254-259.
- Straight, S. 1968. A radical transformational formulation of the psychology of language and language acquisition. Mimeographed, University of Chicago.
- Strawson, P. F. 1959. Individuals. London: Methuen.
- Szamosi, M. 1974. Verb-object agreement in Hungarian. CLS 10, 701-711.
- Thompson, H. 1975. The cycle: a formal statement. CLS 11, 589-603.
- Vago, R. 1970. The phonology of the Hungarian conjugations. Unpublished paper, UCLA.
- Vendler, Z. 1957. Verbs and times. Philosophical review 66, 143-160. Also in Z. Vendler, Linguistics in philosophy, Ithaca: Cornell University Press (1967), pp. 97-121.

## References

- Warnock, G.J. 1965. Seeing in R. Swartz (ed.), Perceiving, sensing, and knowing, Garden City: Doubleday Anchor, pp. 49-67.
- Wells, R.S. 1947. Immediate constituents. Language 23, 81-117.
- Wierzbicka, A. 1969. Dociekania Semantyczne. Wrocław: Zakład Narodowy im. Ossolińskich.
- Wierzbicka, A. 1971. Kocha, lubi, szanuje. Warsaw: Wiedza Powszechna.
- Wierzbicka, A. 1972. Semantic primitives. Frankfurt: Athenäum.
- Wierzbicka, A. 1974. The semantics of direct and indirect discourse. Papers in Linguistics 7.267-307.
- Wierzbicka, A. 1975a. Why kill does not mean cause to die. Foundations of Language 13, 491-528.
- Wierzbicka, A. 1975b. Topic, focus, and deep structure. Papers in linguistics 8, 59-87.
- Wierzbicka, A. To appear. Descriptions or quotations. Sign, language, culture. The Hague: Mouton.
- Wittgenstein, L. 1953. Philosophical investigations. Oxford: Blackwell.
- Worth, D.S. 1958. Transform analysis of Russian instrumental constructions. Word 14, 247-290.
- Worth, D.S. 1959. "Linear contexts", linguistics, and machine translation. Word 15, 183-189.
- Wundt, W. 1880. Logik: eine Untersuchung der Prinzipien der Erkenntniss und der Methoden wissenschaftlicher Forschung, Band I: Erkenntnisslehre. Stuttgart: Ferdinand Engke.
- Wundt, W. 1900. Völkerpsychologie: eine Untersuchung der Entwicklungsgesetze von Sprache. Mythus und Sitte. Band II: Die Sprache, Zweiter Teil. Leipzig: W. Engelmann.
- Zwický, A.M. 1968. Naturalness arguments in syntax. CLS 4, 94-102.

#### References

Zwický, A.M., and Sadock, J.M. 1975. Ambiguity tests and how to fail them. In J. Kimball (ed.), Syntax and semantics, Vol. 4. New York: Academic Press, pp. 1-36.

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