TOPICS IN ENGLISH MORPHOLOGY

by

DOROTHY C. SIEGEL

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Signature of Author .....Dorothy S. Siegel.....
Department of Foreign Literatures
and Linguistics, August 12, 1974

Certified by .....Morris Halle.....
Thesis Supervisor

Accepted by .....Morris Halle.....
Chairman, Departmental Committee
on Graduate Students

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ABSTRACT

This thesis concerns aspects of English inflectional and derivational morphology.

In Chapter 1, a theory of English case is developed. The morphology of genitive pronouns is investigated. It is shown that the genitive feature originates in the determiner. A phrase structure rule which expands N'''' as N''' CASE is motivated. The structure-dependent rules which realize CASE are formulated and their ordering is investigated. The empirical consequences of enriching the structure of noun phrases is discussed. A condition on N''', the CASE Condition, is proposed and its consequences are discussed. The surface rules which incorporate the genitive feature into nouns and pronouns are formulated.

In Chapter 2, some fundamental issues in derivational morphology are investigated. The nature and distribution of the boundaries which play a role in lexical word derivation are discussed. It is demonstrated that English affixes fall into two classes: those which are introduced with the + boundary (Class I affixes) and those which are introduced with the # boundary (Class II affixes). The application of the rules of primary stress assignment and stress subordination to lexically derived words is considered. The ways in which Class I and Class II affix-derived words differ are discussed. A schema of lexical organization which accounts for these differences is proposed. This schema obviates the need for global affixation conditions and constrains the generative capacity of the lexicon.

Thesis Supervisor: Morris Halle
Title: Professor of Modern Languages and Linguistics

"'American' terminates in 'I can' and 'dough' begins with 'do.'"

--Alfred Carl Fuller

"The Last Word in Lonesome is Me"

--country song title

This thesis is dedicated to my parents.

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Writing a thesis is a peculiar enterprise, for it is simultaneously attended by exhaustion and exhilaration. It is a watershed period in ones development, during which the diverse threads of ones intellectual life must become integrated. I am grateful to those who have prepared me, both directly and indirectly, for this remarkable experience.

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INTRODUCTION

Morphology is the study of the word formation processes of language. In characterizing the issues which morphology encompasses, it is hard to go beyond this general statement, for word formation takes place in two distinct realms. Inflectional morphology treats the generation of words by the syntactic component of the grammar. Derivational morphology is the study of word formation processes which occur in the lexicon. Each of these morphological processes is governed by constraints which are characteristic of the components in which they arise.

Before turning to the specific morphological issues which are treated in this thesis, I would like to discuss the nature of the distinction between inflectional and derivational morphology. This distinction was noted by traditional grammarians; and it is well motivated by semantic, phonetic, and syntactic considerations.

All inflectional features are introduced by the syntactic component of the grammar. Inflectional features such as perfect aspect (-en), progressive aspect (-ing), the gerundive (-ing), and tense (+past, -past) are generated by the phrase structure rules. Thus, the words taken, taking (progressive), taking (gerundive), takes, and took are

created by syntactic morphological processes. Case is syntactically introduced as well. I argue in Chapter 1 that the phrase structure rules introduce the node CASE, which is realized as genitive, nominative, and oblique in English. At surface structure, inflectional features are incorporated into words. These features are spelled out cyclically, and an inflected word is born.

Derivational morphemes, on the other hand, are lexically introduced. In the lexicon, there are rules which attach morphemes to stems and words to form new words. The words probity, vacuous, and potable are lexically derived from the stems prob, vacu, and pot. The words sincerity, fibrous, and remarkable are lexically derived from the words sincere, fiber, and remark. The output of lexical word derivation is the input to the syntax. Probity, vacuous, potable, sincerity, fibrous, and remarkable are inserted into phrase markers as words at the level of deep structure. On the other hand, the words is, was, having, doing, taken, him, he, and his are not words at the level of deep structure, for these words are created as the result of syntactic morphological processes.

The distinction between derivational and inflectional morphology has strong semantic, phonetic, and syntactic support. In discussing the evidence for this distinction, I will refer to the eight phrases below. The ○ marks inflectional morphemes and the □ marks derivational morphemes.

A) Markov solv (ed) the problem

B) Markov' (s) solv (ing) the problem

C) Markov' (s) solu [tion] of the problem

D) a Markov [ian] solu [tion] of the problem

E) a Markov [ian]' (s) solu [tion] of the problem

F) Markov appear (s) to be a swell guy

G) Markov' (s) appear (ing) to be a swell guy

H) *Markov' (s) appear [ance] to be a swell guy

The Semantic Difference between Syntactically and Lexically Derived Words

The meaning of a syntactically derived word is compositional. If one knows what solve and past mean, one also knows what solved means. Likewise, if one knows what discover and past mean, one knows what discovered means. The function relating solve and solved is the same as the function relating discover and discovered. Similarly, the function relating sing and singing is the same as the function relating help and helping. Since the meaning of each inflectional feature is determined in deep structure, it follows that syntactically derived words have compositional meanings.

The meanings of lexically derived words, on the other hand, are not compositional. Solution's semantic relationship to solve is not the same as vacation's semantic relationship to vacate. Likewise, a Markovian solution is a solution made

in the style of Markov, but a Fallopian tube is not a tube made in the style of the Italian anatomist Fallopius. -(t)ion and -ian bear no constant semantic relationship to the words they attach to. Thus, the words Markovian, Fallopian, solution, and vacation have definitions which cannot be predicted from the meanings of their respective parts. The same is true for all other lexically derived words. The explanation for this fact is that lexically derived words are inserted into trees at the level of deep structure as semantic units associated with distinct, idiosyncratic dictionary definitions.

The Phonetic Difference between Syntactically and Lexically Derived Words

All words which belong to lexical categories are bounded by word boundaries. Inflectional morphemes are introduced with word boundaries. Therefore, when a word receives an inflectional suffix, that word is impervious to phonological processes, except for those which operate in the environment #.

There is a class of derivational suffixes which is introduced with the + boundary. (In Chapter 2, the distribution of boundaries in lexically derived words is examined in detail.) Since inflectional morphemes are all introduced with the # boundary, syntactically derived words are not subject to phonological processes which take place

across +. For example, the final d of divide changes to ž in division (= divide+ion). However, the quality of the final d in divide does not change in dividing (= divide##ing).

Furthermore, inflectional affixes are all stress-neutral. In Chapter 2, I show that the cyclic rules which assign primary stress in words are ordered before the rules which create a class of lexically derived words. The cyclic primary stress assignment rules, then, apply before lexical insertion takes place in a derivation. Since words created by the syntax are formed after the cyclic stress rules have applied, it follows that syntactically derived words are stress-neutral. Stress on a syntactically derived word is thus the same as stress on the word minus the inflectional suffix.

By contrast, there is a class of lexically derived words which is subject to the cyclic stress rules. Thus, there are derivational suffixes which satisfy the environment of the cyclic stress rules. In these words, there is a shift in stress on the derived word (sólid, solídify; tóxic, toxícity).

Another phonetic difference between lexically and syntactically derived words is that the suffixes which create the former may be sensitive to information contained in the words they attach to. For example, the noun-forming suffix -al attaches only to words which end in vowels or anterior consonants and whose last syllable is stressed. (Phenomena

such as this will be examined at length in Chapter 2.) Inflectional affixes are never discriminating in this way; the possibility of deriving an inflected form is never contingent on phonological considerations. This distinction in the behavior of the two types of affixes is explained by having inflectional affixation be a syntactic process, for syntactic rules, by their nature, are not sensitive to phonological information.

The Syntactic Difference between Syntactically and Lexically Derived Words

Syntactically derived words are built by Chomsky-adjunction. This means that when an inflectional suffix is attached to a word by a rule, the structure of the derived word is exactly the derived constituent structure introduced by the rule. If $[\#X\#]_{\alpha}$ is an α, $[\#[X\#]_{\alpha}$ #inflectional suffix#$]_{\alpha}$ is also an α. There are no exceptions to this generalization. Thus, in (A), solved is a verb because solve is a verb. In (B), (C), and (G), Markov's is a noun because Markov is a noun. In (B), solving is a verb because solve is a verb. In (G), appearing is a verb because appear is a verb.

The situation is entirely different in the case of derivational affixes. For example, solution in (C), (D), and (E) is a noun, but solve is a verb. In (D), Markovian is an adjective, but Markov is a noun. In (*H), appearance is a

noun, but appear is a verb. In an overwhelming number of cases, derivational suffixes introduce node labels which are distinct from the node labels of the words they attach to. Thus, we find $[[\text{derive}]_V\text{ation}]_N$, $[[\text{music}]_N\text{al}]_A$, $[[\text{commence}]_V\text{ment}]_N$, and $[[\text{usual}]_A\text{ly}]_{Adv}$. Derivational suffixes of this sort far outnumber the derivational suffixes which don't form a new category: $[[\text{shepherd}]_N\text{ess}]_N$, $[[\text{Israel}]_N\text{ite}]_N$, $[[\text{major}]_N\text{ette}]_N$. Exactly this distribution of facts involving labelled bracketing is predicted by the theory which says that inflectional features are syntactically introduced and that derivational morphemes are lexically introduced.

The nature of the distinction between derivational and inflectional affixes has a second syntactic consequence. The prediction is that we will find derivational affixes inside inflectional affixes, but not vice versa. Since derivational affixes have been attached in the lexicon, the words formed thereby should be able to receive syntactically introduced affixes. This is indeed the case. Lexically derived nouns can pluralize: transformations, derivations, solutions, commencements, appearances. Lexically derived nouns can receive the genitive feature: decision's, commandment's, utterance's. Lexically derived verbs get past tense: nominalized, tabulated. Lexically derived verbs get the progessive: nominalizing, tabulating. The claim that

derivational affixes have a lexical source and that inflectional affixes have a syntactic source ensures that we never get words like *arrivingment, *boy'sish, or *derivedation, in which an inflectional affix appears inside a derivational affix.

A third syntactic prediction which arises from the distinction between derivational and inflectional morphology is that the string in which a lexically derived word appears must be base-generated. The string in which a syntactically derived word appears can be either base-generated or transformationally produced. Consider (G) and (*H). Markov is the deep subject of the sentential complement of appearing in (G). The rule of NP-Preposing makes Markov the surface subject of appearing in (G). Since appear does not have a deeply filled subject, its nominalization, appearance, cannot have a deeply filled subject. If appearance in (*H) is lexically derived and if appearing is syntactically derived, we can explain the difference in grammaticality between (G) and (*H).

The Status of Syntactically and Lexically Derived Words in the Lexicon

Given all these observations, it makes sense to say that lexically derived words have a status in the lexicon which

is different from that of syntactically derived words. This difference in lexical status is captured by the notion "paradigm." Related syntactically derived words are represented in the lexicon as a paradigm. The whole inflectional paradigm, not the individual items in it, has a definition in the lexicon. Thus, the paradigm for solve contains solve, solving, and solved. Since solve is a verb, all the words in the paradigm for solve are verbs. By contrast, each lexically derived word has its own entry and idiosyncratic definition in the lexicon. The words soluble, solution, solvent, and dissolve are separate lexical entries with unpredictable lexical definitions.

Sometimes an inflected item in a paradigm "escapes" from the paradigm and acquires a meaning of its own. Halle (1973) describes such a case in "Prolegomena to a Theory of Word Formation":

> . . . one finds that particular case forms of particular words idiosyncratically possess meanings that are in general not those of either the base (i.e., the stem (DS)) or the case (i.e., the inflectional ending (DS)). For instance, in Russian the instrumental case of certain nouns designating times of the year and of the day has special adverbial force that is not possessed by other nouns in the instrumental case. In particular, letom may mean 'in summer', noč'ju 'at night', zimoj 'in winter'. However, avgustom may not mean 'in the month of August', or obedom may not mean 'at dinner (or noon) time'. (p. 6)

We find similar cases in English. For example, the words bananas, nuts, and bats have meanings distinct from the

plurals of banana, nut, and bat. Furthermore, bananas, nuts, and bats, in their nonplural senses, are not even nouns. They are adjectives, as we can see from the fact that they occur after inchoative go: went bananas, went nuts, went bats. Inchoative go subcategorizes only for adjectives: went rotten, AWOL, broke, berserk, straight, rigid, green with envy, awry, sour, deaf, astray, *banana, *nut, *bat, *prisoner, *cook. (I am indebted to Alan Prince for bringing these examples to my attention.)

The acquisition of a meaning which is not predictable from that of the root, and the formation of a word which has a different category label from that of the root, are typical of lexical word derivation, as we have seen. Thus, the s which we find on bananas, nuts, and bats is no longer the plural s but rather an adjective-deriving s.

The plural s has become extended in yet another way. It can attach to adjectives and verbs to form nouns. Thus, we find the blues, the hots, the shakes, and the jitters.

The theory which says that derivational affixes are introduced by the lexicon and that inflectional affixes are introduced by the syntax predicts that inflectional affixes may become derivational affixes but not vice versa. Since derivational affixes are already inside a word at the level of deep structure, there is no way that they can escape to form new words in the syntactic component. On the other hand,

inflectional morphemes are listed in the dictionary. Therefore, they are liable to being re-labelled as derivational affixes. The facts which have just been presented give considerable empirical support to the claim that inflectional morphemes are syntactically introduced and that derivational morphemes are lexically introduced.

Despite the traditional grammarians' interest in morphology, it is only recently that morphology has seriously engaged the attention of linguists working within the framework of transformational-generative grammar. There are both methodological and psychological explanations for this fact. Methodologically, it was impossible to examine certain morphological issues until a satisfactory theory of syntax was developed. In fact, without an understanding of the nature of English syntactic processes, the very distinction between morphology and syntax could not be clearly delineated. For example, Chomsky's work on nominalization (1970) showed that the formation of derived nominals was a lexical morphological process. Before his pioneering work, derived nominals were regarded as being transformationally created. The theory of English case which I develop in Chapter 1 of this thesis relies heavily on Chomsky's schema for the representation of phrase nodes and depends crucially on previous syntactic work involving the nature of movement rules.

Just as an elaboration of the theory of syntax was a

prerequisite for progress in inflectional morphology, so has work in derivational morphology reflected progress in phonology, particularly that aspect of phonology which deals with stress. The work of Chomsky and Halle (1968), Halle and Keyser (1971), and Halle (1973) has made it possible to frame many crucial questions involving lexical word formation processes.

The psychological factors which have inhibited the study of morphology are more obscure, and my musings regarding them are highly speculative. Nevertheless, I will seize the opportunity offered by this forum to mention them here. There is a sense in which morphology is not as accessible a field as phonology and syntax. Since to approach inflectional morphology at all, one must have an overview of work in syntax, I suspect that there has been an unstated belief in the minds of many linguists that inflectional morphology was not a field at all and would turn out to be entirely derivative of syntax. Furthermore, inflectional morphology is not as spectacular a field as syntax. Syntax treats such flashy processes as relative clause formation and the dramatic movement of pieces of a sentence from one position to another. Case marking and number agreement seem tame by comparison.

If inflectional morphology seemed so prosaic as to be devoid of interest, derivational morphology dealt with such strikingly irregular and quasiproductive processes as to seem hopeless ground for theory construction. Although there are

grains of truth on both horns of this dilemma, I feel that recent work has vindicated morphology's importance in the theory of grammar.

This thesis deals with aspects of English inflectional and derivational morphology. In Chapter 1, a theory of English case is presented. This topic is approached through a detailed study of the morphology of English genitive pronouns.

It is observed that English genitive pronouns occur in both a strong form and a weak form. The environment in which each form occurs is studied, and a rule which derives the weak form from the strong form is formulated. This rule, in its final formulation, is structure-dependent, and it captures the morphological similarity between mine and my and between the strong and weak forms of the other genitive pronouns. Many arguments are adduced to show that the genitive feature originates in the determiner.

Next, two rules which move items from the determiner are examined. One of these rules, Genitive Movement, moves the genitive case along with the noun phrase. The other rule, Agent-Postposing, moves only the noun phrase, leaving the genitive case behind. To account for these facts, it is claimed that there is a node N'''', which is expanded as N''' CASE by the phrase structure rules. The phrase structure rules of English are revised to incorporate N''''.

The language-specific rules which realize CASE as

genitive, nominative, and oblique (in English) are examined. The Genitive CASE-Realization Rule is a structure-dependent rule which operates before any transformational rules apply on each cycle. I motivate a revision of the structure in which verbal gerunds arise. This revision allows the Genitive CASE-Realization Rule to make the subjects of verbal gerunds genitive. Nominative and oblique CASE-realization take place after the post-cyclic rules have applied. The Nominative CASE-Realization Rule is a structure-dependent rule which makes the subjects of tensed clauses nominative. Elsewhere CASE is realized as oblique.

I discuss the empirical consequences of enriching the structure of noun phrases in the manner just outlined. I propose a global condition on N''', the CASE Condition, which says that throughout a derivation every N''' is associated with CASE. It is shown that the CASE Condition supersedes Emonds' (1970) Structure Preserving Hypothesis in both descriptive and explanatory adequacy. Specifically, the CASE Condition provides a principled explanation of why some noun phrase movement rules are structure-preserving and why others are not. N''''-movement rules are not structure-preserving, yet they apply in embedded sentences. N''''-movement rules are permitted in my system, since they satisfy the CASE Condition by definition. Furthermore, the CASE Condition entails that all N''' -movement rules be structure-preserving.

The rules of Genitive Movement, NP-Preposing, and Agent-Preposing are formulated. It is shown that the CASE Condition, together with the TRACE theory of movement, can explain the ungrammaticality of phrases whose generation cannot be blocked by rule ordering.

Last, I write the surface rules which incorporate the genitive feature into nouns and pronouns. The output of these rules is the input to the rules which spell out the genitive feature.

In Chapter 2, some fundamental issues in derivational morphology are investigated. The nature and distribution of the boundaries which play a role in derivational morphology are discussed. In The Sound Pattern of English, it was claimed that there were three boundaries relevant to derivational morphology: #, +, and =. It is shown here that there are only two: # and +. I treat the distribution of these two boundaries in words, stems, prefixes, and suffixes. Affixes introduced with the + boundary are called Class I affixes; affixes introduced with the # boundary are called Class II affixes. I demonstrate that there are Class I prefixes and suffixes and that there are Class II prefixes and suffixes.

Next, I consider the way in which the rules of primary stress assignment apply to derived words, given an inventory of two boundaries. It is shown that Class II prefixes get primary stress assignment by the Primary Stress Rule and that

word stress in Class II prefix-derived words is handled exactly like stress in compound words.

I discuss the ways in which Class I and Class II affixes differ in their properties and propose a schema of lexical organization which accounts for these differences. This schema of lexical organization constrains the generative capacity of the lexicon and obviates the need for global suffixation conditions.

CHAPTER 1

A THEORY OF ENGLISH CASE

1. The Morphology of English Genitive Pronouns

1.1. The Strong and Weak Forms of English Genitive Pronouns

There are two forms of the genitive pronoun in English. The items in (1) will be referred to as the strong forms of the genitive, and the items in (2) will be referred to as the weak forms of the genitive. Nonpronominal nouns do not have strong and weak forms, nor is case spelled out on them, except for the genitive case.

		SINGULAR	PLURAL
1)			
	1.	mine	ours
	2.	yours	yours
	3.	his hers	theirs
2)	1.	my	our
	2.	your	your
	3.	his her	their

In this section, we will find out under what

conditions each form occurs and write rules to generate the proper surface forms of the genitive pronouns. The examples we will consider show the alternation between mine and my, for the most part. This is done as a matter of convenience and economy. The reader may wish to verfy that in all examples in which mine must occur, the other strong forms must also occur. Likewise, in all examples in which my must occur, the other weak forms must occur. The distributional problem, then, reduces to discovering when $[+pro, 1st\ person, +sing, GEN]_N$ is realized as my and when it is realized as mine. I will use me from now on as an abbreviation for $[+pro, 1st\ person, +sing]_N$; but by doing so, I want to make it clear that I am not claiming that the genitive feature gets incorporated into the oblique case of the pronoun. For the time being we will not be concerned with how the genitive feature is generated and how it gets incorporated into pronouns and nouns. These problems will be dealt with at length later.

1.2. The Distribution of the Strong and Weak Forms

We will now try to decide whether me+GEN becomes mine and goes to my in some environment, or whether me+GEN becomes my and goes to mine in some environment. In other words, what is the basic form of the English genitive pronoun -- the

strong form or the weak form?

In order to determine the basic form of the English genitive pronoun, we must first consider the distribution of the two forms in which these pronouns appear. Thus, consider the examples in (3) and (4). The symbol Δ in (3) below stands for an empty node. TRACE fills a node from which an item has been moved.

3) a) Sam took your book and Sue took $\left\{\begin{matrix}\text{mine}\\ *\text{my}\end{matrix}\right\}$ Δ

b) I regret Bill's decision to run and $\left\{\begin{matrix}\text{mine}\\ *\text{my}\end{matrix}\right\}$ Δ to withdraw

c) $\left\{\begin{matrix}\text{mine}\\ *\text{my}\end{matrix}\right\}$ Δ is 200 pages long

d) Sam read $\left\{\begin{matrix}\text{mine}\\ *\text{my}\end{matrix}\right\}$ Δ

e) This book is $\left\{\begin{matrix}\text{mine}\\ *\text{my}\end{matrix}\right\}$ Δ

f) Which book TRACE is $\left\{\begin{matrix}\text{mine}\\ *\text{my}\end{matrix}\right\}$ Δ

4) a) $\left\{\begin{matrix}*\text{mine}\\ \text{my}\end{matrix}\right\}$ proposal was unusual

b) $\left\{\begin{matrix}*\text{mine}\\ \text{my}\end{matrix}\right\}$ extremely long climb was exhausting

c) Sam took my green hat and Sue took $\left\{\begin{matrix}*\text{mine}\\ \text{my}\end{matrix}\right\}$ red

d) $\left\{\begin{matrix}*\text{mine}\\ \text{my}\end{matrix}\right\}$ asking Fred a favor was difficult

The labelled bracketings (5) and (6) of the sentences

in (3) and (4) give a straightforward answer to the distributional problem. Since phrase structure considerations are central to this chapter, I would like to make explicit which phrase structure rules provide the basis for (5) and (6). I have adopted Bresnan's (1972) analysis of complementizers. I thus assume that there is a phrase structure rule

$$S' \longrightarrow \text{COMP } S$$

I use the notation X' to replace the familiar $\overline{X}$ notation. In addition, I assume the phrase structure rules proposed by Chomsky (1970) in "Remarks on Nominalization":

$$X'' \longrightarrow \text{Spec, } X' \quad X'$$

$$X' \longrightarrow X...$$

I use the term <u>determiner</u> in place of the term <u>specifier phrase of N'</u>. The X'' notation provides a schema for the phrase categories adjective phrase (A''), noun phrase (N''), and verb phrase (V'').

Redundant word boundaries have been deleted in (5) and (6) by the readjustment rule which Lisa Selkirk (1972) referred to as SPE II. SPE II says the following:

In a sequence of $Z\#\underset{X}{]}\#\underset{Y}{]}W$ or $W\underset{Y}{[}\#\underset{X}{[}\#Z$, where $Y \neq S'$,

delete the "inner" word boundary.

I have followed Selkirk's convention which says that strings dominated by nonlexical nodes (Aux, P, Art, Modal, Conj, Copula, and Complementizer) do not receive word boundaries.

I have also adopted her convention of not assigning word boundaries to nodes which dominate pronouns. TRACE and delta have no phonological properties.

5) a) [#[ø] [#[[[[Sam]]#] [#[[took#]
COMP NN'N" V

[#[[you+GEN]] [#[book]]]]]#] [and]
N Det NN'N"V'V" S CONJ

[#[[[Sue]]#] [#[took#] [#[[me+GEN]]
NN'N" V N Det

[#[Δ]]]]]]#]#]
NN'N"V'V" S S S'

b) [#[ø] [#[[[I]]] [#[regret#]
COMP NN' N" V

[#[[[Bill's#]] [#[decision]#]
N Det N N'

[#[[to run]]]#] [and] [#[[me+GEN]]
VV'V" N" CONJ N Det

[#[Δ]#] [#[[to withdraw]]]]]]#]#]
N N' VV'V"N"N"V" S S'

c) [#[ø] [#[[[me+GEN]] [#[Δ]]#] [is]
COMP N Det NN' N" COP

[#[200 pages] [long]]]#]#]
QP AA"' S S'

d) [#[ø] [#[[[Sam]]#] [#[[read#]
COMP NN' N" V

[#[[me+GEN]] [#[Δ]]]]]#]#]
N Det NN'N"V'V" S S'

e) [#[ø] [#[[[this]] [#[book]]#] [is]
COMP Art Det NN' N" COP

[#[[me+GEN]] [#[Δ]]]#]#]
N Det NN'N" S S'

f) [#[[[which] [#[book]]#]] [#[TRACE#] [is]
Det NN'N" COMP N" COP

[#[[me+GEN]] [#[Δ]]]#]#]
N Det NN'N" S S'

6) a) [#[ø] [#[[[me+GEN]] [#[proposal]]#]
COMP N Det NN' N"

[was] [#unusual]#]#]
COP A S S'

b) [#[ø] [#[[[me+GEN]] [#[[extremely#]
COMP N Det Adv

[#long]#] [#climb]]#] [was] [#exhausting]#]#]
A A' NN'N" COP A S S'

c) [#[ø] [#[[[[Sam]]] [#[[took] [#[[me+GEN]]
COMP NN'N" V N Det

[#[green#] [#hat]]]]] [and] [#[[[Sue]]]
A NN"V'V" S CONJ NN'N"

[#[[took] [#[[me+GEN]] [#[red#] [# Δ]]]]]]#]#]
V N Det A NN'N"V'V" S S S'

d) [#[ø] [#[[[[me+GEN]]] [#[[asking#]
COMP NN' N" V

[#[[Fred]]] [#[[a]] [#[favor]]]]]]]
NN' N" ArtDet NN'N"V'V" S N"

[was] [#difficult]#]#]
COP A S S'

It is clear from an examination of the bracketings in (5) and (6) that the environment for rewriting me+GEN as my or mine depends crucially on the nature of the units (boundaries and segments) which immediately follow. If the immediately following units are ##, we find mine, as we see in (5). If the immediately following units are # [+seg], we get my, as we see in (6).

1.3. Genitive Spell-Out on Pronouns

Two hypotheses are compatible with the facts brought out in our brief examination of the examples in (3), (4), (5), and (6).

HYPOTHESIS A: me+GEN becomes my. Then, my becomes mine before ##.

HYPOTHESIS B: me+GEN becomes mine. Then, mine becomes my before # [+seg].

We can observe immediately that Hypothesis B is preferable to Hypothesis A. If we were to choose Hypothesis B, we could simply write a rule dropping the final consonant of the strong form of the genitive pronoun in the environment # [+seg].[1] If we chose Hypothesis B, this rule would say: C $\longrightarrow$ $\emptyset$ / ___ # [+seg]. This rule would allow us to capture the morphological similarity between mine and my, yours and your, hers and her, etc.

On the other hand, if we were to choose Hypothesis A, we would have to complicate the rule which rewrites my as mine to say, "Add an n in the first person singular, and add an s everywhere else." This rule would fail to capture the constant morphological relationship between the strong and weak forms of the genitive pronouns.

On the grounds of morphological regularity and simplicity, Hypothesis B is to be preferred over Hypothesis A. Thus, we will adopt Hypothesis B. The Genitive Spell-Out Rule, then, is (7).

7) a) [+pro, 1st person, +sing, GEN] ⟶ mine
[+pro, 2nd person, +sing, GEN] ⟶ yours
[+pro, 3rd person, +masc, +sing, GEN] ⟶ hiss
[+pro, 3rd person, -masc, +sing, GEN] ⟶ hers
[+pro, 1st person, -sing, GEN] ⟶ ours
[+pro, 2nd person, -sing, GEN] ⟶ yours
[+pro, 3rd person, -sing, GEN] ⟶ theirs

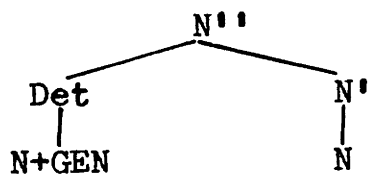
b) C ⟶ Ø / ___ # [+seg] [2]

(Hiss becomes his by (7b). If (7b) does not apply, hiss becomes his by Degemination.)

In Section 6 of this chapter, I will show that (7) applies at surface structure.

1.4. Justification of the Determiner Source for the Genitive Feature

Implicit in my presentation has been the claim that the noun which gets genitive morphology originates in the determiner of N'. In a later section, I will elaborate on the structure of the noun phrase in which the genitive feature occurs. However, the following structure temporarily expresses a sufficient degree of detail for our purposes:



When a filled node follows the genitive pronoun, the genitive pronoun appears in the weak form. When an unfilled node follows the genitive pronoun, the genitive pronoun appears in the strong form.

1.4.1. Evidence that Genitive Pronouns Are Not Subjects or Objects

As an alternative to this analysis, one might want to claim that genitive pronouns can be generated as subjects and objects (i.e., filling the head node) as well as being generated as pre-nominal determiners. One could then claim that pronouns generated as subjects and objects appear in the strong form and that pronouns generated in the determiner appear in the weak form. To make this position precise, the person holding this view would have to say that there are two phrase structure rules which introduce the genitive feature:

PSR A: $\text{Det} \longrightarrow \text{N+GEN}_{\text{WEAK}}$

PSR B: $\text{N}' \longrightarrow \text{N+GEN}_{\text{STRONG}}$

PSR A would allow us to generate me+GEN book is 200 pages long. PSR B would allow us to generate me+GEN is 200 pages long, where no delta appears after me+GEN. These phrase structure rules embody the claim that me+GEN has two sources: a determiner source and a nondeterminer source.

This proposal runs into serious difficulties, which I

shall now enumerate. The following discussion establishes two facts: (1) the genitive feature appears on nouns which come from the determiner and (2) the strong form of the genitive pronoun appears when Δ follows the genitive pronoun.

First, given the two phrase structure rules above, it would be possible to generate two genitives under N". This means that phrases such as those in (8) would wrongly be generated.

8) a) *your mine is on the table
   b) *I regret his mine
   c) *Sam read her mine
   d) *This book is your mine

The sentences in (8) are automatically excluded if the genitive feature has only a determiner source.

Next, consider a case such as (9), in which mine has been generated as a subject by PSR B.

9) mine $\left\{\begin{matrix}\text{is}\\\text{are}\end{matrix}\right\}$ 200 pages long

Since mine is singular, the person who claims that mine is the subject of (9) has no explanation for the fact that the verb can be either singular or plural. In a theory in which the genitive feature has only a determiner source, the explanation for the existence of the plural instance of (9) is that mine

precedes a delta which is the subject of the sentence. This delta may be either singular or plural in deep structure. Therefore, the verb in (9) may be either singular or plural.

Third, let us consider a case in which the genitive feature appears on a nonpronominal noun. PSR B could generate John's in John's is 200 pages long. From our discussion of inflectional morphology in the Introduction, we know that inflectional features, such as the genitive, do not alter the subcategorizational properties of the nouns they attach to, for the subcategorization rules have already operated before the transformational rules which attach inflectional affixes have applied. This being the case, we would expect John and John's to take the same modifiers and complements. However, such is not the case. Thus, compare (10) and (11).

10) a) the John I know
    b) one John has green eyes
    c) John of Normandy discovered America

11) a) *the John's I know
    b) *one John's has green eyes
    c) *John's of Normandy discovered America

The natural way to block (*11) is to claim that the genitive nouns in (*11) are not in N' but are rather in the determiner of N', under N". These genitive nouns are thus excluded from taking the range of modifiers permitted subjects and objects.

The claim that the genitive feature has only a determiner source explains yet another phenomenon. The discussion in the Introduction established that the addition of inflectional features to a noun does not change that noun's selectional characteristics. Thus, in (12) we see that the inflectional feature "plural" on boy in (12a) and on [+pro, 1st person, NOM] in (12b) does not prevent boys and we from being the subjects of read.

12) a) { one boy / two boys } read Moby Dick

b) { I / We } read Moby Dick

Since the genitive, like the plural, is an inflectional feature, we would not expect its appearance on a noun to alter that noun's selectional characteristics. Thus, we would expect to find the (b) sentences as well as the (a) sentences in (13) and (14).

13) a) { John's / mine } is 200 pages long

b) * { John / I } { is / am } 200 pages long

14) a) Sam read { John's / mine }

b) *Sam read { John / me }

Claiming that John's and me+GEN are not the subjects of be in

(13a) and not the objects of read in (14a) solves this dilemma, since the verb selects features only on subjects and objects.

Yet another reason for claiming that the genitive feature originates in the determiner is the fact that nonrestrictive relative clauses can't modify genitive nouns, although they can modify nongenitive nouns. Compare (*15) with (16).

15) a) *Sam took your book and Sue took John's, who teaches math
    b) *This book is John's, who teaches math
    c) *John's, who teaches math, is 200 pages long
    d) *Sam read John's, who teaches math

16) a) Mary introduced John, who teaches math
    b) this person is John, who teaches math
    c) John, who teaches math, is a Bach scholar
    d) Sam met John, who teaches math

We observe in (17) that nonrestrictive relative clauses do not modify nouns in the determiner.

17) *Sam took John's book, who teaches math

By claiming that John's in (*15) is in the determiner, we are able to explain the ungrammaticality of (*15). Furthermore, if we claim that John's in (*15) precedes a delta dominated by N, we can explain why the sentences in (18) are good. In

(18), John's precedes a delta to which the relative clauses refer.

18) a) Sue took John's, which was right here

b) John's, which is a rare edition, has all 200 pages intact

Further support for the claim that there is a delta following the genitive pronouns in (3) is the fact that complements which can't be complements of John or me may show up following the genitive.

19)

a) {*John, *me, *I, *my, John's, mine} on birds has 200 color illustrations

b) Sam read {*John, *me, *I, John's, mine} about birds

c) your decision to run and {*John, *me, *I, John's, mine} to withdraw

The final piece of evidence which shows that the genitive feature originates in the determiner comes from the rule of Genitive Movement. Genitive nouns and pronouns occur both pre-nominally and post-nominally. This

fact is illustrated in (20) and (21). The genitive nouns are underlined.

20) a) Bill's picture

b) a picture of Bill's

21) a) Bill's picture of John

b) a picture of John of Bill's

A given noun, such as picture, can be modified by a pre-nominal genitive phrase or by a post-nominal genitive phrase, but not by both, as we see in (22).

22) *Bill's picture of John's

To block (*22), we must generate the genitive feature in only one position in N". To derive both the (a) and (b) cases of (20) and (21), we must allow the noun phrase which bears the genitive feature to be moved by a rule. I will call this rule Genitive Movement.

We must now determine whether (a) or (b) is the underlying string in(20) and whether (a) or (b) is the underlying string in (21). I will now present evidence which shows that Genitive Movement moves a constituent from the determiner to the right over the head of a noun phrase. This means that (20b) is derived from (20a) and that (21b) is derived from (21a).

Consider the phrases in (23) and (24). Car and picture

are nouns which take only one nominal complement.[3]

23) a) a car of gold

b) *a car of gold of John

24) a) a picture of John

b) *a picture of John of Bill

When the second complement of car in (*23b) and the second complement of picture in (*24b) are genitive, the phrases are rendered grammatical, as we see in (25) and (26).

25) a car of gold of John's

26) a picture of John of Bill's

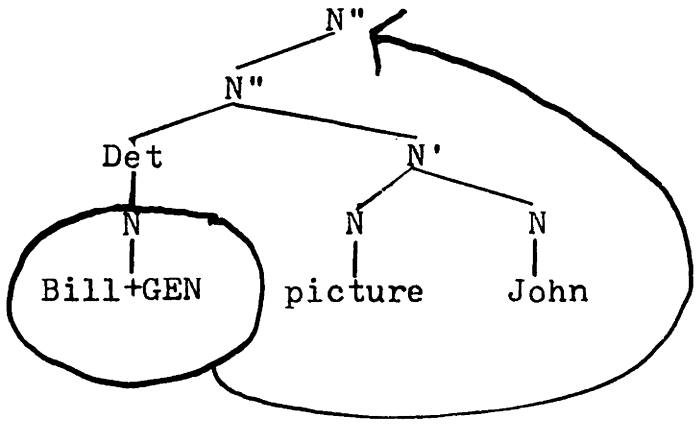
This fact can be explained if there is a rule which has moved John's in (25) and Bill's in (26) out of the determiner, over the head nouns car and picture, and into N''. This means that the sources of (25) and (26) are (27) and (28), respectively.

27) John's car of gold

28) Bill's picture of John

(29) shows how Genitive Movement applies to yield (26) from (28). Bill+GEN is Chomsky-adjoined to N''.

29)



The decision to attach the node dominating Bill+GEN to N" instead of to N' is made on theoretical grounds which were discussed by Chomsky (class lectures, M.I.T., spring, 1974). In brief, Chomsky's claim is that movement rules always "promote" the items they move. This means that there will always be fewer nodes intervening between S and the node dominating the item moved when this item is in its moved position than there were before the item was moved.

Genitive Movement is evidently not a structure-preserving transformation. I will have more to say about this matter later.

Next, consider the following phrases.

30) a) my own picture
b) *an own picture
c) *own overexposed pictures
d) *the own picture
e) a picture of me
f) *a picture of me own
g) a picture of my own

The phrases in (30) show that own's appearance in a phrase is contingent on the presence of the genitive. Note in particular that (*30f) is ungrammatical, while (30g) is grammatical. This array of facts can be explained if we claim that own is an intensive form of the genitive and that own originates in the determiner under the same node as nouns which get the genitive case. In this way, we can capture the generalization that the distribution of own is the same as the distribution of the genitive. We will then make the correct prediction that own will show up only next to nouns which are in the determiner or which have been moved from the determiner by Genitive Movement.

1.4.2. "One" as the Missing Subject or Object

The preceding discussion has established that there is a delta following the genitive pronouns in (3a-f) and that the genitive pronouns in those phrases are in the determiner of an unfilled noun. Having established this fact, the skeptical might want to argue that this missing noun in (3a-f) is not delta, but is rather the pronoun one. This move might be motivated by the appearance of the n in mine and by the observation that we find a green one, the same one, my green one, but not *my one. First, I will lay out the analysis which says that one is the missing noun in (3a-f), and then I will

argue against this analysis.

One's status as a potential head noun is substantiated by phrases such as those in (31), in which one takes determiners, modifiers, and noun complements.

31) a) the only one

b) a new one

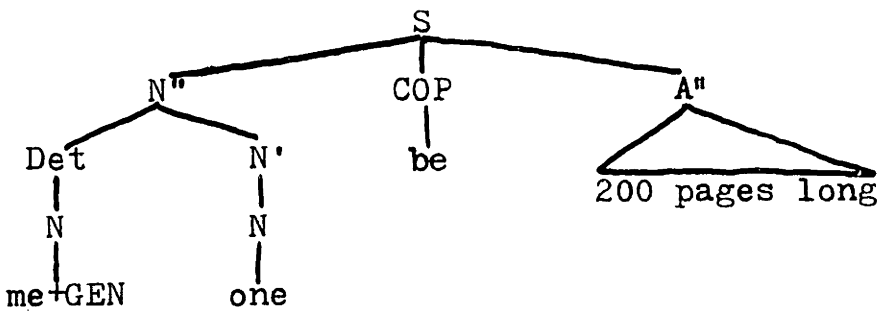
c) two green ones

d) ones in need of care

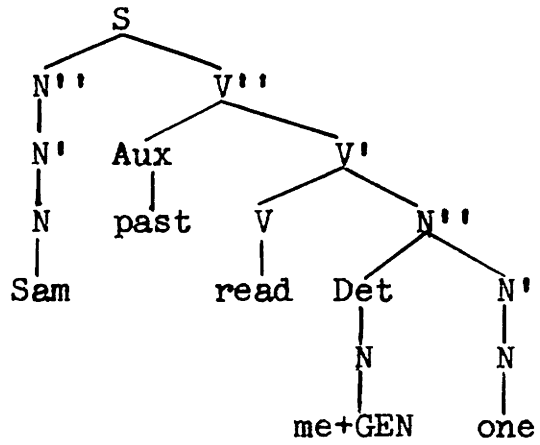
e) one for the asking

Thus, N in N' may contain a fully specified lexical item like book, or it may contain one. One, then, is inserted as an N in deep structure, analogous to other pronouns. The structures underlying (3c) and (3d), then, would be (32) and (33), respectively.

32)



33)



To account for the surface form of (3c) = (32) and (3d) = (33), there could be an obligatory cliticization rule which takes one and makes it a single word with me+GEN: [me+GEN]$_N$ [one]$_N$ $\longrightarrow$ [me+GEN+one]$_N$. Then, [me+GEN+one]$_N$ could be spelled out as mine.

One-Cliticization is a dubious rule, to say the least. The only facts that it might explain are the appearance of the n in mine and the non-occurrence of *my one. The explanatory force of this analysis immediately vanishes because of the following fact. One can be interpreted only as a count pronoun: *Sam gave blood and I gave one too. Therefore, one cannot be the missing head in mine is clotting. For this case, we would have to make up a mass pronoun that never shows up on the surface -- a dubious move. Thus, the analysis which assigns one the role of the missing N in (3a-f) is highly suspect, for it still can't explain the appearance of the n in mine is clotting.

In addition, genitive pronouns are not the only determiner elements which can't appear next to one. Genitive

nouns, as well as a number of other determiner items, also fail to appear immediately before one. Thus, we don't find (*34); but, for some reason I don't understand, we do find (35).

34) a) *my one
    b) *Fred's one
    c) *some ones
    d) *the one
    e) *several ones

35) a) my new one
    b) Fred's only one
    c) some old ones
    d) the blue ones
    e) several rusty ones

These facts suggest that *my one be prohibited in the same way as (*34b-e) are prohibited, however that may be.

The third reason for taking One-Cliticization with a grain of salt is that its environment is met only when a genitive immediately precedes. Thus, we find my green one, but not *my green'n. Fourth, we would need additional machinery to wipe out the n in John's'n and in all the genitive pronouns except mine. We may, therefore, conclude that the missing noun in (3a-f) is indeed delta and not one.

1.5. Justification for Not Using Syntactic Dependency to Predict the Distribution of the Strong and Weak Forms

Yet another question may be puzzling the mind of the critical reader. Instead of having Rule (7b), why not allow Lisa Selkirk's notion of "syntactic dependency" to account for the appearance of the weak forms in (4)? In order to answer this question, we must first review Selkirk's proposal. Selkirk's definition of the notion "syntactic dependent" is as follows: (I quote from Selkirk (1973), p. 51.)

36) D is a dependent of a head X if

1) D is a nonlexical category

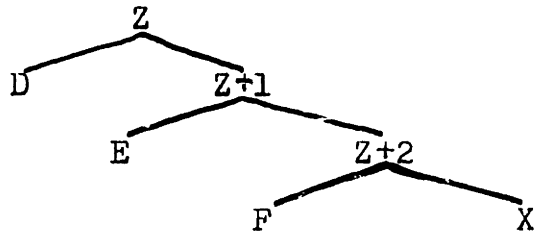
AND 2) X is a lexical category

AND 3) D is immediately dominated by a node Z_i which dominates X

AND 4) D and X are separated by no nondependents in the terminal string.

Thus, in the structural configuration (37), where D, E, and F are nonlexical nodes, and where X is a lexical node, D, E, and F are all syntactic dependents of X.

37)



To quote Selkirk further, "Lexical nodes or categories

are noun, verb, and adjective. The phrase nodes are A", N", and V", and the minor phrase nodes are A', N', and V'. The categories S', S and PP will also be considered as phrase nodes. Finally, the remaining categories introduced by the phrase structure rules, i.e., preposition, auxiliary, modal, copula, article, conjunction, etc., are non-lexical categories or nodes." (p. 21.) All lexical nodes, phrase nodes, and minor phrase nodes automatically receive a pair of word boundaries by the convention SPE-I, which I state here:

SPE-I: The boundary # is automatically inserted at the beginning and end of every string dominated by a lexical node, a phrase node, or a minor phrase node.

Strings dominated by nonlexical nodes do not receive word boundaries.

By SPE II, which I restate here for the reader's convenience, some of the word boundaries inserted by SPE I are eliminated.

SPE II: In a sequence of $Z\#]_X\ \#]_Y\ W$ or $W[_Y\#[_X\#\ Z$, where $Y \neq S'$, delete the "inner" word boundary.

The conventions SPE I and SPE II, together with the definitions of lexical node, nonlexical node, phrase node, and minor phrase node, ensure that no more than one word

boundary ever intervenes between D and X. The notion of syntactic dependency is encoded into Selkirk's Monosyllable Rule, which I reproduce here as (38).

38) $V \longrightarrow [\text{-stress}] / [\#W[C_0 \_\_\_ C_0]\ [(\#)\ X\ \acute{V}\ Y\ (\#)]\ Z\ \#]$

Condition: $X \neq T\#\#U$

This rule says that monosyllabic words dominated by nonlexical categories lose their stress when they are separated from a stressed vowel by no more than one word boundary, i.e., when they are syntactic dependents.

Selkirk argues that Ns which dominate pronouns have no word boundaries. I have adopted this convention in my presentation. Therefore, pronouns may be syntactic dependents.

The Monosyllable Rule accounts for the difference in stress on the items belonging to nonlexical categories in the (a) and (b) cases of the phrases below. In the (a) phrases, the Monosyllable Rule has applied, and the underlined items lose their stress. In the (b) phrases, the Monosyllable Rule's environment is not met, and the circled items retain their stress. Therefore, their vowels don't reduce.

39) a) $\overset{0}{\underline{\text{to}}}\ \overset{1}{\text{school}}$ to = [tə]

b) $\overset{3}{\text{(to)}}$ and $\overset{3}{\text{(from)}}\ \overset{1}{\text{school}}$ to = [tūw]; from = [frʌ m]

40) a) 0 1
can run — can = [cn]

b) 3 3 1
can and should run — can = [cæn]; should = [šʊd]

41) a) 0 1
my book — my = [mɪ]

b) 3 3 1
Fred's and my book — my = [may]

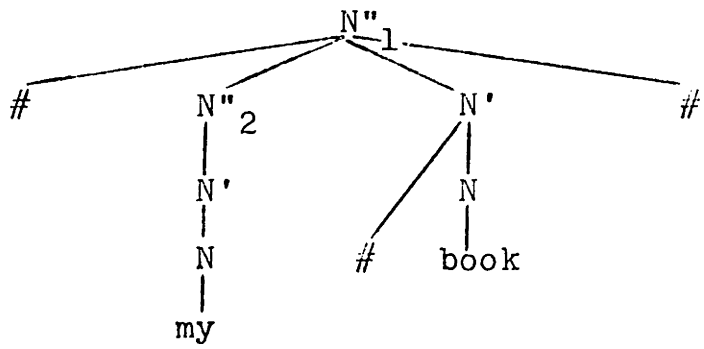
We may now make precise the proposal offered by our critical reader.

42) If a genitive pronoun is a syntactic dependent, it takes the weak form. If a genitive pronoun is not a syntactic dependent, it takes the strong form.

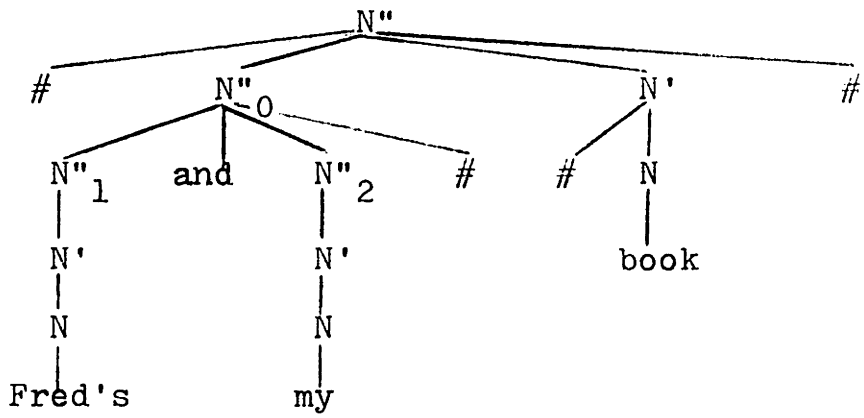
The claim embodied in (42) is that genitive pronouns appear in the weak form in all cases in which they are stressless and appear in the strong form in all cases in which they retain their stress. The examples in (41) do show that once the correct form of the genitive pronoun has been determined, the notion of syntactic dependency embodied in the Monosyllable Rule will distinguish those genitive pronouns which lose their stress from those which retain their stress. In (41a), only one # intervenes between my and book, as we see in (43) below. Thus, my gets destressed in (41a). In (41b), two #s intervene between my and book, as we see in (44) below. Thus, the Monosyllable Rule doesn't apply, and my retains its stress in

(41b). Redundant word boundaries have been deleted in (43) and (44) by SPE II. In considering (43) and (44), recall that Selkirk claims that Ns which dominate pronouns have no word boundaries and that this debility bleeds all the way up to $N"_2$. In (44), $N"_0$ dominates an N" which dominates a nonpronominal noun, namely, Fred. Thus, $N"_0$ in (44) must be bounded on the left and right by a word boundary, the leftmost of which is deleted by SPE II. To give this proposal the full benefit of the doubt, I have elminated the determiner node in (43) and (44). Were the determiner node present, my in (43) would not fulfill condition (36.3) and would not be a syntactic dependent of the head book.

(43) = (41a)



(44) = (41b)



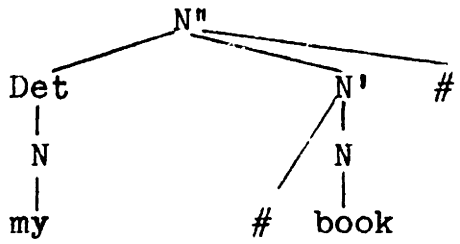
In (43) = (41a), the genitive pronoun is a syntactic dependent of book. Thus, it is conceivable that (42) could account for the pronoun's appearing in the weak form in (43). However, (44) = (41b) clearly shows that syntactic dependency does not play a role in assigning the weak form or the strong form to genitive pronouns.

In (44), the genitive pronoun is not a syntactic dependent of book. Thus, the Monosyllable Rule correctly fails to apply, and my retains its stress. Yet, (42) predicts that we should find the strong form of the genitive pronoun in (44), since my is not a syntactic dependent of book. On the contrary, we find the weak from. Since we find the weak form of the genitive pronoun in (44), and since this pronoun is not a syntactic dependent, we must conclude that (42) is incorrect and that syntactic dependency does not account for the choice between the weak form and the strong form of the genitive pronoun.

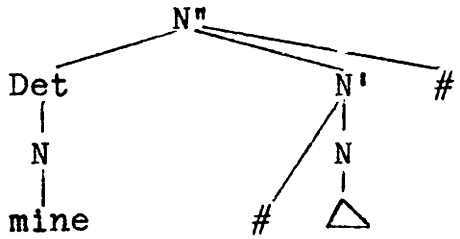
1.6. Reformulation of the Genitive Pronoun Spell-Out Rule

In Section 1.3., it was claimed that a genitive pronoun loses its final consonant in the environment ___ # [+seg] by Rule (7b). Rule (7b) thus accounts for the loss of the final n of mine in (45a). Rule (7b) fails to apply in (45b). Thus, mine in (45b) retains its final consonant.

45) a)



b)



In (44), just as in (45b), two word boundaries follow me+GEN. Yet, in (44), the genitive pronoun is in the weak form. Thus, (7b) incorrectly predicts that we should get *Fred's and mine book from (44).

The crucial difference between (45b) and (44) is that in the former, me+GEN precedes an empty node; whereas in the latter, me+GEN precedes a filled node. Therefore, we need to revise (7b) so that it will delete the final consonant of a genitive pronoun when the pronoun immediately precedes a filled node. The desired revision of (7b) is stated in (46). L is defined as a filled node.

46) $C \longrightarrow \emptyset \; / \; \_\_\_ \; L$

2. The Representation of CASE in Phrase Structure

We are now in a position to consider in detail how

the genitive feature is generated and how it is represented in phrase structure. The exposition will proceed as follows.

It will be shown that the distribution of the genitive case cannot be stated at the surface. Crucial evidence which shows that the genitive feature is present before the transformational rules apply comes from phrases which are produced by Genitive Movement. We have already seen that the items which are moved by this rule originate in the determiner. Here I will show that the node which is moved by this rule dominates the genitive feature before the rule of Genitive Movement applies.

Next, two rules which move noun phrases from the determiner are examined. One of the these rules (Genitive Movement) moves noun phrases along with case, and the other (Agent-Postposing) moves only the noun phrase. From these facts, it is argued that there is a node N'''', which is expanded as N''' CASE. The phrase structure rules of English are revised to incorporate N''''.

In Section 3, the rules which realize CASE are considered. It is shown that the Genitive CASE-Realization Rule is a structure-dependent rule which operates at the beginning of each cycle. A revision of the structure in which verbal gerunds are generated is motivated. This revision makes it possible to predict that the subjects of verbal gerunds are genitive. It is shown that the rules for nominative and

oblique CASE-realization apply after the post-cyclic rules have applied.

The rules of Genitive Movement, NP-Preposing, and Agent-Postposing are formulated in Section 4 in accordance with the theory which has been developed. In Section 5, the empirical consequences of this theory are discussed. I propose a condition on N''', the CASE Condition, which says that throughout a derivation, every N''' is associated with CASE. From the CASE Condition, it follows that N'''-movement rules are structure-preserving and that N''''-movement rules are not structure-preserving. I will show that my theory accounts for a number of other syntactic facts.

Finally, in Section 6, I will examine the rules which incorporate the genitive feature into nouns and pronouns and write the rule which spells out the genitive feature on nouns.

2.1. Evidence that the Distribution of the Genitive Feature Cannot Be Stated at the Surface

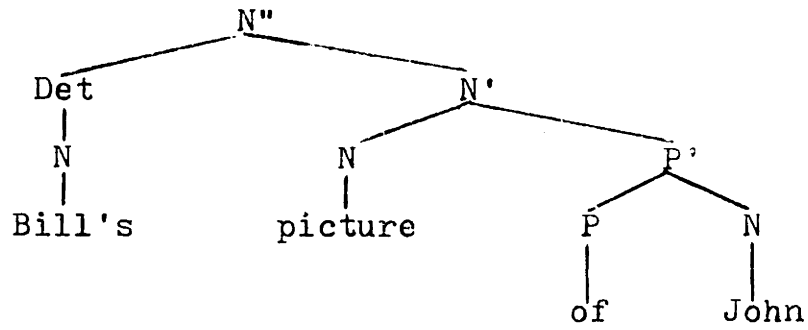
Let us now return to (21a) and (21b), which are reproduced here as (47a) and (47b).

47) a) Bill's picture of John

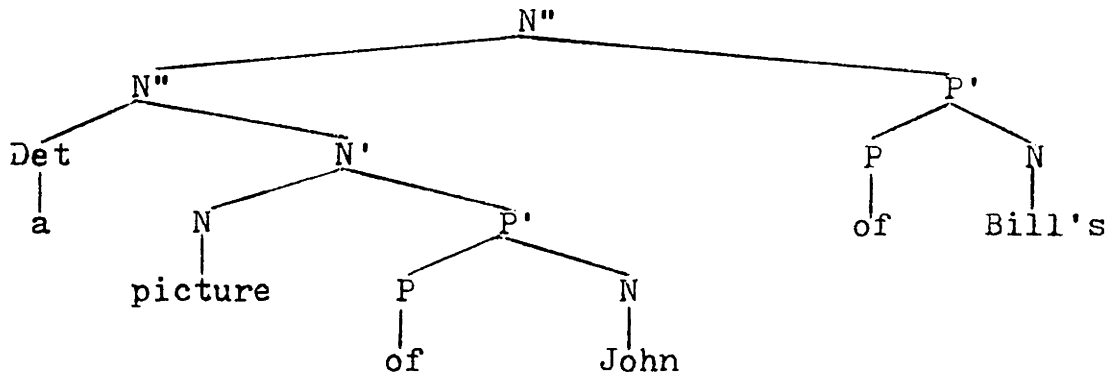
b) a picture of John of Bill's

These phrases are represented in (48) and (49), respectively.

48)



49)



I will now argue that it is correct to assume that Bill's in (48) is associated with the genitive feature before the rule of Genitive Movement applies on the N" cycle.

Suppose that we were to generate only Bill and not the genitive feature in the determiner of (48). We would then need rules which determine the distribution of the genitive case in terms of surface structure environments. The rules which account for the distribution of the genitive feature at surface structure would have to be as follows.

50) a) $N \longrightarrow +GEN \;/\; \_\_\_\; X'$

b) $N \longrightarrow +GEN \;/\; P \;\_\_\_$

Note that there would have to be two rules which generate the genitive feature if the distribution of genitive

case were determined at the surface. There is obviously no way in which the rules in (50) can be collapsed. Their effect is to claim that the environment for the insertion of the genitive feature is totally arbitrary.

(50a) is needed to get the genitive feature in the right place in (3) and (4). X' in (50a) abbreviates both the N' environment required for (3) and (4a-c) and the V' environment required for (4d). (50b) is needed to get the genitive feature on Bill's in (47b). (50b) has the undesirable consequence of making the false prediction that the objects of all prepositions should receive the genitive case. Thus, (50b) falsely predicts that we should find phrases such as *a picture of Bill's of John's, *Bill's picture of John's, and *the enemy's destruction of the city's. (50b) could be revised so that it associates the genitive feature with noun phrases which have been moved from the determiner. The revised (50b) would then be a global rule. Even this move would be inadequate, for it would incorrectly predict that we should find the genitive feature in the by-phrases of derived nominals (cf. *the destruction of the city by the enemy's). The distribution of the genitive feature is unstatable at the surface. Clearly, an alternative to the rules in (50) must be found.

Not only are the rules in (50) descriptively inadequate, but they also fail to capture the generalization that it is

determiner noun phrases which get the genitive feature. We have shown that noun phrases which move from the determiner via Genitive Movement get genitive morphology (a picture of Bill's). We also know that noun phrases which haven't moved from the determiner get genitive morphology (Susie's hat, Bill's picture of John). Furthermore, noun phrases which get moved into the determiner by NP-Preposing get genitive morphology (the city's destruction by the enemy).

These facts suggest that we can avoid all the problems associated with the rules in (50) by creating a deep structure node CASE and by stating the distribution of the genitive case before the transformational rules apply on each cycle. I therefore propose that the phrase structure rules of English generate the node CASE.

2.2. N''''

We must now discover how this CASE node is represented in phrase structure. To attack this problem, let us examine two rules which move noun phrases from the determiner: Genitive Movement and Agent-Postposing. (Agent-Postposing moves noun phrases from the determiner when it applies in derived nominals.) Genitive Movement applies to (51a) to yield (51b); Agent-Postposing applies to (52a) to yield (52b).

51) a) Bill's picture

b) a picture of Bill's

52) a) the enemy's destruction of the city

b) the destruction of the city by the enemy

There is a striking difference between (51b) and (52b). In (51b), both the noun phrase Bill and the genitive feature have moved. In (52b), only the noun phrase the enemy has moved; the genitive feature has been left behind. In (52b), the genitive feature is not morphologically realized; yet we know it is there, for it shows up if the city is moved into the determiner of destruction by NP-Preposing:

53) the city's destruction by the enemy

We must conclude that there are two varieties of noun phrase movement rules. One type of noun phrase movement rule moves a noun phrase and the case with which it is associated (e.g., Genitive Movement). The other type of noun phrase movement rule moves only the noun phrase, leaving case behind (e.g., Agent-Postposing, NP-Preposing).

To account for this bewildering array of facts, I propose that we enrich the schema for the representation of noun phrases to include the node N''''. N'''' is expanded as N''' CASE. Within this system, both N'''' and N''' are subject to movement. N''''-movement rules are rules which move noun

phrases (N'''') along with CASE. Genitive Movement is an N''''-movement rule. N''''-movement rules move "bare" noun phrases, leaving CASE behind. NP-Preposing and Agent-Postposing are N''''-movement rules.

2.3. Revision of the Phrase Structure Rules to Incorporate N''''

I will now revise the phrase structure rules of English to incorporate the node N''''.

54) ENGLISH PHRASE STRUCTURE RULES

a) $S' \longrightarrow COMP \quad S$

b) $S \longrightarrow N'''' \quad V''$

c) $V'' \longrightarrow Aux \quad V'$

d) $Aux \longrightarrow \left\{ \begin{matrix} to \\ tense \end{matrix} \right\} \quad (modal)$

e) $V' \longrightarrow (have+en) \quad (be+ing) \quad (be+en) \quad V \ . \ . \ .$

f) $N'''' \longrightarrow N''' \quad CASE$

g) $N''' \longrightarrow (\left\{ \begin{matrix} QP' \\ AP' \end{matrix} \right\}) \quad N''$

h) $N'' \longrightarrow Det \quad N' \ . \ . \ .$

i) $Det \longrightarrow [\pm def, (N'''')]$

j) $N' \longrightarrow \left\{ \begin{matrix} N \ . \ . \ . \\ -ing \ V' \ . \ . \ . \end{matrix} \right\}$

k) $N \longrightarrow \left\{ \begin{matrix} N \\ [+ sing] \\ N \\ [-sing] \end{matrix} \right\}$

These phrase structure rules are similar to those which Chomsky (1970) motivated in "Remarks on Nominalization", with the exception of Rules (54a, b, f, g, i, and j). Bresnan (1972) motivated Rule (54a) and Rule (54g), which expands N''' as an optional quantifier phrase or adjective phrase and N''. In Section 3.1.2., I will justify Rule (54j).

The key feature of this system of phrase structure rules is that N''' is distinct from the node which bears CASE, N''''.[4]

3. CASE-Realization

3.1. Genitive CASE-Realization

We now need rules which realize CASE. I have already shown that the distribution of the genitive case in derived nominals and noun phrases is statable with greatest generality at the level before the transformational rules apply on the N'' cycle. The Genitive CASE-Realization Rule says that CASE in the determiner is genitive. This rule can be formulated as shown in (55).

55) GENITIVE CASE-REALIZATION RULE

$$\text{CASE} \longrightarrow \text{GENITIVE} \;/\; [X[N''' \underset{N''''}{\_\_\_}\,] \; Y]_{\text{Det}}$$

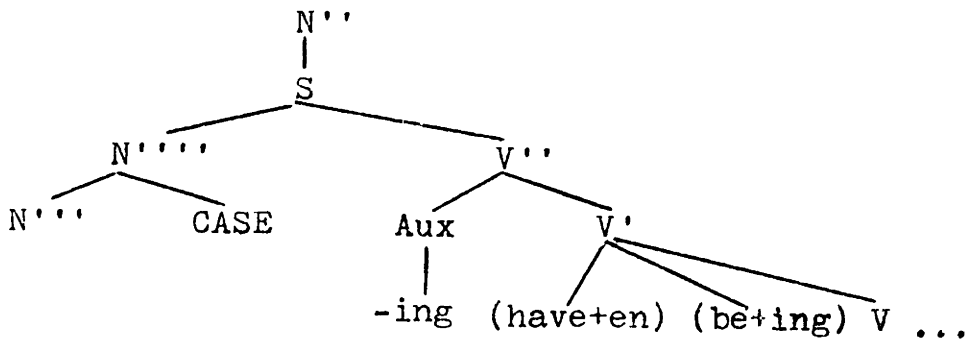
3.1.1. The Rule's Application in Noun Phrases and Derived Nominals

(55) effectively states the fact that genitive CASE-realization is structure-dependent, i.e., the genitive case is associated with N''' in the determiner position. Noun phrases which get generated in the determiner and which are not moved from the determiner get the genitive case (the lion's roar, Susie's hat, the enemy's destruction of the city). N''' which moves into the determiner gets genitive case (the city's destruction). N''' which moves from the determiner does not show genitive case, since a rule which moves N''' leaves CASE behind (the destruction of the city by the enemy). You will recall that Genitive Movement moves the determiner N''''. Since (55) applies before the transformational rules apply on the N'' cycle, we guarantee that noun phrases moved by Genitive Movement show genitive case.

3.1.2. The Rule's Application to the Subjects of Verbal Gerunds

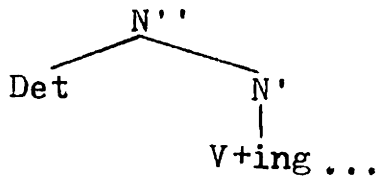
I will now argue that (55) also accounts for the fact that the subjects of verbal gerunds show genitive case. The usual representation assigned verbal gerunds (Emonds (1970); Wasow and Roeper (1972)) is shown in (56).

56)



The representation assigned nominal gerunds appears in (57).

57)



Verbal gerunds are claimed to arise in sentences which have -ing (not to be confused with the progressive -ing) in the Aux. Having verbal gerunds arise in sentences explains the fact that the phrases in which these gerunds appear exhibit sentence characteristics. Having nominal gerunds arise under N' in N'' explains the fact that these gerunds have the same syntactic properties as derived nominals.

I will now review the facts which led Wasow and Roeper to assign the structure (56) to verbal gerunds. Many of the examples in this discussion are taken from Wasow and Roeper (1972).

Nominal gerunds take a preceding adjective modifier, whereas verbal gerunds take following adverbial modifiers:

58) a) I detest Sam's loud singing

b) I detest Sam's singing loudly

The nominal gerunds of (59a) and (60a) are introduced with the article, while the verbal gerunds in (59b) and (60b) are not:

59) a) John enjoyed a reading of The Bald Soprano

b) John enjoyed reading The Bald Soprano

60) a) the killing of his dog upset John

b) killing his dog upset John

The nominal gerunds (59a) and (60a) express the grammatical relation direct object of in a prepositional phrase. By contrast, the direct objects of the verbal gerunds (59b) and (60b) are not expressed in prepositional phrases.

The nominal gerund (61a) can be pluralized, but the verbal gerund (61b) cannot:

61) a) sightings of UFO's make Sally nervous

b) sighting UFO's makes Sally nervous

The nominal gerund (62a) takes no, while the verbal gerund (62b) takes not:

62) a) no acting is good enough for John

b) not acting is good enough for John

The nominal gerund (63a) does not permit aspect, but

the verbal gerund (63b) does:

63) a) I enjoy graceful diving

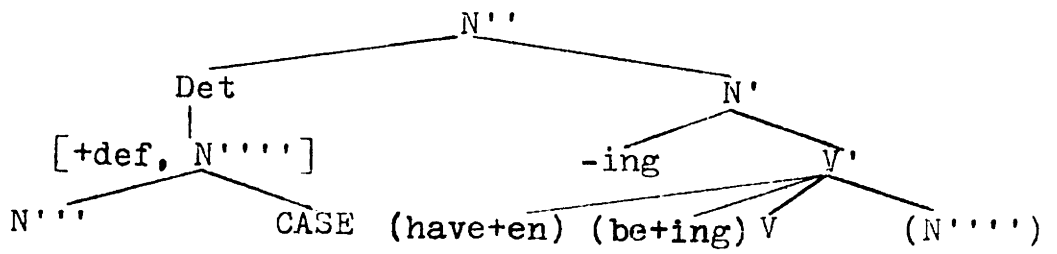
b) I enjoy having dived gracefully

The evidence presented in (58)-(63) led Wasow and Roeper to the conclusion that nominal gerunds are dominated by N'' directly, whereas verbal gerunds are immediately dominated by V'', which is in turn dominated by S, which is in turn dominated by N''.

It is clear that (55) will not realize CASE in (56) as genitive. We must, therefore, find some way of ensuring that the subjects of verbal gerunds are genitive. Two options are open to us. Either we could complicate (55) by adding the environment -ing, or we would claim that the subjects of verbal gerunds are in the determiner. I will now argue that the second alternative is the better course. I will propose a structure for verbal gerunds which (1) accounts for the fact that the subjects of verbal gerunds are genitive, (2) accounts for all the facts noted by Wasow and Roeper, and (3) accounts for syntactic facts which the Wasow and Roeper model can't handle.

Suppose that verbal gerunds come from the following structure.

64)



It is immediately clear that CASE in (64) will get realized as genitive by (55). In addition, since the gerund is dominated by V', the gerund will be modified by adverbs, not by adjectives; the direct object will not be expressed in a prepositional phrase; aspect can appear; and the gerund will take <u>not</u> rather than <u>no</u>. (64), then, handles the facts that Wasow and Roeper sought to explain and allows for a concise statement of the structural environment in which the genitive feature is realized as well. Furthermore, (64) provides the basis for an explanation of two additional syntactic facts.

While Wasow and Roeper correctly observed that verbal gerunds do not take the definite or indefinite article, it is nevertheless true that the demonstrative article can appear in the verbal gerund phrase:

65) a) this getting shot by gangsters has got to stop
b) this throwing beer cans can't be tolerated

Since there is a determiner node in (64), and since articles are dominated by the determiner node, (64) provides a source for

(65a) and (65b). However, in (56), there is no determiner node. Thus, given the analysis of verbal gerunds embodied in (56), the phrases in (65) are underivable.

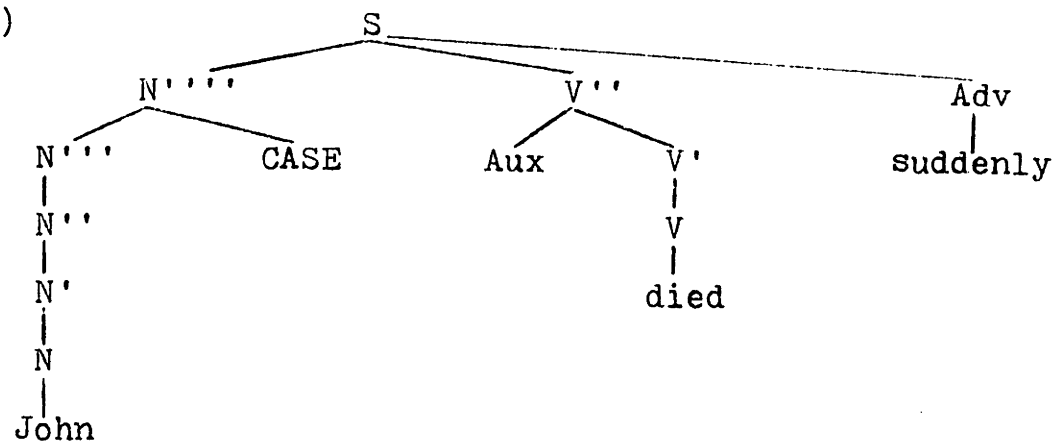
The second argument in favor of (64) is based on facts involving adverbs. Adverbs like <u>suddenly</u> can hang from either S or V'. Thus, the phrase in (66) is structurally ambiguous.

66) John died suddenly

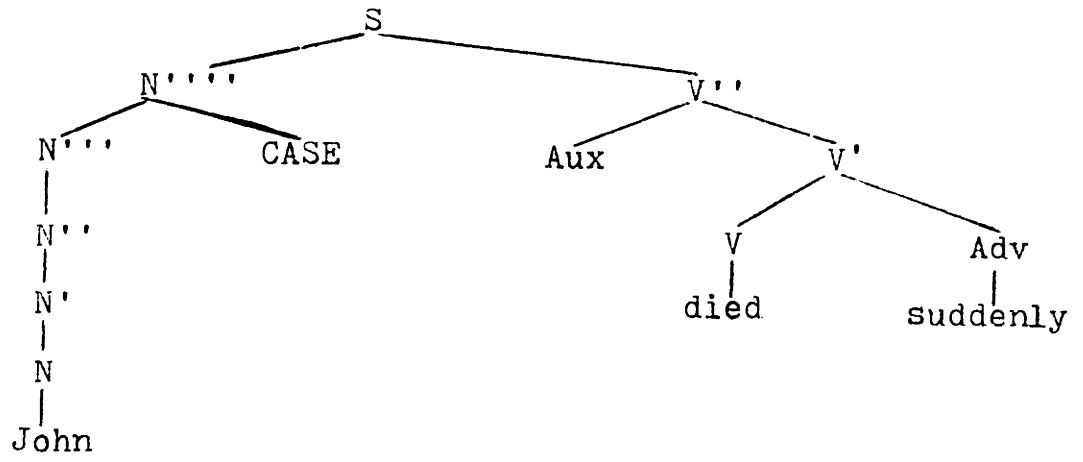
Under one reading, the onset of John's death was sudden; no claim is made concerning how long it took him to die. Thus, <u>suddenly, John died slowly</u> is not a contradiction. Under the second reading, the actual dying itself is sudden.

The two structures which underlie (66) are shown in (67) and (68). (67) corresponds to the first reading, and (68) corresponds to the second reading.

67)



68)



In (67), suddenly can move to the front of the sentence to produce suddenly John died. If (56) were the correct structure of verbal gerunds, we would expect (*69a) to be as good as (69b) and (69c).

69) a) *suddenly John's dying scared me

b) John's dying suddenly scared me

c) John's suddenly dying scared me

If we adopt (64), we can explain the ungrammaticality of (*69a), for in (64) there is no S node for suddenly to move to the front of; suddenly can only move to the front of V'. Thus, (64) correctly allows us to derive only (69b) and (69c), while excluding (*69a).

The preceding discussion has shown that the distribution of the genitive case can be stated in terms of the determiner position if Genitive CASE-Realization applies at the beginning of each transformational cycle. By claiming that verbal gerunds

originate in (64), rather than in (56), we explain a number of syntactic facts and obviate the need for complicating the Genitive CASE-Realization Rule's environment.

3.2. Nominative and Oblique CASE-Realization

We now need rules which realize CASE as nominative and oblique. These rules are stated in (70).

70) NOMINATIVE AND OBLIQUE CASE-REALIZATION RULES

$$\text{CASE} \longrightarrow \begin{cases} \text{NOMINATIVE} \;/\; [X[N'''\underset{N''''}{\_\_\_}]\ [Y]\ [\underset{V''}{\text{tense}}\ Z]W] & \text{a} \\ \text{OBLIQUE} \;/\; \_\_\_ & \text{b} \end{cases}$$

Rule (70a) ensures that the subjects of tensed verbs are nominative. Elsewhere, CASE becomes oblique by (70b).

I will now show that the realization of the nominative and oblique cases occurs after the post-cyclic rules have applied.

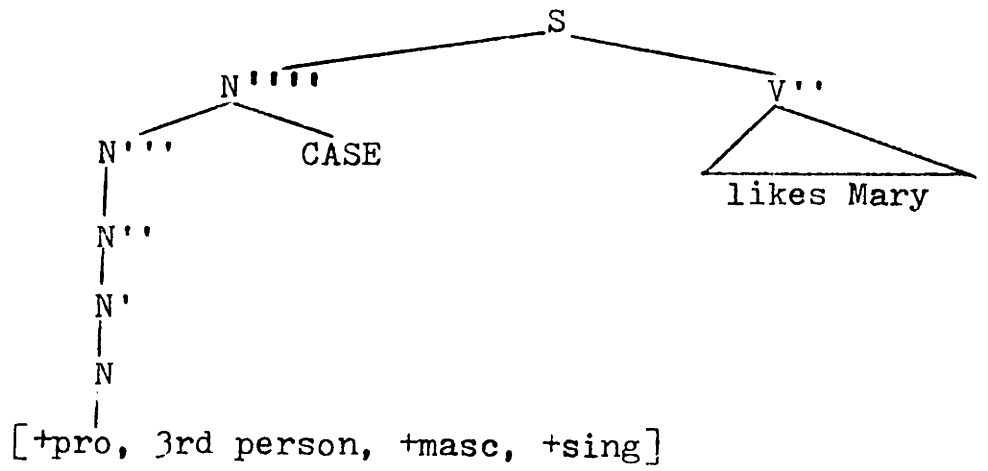
Nominative and Oblique CASE-Realization must follow Left Dislocation, which is a post-cyclic N''''-copying rule. (71b) is derived from (71a) by Left Dislocation.

71) a) he likes Mary

b) him, he likes Mary

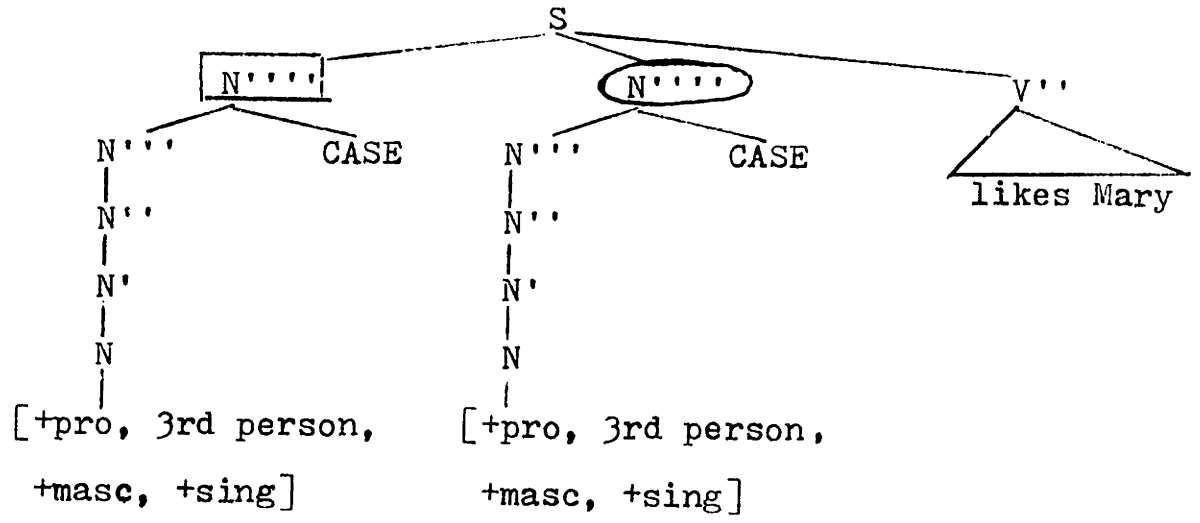
The structure of (71a) is shown in (72).

72)



The application of Left Dislocation to (72) produces (73), which underlies <u>him, he likes Mary</u>.

73)



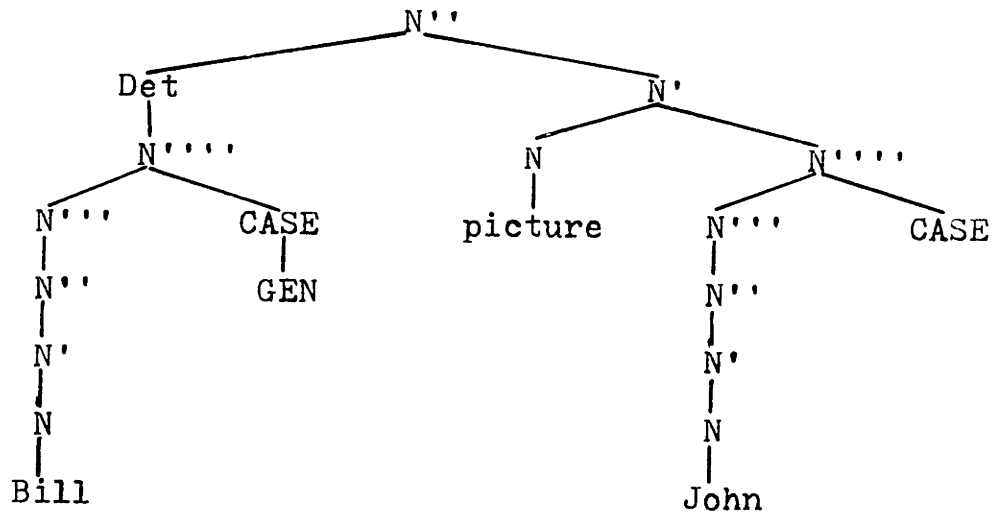
CASE in the circled N'''' is realized as nominative by (70a). CASE in the squared N'''' is realized as oblique by (70b). It is clear that Nominative and Oblique CASE-Realization must follow Left Dislocation, for the copied CASE is realized differently than the CASE which was generated by the phrase structure rules.

4. Formulation of Genitive Movement, NP-Preposing, and Agent-Postposing

I will now formulate the rules of Genitive Movement, NP-Preposing, and Agent-Postposing. Genitive Movement will be considered first.

Within the system I have just outlined, the phrase Bill's picture of John has the following structure.

74)



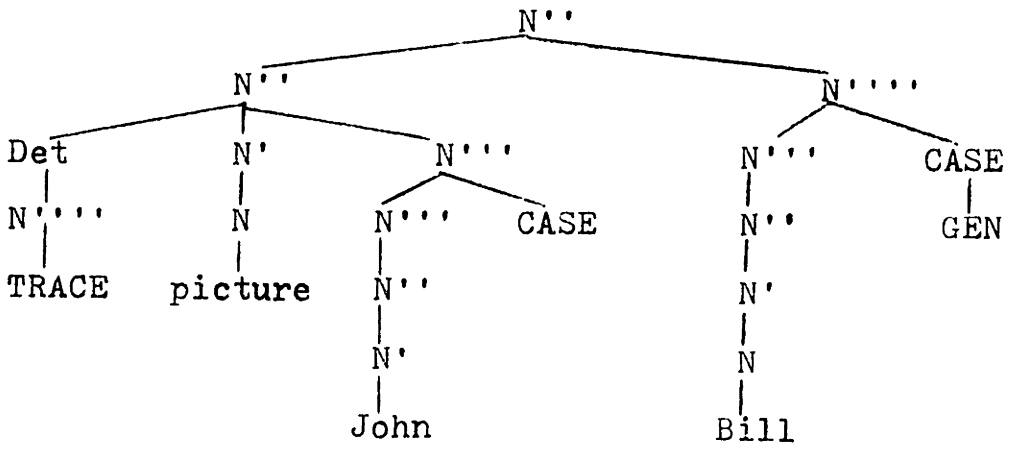
We may formulate Genitive Movement as follows.

75) GENITIVE MOVEMENT

N''''	N'		
1	2	⟶	
TRACE	2		1

The application of Genitive Movement to (74) produces (76).

76)



Since Genitive Movement is an N''''-movement rule, the noun phrase Bill is associated with the genitive case both before and after movement.

Now we will examine the two N'''-movement rules which we have discussed: NP-Preposing and Agent-Postposing.

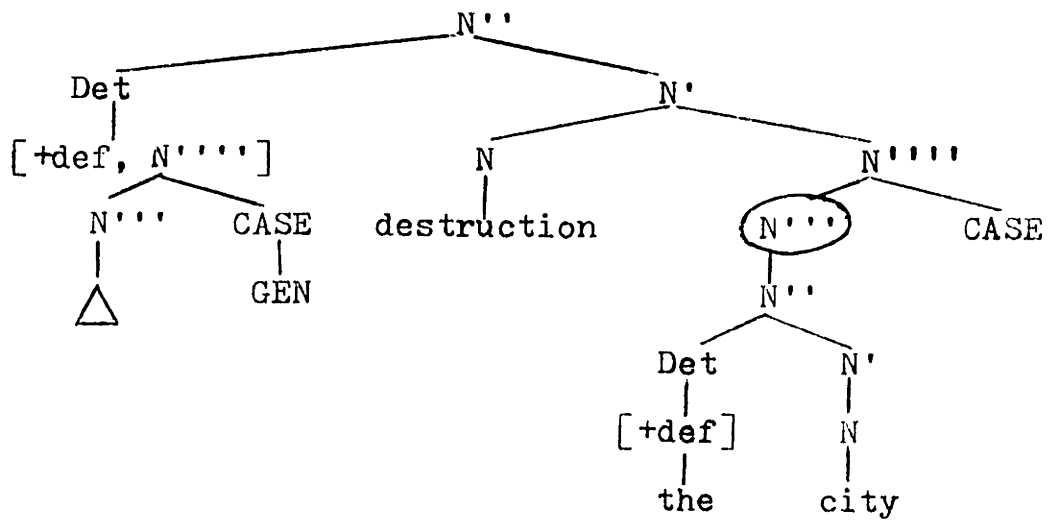
NP-Preposing derives (77b) from (77a).

77) a) the destruction of the city

b) the city's destruction

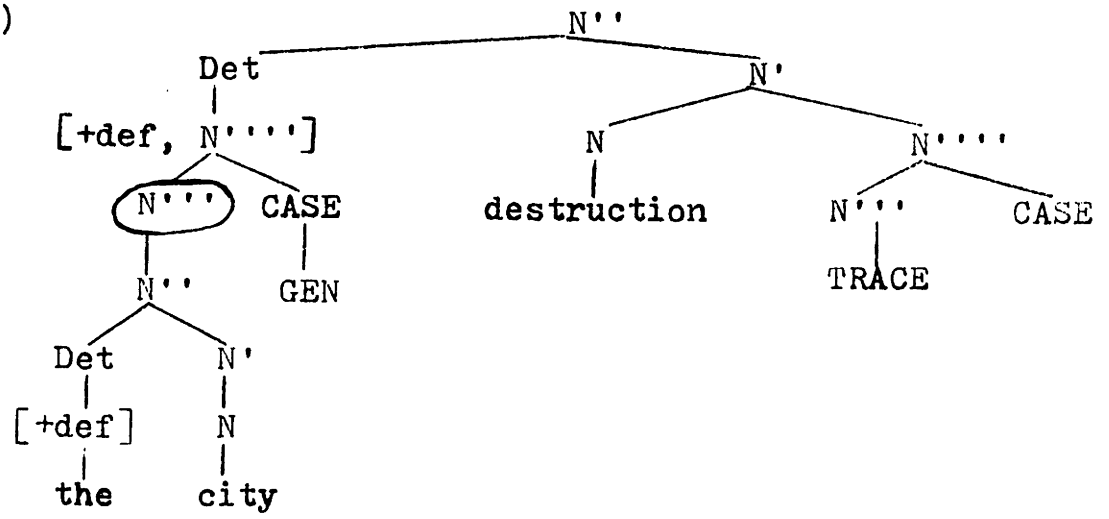
The structure of (77a) is shown in (78).

78)



NP-Preposing moves the circled N''' in (78) into the empty N''' in the determiner to produce (79).

79)



Since N'''-movement rules move "bare" N''', (N''') in (79) is associated after movement with a CASE node which is distinct from the CASE node with which it was originally associated. The noun phrase the city, which was associated with the as-yet-unrealized oblique case in (78), is associated with the

genitive case in (79). Since N''''-movement rules, such as Genitive Movement, move N''' and CASE, it is a property of such rules that the case associated with the moved item reamins constant.

I will now state the rule of NP-Preposing.

80) NP-PREPOSING

X	N'''	Y	$\{^{V}_{N}\}$	N'''	Z
1	2	3	4	5	6
1	5	3	4	TRACE	6

$\longrightarrow$

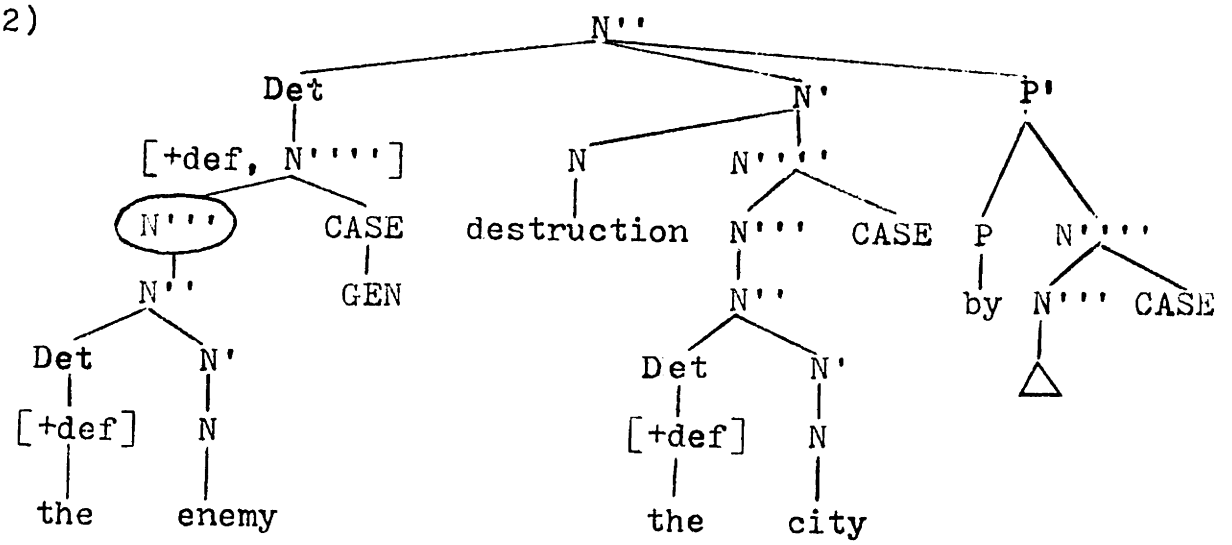
Now let us consider another N'''-movement rule, Agent-Postposing. This rule derives (81b) from (81a).

81) a) the enemy's destruction of the city

b) the destruction of the city by the enemy

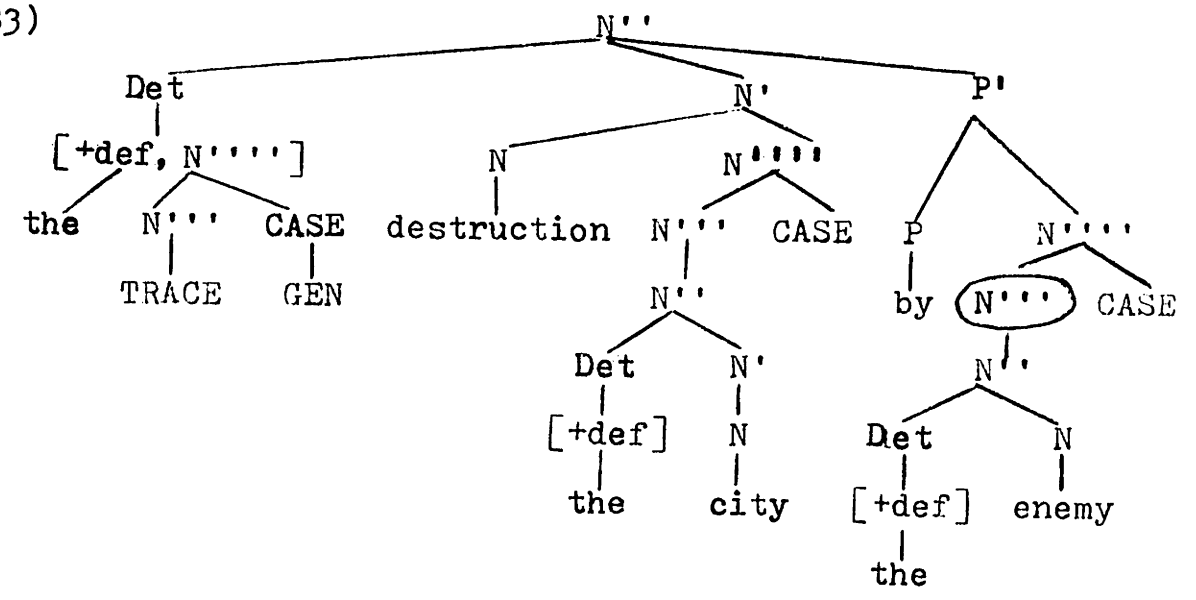
The structure of (81a) is shown in (82).

82)



Agent-Postposing moves the circled N''' into the empty N''' of the by-phrase to produce (83).

83)



The noun phrase the enemy, which was associated with the genitive case in (82), is associated with the as-yet-unrealized oblique case in (83).

I will now state the rule of Agent-Postposing.

84) AGENT-POSTPOSING

Y	N'''	Z	X'	K	by	N'''	W
1	2	3	4	5	6	7	8
1	TRACE	3	4	5	6	2	8

5. Empirical Consequences of the Theory of CASE

5.1. Two Types of Movement Rules

Having the phrase structure rule N'''' $\longrightarrow$ N''' CASE makes possible the statement of two types of rules which move phrase node projections of N: N''''-movement rules and N'''-movement rules.

It has been shown that both types of movement rules exist. If a rule moves N'''', CASE is moved along with N'''. Since Genitive Movement moves N'''', we account for the fact that the genitive case is moved along with N'''. If a rule moves N''', CASE is left behind. Since Agent-Postposing moves N''', we account for the fact that in derived nominals, the N'''' originally associated with the genitive case is associated in its moved position with the unrealized oblique case. Since NP-Preposing moves N''', we account for the fact that in derived nominals, the N''' originally associated with the unrealized oblique case is associated in its moved position with the genitive case.

5.2. The CASE Condition

There exists yet stronger confirmation of the correctness of this theory. The fundamental insight expressed in the phrase structure rule N'''' $\longrightarrow$ N''' CASE is that all N''' are associated with CASE at the level of deep structure. I would now like to make an even stronger proposal -- namely, that throughout a derivation, every N''' is associated with CASE. I will call this proposal the CASE Condition.

All N''''-movement rules satisfy the CASE Condition by definition, since N''''-movement rules move N''' and CASE. In order for N'''-movement rules to satisfy the CASE Condition, N''' must be moved into a node which has CASE as its sister. The only node which fulfills this condition is N'''. The CASE Condition thus entails that the Structure Preserving Constraint holds for all N'''-movement rules.

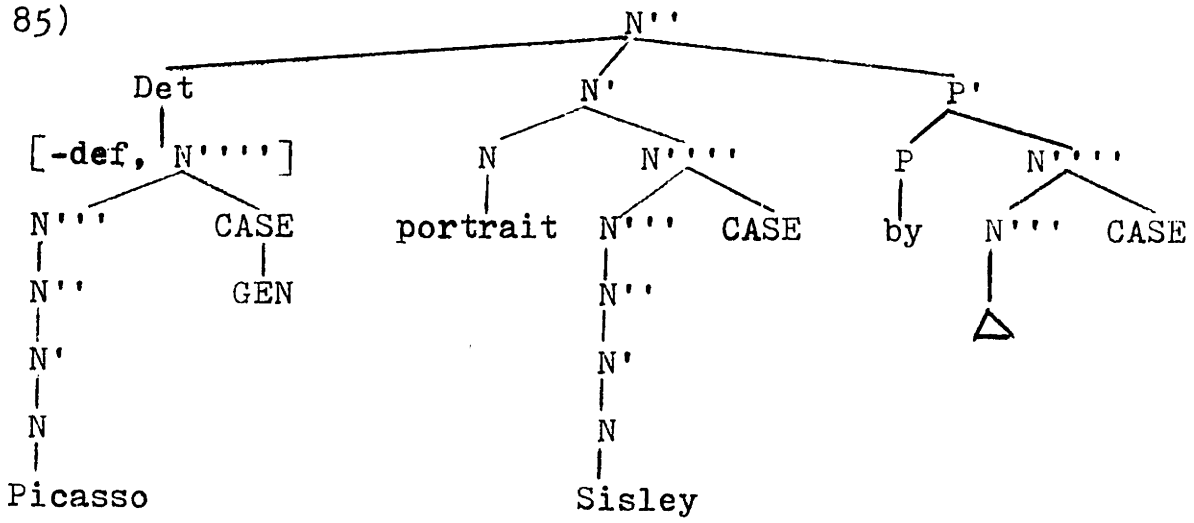
The Structure Preserving Hypothesis says that phrase node movement rules in embedded sentences must always be structure-preserving. A structure-preserving rule, in the sense of Emonds (1970), moves a phrase node X into a position in which a phrase structure rule can generate the category X. The CASE Condition supersedes the Structure Preserving Hypothesis at the level of descriptive adequacy, for it is untrue that all phrase node movement rules in embedded sentences are structure-preserving. Genitive Movement, which is an

N''''-movement rule, is not structure-preserving; yet, it applies in embedded sentences: Sam told Martha to be sure to alert Fred to the fact that Alex might steal a picture of John of Bill's.

5.3. Further Remarks

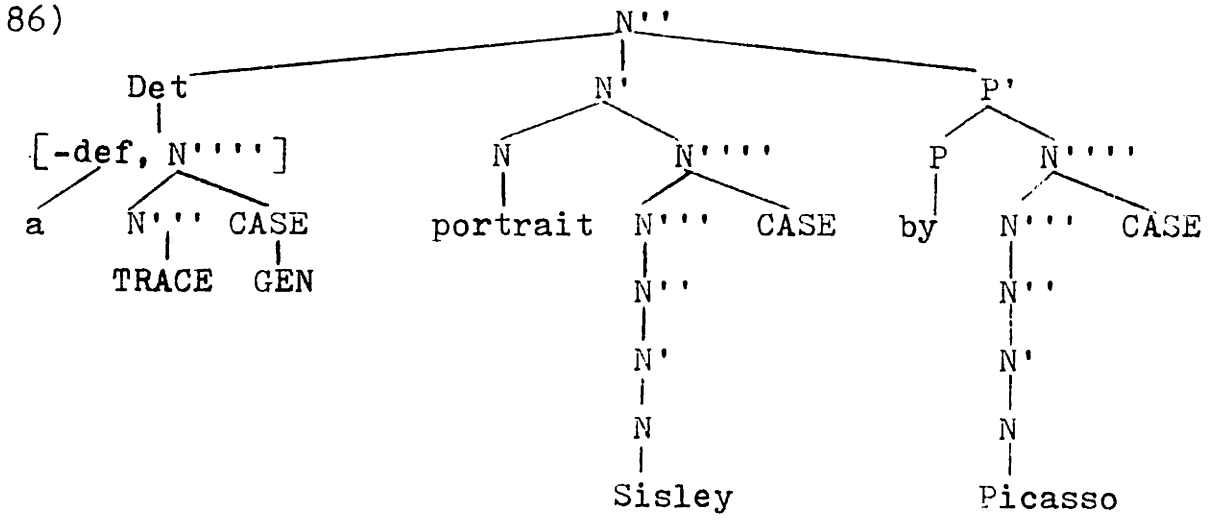
I will now give some sample derivations to illustrate how the rules of Genitive Movement, NP-Preposing, and Agent-Postposing work within my theory. In doing so, I will show that the theory which has been developed here predicts the ungrammaticality of phrases whose generation cannot be prevented by the imposition of rule ordering. We will consider the phrases which can be derived from the structure (85).

85)



If Agent-Postposing applied, we would derive (86), which underlies a portrait of Sisley by Picasso.

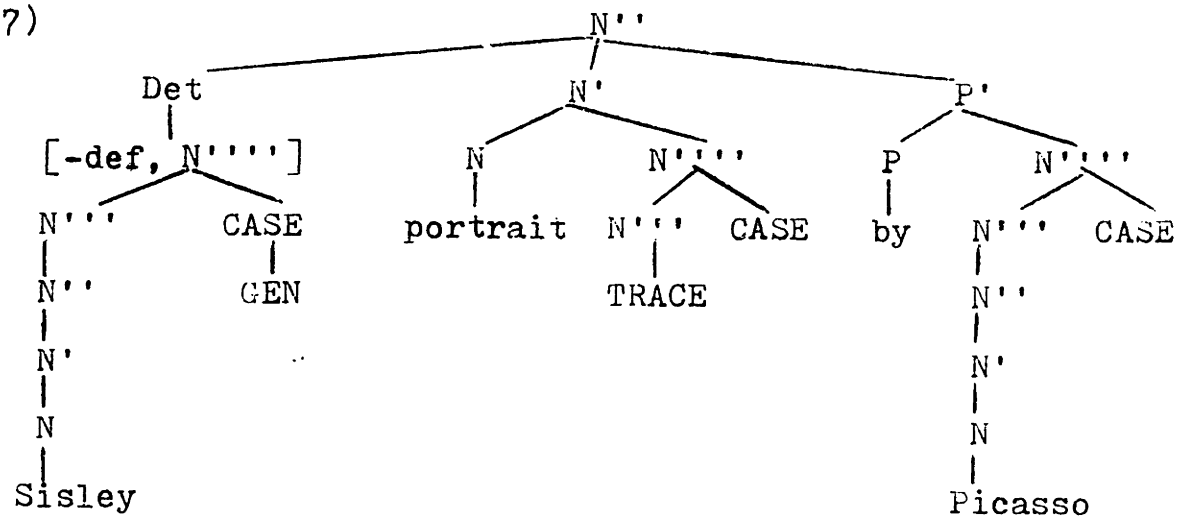
86)



A brief word about the TRACE which appears in (86) is in order here. According to the theory of movement in which TRACE is an element, TRACE is that element which is left by a movement transformation. TRACE must be "properly bound" by some element in the phrase marker. Proper binding is a relation which obtains between positions in phrase markers. A proper binder either precedes or asymmetrically commands TRACE. A phrase is uninterpretable if it contains a TRACE which is not properly bound. Since TRACE is a designated element, it can be deleted by another item. The deletion of the TRACE by the article in (86) renders (86) interpretable. The reader is referred to Fiengo (1974) for the particulars of this theory.

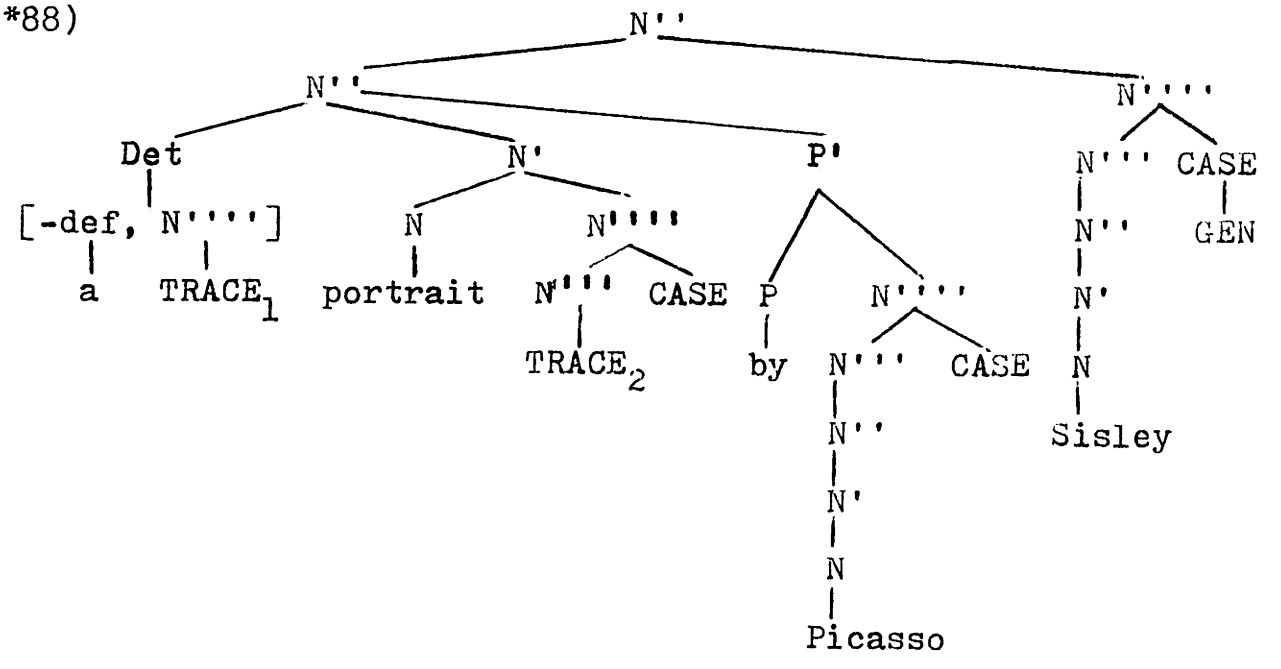
If NP-Preposing applied in (86), we would derive (87), which underlies Sisley's portrait by Picasso. Here, Sisley deletes TRACE.

87)



Now, consider what would happen if Genitive Movement applied to (87).

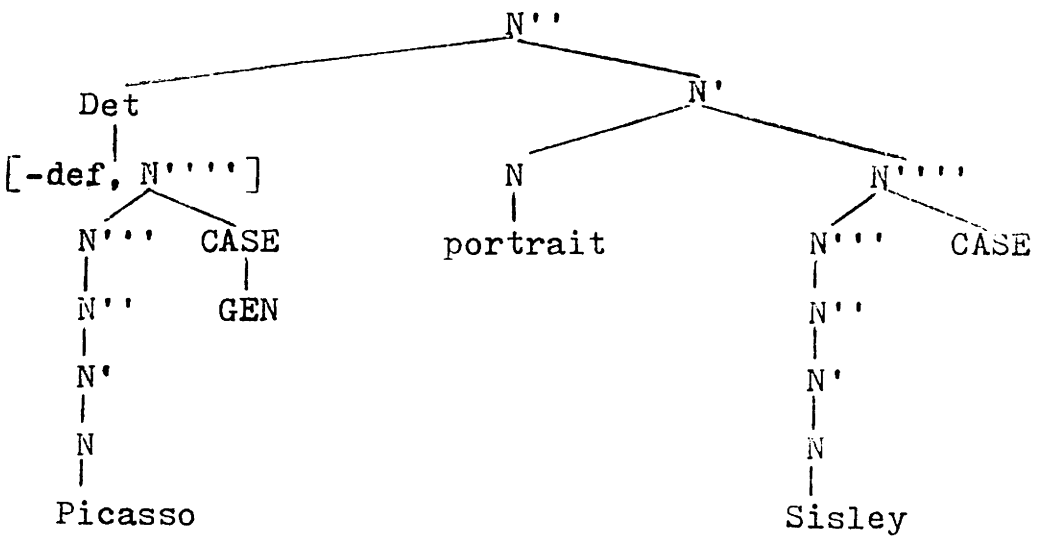
*88)



The ungrammatical string *<u>a portrait by Picasso of Sisley's</u> is produced. The article deletes $TRACE_1$. However, $TRACE_2$ is not properly bound. (*88) is therefore uninterpretable.

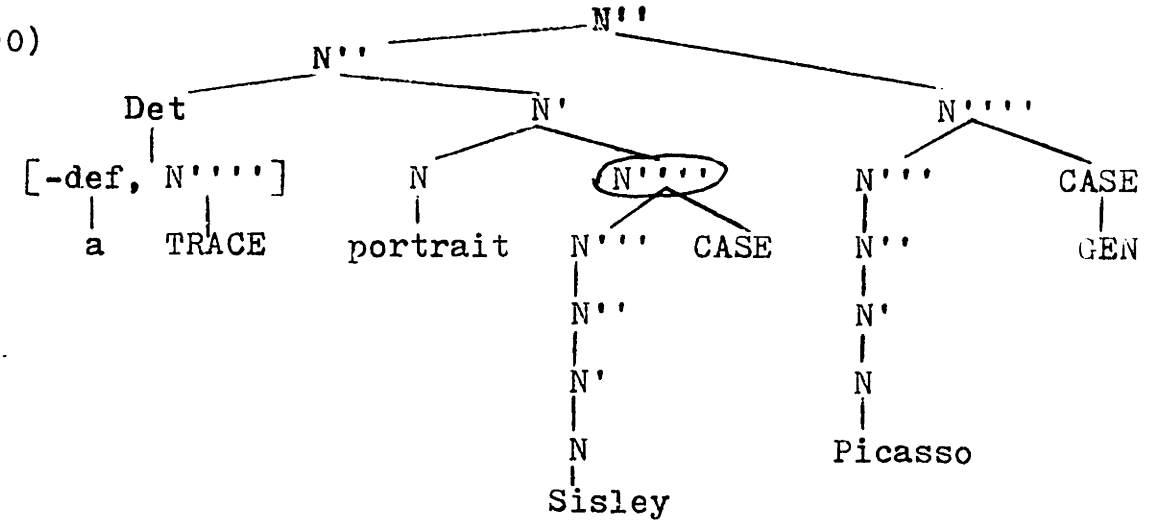
Let us now consider (89), which is identical to (85), except that the by-phrase has been omitted.

89)



The application of Genitive Movement to (89) produces (90), which underlies a portrait of Sisley of Picasso's.

90)



The article deletes TRACE, and we get a portrait of Sisley of Picasso's.

We can now explain why the ungrammatical phrase

*Sisley portrait of Picasso's is ungenerable. NP-Preposing is an N'''-movement rule. Therefore, NP-Preposing cannot move the circled N'''' in (90) into the position occupied by TRACE. Furthermore, NP-Preposing cannot move the N''' which dominates Sisley into the position occupied by TRACE because to do so would violate the CASE Condition. Thus, the phrase *Sisley portrait of Piscasso's is underivable.

Suppose one were to reject both the TRACE theory of movement and the CASE Condition. Then, one would have to invoke rule ordering to block *Sisley portrait of Picasso's and (*88), the portrait by Picasso of Sisley's. Yet, no matter how Genitive Movement is ordered with respect to NP-Preposing, an ungrammatical phrase is produced.

To block *Sisley portrait of Picasso's, one could order NP-Preposing before Genitive Movement. However, this ordering produces phrases like *the portrait by Picasso of Sisley's, in phrases to which Agent-Postposing has applied.

To block *the portrait by Picasso of Sisley's, one could order Genitive Movement before NP-Preposing. But this ordering of the rules generates *Sisley portrait of Picasso's.

In the absence of the TRACE theory of movement and the CASE Condition, these ungrammatical phrases can be blocked only by the ad hoc stipulation that both Genitive Movement and

NP-Preposing cannot apply within the same cycle.

This discussion has shown that the TRACE theory of movement, together with the CASE Condition and the system of rules which has been developed here, allows us to explain the ungrammaticality of phrases whose ungrammaticality cannot be handled by rule ordering. This fact constitues extremely strong empirical confirmation of the correctness of our theory.

6. Surface Rules

We have seen how CASE is generated and realized. We can now investigate the manner in which the genitive feature gets incorporated into lexical items.

The genitive feature must be incorporated into a noun within its scope at surface structure, for the application of NP-Postposing can move a noun out of the scope of the genitive case. Likewise, NP-Preposing can move a noun into the scope of the genitive case. The genitive feature must therefore remain unincorporated until all transformational rules have applied.

It will be shown that only in special cases does the genitive feature actually get incorporated into a lexical item within its scope.

The rule which spells out the genitive feature to produce the strong forms of genitive pronouns was formulated as (7a). The rule which derives the weak forms of genitive

pronouns was formulated as (46). These rules are reproduced here for the reader's convenience.

7) a) [+pro, 1st person, +sing, GEN] ⟶ mine
[+pro, 2nd person, +sing, GEN] ⟶ yours
[+pro, 3rd person, +masc, +sing, GEN] ⟶ hiss
[+pro, 3rd person, -masc, +sing, GEN] ⟶ hers
[+pro, 1st person, -sing, GEN] ⟶ ours
[+pro, 2nd person, -sing, GEN] ⟶ yours
[+pro, 3rd person, -sing, GEN] ⟶ theirs

46) $C \longrightarrow \emptyset \; / \; \_\_\_ \; L$

6.1. Genitive Incorporation

When there is a single noun or pronoun in the determiner, we want the genitive feature to be incorporated into that noun or pronoun. Thus, in the phrases my book and Fred's promise, we want to be able to say that my and Fred's are words. We will thus need Rule (91).

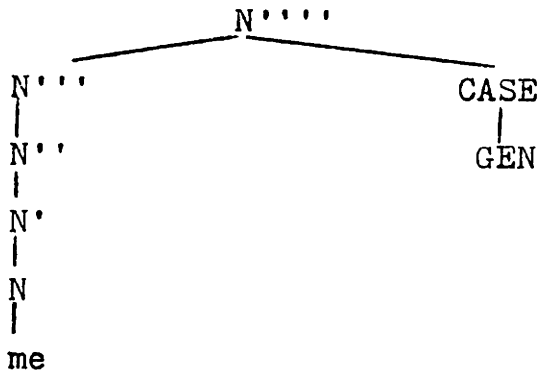
91) GENITIVE INCORPORATION

N	(#)	GEN
1	2	3
1+3	2	∅

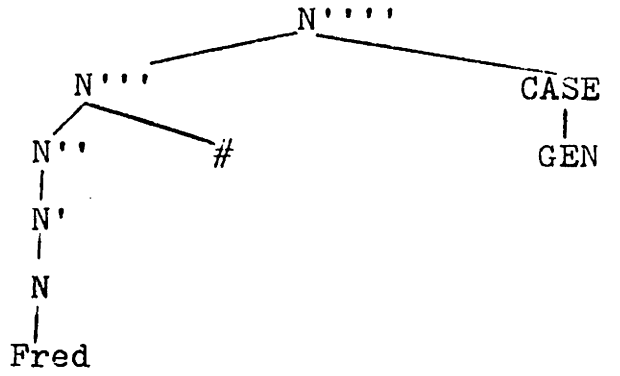
⟶

Rule (91), applying to (92), yields $[\#[me]_N GEN\#]_N$. Rule (91), applying to (93), yields $[\#[\#Fred\#]_N GEN\#]_N$.

92)

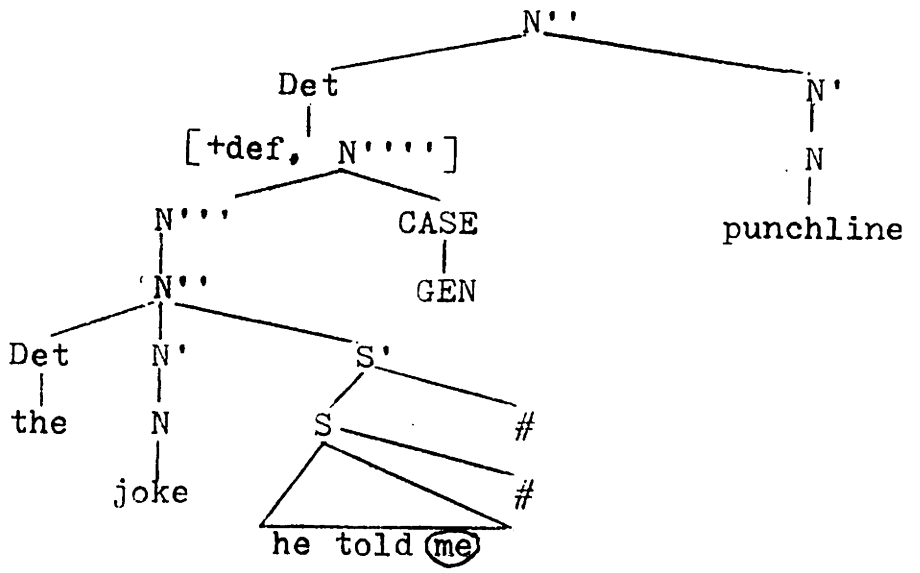


93)

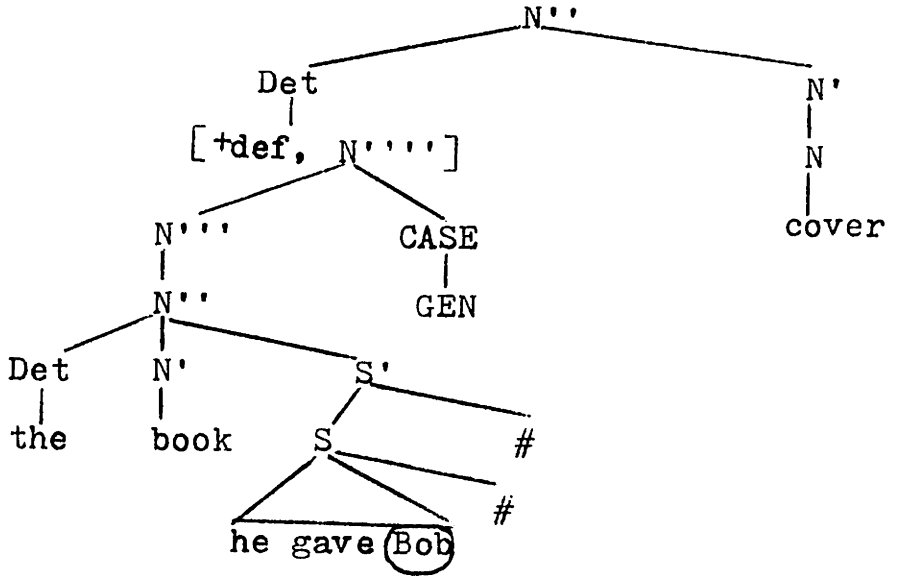


Rule (91) allows only one # to intervene between the noun in question and the genitive feature. Allowing only a single # to intervene between the noun and the genitive feature will block the genitive feature from attaching to the circled items in (94) and (95).

94)



95)



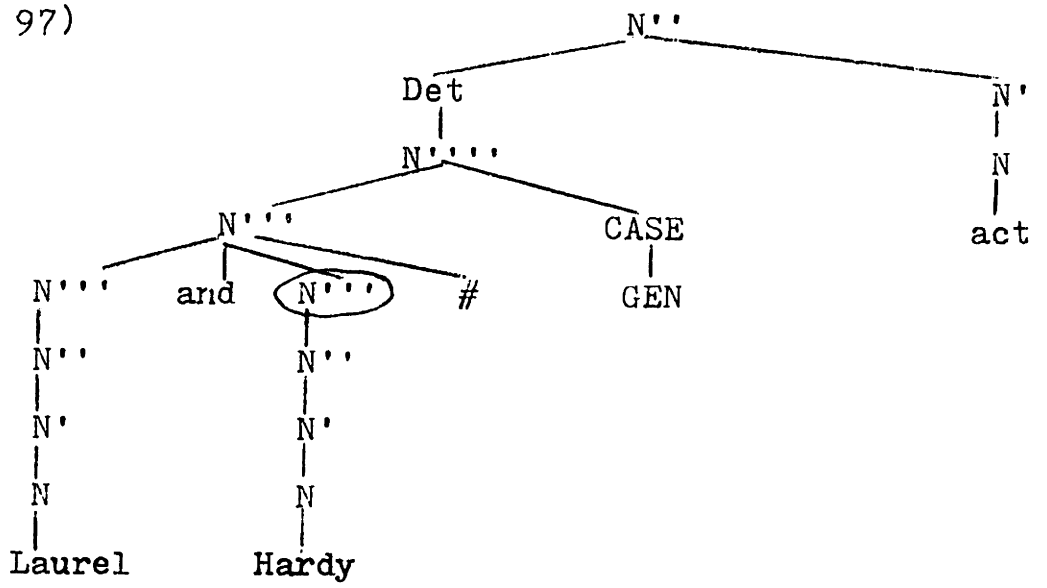
Thus, the genitive feature will be no more attached to me in (94) and Bob in (95) than it is to see in the person to see's address or to for in the person I looked for's trail. If anything, we get (96a), and not (96b), from (94).

96) a) the joke he told me's punchline

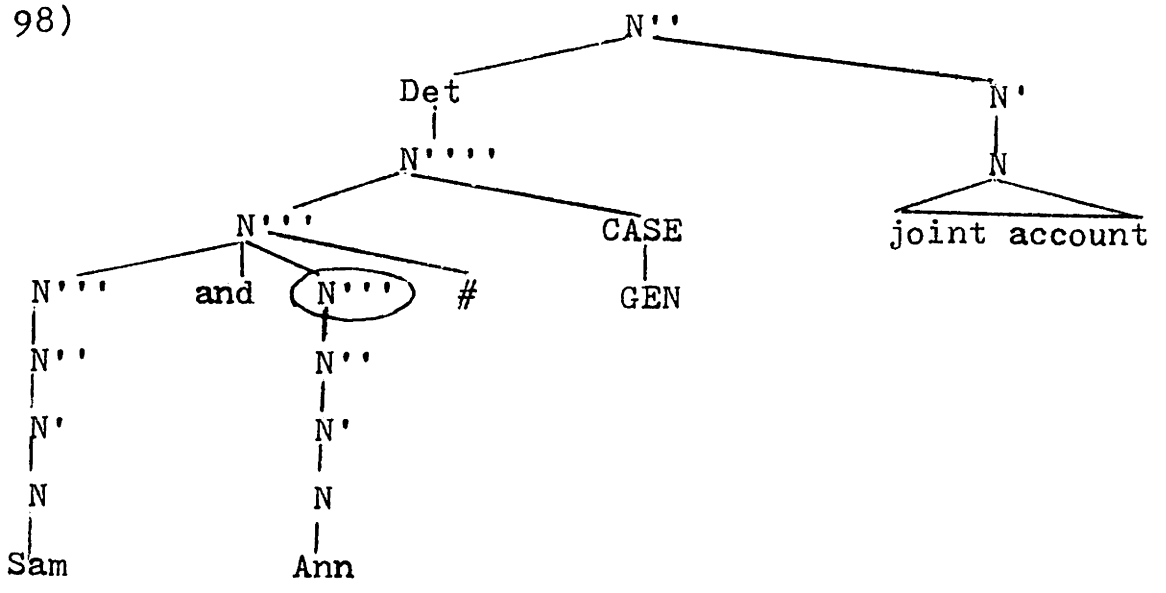
b) *the joke he told my punchline

Note also that (91) will not incorporate the genitive feature into Hardy in (97) or into Ann in (98), for if it did, the Coordinate Structure Constraint would be violated.

97)



98)



I am thus claiming that the genitive feature remains outside the circled N'''s in (97) and (98) and is crucially not incorporated

into Hardy and Ann.

6.2. Genitive Distribution

Now, we run into a curious fact. Although conjoined nouns in the determiner do not form a single word with the genitive feature, conjoined pronouns do. In fact, if just one of a number of conjoined items in the determiner is a pronoun, all of the conjoined items in the determiner form a single word with the genitive feature. These facts are illustrated in (99).

99) a) *Dave's and Sam's resemblance

b) Dave and Sam's resemblance

c) {Dave's / your} and my resemblance

d) *{Dave / you} and my resemblance

e) *{Dave / you} and me's resemblance

f) my and {Dave's / your} resemblance

g) *me and {Dave's / your} resemblance

The phrases in (99) show that there is a rule which obligatorily distributes the genitive feature among the conjoined nouns in the determiner if any one of these nouns is a pronoun. I will write this rule as (100).

100) GENITIVE DISTRIBUTION

$$([(\text{CONJ})\ N]^n)\ [(\text{CONJ})\begin{bmatrix} N \\ +\text{pro} \end{bmatrix}]^n\ ([(\text{CONJ})\ N]^n)\ (\#)\ \text{GEN}$$

$$1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \longrightarrow$$

$$1 \quad 2+8 \quad 3 \quad 4+8 \quad 5 \quad 6+8 \quad 7 \quad \emptyset$$

(100) abbreviates a set of rules. It says that whenever pronouns are conjoined with other pronouns or nouns in the determiner, the genitive feature is distributed among them; and all of the nouns form a single word with the genitive feature.

In (99f), (46) has operated to produce my and your. However, suppose we had the string Sam remarked on Bill and John's resemblance and Fred remarked on me+GEN and you+GEN △. Rule (7a) will give us mine and yours. Rule (46), as it now stands, will apply to mine, but not to yours. Thus, the phrase *Sam remarked on Bill and John's resemblance and Fred remarked on my and yours is generated. To block the generation of this phrase, we must write structure into the rule that derives the weak forms of the genitive pronouns from the strong forms. In this way, we can guarantee that a genitive pronoun loses its final consonant when the first node in N' is filled. The required reformulation of (46) is as follows: $C \longrightarrow \emptyset\ /\ [X[\text{PRO}\ \underset{N\ \text{Det}}{\underline{\quad}}\ ]Y]\ \underset{N'\ N''}{[L\ Z]\ W]}$.

Rule (91) will incorporate the genitive feature into all the nouns and pronouns in (101) below.

101) a) your friend and mine

b) Sam's health and Fred's

We can show that these phrases come from conjoined subject N'''s and not from conjoined determiner N'''s, for when (101a) and (101b) appear as the subjects of sentences, the verb must be plural:

102) a) your friend and mine are in Cleveland

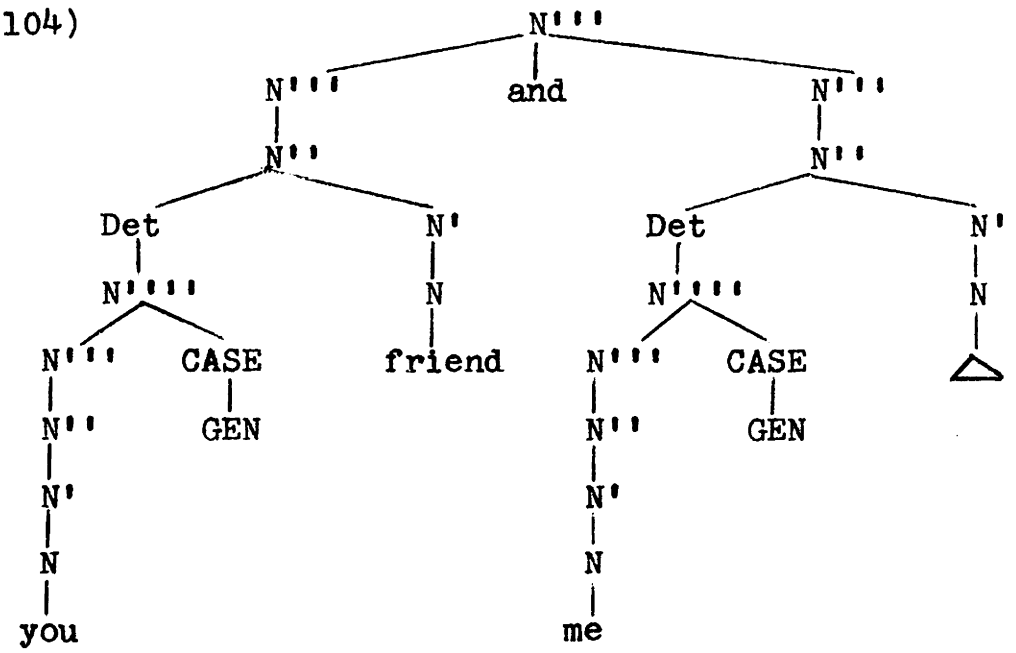
b) *your friend and mine is in Cleveland

103) a) Sam's health and Fred's are in bad shape

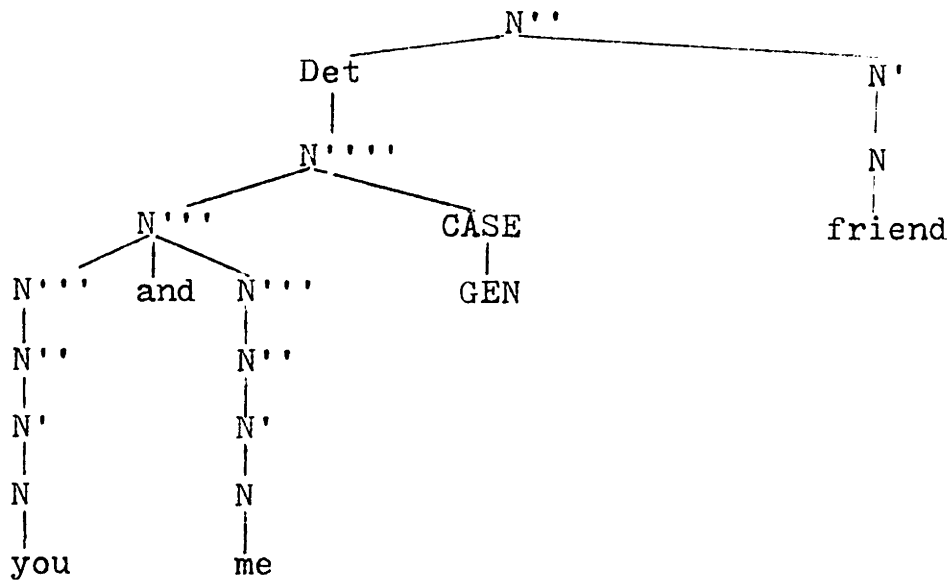
b) *Sam's health and Fred's is in bad shape

(*102b) is good only in a "showbiz" sense: "There goes your friend and mine -- the preacher." (*103b) is totally out, for health is an inalienable characteristic of one person. Therefore, the structure of the subject of (102a) must underlyingly be as shown in (104), and not as shown in (105).

104)

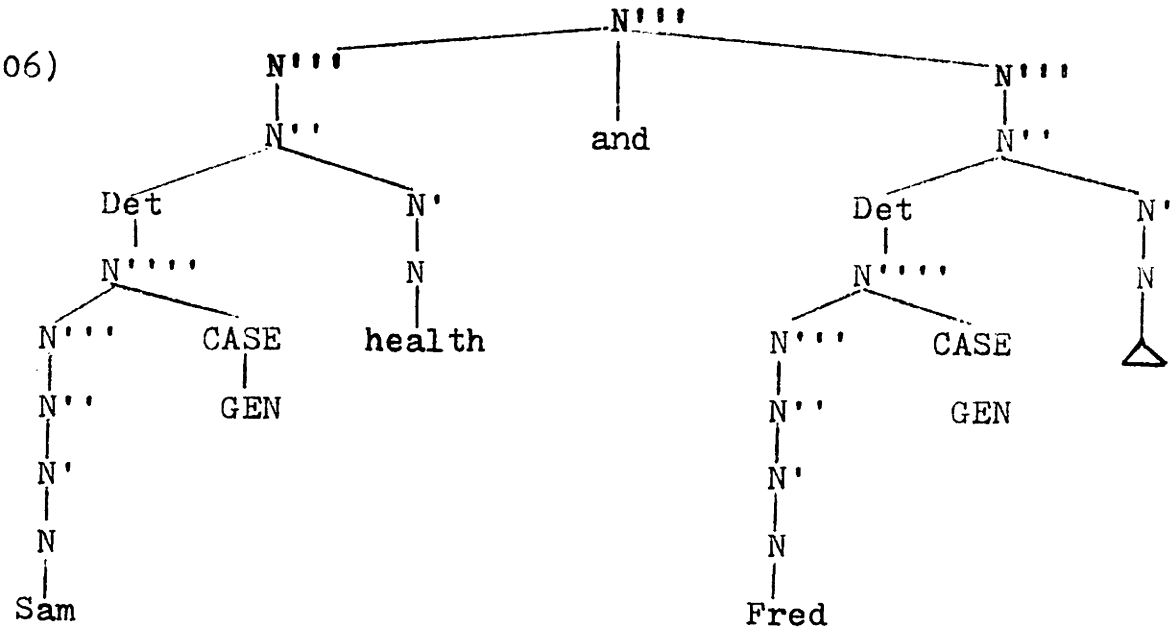


105)

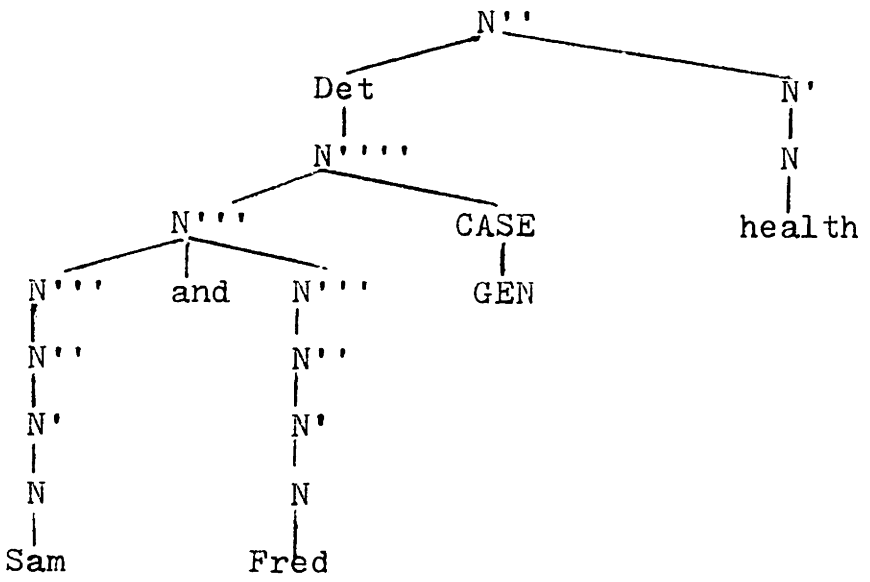


Likewise, the structure of the subject of (103a) must be as shown in (106) and not as shown in (107).

106)



107)



Since (104) and (106) are the sources for the subjects of (102a) and (103a), respectively, we now see that Rule (91) will apply to give $[\#[\text{you}]_N\text{GEN}\#]_N$ and $[\#[\text{me}]_N\text{GEN}\#]_N$ in (104) and $[\#[\#\text{Sam}\#]_N\text{GEN}\#]_N$ and $[\#[\#\text{Fred}\#]_N\text{GEN}\#]_N$ in (106). Rule (7a), the Genitive Spell-Out Rule, will yield <u>yours</u> and <u>mine</u> in (104). <u>Yours</u> will lose its final consonant by (46), as reformulated.

6.3. <u>Genitive Spell-Out on Nouns</u>

We have now seen how the genitive feature is incorporated into pronouns and nouns. We have written rules to spell out the genitive feature on pronouns. Now we must consider how the genitive feature is spelled out on nouns. The following data should clarify this matter.

108)

	SG.	GEN. SG.	PL.	GEN. PL.
1.	man	man's	men	men's
2.	sheep	sheep's	sheep	sheep's
3.	knife	knife's	knives	knives'
4.	mouse	mouse's	mice	mice's
5.	tree	tree's	trees	trees'
6.	bush	bush's	bushes	bushes'
7.	bucket	bucket's	buckets	buckets'

Note that we can best capture the fact that the irregular form of the plural shows up in both the genitive plural and the plural by claiming that:

109) A. The genitive is outside the plural.

B. The plural gets spelled out before the genitive.

C. The genitive morpheme is [#s] and its alternants [#ɨz] and [#z]. (For our purposes, it is sufficient to let [#s] stand for all forms of the genitive.)

We can see quite clearly that in compound nouns, the genitive is outside the plural. In compound nouns such as those in (110)-(112) below, the head noun of the compound (the noun which gets the plural morpheme) does not receive genitive morphology.

110) a) father-in-law's GENITIVE SINGULAR

b) fathers-in-law's GENITIVE PLURAL

111)	a)	hanger-on's	GENITIVE SINGULAR
	b)	hangers-on's	GENITIVE PLURAL
112)	a)	lady-in-waiting's	GENITIVE SINGULAR
	b)	ladies-in-waiting's	GENITIVE PLURAL

In (110-112), the singular and plural cases both show up with the genitive feature incorporated into the N which dominates the entire compound. The genitive feature is not incorporated into the head noun of the compound. Thus, the structure of (111b), for example, is as shown in (113).

113) $[\#[\#[\#\text{hangers}\#]_{N}\ [\text{on}]_{P}\ \#]_{N}\text{GEN}\#]_{N}$

Note that our formulation of the phrase structure rules (54) guarantees that (109A) is true. Singular and plural are features on nouns. The genitive is a feature of N''''. Therefore, the singular and plural features must be inside the genitive. The cyclic application of spell-out rules at surface structure will guarantee that the plural gets spelled out before the genitive.

Taking men's as an example, the structure of this word is $[\#[\#[\#\text{man}\#]_{N}\text{PL}\#]_{N}\text{GEN}\#]_{N}$. At surface structure, the appropriate form of an inflected item must be looked up in the lexicon. The lexicon must specify for every noun whether that noun has a regular or irregular plural form. There is a morphological rule in the lexicon in the paradigm for man

which says $[\#[\#man\#]_N PL\#]_N \longrightarrow [\#men\#]_N$. There will be a rule of this type for every noun which forms an irregular plural. Elsewhere, the plural goes to [#s] and its alternants, by regular rules. The output of this morphological rule is $[\#[\#men\#]_N GEN\#]_N$. Now, there can be a rule which spells out the genitive feature as <u>s</u>.

114) GEN $\longrightarrow$ [#s]

Thus, $[\#[\#men\#]_N GEN\#]_N$ becomes $[\#[\#men\#]_N \#s\#]_N$.

Now we need a rule to delete the genitive <u>s</u> and its alternants after the plural <u>s</u> and its alternants to get the correct phonetic output for (108.5-108.7). I will use <u>s</u> to stand for all the phonetic alternants of the genitive and the plural.

115) s $\longrightarrow \emptyset$ / ##s## ___

Taking the genitive plural of <u>tree</u> as an example, we see that Rule (115) gives us the right results:

116) $[\#[\#[\#tree\#]_N \#s\#]_N \#s\#]_N$ → $\emptyset$

Our rules give us exactly the right results for $[\#[\#[\#mouse\#]_N PL\#]_N GEN\#]_N$ as well. First, the plural is spelled out, and we get $[\#[\#mice\#]_N GEN\#]_N$. Next, the genitive feature

is spelled out, and we get $[\#[\#\text{mice}\#]_N\#\text{s}\#]_N$. Now, (115) can't apply, for the final s of mice is not preceded by ##.

I believe there is a dialect split here. Some people would pronounce mice's as [mays] and sis' as [sis]. I pronounce mice's as [maysiz] and sis' as [sisiz]. For people who don't have my dialect, Rule (115) would read as follows.

117) $s \longrightarrow \emptyset \; / \; \left\{ \begin{matrix} s \\ z \end{matrix} \right\} \; \#\#\_\_$

7. Epilogue

Linguists who have studied case in the past have focused primarily on the issue of case spell-out. These linguists correctly observed that the case with which an item appears may be "changed" by the application of transformational rules. This observation motivated the notion that case is entirely a surface phenomenon and accounts for the historical preoccupation with case spell-out.

Various ways of assigning case at surface structure are found in the literature. Halle (1973) proposed inserting the entire inflectional paradigm of a lexical item into trees, with the subsequent erasure of every form except the appropriate one at surface structure. Fillmore (1968) proposed a competing system, whereby a "second lexical pass" at surface structure looks up the appropriate form in the lexicon. Both of these theories express the insight that case endings are

spelled out at surface structure, but they hardly tell the whole story.

In this study, case spell-out is given its proper place in the panoply of rules which involve case. Far from being a creature of the surface, CASE is generated by the phrase structure rules. The phrase structure rules generate the node N'''', which is expanded as N''' CASE. A global condition on N''', the CASE Condition, states that throughout a derivation, N''' must be associated with CASE. The CASE Condition entails that N'''-movement rules are structure-preserving; N''''-movement rules satisfy the CASE Condition by definition. CASE is realized by structure-sensitive morphological rules. The Genitive CASE-Realization Rule applies before the transformational rules apply on each cycle. The Nominative CASE-Realization Rule and the Oblique CASE-Realization Rule apply after the post-cyclic rules have applied. At surface structure, the genitive feature is incorporated into N, if the appropriate conditions are met. The genitive feature is spelled out. In investigating CASE from its generation by the phrase structure rules to its spelling out at surface structure, we have seen that CASE plays a fundamental role in syntactic derivations.

FOOTNOTES TO CHAPTER 1

1. Paul Kiparsky pointed out this fact to me.

2. Rule (7b) is strictly limited to genitive pronouns in its application.

3. The *of* in *a car of gold* and *a picture of John* is inserted under conditions which need not concern us here.

4. Instead of treating CASE as a sister of N''', CASE could be a feature on N''''. This is just a notational variant of the system proposed in the text.

CHAPTER 2

BASIC ISSUES IN DERIVATIONAL MORPHOLOGY

1. Introduction

Derivational morphology is the study of lexical word formation. The lexicon minimally contains the paradigms of the words generated by the syntax, a list of all the formatives in the language, derivational rules, and a list of all the words which are derived from the formatives by the derivational rules. Here, we shall study the manner in which formatives of various sorts are represented in the lexicon and see how these formatives combine to create words. This study brings to light a number of seemingly disparate facts which are all naturally explained by assigning the correct structure to formatives and by imposing the appropriate organization on the lexicon.

The exposition preceeds as follows. First, I shall discuss the manner in which stems, prefixes, suffixes, underived words, and derived words are represented in the lexicon. The notation used for representing these formatives permits us to give precise definitions of stem, prefix, suffix, underived word, and derived word. In

addition, this notation has important empirical consequences, as we shall see when we consider the manner in which the stress rules apply to derived words.

In discussing the lexical representation of formatives, I shall make use of only two boundaries: # and +. In The Sound Pattern of English (1968), it was claimed that there were three boundaries relevant to derivational morphology: #, +, and =. Suffixes were introduced with either the # or the + boundary; prefixes were introduced with either the = or the + boundary. It is shown in this chapter that prefixes fall into the same two classes as suffixes. The two classes of affixes are distinguished by the nature of the boundary with which they are introduced. Affixes which are introduced with the + boundary are called Class I affixes. Affixes which are introduced with the # boundary are called Class II affixes.

Evidence involving the manner in which the stress rules apply to lexically derived words is crucial in establishing the fact that there are only two classes of affixes. I shall show that the cyclic stress assignment rules apply to Class I prefix-derived words in the same manner in which they apply to Class I suffix-derived words. It will be claimed that Class II-derived words do not undergo the cyclic stress assignment rules, for these words are derived after the cyclic stress assignment rules apply. Because

of the nature of their lexical representation, Class II prefixes get primary stress by the Primary Stress Rule. Stress subordination in Class II prefix-derived words is handled by the Compound Stress Rule and the Nuclear Stress Rule.

After establishing that there are two classes of prefixes and two classes of suffixes, I shall discuss the ways in which these two classes of affixes differ in their properties. Class I affixes attach to both words and stems, whereas Class II affixes attach only to words. To account for this behavior, I shall claim that the lexicon is so organized that Class I affixation precedes Class II affixation. In addition, it is claimed that Class I affixation precedes the cyclic stress assignment rules and that Class II affixation follows the cyclic stress assignment rules. This schema of lexical organization explains two seemingly unrelated facts: the stress-neutrality of Class II affixes and their peculiar distribution. Furthermore, the structure imposed on the organization of the lexicon eliminates the need for global suffixation conditions and limits the generative capacity of the lexicon.

2. The Lexical Representation of Formatives

We shall now investigate the manner in which formatives are represented in the lexicon. The word formative refers to the category which includes the minimal word-building elements of English.

The formatives of English fall into four principal classes: 1) formatives which happen to be words, 2) stems, 3) suffixes, and 4) prefixes.

These terms are referred to often, and the distinctions among them are crucial. Therefore, I would like to introduce certain notational conventions which allow us to give these four classes of formatives distinct lexical representations. This notation also enables us to give precise definitions of the terms stem, suffix, prefix, underived word, and derived word.

In the discussion which follows, I shall presuppose the existence of the two classes of suffixes and the two classes of prefixes which were alluded to in the introduction to this chapter. I shall justify the decision to have two classes of prefixes and suffixes shortly.

2.1. Stems

A sampling of English stems appears in (1).

1) graph, dur, quire, cite, cede, mit, ject, tend, clude, leg, lit, loc, sume, test, tract, duce, sorb

Stems belong to no syntactic category. By syntactic category I mean a category mentioned by the phrase structure rules of the syntax. I therefore propose that stems be represented in the lexicon surrounded by brackets labelled S. The items in (1), then, have the lexical representations shown in (2).

2) $[\text{graph}]_S$, $[\text{dur}]_S$, $[\text{quire}]_S$, $[\text{cite}]_S$, $[\text{cede}]_S$, $[\text{mit}]_S$,
$[\text{ject}]_S$, $[\text{tend}]_S$, $[\text{clude}]_S$, $[\text{leg}]_S$, $[\text{lit}]_S$, $[\text{loc}]_S$,
$[\text{sume}]_S$, $[\text{test}]_S$, $[\text{tract}]_S$, $[\text{duce}]_S$, $[\text{sorb}]_S$

We may now define stem as follows.

3) def: $[XZY]_S$ is a stem, where Z contains only segments and where X and Y are null.

2.2. Prefixes

A sampling of English prefixes appears in (4). The prefixes in (4a) are Class I prefixes, and the prefixes in (4b) are Class II prefixes. Some prefixes appear in both classes.

4) a) in-, con-, de-, para-, sub-, dis-, hyper-, circum-, neo-, auto-, mono-

b) anti-, pro-, circum-, hyper-, neo-, auto-, mono-, electro-, encephalo-, meningo-

Stems belong to no syntactic category. By syntactic category I mean a category mentioned by the phrase structure rules of the syntax. I therefore propose that stems be represented in the lexicon surrounded by brackets labelled S. The items in (1), then, have the lexical representations shown in (2).

2) $[\text{graph}]_S$, $[\text{dur}]_S$, $[\text{quire}]_S$, $[\text{cite}]_S$, $[\text{cede}]_S$, $[\text{mit}]_S$,
$[\text{ject}]_S$, $[\text{tend}]_S$, $[\text{clude}]_S$, $[\text{leg}]_S$, $[\text{lit}]_S$, $[\text{loc}]_S$,
$[\text{sume}]_S$, $[\text{test}]_S$, $[\text{tract}]_S$, $[\text{duce}]_S$, $[\text{sorb}]_S$

We may now define stem as follows.

3) def: $[\text{XZY}]_S$ is a stem, where Z contains only segments and where X and Y are null.

2.2. Prefixes

A sampling of English prefixes appears in (4). The prefixes in (4a) are Class I prefixes, and the prefixes in (4b) are Class II prefixes. Some prefixes appear in both classes.

4) a) in-, con-, de-, para-, sub-, dis-, hyper-, circum-, neo-, auto-, mono-

b) anti-, pro-, circum-, hyper-, neo-, auto-, mono-, electro-, encephalo-, meningo-

Prefixes, since they are formatives, are bounded by brackets. These brackets are labelled P. Prefixes, as well as stems, belong to no syntactic category.

The category of a word formed by prefixation is generally that of the word attached to.[1] Furthermore, prefixes generally do not discriminate with respect to the category of the words they attach to. Super-, for example, derives nouns from nouns (superman), verbs from verbs (super-saturate), and adjectives from adjectives (super-fluid).

Where prefixes attach to stems, the category of the word thereby derived is unpredictable. The prefix con-, for example, derives adjectives (convex), verbs (convey), and nouns (contract).

Prefixes are distinguished from stems in the following way. Prefixes, unlike stems, attach to other items; whereas stems are passive with respect to attachment. In addition, prefixes precede the items they attach to. I shall use the boundary symbols # and + following the segments in the prefix to encode this fact. Hence, prefixes are of the form $[_{P}$segments+$]_{P}$ or $[_{P}$segments#$]_{P}$.

The choice of boundary determines, in part, the phonological properties of the item created by a prefix's attachment.

The prefixes in (4), then, have the lexical

representations shown in (5).

5) a) $[_P$in+$]$, $[_P$con+$]$, $[_P$de+$]$, $[_P$para+$]$, $[_P$sub+$]$, $[_P$dis+$]$, $[_P$hyper+$]$, $[_P$circum+$]$, $[_P$neo+$]$, $[_P$auto+$]$, $[_P$mono+$]$

b) $[_P$anti#$]$, $[_P$pro#$]$, $[_P$circum#$]$, $[_P$hyper#$]$, $[_P$neo#$]$, $[_P$auto#$]$, $[_P$mono#$]$, $[_P$electro#$]$, $[_P$encephalo#$]$, $[_P$meningo#$]$

The definition of prefix is given in (6).

6) def: $[_P XZY]$ is a prefix, where Z contains only segments, where X is null, and where Y is a boundary.[2]

2.3. Suffixes

A sampling of English suffixes appears in (7).

7) a) -en, -ate, -ion, -y, -ic, -al (adjective-forming)

b) -ness, -less, -ly, -al (noun-forming)

Suffixes, since they are formatives, are bounded by brackets. These brackets are labelled Suf. Suffixes, like prefixes and stems, belong to no syntactic category.

Unlike prefixes, however, suffixes generally derive words which belong to a specific syntactic category. Thus, words ending in -ation are nouns; words ending in -en are verbs, and words ending in -less are adjectives.

Furthermore, when suffixes attach to words, suffixes generally attach to words belonging to a specific syntactic category. Thus, -ly forms adverbs from adjectives; -ation forms nouns from verbs; and -en forms verbs from adjectives. Such is not the case with prefixes. The lexical entry for each suffix, then, minimally contains information specifying (1) the category of the items the suffix attaches to and (2) the category of the items derived by suffixation.

Suffixes differ from prefixes in yet another way. Suffixes follow the itmes they attach to. I shall express this fact by claiming that suffixes are of the form $[\text{boundary segments}]_{\text{Suf}}$. As is the case with prefixes, this boundary can be either # or +. Therefore, suffixes are formatives which have the form $[\#\text{segments}]_{\text{Suf}}$ or $[+\text{segments}]_{\text{Suf}}$. The choice of boundary has predictable phonological consequences in the derived word.

The lexical representations of the suffixes in (7), then, are as shown in (8).

8) a) $[+\text{ate}]_{\text{Suf}}$, $[+\text{ion}]_{\text{Suf}}$, $[+\text{y}]_{\text{Suf}}$, $[+\text{ic}]_{\text{Suf}}$, $[+\text{al}]_{\text{Suf}}$, $[+\text{en}]_{\text{Suf}}$

b) $[\#\text{ness}]_{\text{Suf}}$, $[\#\text{less}]_{\text{Suf}}$, $[\#\text{ly}]_{\text{Suf}}$, $[\#\text{al}]_{\text{Suf}}$

In (9), the definition of suffix is stated.

9) def: $[XZY]_{Suf}$ is a suffix, where Z contains only segments, where X is a boundary, and where Y is null.

2.4. Underived Words

Underived words are the only formatives which have a bracketing which is labelled with a syntactic category label. The category specification must be present for two reasons. First, in order for lexical insertion into phrase markers to take place, all words must be given category labels. Second, words must have category labels in order for lexical word derivation to proceed.

I shall follow the SPE convention which says that the boundary # is automatically inserted at the beginning and end of every string dominated by the category noun, verb, or adjective.

We then have the following definitions for underived word.

10) def: $[XZY]_{W}$ is an underived word, where Z contains only segments, where X and Y = #, and where W = N, A, or V.

def: $[XZY]_{W}$ is an underived word, where Z contains only segments, where X and Y are null, and where W = conjunction, modal, preposition, complementizer, or article.

2.5. Derived Words

In addition to defining stem, prefix, suffix, and underived word, we also want to be able to define what we mean by derived word. We shall therefore adopt the following convention. Whenever an item belonging to a syntactic category is created by prefixation or suffixation, [# is inserted at the beginning of this new item, and #] is inserted at the end of this new item. The brackets are labelled with a syntactic category label. The condition which stipulates that the item created must belong to a syntactic category is necessary to prevent our placing brackets and word boundaries around $[_{P}\text{ex+}][_{S}\text{acerb}]$, which belongs to no syntactic category.

As an example of a well-formed derived word, consider inquire. This word is formed from the Class I prefix $[_{P}\text{in+}]$ and the stem $[_{S}\text{quire}]$. The derived word inquire has the following structure: $[_{V}\#[_{P}\text{in+}][_{S}\text{quire}]\#]$.

Inquire and exacerb both consist of a prefix and a stem. Yet, inquire is a verb, whereas exacerb belongs to no syntactic category.

We may define derived word as follows.

11) def: $[_{W}XZY]$ is a derived word, where Z contains segments and at least one boundary, where X and Y = #, and where W = N, A, or V.

3. Two Classes of Affixes

In discussing the manner in which prefixes and suffixes are represented in the lexicon, I assumed that there is a class of prefixes which is introduced with the + boundary and a class of prefixes which is introduced with the # boundary. I also assumed that there is a class of suffixes which is introduced with the + boundary and a class of suffixes which is introduced with the # boundary. I would now like to justify the claim that there are two classes of derivational affixes. First, I shall discuss the evidence which shows that there are two classes of suffixes. Then, I shall discuss the evidence which shows that prefixes fall into the same two classes as suffixes.

3.1. Two Classes of Suffixes

In SPE, it was claimed that there was a two-way boundary distinction among suffixes. Five phonological arguments for this dual classification of suffixes appear in SPE.

3.1.1. Class I Suffixes

It was observed that there is a class of suffixes the members of which themselves may receive stress and which also cause a rightward shift of main stress in the words they attach to. For example, we have tél̀egràph, but telégraphy. We have elícit, but el̀icitátion. We

have recóver and recóverable, but recòverabílity. Thus, noun-forming -y, -ation, -able, and -ity are all suffixes which satisfy the environment of the cyclic stress assignment rules and influence the placement of primary stress. Suffixes which have these properties are introduced with the + boundary.[3] Suffixes which are introduced with the + boundary will henceforth be called Class I suffixes.

3.1.2. Class II Suffixes

In addition to the class of suffixes which is introduced with the + boundary, there is another class of suffixes which plays no role in the assignment of stress. These suffixes are called stress-neutral in SPE. Examples include adjective-forming -y, -ness, -less, -ly, and noun-forming -al.

To ensure that these suffixes block stress placement, they are introduced with the # boundary. Suffixes which are introduced with the # boundary will henceforth be called Class II suffixes.

Since the cyclic stress assignment rules do not mention internal #, and since # must be mentioned in a rule if that rule is to apply to a string containing #, words derived with Class II suffixes do not undergo the cyclic stress assignment rules.

The presence of the # boundary in the stress-neutral class of suffixes is motivated by additional

considerations. I quote from SPE, pp. 85-86.

> The...affixes which are neutral with respect to stress...characteristically affect final clusters in the same way as word boundary does. For example, in many dialects /g/ drops after nasals in word-final position but remains in word-medial position, so that we have [siŋ] but [miŋgl] (from underlying /siNg/, /miNgl/, respectively, /N/ being the archi-segment "nasal consonant"). But before -ing, -er (agentive), -ed, -ly, etc., /g/ also drops, so that we have [siŋiŋ], [siŋr], contrasting with [fiŋgr]...
>
> Furthermore, we must have a rule:
> (56) sonorants become syllabic / C ___#.
> This is needed to account for the fact that in words such as hinder, cylinder, remember, carpenter, disaster, schism, burgle, twinkle, the sonorant is syllabic in word-final position although the underlying representations must be /hiNdr/, /siliNdr/, /rEmeNbr/, /kɑrpVNtr/, /disɑstr/, /sizm/. /burgl/, /twiNkl/. as shown by the related forms where these sonorants are not syllabic: hindrance, cylindric, remembrance, carpentry, disastrous, schismatic, burglar, twinlking (in the sense of "instant", from /twiNkl + liNg/, the /l/ of /liNg/ dropping ...after /Cl/). However, the sonorant is also syllabic in such forms as hindering, hindered, remembering, burgled, twinkling (the participle), indicating that these neutral affixes also carry the boundary #. Similarly, the noun-forming -y affix, which is not neutral with respect to stress placement, changes preceding /t/ to [s] (democrat - democracy, president - presidency), but the neutral, adjective-forming -y does not affect final /t/ (chocolaty, bratty, etc.), indicating that it carries the boundary # that blocks this process.

3.2. Two Classes of Prefixes

The preceding arguments establish the fact that there is a class of suffixes which is introduced with the + boundary and a class of suffixes which is introduced with the # boundary. I shall now argue that just as there are Class I and Class II suffixes, there are Class I and Class II prefixes.

In SPE, it was claimed that English has an inventory of three boundaries: #, +, and =. There were + boundary and # boundary suffixes, and there were = boundary and + boundary prefixes.

The Latinate prefixes (con-, de-, re-, in-, ex-, etc.) were introduced with the = boundary in the SPE system. Words such as permit, concur, compel, and deter, then, were given the representations $[_{V}$per=mit$]$, $[_{V}$con=cur$]$, $[_{V}$com=pel$]$, and $[_{V}$de=ter$]$. The = boundary, like the # boundary, blocks the application of the cyclic stress assignment rules in the SPE system. The presence of the = boundary ensured that stress in the above verbs would be final, even though the final syllables of these verbs are weak. Verbs like permit, concur, compel, and deter, then, contrast with verbs whose final syllable is weak and not preceded by the = boundary: astonish, edit, consider, imagine, interpret, promise, embarrass, elicit, determine, cancel, furnish, worship, covet.

Prefixes such as mono- in monosyllable and hyper- in hypertrophy were introduced with the + boundary in SPE. The stress on mono- in monosyllable was assigned by the Stressed Syllable Rule, which retracts stress. The stress on hyper- in hypertrophy was assigned by the Main Stress Rule.

I shall now show that the prefixes which were introduced with the = boundary in the SPE system are actually introduced with the + boundary. It will also be shown that there exist prefixes which are introduced with the # boundary. The problem which prompted Chomsky and Halle to introduce the Latinate prefixes with the = boundary is discussed. The ad hoc nature of their solution to this problem is revealed, and an alternative solution is proposed. This alternative solution makes it possible to dispense with the = boundary.

3.2.1. Class I Prefixes

In the SPE system, the trisyllabic verbs advocate and interdict both receive final stress by case (eii) of the Main Stress Rule (henceforth, MSR). Case (eii) of the MSR is reproduced here as (12).

12) $V \rightarrow [1 \text{ stress}] / \_\_\_ C_0$

The Alternating Stress Rule (henceforth, ASR),

stated here as (13), retracts stress two syllables to the left off final-stressed nouns, verbs, and adjectives.

13) ASR

$$V \longrightarrow [1 \text{ stress}] \; / \; \_\_\_ \; C_oVC_o\overset{1}{V}C_o]_{NAV}$$

Advocate undergoes the ASR, but interdict does not. The problem is to explain why.

To account for the distinction between advocate, in which stress is retracted by the ASR, and interdict, in which no retraction takes place, ad- and inter- were introduced with the = boundary. Thus, advocate and interdict were given the following representations: $[_V$ad=voc+ate$]_V$, $[_V$inter=dict$]_V$. The ASR was modified to allow retraction over = if = appeared between the second and third syllables from the end of the word, but not if = appeared between the first and second syllables from the end of the word. Hence, the ASR was reformulated as follows.

14) ASR

$$V \longrightarrow [1 \text{ stress}] \; / \; \_\_\_ \; C_o \; (=) \; C_oVC_o \; [1 \text{ stress}] \; C_o]_{NVA}$$

Chomsky and Halle's solution to the stress retraction problem in advocate and interdict had three unfortunate consequences. First, Latinate prefixes, by virtue of being introduced with the = boundary, were assigned a boundary status distinct from that of Latinate suffixes (e.g., -ate, ion),

which were introduced with +. Second, the ASR had to be complicated to accommodate this addition to the boundary family. Worse, the ASR was complicated in such a way as to obscure what is really going on in advocate and interdict. In effect, what is being stated in the revised ASR is that stress doesn't retract across = except when = is between the second and third syllables from the end of the word. What is so special about this boundary when it appears before the final syllable in verbs?

We would gain more insight into what is really going on in these Latinate-prefixed verbs if we examined the structure of the verbs in which retraction fails.

In all cases in which retraction does occur in verbs, the retraction is (1) off a vowel which is contained in a suffix (advocate, violate, extrapolate, insinuate, experiment, implement, exercise, organize, recognize, solidify) or (2) off a vowel which is in a word with no internal structure (gallivant, caterwaul).

The real generalization governing stress retraction in Latinate-prefixed verbs has nothing to do with the boundary with which the prefix is introduced. Rather, it seems to be the case that stress does not retract off stems in verbs when the stem is the final formative of the verb.[4] In all cases in which retraction fails, the final stressed syllable is a stem: interdict, condescend.

This peculiar stress retraction phenomenon in stem-final verbs can be handled with a simple redundancy rule.

Before stating this redundancy rule, I would like to review the new system of stress rules which Halle (1973) has developed. Halle's system is superior in a number of ways to that of SPE, and the redundancy rule under discussion is best stated in terms of Halle's system.

In SPE, stress subordination was an automatic consequence of stress assignment. In Halle's new system, stress subordination is limited to rules which assign [1 stress] to vowels which are already [1 stress]. The Compound Stress Rule and the Nuclear Stress Rule, then, are the only rules whose application entails stress subordination. Furthermore, in Halle's system, there is only one stress retraction rule, the Stressed Syllable Rule. The ASR has been eliminated.

I shall now show how the aforementioned verb stress retraction phenomenon can be handled, without resorting to the = boundary, in Halle's system. Since the ASR no longer exists, the problem reduces to discovering which part of the system is responsible for the final [1 stress] in stem-final verbs.

The rules of Halle's system which are relevant to this discussion appear in (15)-(18).

15) PRIMARY STRESS RULE

$$V \longrightarrow [1\ \text{stress}] \ / \ \_\_\_\ C_o(W)(\begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix} C_o)]_{NAV}$$

The Primary Stress Rule applies in the four environments below.

a) $\_\_\_\ C_oW \begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix} C_o]_{NAV}$

1 1 1 1
America, Canada, capital, elephant,

1 1
fabulous, Connecticut

b) $\_\_\_\ C_o \begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix} C_o]_{NAV}$

1 1 1 1
Wisconsin, Nantasket, Charybdis, Arizona,

1 1 1 1
Massachusetts, Bermuda, Jacob, Goliath

c) $\_\_\_\ C_oW]_{NAV}$

1 1 1 1 1
edit, elicit, cancel, determine, imagine

d) $\_\_\_\ C_o]_{NAV}$

1 1 1 1 1
Vermont, Saigon, Berlin, achieve, cajole,

1 1 1 1 1
machine, elect, torment, collapse, lament

Verbs predominantly follow patterns (15c and d), whereas nouns tend to follow patterns (15a, b, and d).

Adjectives vacillate between the two types.

16) STRESSED SYLLABLE RULE

$V \longrightarrow [1\ \text{stress}] / \_\_\_\ C_0(W)(VC_0)\ [1\ \text{stress}]\ Q]_{NAV}$

The Stressed Syllable Rule applies in the four environments below.

a) $\_\_\_\ C_0WVC_0\ [1\ \text{stress}]\ Q]_{NAV}$

1 1 1 1 1 1
assimilatory, Winnepassaukee, Passamaquoddy,

1 1 1 1 1 1 1 1
peregrinate, oxygenate, ameliorate, alienate

b) $\_\_\_\ C_0VC_0\ [1\ \text{stress}]\ Q]_{NAV}$

1 1 1 1 1 1 1 1
compensatory, Conestoga, Monongahela, devastate

c) $\_\_\_\ C_0W\ [1\ \text{stress}]\ Q]_{NAV}$

1 1 1 1 1 1
inhibitory, facilitate, amygdaloid

d) $\_\_\_\ C_0\ [1\ \text{stress}]\ Q]_{NAV}$

1 1 1 1 1 1 1 1
compulsory, adumbrate, eructate, molluscoid,

1 1 1 1
recondite, locate

17) COMPOUND STRESS RULE

$$[1\ \text{stress}] \longrightarrow [1\ \text{stress}] \ /\ \_\_\_\ Q((\#\#P)\ VC_o\ (+y))]_{NAV}$$

Conditions: Q contains no [1 stress]

P contains no ##

The Compound Stress Rule applies in the four environments below.

a) $\_\_\_\ Q\#\#P\ VC_o]_{NAV}$

1 2 1 2
Madison Street, chocolate cake

b) $\_\_\_\ Q\ VC_o\ +y]_{NAV}$

1 2
assimilatory

c) $\_\_\_\ Q\ VC_o]_{NAV}$

1 2 2 1
assimilate, assimilation

d) $\_\_\_\ Q]_{NAV}$

2 1 2 1 2 1
Madison Avenue, chocolate pie, brigadoon ,

2 1
buccaneer

18) NUCLEAR STRESS RULE

[1 stress] ⟶ [1 stress] / ([1 stress] R##P) ___ Q]

Condition: Q contains no [1 stress]

The Nuclear Stress Rule applies in the two environments below.

a) [1 stress] R##P ___ Q]

2 1
Jesus wept

b) ___ Q

1 3 1 3 3 1
assimilate, Madison Street, Madison Avenue

The Compound Stress Rule (henceforth, CSR) now subordinates stress in words as well as in compounds. Applying within words, the CSR has the effect of lowering the stress on all but the last stressed vowel in the word, except when this vowel is also in the final syllable of the word, in which case stress is lowered on all but the penultimate stressed vowel in the word. The CSR guarantees that we get 1 2 <u>assimilate</u>, but 2 1 <u>assimilation</u>. The Nuclear Stress Rule (henceforth, NSR) puts [1 stress] on the rightmost sonority peak in the word and subordinates stress: 1 3 3 1 <u>assimilate</u>, <u>assimilation</u>.

Now, consider how the rules in (15)-(18) operate

to derive $\overset{1}{\underline{\text{advocate}}}\ \overset{3}{}$ vs. $\overset{3}{\underline{\text{interdict}}}\ \overset{1}{}$. The bracketings of these words appear in (19).

19) a) [#[ad+][voc][+ate] #]
P S Suf V

b) [#[inter+][dict]#]
p S V

Rule (15d), the Primary Stress Rule (henceforth, PSR) assigns [1 stress] to the final syllable of each verb. Then, case (b) of the Stressed Syllable Rule (henceforth, SSR) assigns [1 stress] to the vowel two syllables away from the [1 stress]: $\overset{1}{\underline{\text{advocate}}}$, $\overset{1}{\underline{\text{interdict}}}$.

Now, we must guarantee that the CSR will assign [1 stress] to the first syllable in advocate and [1 stress] to the final syllable in interdict. This means that case (c) of the CSR must apply to $\overset{1}{\underline{\text{advocate}}}$, which is not stem-final, and that case (d) of the CSR must apply to $\overset{1}{\underline{\text{interdict}}}$, which is stem-final.

We have already observed, in SPE terms, that stress does not retract off stem-final verbs. Now all we must do is translate this fact into terms consistent with Halle's system of rules. To block case (c) of the CSR from applying to interdict, we need a lexical redundancy rule which makes all stem-final verbs subject to case (d) of the CSR. The notation we have developed, whereby stems are identified

by brackets labelled S, provides a simple way of stating the fact that stem-final verbs are subject to the ___ Q environment (case (d)) of the CSR.

The required lexical redundancy rule is stated in (20).

20) LEXICAL REDUNDANCY RULE

All verbs of the form $[\#. . . [Z]^{S}_{V}\#]$

are subject to the environment ___ Q of the CSR.

This lexical redundancy rule must be limited to verbs, for, as we see in (21), stress in nouns and adjectives does not subordinate to the stress on a final-stressed stem.

21)

NOUNS	ADJECTIVES
1 3 episode	1 3 manifest
1 3 anecdote	1 3 difficult
1 3 pedigree	
1 3 monolith	
1 3 epitaph	
1 3 telegraph	
1 3 monogram	

We have now seen now a simple lexical redundancy rule, in association with Halle's system of stress rules, ensures that in stem-final verbs, stress elsewhere in the verb is subordinated to stress on the stem. The verb stress subordination phenomenon, which motivated the introduction of = in SPE, has been shown to have nothing to do with boundaries. The lexical redundancy rule involved in this phenomenon is triggered entirely by word structure. The = boundary, then, plays no role either in stress assignment or in stress subordination. The boundary with which Latinate prefixes are introduced has the same properties as the boundary which introduce Class I suffixes. I therefore claim that the prefixes introduced with the = boundary in the SPE system are indeed introduced with the + boundary. The Latinate prefixes, then, are Class I affixes.

I would now like to discuss a case in which a rule can be improved by claiming that the Latinate prefixes are introduced with + and by claiming that formatives are bracketed.

The word level rules of the phonology contain the s-Voicing Rule, which is Rule (119) in Chapter 4 of SPE. I reproduce this rule here as (22).

22) s-VOICING

$$\begin{bmatrix} +\text{cor} \\ +\text{stri} \\ +\text{cont} \end{bmatrix} \longrightarrow [+\text{voice}] \; / \; \left\{ \begin{array}{ll} V = \_\_\_\; V & a \\ \begin{bmatrix} +\text{tense} \\ V \end{bmatrix} \; \_\_\_\; V & b \\ VK \; \_\_\_\; \acute{V} & c \end{array} \right\}$$

(22a) applies in words such as resume, reside, resident, design, and reserve.

(22b) applies in words such as Asian and Cartesian. It does not apply in misogyny or philosophy, where the vowel preceding s is lax. In SPE, a special redundancy rule which blocks (22b) from applying in the context +___ was needed to block the application of (22b) in gruesome and awesome.

(22c) is claimed to apply in words such as exist, examine, auxiliary, and exasperate. The s remains unvoiced when it is not followed by a stressed vowel, as we see in máxillàry and áxis. Chomsky and Halle noted that (22c) fails in hexámeter, toxícity, annexátion, and taxátion, where the vowel following s is stressed and followed by the + boundary. Therefore, they needed a redundancy rule that assigns [- Rule (22c)] to s in the context k___+.

Under Chomsky and Halle's analysis of Latinate prefixes, (22c) should not apply in exist, examine, exempt, exert, exotic, and exasperate, for ex- is given the representation /eks=/ in SPE. Ex- must be introduced with the

= boundary in the SPE system to ensure that expel gets final stress. The = boundary is not mentioned in (22c). Therefore, (22c), as stated, should fail to apply in exist, examine, exempt, exert, exotic, and exasperate.

Now recall that I have already argued that the Latinate prefixes are introduced with the + boundary. This means that the words which motivated (22c) contain + boundary prefixes. Given this analysis of Latinate prefixes, (22c), as it now stands, will voice the s in exist, exert, examine, exempt, exotic, auxiliary, and exasperate.

There is a problem, however. To account for the failure of (22c) in hexameter, toxicity, annexation, and taxation, Chomsky and Halle needed a redundancy rule that assigns [- Rule (22c)] to s in the context k___+. If this redundancy rule were allowed to stand, it would block the application of s-Voicing to words prefixed by aux- and ex-.

The solution to this problem can be found in the bracketing of the circled boundary in $[\#[ex \oplus]_{P}[ist]_{S}\#]_{V}$ vs. $[\#[\#[tox]_{S}[\oplus ic]_{Suf}\#]_{A}[+ity]_{Suf}\#]_{N}$. If we have the environment k___+]V, s-Voicing applies; otherwise, the rule fails.

In discussing the lexical representation of suffixes and prefixes, I claimed that suffixes and prefixes were bracketed. We have now seen one piece of evidence in support of bracketing prefixes and suffixes. By

pulling a bracket out of the woodwork, we can restate the environment of (22c) as (23), ensuring that s-Voicing applies to exist and exert, but not to toxicity or taxation.

23) (22c) REVISED

Vk ___ +] $\acute{V}$

The environment (22a) must be revised to eliminate the = boundary and to block the application of s-Voicing in parasitic, chromosomal, monocerous, philosophical, and metasoma.

24) (22a) REVISED

$[\#C_oV+$ ___ V

In the SPE system, the words gruesome and awesome are exceptions to case (b) of s-Voicing. To block (22b) from applying in these words, a special redundancy rule was invoked which blocks (22b) in the context +___.

As an alternative to this redundancy rule, I shall claim that -some is a Class II suffix. If this is true, (22b) couldn't apply to awesome because the structure of this word is [#[#awe#][#some] #]. The presence of the word boundaries blocks the rule.

There is evidence to indicate that -some is introduced with the # boundary. First of all, in the overwhelming number of cases, -some attaches to words and not to

stems, which, as we shall see, is characteristic of Class II suffixes. The exceptions to this generalization are gruesome, fulsome, winsome, and cumbersome. Second, we know that gamble, trouble, meddle, cuddle, giggle, and tangle are underlyingly /gaNbl/, /troubl/, /medl/, /cudl/, /gigl/, and /taNgl/. Before a word boundary and after a consonant, the final l syllabifies: gaNbl##ed, troubl##ed, medl##ed, cudl##ed, gigl##ed, taNgl##ed. Now we note that these ls also become syllablic before -some: troubl##some, gaNbl##some, medl##some, cudl##some, gigl##some, taNgl##some. This fact can be explained if -some is a Class II suffix. If -some is a Class II suffix, then awesome and gruesome are not exceptions to (22b); (22b) is merely inapplicable because it does not mention word boundaries in its environment.

This discussion has shown that the s-Voicing Rule can be improved if we bracket formatives and eliminate the = boundary from the repertoire of boundaries. Under the reformulation of (22c) as (23), toxicity, hexameter, annexation, and taxation are no longer exceptions to s-Voicing. The rule is merely inapplicable because of the bracketing of + in these words. This fact constitutes evidence that suffixes and prefixes are bracketed, for (23) makes a distinction between a + which is bracketed +] and a + which is bracketed [+.

Furthermore, the boundary distinction between Class I

suffixes and Class II suffixes, along with the fact that -some is a Class II suffix, guarantees that awesome is not subject to s-Voicing.

3.2.2. Class II Prefixes

It has been shown that the + boundary, and not the = boundary, introduces the Latinate prefixes. Now we must determine whether all prefixes are introduced with the + boundary or whether there are some prefixes which are introduced with the # boundary, as is the case with suffixes. In my presentation of the formative types of English, I claimed that there were + boundary prefixes and # boundary prefixes. I shall now justify that claim. Concomitantly, additional evidence will be given that prefixes are bracketed.

In SPE, the prefix mono- in $\overset{1}{\text{monosyllable}}\overset{3}{}$ was introduced with the + boundary. Therefore, monosyllable had the following structure in SPE: $[\#\text{mono}+[\#\text{syllable}\#]_{N}\#]_{N}$.

On the first pass through the stress rules, syllable gets stress on the first syllable: $\overset{1}{\text{syllable}}$. On the second pass through the cycle, a problem involving stress retraction arises.

Case (c) of the MSR, whose environment is $\_\_\_\ (+\text{C})\ [-\text{seg}]\ C_0\overset{1}{V}C_0]_{NA}$ cannot retract stress onto the first

o in mono- for two reasons. First, in monosyllable, the stressed vowel is not final. Furthermore, the word boundary between mono- and syllable would block retraction even if the final syllable of the word were stressed. Chomsky and Halle thus relax condition (c) of the MSR to allow an extra unstressed syllable after [1 stress] in nouns and adjectives. The revised case (c) of the MSR must also be relaxed to allow stress to retract over # before the stressed syllable. I now quote from SPE, p. 105.

> Apparently, under certain circumstances condition (c) applies even though there is an extra nonstressed syllable on the extreme right. The circumstances are easy to detect. Recall that the complex forms that have been occupying us ... consist of a prefix followed by an item which is either a stem or an independent noun. In each case in which the extra nonstressed syllable on the right is disregarded, the element filling the second position in the complex form is a noun rather than a stem, and it is this fact that permits condition (c) to be relaxed to allow this extra nonstressed syllable. Where we have an independent noun as the second element of a complex form, we naturally expect it to carry with it a # boundary. Using the angle notation, we can express the fact that the extra permitted syllable on the right is conditional on the presence of the # boundary, this being automatically associated with the incorporated lexical item in representations such as mono#syllable, meta#language. Thus we replace ... (+⊃) [-seg] $C_o\overset{1}{V}C_o]_{NA}$ by (93) as a more fully adequate version of condition (c):

93) $(+\supset)\ \begin{bmatrix}-\text{seg}\\-\text{FB}\end{bmatrix}\ C_o\overset{1}{V}C_o\ (V_oC_o)\ ]_{NA}$

Even with this complication of case (c) of the MSR, there remain examples of prefix-derived words which the revised case (c) cannot account for. These are prefixed trisyllabic nouns and adjectives with stress which is neither ultimate nor penultimate. Examples of such cases are

$$[\#\text{circum}+[\#\overset{1}{\text{metropolis}}\#]\#]_{N\ A} \text{ and } [\#\text{sub}+[\#\overset{1}{\text{treasurer}}\#]\#]_{N\ N}.$$

In order to get stress to retract onto the prefix in these words, case (c) of the MSR would have to be revised to allow n number of unstressed syllables after [1 stress] in nouns and adjectives.

I shall now show that we can solve the problem of stress placement in words like monosyllable, metalanguage, circummetropolis, and subtreasurer by allowing mono-, meta-, circum-, and sub- to be introduced with the # boundary when these prefixes attach to words, by bracketing these prefixes, and by adopting Halle's system of stress rules.

Under this analysis, $\overset{1\quad 3}{\text{monosyllable}}$ has the followimg structure: $[\#[\text{mono}\#]_{P}[\#\text{syllable}\#]\#]_{N\ N}$. The PSR (15) gives us $\overset{1}{\text{syllable}}$. The problem is to discover how $\overset{1}{\text{mono}}$- gets its stress.

Halle's SSR (16) will not retract [1 stress] onto mono- in $[\#[\text{mono}\#]_{P}[\#\overset{1}{\text{syllable}}\#]\#]_{N\ N}$ because internal

is not mentioned in the rule. We must therefore look elsewhere in the system for the solution to the monosyllable problem.

The solution to the retraction problem lies in Halle's PSR (15). This rule applies to nouns, verbs, and adjectives. Nouns, verbs, and adjectives are all of the form $[_{W}\#Z\#]$. Nouns, verbs, and adjectives are all words, so they are bounded on the left by [# and on the right by #]. For this reason alone, the PSR must be modified to include a # before the right bracket, as shown in (25).

25) PRIMARY STRESS RULE (revised)

$$V \longrightarrow [1 \text{ stress}] \; / \; \_\_\_ \; C_0(W)\left(\begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix} C_0\right) \#]_{NAV}$$

Now recall that I claimed in Section 2.2. that Class II prefixes are of the form $[_{P}Z\#]$. Simply be eliminating the category labels from the PSR, we guarantee that the PSR will apply to Class II prefixes as well as to nouns, verbs, and adjectives. In fact, we would have to complicate the PSR to prevent it from applying to Class II prefixes. The final version of the PSR is stated in (26).

26) PRIMARY STRESS RULE (final version)

$$V \longrightarrow [1 \text{ stress}] \; / \; \_\_\_ \; C_0(W)\left(\begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix} C_0\right) \#]$$

Under the proposed analysis of Class II prefixes, words formed from a Class II prefix plus a word are treated exactly like compounds by the stress rules. To illustrate this point, let us condider monosyllable, which I claim has the structure $[_{P}\#[_{N}\text{mono}\#][_{N}\#\text{syllable}\#]\#]$.

Mono- and syllable each undergo the PSR. Mono- becomes $\overset{1}{\text{mono-}}$ by PSR(b); syllable becomes $\overset{1}{\text{syllable}}$ by PSR(b). We thus have $[_{N}\#\overset{1}{\text{mono}}\#\#\overset{1}{\text{syllable}}\#\#]$ at the end of the internal cycles. On the second cycle, the PSR and SSR are blocked by the presence of internal ##.

The word level stress-subordinating rules now apply. Case (a) of the CSR yields $\overset{1\quad 2}{\text{monosyllable}}$, and case (b) of the NSR yields $\overset{1\quad 3}{\text{monosyllable}}$.

Within Halle's new system, there is an alternative way of deriving the stress contour on $\overset{1\quad 3}{\text{monosyllable}}$, while maintaining that this word has the structure $[_{N}\#\text{mono}+[_{N}\#\text{syllable}\#]\#]$. I shall digress for a moment to consider this alternative derivation. It will be shown that while mono- in monosyllable could be analyzed as being introduced with the + boundary, there are a number of other prefixes for which this analysis is not possible.

In Halle's system of stress rules, there is an Initial Stress Rule (henceforth, ISR), which places [1 stress] on the initial syllables of all words. Thus, 3 4 1 Ticonderoga, 3 4 1 Halicarnassus, 3 1 3 anticipate, 3 1 3 3 1 3 anthropomorphize, 3 1 3 elephantine, and 3 4 1 phantasmagoria get initial stress by the ISR. The rule is stated as follows.

27) INITIAL STRESS RULE

$$V \longrightarrow [1 \text{ stress}] \; / \; [\#C_0 \_\_$$

To account for the absence of initial stress in 1 3 legitimatize and 1 3 phenomenalize, there is a rule which destresses initial syllables ending with a weak cluster.

28) DESTRESSING RULE

$$V \longrightarrow [- \text{ stress}] \; / \; [\#C_0 \left[\begin{array}{c}\_\_\\ -\text{long}\end{array}\right] C \; [1 \text{ stress}]$$

The vowel to be destressed must be followed by a stressed vowel. Otherwise, the stress would be lost in the initial syllables of 3 4 1 Halicarnassus, 3 1 Winnepassaukee, 3 1 Peloponnesus, 3 1 Pemigewasset, and 3 1 Passamaquoddy.

Now let us return to monosyllable. Suppose this word had the structure [#mono-[#syllable#]#]. On the first cycle, the PSR would assign [1 stress] to the first

N N

syllable of syllable: $\overset{1}{\text{syllable}}$. On the second cycle, the PSR and SSR are blocked because of the internal #. However, the ISR can apply, yielding $\overset{1}{\text{monosyllable}}$. The Destressing Rule is not applicable, since the second syllable of $\overset{1}{\text{monosyllable}}$ is not stressed. The CSR and the NSR will subordinate the stress in $\overset{1}{\text{syllable}}$ to the stress in $\overset{1}{\text{mono-}}$ to yield $\overset{1}{\text{monosyllable}}$.

This alternative analysis of how prefixes get stress is not tenable once a more representative variety of prefixes is considered.

Recall that words of the form $[\#C_o \begin{bmatrix} \overset{1}{V} \\ -\text{long} \end{bmatrix} \overset{1}{CV} \ldots$ undergo the Destressing Rule (28) in Halle's system. There exists a class of apparent counterexamples to this claim. These counterexamples are prefix-derived words which retain initial stress on the prefix under the precise conditions in which we would expect them to lose their stress. These words are prefix-derived words in which the prefix is monosyllabic and where the prefix contains a short vowel followed by only one consonant followed by a stressed vowel in which the vowel of the prefix does not reduce to schwa. Examples of words of this type appear in Column A of (29). In Column B of (29) are words derived with the same prefix, in which the vowel of the prefix reduces, as expected. It

will be argued that the prefixes in Column A are introduced with the # boundary and that the prefixes in Column B are introduced with the + boundary.

29)

A	B
3 1 3 cisAlpine	
3 4 1 cisequatorial	
3 1 dishonor	0 1 disease
3 1 disannex	0 1 disgust
3 4 1 disunite	
3 1 3 disorganize	
3 4 1 disadvantageous	
3 4 1 disinclination	
3 4 1 dysadaptation	
3 4 1 dysanagnosia	
3 4 1 dysantigraphia	
3 4 1 dysembryoma	
3 4 1 dysequilibrium	

29) (cont'd)

3 4 1 maladaptation	0 1 malignant
3 4 1 malinterdigitation	0 1 malaise
	0 1 malign
	0 1 malevolent
	0 1 malicious
	0 1 malignify
3 1 3 miseducate	
3 4 1 misapprehension	
3 1 3 misexecute	
3 4 1 misunderstanding	
3 1 misusage	
3 1 3 denaturalize	0 1 decide
3 1 3 dehumanize	0 1 descend
3 1 3 demagnetize	

If words like <u>disinclination</u> and <u>maladaptation</u>

have the structures [#dis+[#inclination#]#] and
N N

[#mal+[#adaptation#]#], respectively, there is no accounting
N N

for why the first syllables of these words, which receive stress by the ISR, do not undergo the Destressing Rule. The # boundary between the prefix and the word it attaches to gets deleted by a rule we have not yet considered, so this # boundary would not block the application of the Destressing Rule.

As a solution to this problem, I claim that the prefixes in Column A of (29) are introduced with the # boundary, while the prefixes in Column B of (29) are introduced with the + boundary.

Under this analysis, <u>disinclination</u> and <u>maladaptation</u> have the structures [#[dis#][#inclination#]#] and
P N N

[#[mal#][#adaptation#]#], respectively. The presence of
P N N

the word boundaries correctly blocks the application of the Destressing Rule in these words.

Introducing a class of prefixes with the # boundary explains yet another fact. The SSR can retract stress only as far as three syllables away from the [1 stress] vowel: $V \longrightarrow [1\ \text{stress}]\ /\ \_\_\_\ C_0(W)(VC_0)\left[\begin{matrix}[1\ \text{stress}] \\ +\text{syl}\end{matrix}\right]Q]$ Q contains no [1 stress]. Thus, in the system in which all prefixes are introduced with the + boundary, and in

which stress on prefixes arises from stress retraction and the ISR, it is a mystery how the words in (30) get stress on the second syllable of the prefix.

30)

3 4 1
reticuloendothelioma

3 4 1
reticuloperithelium

3 4 1
reticulosarcoma

3 4 1
abdominoanterior

3 4 1
abdominoposterior

3 4 1
abdominothoracic

3 4 1
erythrocyanosis

3 4 1
meningoarteritis

3 4 1
meningocephalitis

3 4 1
meningoencephalopathy

3 4 1
meningoexothelioma

3 4 1
meningoosteophlebitis

3 4 1
meningopneumonitis

30) (cont'd)

3 4 1
pharyngoamygdalitis

3 4 1
pharyngoconjunctivitis

3 4 1
pharyngoesophageal

3 4 1
pharyngokeratosis

3 4 1
pharyngolaryngitis

3 4 1
pharyngosalpingitis

3 4 1
salpingooophorectomy

3 4 1
salpingoovariectomy

3 4 1
salpingoperitonitis

3 4 1
radiculoganglionitis

3 4 1
jejunoileitis

3 4 1
jujunoileostomy

3 4 1
jejunojejunostomy

3 4 3 1
laryngotracheobronchoscopy

3 4 1
laryngovestibulitis

30) (cont'd)

3 4 1
galactometastasis

3 4 1
iatromathematical

3 4 1
encephalodysplasia

3 4 1
encephalomyelitis

3 4 1
odontoparallaxis

3 4 1
odontoperiosteum

3 4 1
ophthalmoblennorrhea

3 4 1
ophthalmocarcinoma

3 4 1
ophthalmodiagnosis

3 4 1
ophthalmodiastimeter

3 4 1
ophthalmodynamometer

3 4 1
ophalmoeikonometer

If one wanted to maintain the claim that the prefixes in (30) are introduced with the + boundary, one might want to allow the SSR to apply iteratively. This

would mean that Q of the SSR would be allowed to contain [1 stress].

Let us consider how this reformulation of the SSR would derive stress on $\overset{3}{\underline{\text{erythro}}}\overset{4}{\underline{\text{cyan}}}\overset{1}{\underline{\text{osis}}}$. Under the hypothesis in which all prefixes are introduced with the + boundary, this word has the structure [#erythro+[#cyanosis#]#].
N N
On the first cycle, the PSR yields $\overset{1}{\underline{\text{cyanosis}}}$, and the SSR yields $\overset{1}{\underline{\text{cyan}}}\overset{1}{\underline{\text{osis}}}$. The ISR applies vacuously.

On the second cycle, the # boundary between $\overset{1}{\underline{\text{erythro}}}$- and $\overset{1}{\underline{\text{cyan}}}\overset{1}{\underline{\text{osis}}}$ is deleted by a rule which we have not yet considered. The PSR applies vacuously. Now, the revised SSR, under the largest expansion of Q (erythrocy Q) gives us $\overset{1}{\underline{\text{erythrocyan}}}\overset{1}{\underline{\text{cosis}}}$.

This solution of the stress assignment problem for the items in (30) seems plausible initially, but it is untenable for the following reasons.

First, even if we permit Q to contain [1 stress], the SSR will still be unable to assign [1 stress] to the underlined vowels in (31), in which the stress in the prefix is four syllables away from the closest stressed vowel.

31) $\overset{3}{\text{rad}}\underline{\text{i}}\overset{4}{\text{culomen}}\overset{3}{\text{ingomy}}\overset{1}{\text{elitis}}$, $\overset{3}{\text{enc}}\underline{\text{e}}\overset{1}{\text{phalomen}}\overset{3}{\text{ingocele}}$

Second, if the revised SSR is to apply iteratively, the prefixes in (30) have to be introduced with the + boundary. Otherwise, the SSR would be blocked. However, if we introduce the prefixes in (30) with the + boundary, we won't be able to account for the fact that the final os of the prefixes encephalo-, erythro-, myelo-, abdomino-, reticulo-, meningo-, pharyngo-, salpingo-, radiculo-, jejuno-, laryngo-, ophthalmo-, odonto-, galacto-, and iatro- in (30) are tense. These os can't be tense underlyingly, for under stress, the orthographic o is pronounced [a]. Such is the case with the words in (32), in which the prefix is indeed introduced with the + boundary.

32)

encephalópathy	pharyngópathy
encephalómeter	salpingógraphy
encephaloscopy	radiculópathy
erythrophagous	laryngógraphy
erythrophilous	ophthalmópathy
myelógenous	odontógenous
myelógraphy	odontótrypy
myelópathy	galactógenous
myelópetal	galactómeter
myeloschisis	galactópathy
myelótomy	galactóphorous
abdominóscopy	galactóphygous
meningópathy	iatrology

The data in (32) show that the prefix-final os in (30) cannot be underlyingly tense. Furthermore, if these prefix-final os were underlying tense and followed by +, the revised SSR would incorrectly retract stress onto them. It should be clear by now that the tenseness of the prefix-final os in (30) is triggered by the presence of ## between the prefix and the word it attaches to.

The bracketing of erythrocyanosis, then, is $[\#[_{P}\text{erythro}\#][_{N}\#\text{cyanosis}\#]_{N}\#]$; and the bracketing of maladaptation is $[\#[_{P}\text{mal}\#][_{N}\#\text{adaptation}\#]_{N}\#]$. The word boundaries explain the failure of the Destressing Rule to apply in maladaptation and in the other words in Column A of (29). They also explain the tenseness of the prefix-final o in erythrocyanosis and in all the other words in (30). In addition, if erythro- has the representation $[\text{erythro}\#]_{P}$, we can assign the underlined vowel [1 stress] by the PSR.

In discussing monosyllable, I claimed that mono- is introduced with the # boundary and that mono- receives [1 stress] by the PSR (26). If it's the case that the PSR applies to all items of the form [. . .Z#], then Class II prefixes, which are of this form, should get [1 stress] by the weak cluster principle. This is indeed the case.

In (33) below there appears a list of prefixes whose stress can be attributed neither to the ISR nor to

the SSR, as we have just argued.

33)

A	B	C
político-	pharýngo-	jejúno-
encéphalo-	salpíngo-	
abdómino-	laryngo-	
retículo-	odónto-	
radículo-	galácto-	
	iátro-	
	ophthálmo-	
	carbóxy-	
	hydróxy-	
	eléctro-	
	erýthro-	
	meníngo-	

The prefixes in Column A of (33) get [1 stress] by case (a) of the PSR. The prefixes in Columns B and C of (33), which have strong penultimate syllables, get [1 stress] by case (b) of the PSR.

We have now established that there is a class of prefixes which is introduced with the # boundary. It is the presence of this # boundary which blocks the Destressing Rule in Column A of (29). It has been shown as well that the iterative application of the SSR to the words in (30) creates more problems than it solves. The iterative application of the SSR requires that the prefixes in

(30) be introduced with the + boundary. I have pointed out that introducing these prefixes with the + boundary both fails to derive the proper stress on the prefixes of the words in (31) and fails to account for the tense quality of the prefix-final os in (30). I therefore conclude that the prefixes in (30) and (31), as well as the prefixes in Column A of (29), are introduced with the # boundary.

We have seen that the independently motivated inclusion of # to the environment of the PSR (25) and the elimination of the category labels from the PSR (26) ensure that Class II prefixes, which have the representation $[Z\#]_P$, undergo the PSR. It has been claimed that stress subordination in Class II prefix-derived words is handled exactly like stress subordination in compounds.

Treating words formed by Class II prefixation as compounds also explains another property of these words. The word that the prefix attaches to can get "factored out": mono- and tri- syllabic, pro- and anti- abortion, pro- and en- clitics, hyper- and hypo- thyroid, socio- and politico-economic. The same is true of compound words: the head of the compound can be "factored out": chocolate and vanilla pie, stock and commodities exchange. Such is not the case with Class I prefixes: *ex- and se- cretions, *mono- or rhine- cerous.

We have now established the fact that there are two

classes of prefixes and two classes of suffixes. Class I affixes are introduced with the + boundary, and Class II affixes are introduced with the # boundary. This system of two boundaries captures the insight that Class I prefixes and suffixes are stress-determining, whereas Class II prefixes and suffixes are stress-neutral. Class II suffixes neither cause a rightward shift in stress in the words they attach to nor do they receive stress themselves. Class II prefixes are stress-neutral to the extent that they do not cause stress to retract off the words they attach to; although, as we have seen, they receive primary stress themselves and play a role in stress subordination. It is important to emphasize that the grammar does not have to be complicated to treat Class II prefixes in this way.

4. The Structure of the Lexicon

Given that we have a lexical inventory consisting of two classes of prefixes, two classes of suffixes, stems, and words (derived and underived), we would expect to find eight basic types of derived words. These eight basic types of derived words are given schematic representation in (34). Only seven of the eight possible types are attested, and one of the seven attested types is exceedingly rare.

34) a) [#[pre+][stem]#]
P S W

influx	advent	paralyze
deduce	afflict	refuse
subtend	advise	submit
refract	recede	monogram
imply	autosome	intend

b) [#[pre#][stem]#]
P S W

UNATTESTED

c) [#[stem][+suf] #]
S Suf W

vacate	fluid	pragmatic
torment	friction	acetic
legible	optimize	potable
local	violate	mutable
legal	nutrition	dominant
loyal	positron	hesitant
royal	probity	modify
penal	vocal	crucify

d) [#[stem][#suf] #]
S Suf W

gruesome	hapless	feckless
winsome	fulsome	

e) [#[pre+][#word#]#]
P W W

insobriety	inequality
inability	inequity
delimit	degenerate
denude	compassion

f) [#[pre#][#word#]#]
P W W

autoimmune	rewash
paramedical	subhuman
monosyllable	superman
hyperthyroid	extrasensory

g) [#[#word#][+suf] #]
W Suf W

profanity	Icelandic	pulsate
limitation	totemic	pollinate
elicitation	metallic	correction
musical	elementary	action
supervisory	advantageous	exhibition
adulatory	liquidize	legality
undulatory	ionize	crudity
variant	solidify	simplify
acidify	purify	intensify

h) [#[#word#][#suf] #]
W Suf W

kindness	happiness	useless
peaceful	inducement	heavily
refusal	arrival	dismissal

Examination of the data in (34) yields the observation that Class II affixes, with the exception of the examples in (34d), do not attach to stems. In the overwhelming number of cases, Class II affixes attach to words. Class I affixes attach to both stems and words.

We always have the option of stating this distributional fact about affixes as a condition on word formation. However, having such a condition on word formation would not explain why it is the case that it is the Class II affixes, and not the Class I affixes, which may not attach to stems. To state the distributional facts in a condition on word formation is to claim that the distribution of the two types of affixes is totally arbitrary. When faced with a situation like this, one always wants to discover deeper principles of grammatical organization which could predict the observed distribution of facts. Thus, we would like for the distributional difference between Class I and Class II affixes to follow from a property of the lexicon.

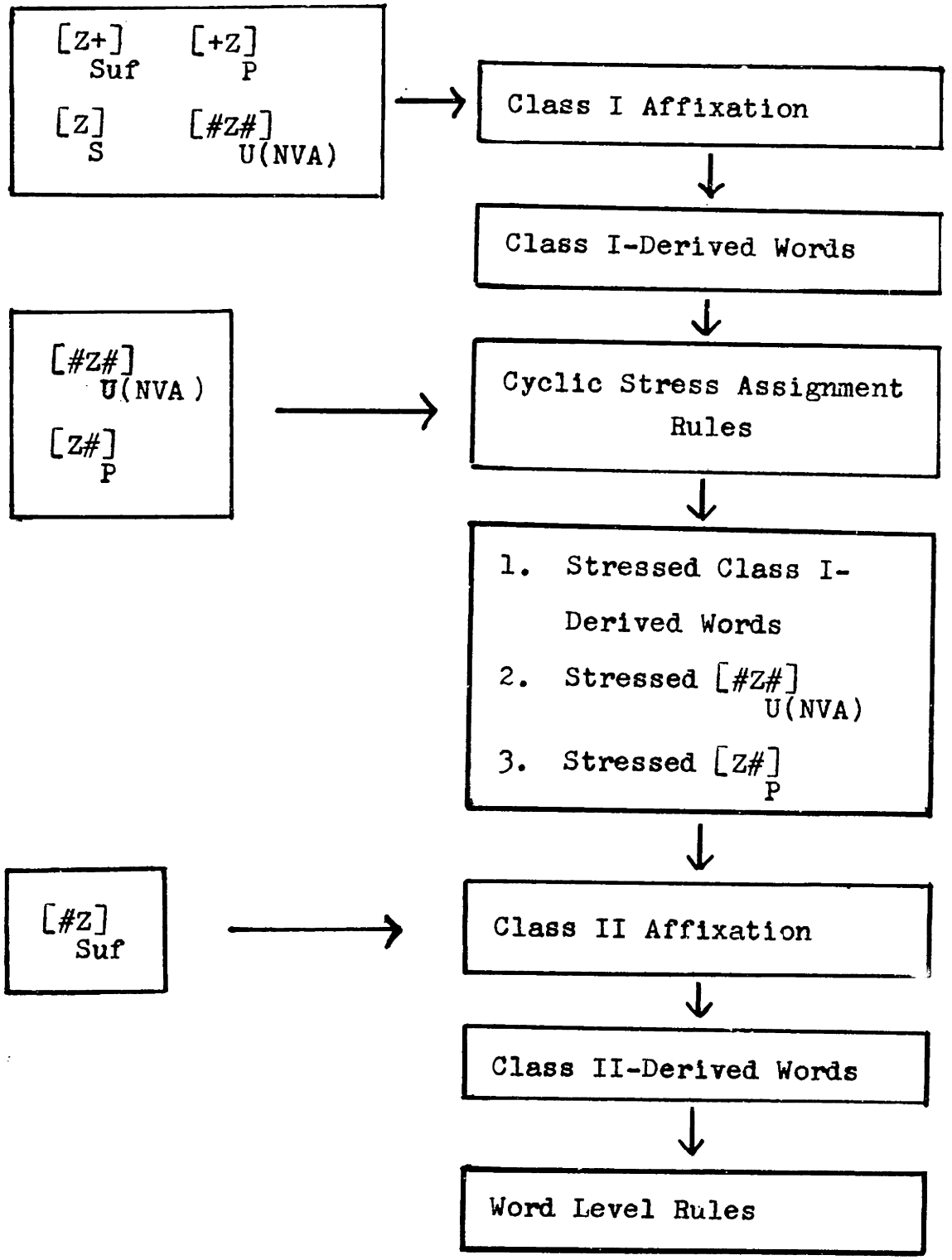
We already know that Class II affixes are stress-neutral. Now, we discover that they attach to words and not to stems. We would like to have a theory of the lexicon which predicts that Class II affixes have these properties. I therefore propose that (35) is true.

35) A. In English, Class I affixation precedes Class II affixation.

B. The cyclic stress assignment rules follow Class I affixation and precede Class II affixation.

In (36) there appears a schematic diagram illustrating the ordering claims made in (35). The label U(NVA) abbreviates underived nouns, verbs, and adjectives.

36)


[Z+] Suf
[+Z] P
[Z] S
[#Z#] U(NVA)
Class I Affixation
Class I-Derived Words
[#Z#] U(NVA)
[Z#] P
Cyclic Stress Assignment Rules
1. Stressed Class I-Derived Words
2. Stressed [#Z#] U(NVA)
3. Stressed [Z#] P
[#Z] Suf
Class II Affixation
Class II-Derived Words
Word Level Rules

4.1. Consequences of (36)

Now let us see how the ordering claims made in (36) predict that Class II affixes attach to words, but not to stems, and that Class I affixes attach to both words and stems. Let us also see how (36) predicts that Class I affixes are stress-determining and that Class II affixes are stress-neutral.

The input to Class I affixation is stems, Class I prefixes, Class I suffixes, and underived words. The output of Class I affixation is Class I-derived words, which are of the form [#Z#]. The output of Class I affixation crucially does not include stems, which are of the form [Z].

The output of Class I affixation and the formatives which satisfy the environment of the cyclic stress assignment rules (Class II prefixes and underived words) undergo the cyclic stress assignment rules. The output of the cyclic stress assignment rules is stressed Class I-derived words, stressed underived words, and stressed Class II prefixes.

Now, stressed Class I-derived words, stressed underived words, stressed Class II prefixes, and unstressed Class II suffixes are the input to Class II affixation. Class II affixation does not attach Class II affixes to stems, for there are no stems available at the point at which Class II affixation applies. Since Class II affixation is ordered after the cyclic stress assignment rules, it

follows that Class II affixation attaches affixes only to stressed words. Class II affixation does not attach Class II affixes to unstressed words, for the cyclic stress assignment rules have already applied by the time Class II affixation occurs.

It further follows that words formed by Class II affixation are stress-neutral. Since the output of Class II affixation is the input neither to Class I affixation nor to the cyclic stress assignment rules, there is no way that Class II affixes can cause stress shift in the words they attach to.

As we have seen, Class II prefixes satisfy the environment of the cyclic stress assignment rules. Thus, they get stress. Words formed by Class II prefixation undergo stress subordination by the CSR and the NSR. These are word level rules.

In the proposed system, it is the ordering of Class II affixation after Class I affixation which prevents Class II affixes from attaching to stems. It is the ordering of Class II affixation after the cyclic stress assignment rules which prevents Class II affixes from being stress-determining.

4.2. Sample Derivations

Let us go through a few sample derivations to see how this system works.

4.2.1. Class I Affixes

Consider the labelled bracketing of the words in (37), which are formed by Class I suffixation.

37) a) [#[prob][+ity] #]
S Suf N

b) [#[#sincere#][+ity] #]
A Suf N

c) [#[#[#tone][+al] #][+ity] #]
N Suf A Suf N

(37a), probity, is formed by attaching the Class I suffix -ity to the stem prob. (37b), sincerity, is formed by attaching the Class I suffix -ity to the word sincere. (37c), tonality, is formed by attaching the Class I suffix -al to the word tone and then by attaching the Class I suffix -ity to the word tonal. (37a-c) are the input to the cyclic stress assignment rules, which include the PSR and the SSR.

In (37a) there is only one pass through the cyclic stress assignment rules. We get $\overset{1}{\text{probity}}$ by case (a) of the PSR.

In (37b), we get $\overset{1}{\text{sincere}}$ by case (d) of the PSR and $\overset{1}{\text{sincere}}$ by case (d) of the SSR. On the second cycle, we have the string $[\#[\#\overset{1}{\text{sincere}}\#][+\text{ity}]\ \#]$.
A Suf N

As matters now stand, the cyclic stress assignment

rules are blocked on the noun cycle because of the presence of # between <u>sincere</u> and -<u>ity</u>. We need a rule to get rid of this # boundary. The need for such a rule was recognized in SPE. I quote from p. 370.

> In these cases the internal constituent analysis is essential for the correct operation of the phonological rules . . . However, it is also necessary for the # boundary to be eliminated before the application of the stress placement rules in the second cycle, since the affixes are not neutral with respect to stress placement. Therefore, the elimination of internal # in these examples can be taken care of by a lexical rule which will be automatic with these and various other affixes which will affect the boundary but not the constituent structure.

To eliminate this # boundary, I propose that we adopt Rule (38).

38) $\# \longrightarrow \emptyset \; / \; \underline{\quad} \; +$

Rule (38), applying on the noun cycle in (37b), gives us the string $[\#[\textcircled{\#}\text{s}\overset{1}{\text{i}}\text{nc}\overset{1}{\text{e}}\text{re}]_{A}[+\text{ity}]_{Suf}\,\#]_{N}$. The circled # at the beginning of <u>sincerity</u> gets deleted by SPE II, which is restated here for the reader's convenience.

SPE II: In the sequence $Z\#]_{X}\#]_{Y}W$ or $W[_{Y}\#[_{X}\#Z$, where $Y \neq S'$, delete the "inner" word boundary.

The application of SPE II to (37b) yields the string $[\#[\text{s}\overset{1}{\text{i}}\text{nc}\overset{1}{\text{e}}\text{re}]_{A}[+\text{ity}]_{Suf}\,\#]_{N}$. Now, case (a) of the PSR

applies vacuously on the noun cycle to put [1 stress] on the third syllable from the end of the word. The SSR also applies vacuously.

Now, the word level stress subordinating rules apply. The CSR gives us $\overset{2\ 1}{\underline{\text{sincerity}}}$, and the NSR gives us $\overset{3\ 1}{\underline{\text{sincerity}}}$.

Next, we come to (37c). On the innermost cycle, we get [1 stress] on $\overset{1}{\underline{\text{tone}}}$ by case (d) of the PSR. The SSR is not applicable. On the second cycle, Rule (38) and SPE II apply to give us $[\#[\underset{N}{\overset{1}{\text{tone}}}][\underset{Suf\ A}{+\text{al}}]\ \#]$. Now, case (c) of the PSR applies vacuously. The SSR is not applicable. On the third cycle, Rule (38) and SPE II apply to yield the string $[\#[[\underset{N\ \ SufA}{\overset{1}{\text{ton}}}][+\text{al}]][\underset{Suf\ N}{+\text{ity}}]\ \#]$. Now, case (a) of the PSR applies and puts [1 stress] on the third syllable from the end of the word: $\overset{1\ 1}{\underline{\text{tonality}}}$. The SSR applies vacuously. No more cyclic stress assignment rule apply. Now, the CSR applies to yield $\overset{2\ 1}{\underline{\text{tonality}}}$, and the NSR applies to yield $\overset{3\ 1}{\underline{\text{tonality}}}$.

Next, consider the words in (39).

39) a) [#[anti+][path][+y] #]
P S Suf N

b) [#[hypo+][ten][+use] #]
P S Suf N

c) [#[in+][#[equ][+ity] #]#]
P S Suf N N

(39a), antipathy, is formed by attaching the Class I prefix anti- and the Class I suffix -y to the stem path. (39b), hypotenuse, is formed by attaching the Class I prefix hypo- and the Class I suffix -use to the stem ten. (39c), inequity, is formed by attaching the Class I prefix in- to the noun equity.

In (39a), there is only one cycle. Case (a) of the PSR gives us $\overset{1}{\text{antipathy}}$. The SSR gives us $\overset{1\ 1}{\text{antipathy}}$. Now, the CSR applies to yield $\overset{2\ 1}{\text{antipathy}}$, and the NSR applies to yield $\overset{3\ 1}{\text{antipathy}}$.

In (39b), hypotenuse, there is also only one cycle. Case (d) of the PSR puts [1 stress] on the tense affix $\overset{1}{\text{-use}}$. Then, the SSR places [1 stress] two syllables away from the [1 stress] by case (c). We now have $\overset{1\ \ 1}{\text{hypotenuse}}$. Th ISR gives us $\overset{1\ 1\ \ 1}{\text{hypotenuse}}$. The word level stress-subordinating rules now apply. The CSR gives us $\overset{2\ 1\ \ 2}{\text{hypotenuse}}$, and the NSR gives us $\overset{3\ 1\ \ 3}{\text{hypotenuse}}$.

In (39c), inequity, we get $\overset{1}{\text{equity}}$ on the first cycle by case (a) of the PSR. On the second cycle, SPE II applies to yield the string $[\#[\text{in+}]_{P}[\#[\text{equ}]_{S}[\text{+ity}]_{Suf\ N}\ ]_{N}\#]$. On this cycle, stress must get placed on the prefix. However, the cyclic stress assignment rules won't operate unless the # boundary between in- and equity gets deleted. I therefore propose that we adopt Rule (40).[5]

40) $\# \rightarrow \emptyset \ / \ + \_\_\_$

The application of (40) to $[\#[\text{in+}]_{P}[\#[\overset{1}{\text{equ}}]_{S}[\text{+ity}]_{Suf\ N}\ ]_{N}\#]$ yields the string $[\#[\text{in+}]_{P}[[\overset{1}{\text{equ}}]_{S}[\text{+ity}]_{Suf\ N}\ ]_{N}\#]$. Now, on the second cycle, primary stress is assigned vacuously, but the SSR applies to yield $\overset{1\ 1}{\text{inequity}}$. The Destressing Rule (28) deletes the [1 stress] on in- to yield $\overset{1}{\text{inequity}}$.

4.2.2. Class II Affixes

We have already seen how the stress rules operate in Class II prefix-derived words. Class II prefixes are stress-neutral in the sense that they don't cause retraction of stress by the SSR. Unlike Class II suffixes, Class II prefixes get stress by the PSR because the PSR applies in the domain . . .#], which is satisfied by Class II prefixes. The words to which Class II prefixes

attach have already received primary stress by the time Class II affixation occurs. The CSR and the NSR handle stress subordination in Class II prefix-derived words.

Now let us see how (36) predicts that Class II suffix-derived words are stress-neutral.

Consider a word like [#[#[#color#][#less] #][#ness] #].
N Suf A Suf N
1
Color gets [1 stress] before Class II suffixation occurs. The output of the cyclic stress assignment rules is the input to Class II affixation, where [#[#[#1color#][#less] #][#ness] #]
N Suf A Suf N
is built. Neither suffix gets stress, for at the point at which this word is built, the cyclic stress assignment rules have already applied.

We have now seen that the ordering of Class II affixation after Class I affixation ensures that Class II affixes attach to words and not to stems. We have also seen that ordering the cyclic stress assignment rules before Class II affixation predicts that Class II affixes are stress-neutral. It has been shown that the environment . . .#] in the PSR ensures that Class II prefixes, as well as words, undergo this rule. Thus, two seemingly unrelated phenomena -- the distribution of affixes in derived words and the stress-neutrality of Class II affixes -- have been shown to follow from the ordering claims embodied in (36).

The fact that the Class I prefixes behave like the

Class I suffixes with respect to stress placement and attachment is evidence that Class I prefixes and suffixes are introduced with the same boundary, namely, +. The fact that the Class II prefixes behave like the Class II suffixes with respect to stress placement and attachment is evidence that Class II prefixes and suffixes are introduced with the same boundary, namely, #. Arguments have been adduced, independent of stress considerations, to show that the + boundary is associated with Class I affixes and that the # boundary is associated with Class II affixes.

5. Further Empirical Consequences of the Proposed Structure of the Lexicon

Given the ordering of Class I affixation, Class II affixation, and the cyclic stress assignment rules embodied in (36), we would expect to find additional data which bears on the correctness of this ordering. Such confirming data is at hand, and it consists of two types.

The first type of evidence in support of (36) that we shall consider involves constraints on affixation which are imposed by various affixes. In Siegel (1971), it was claimed that there were global constraints on affixation. There, I accepted the claim, embodied in SPE, that the cyclic stress assignment rules apply to the output of the syntax. Since lexically derived words are the input to the

syntax, this meant that all lexical word formation was ordered before all phonological rules. Then, it was observed that there are suffixes whose conditions on attachment are sensitive to stress information contained within the word which is attached to. This fact was taken as evidence that affixation rules were global in nature; they could "look ahead" to the phonology to see whether certain stress conditions on affixation were met.

Global rules add enormous power to a grammar. Thus, the power of the grammar is considerably constrained if one can show that such rules are unnecessary. I shall show in Section 5.1. that the ordering imposed by (36) allows us to dispense with global constraints on suffixation.

The second type of evidence in support of (36) that we shall consider involves the way in which Class I and Class II affixes stack up. It will be shown in Section 5.2. that Class II affixes may appear outside Class I affixes, but that Class I affixes may not appear outside Class II affixes. This result is exactly what we would expect if (36) is essentially correct, for Class I affixation feeds Class II affixation via the stress rules, but Class II affixation follows Class I affixation.

5.1. Elimination of Global Constraints on Suffixation

Among the Class II suffixes, there are several whose conditions on attachment refer to stress and/or

segmental information contained within the words they attach to. In a theory in which all affixation takes place before all stress rules apply, these stress conditions on attachment must be global in nature. That is, the affixation rules for particular suffixes have to "look ahead" to the phonetic form of the words they are considering attaching to, in order to see whether the appropriate condition obtains within that word.

I shall now discuss such phonetic conditions on Class II suffixation. It will be shown that the nature of these conditions is such that all the relevant information for Class II suffixation is available at the level between the cyclic stress assignment rules and the word level rules. It has already been shown, independent of considerations involving conditions on attachment, that the Class II affixation rules are ordered between the cyclic stress assignment rules and the word level rules. Now I shall show that this ordering derives further empirical support from the fact that it allows us to dispense with global conditions on suffixation.

The first suffix we shall consider is noun-forming -al. This is the suffix that appears on words like appraisal, disposal, renewal, and survival.

Ross (1972) noted that this suffix can occur only after the phonetic sequence shown in (41).

41) $X \begin{bmatrix} +voc \\ +str \end{bmatrix} (\begin{bmatrix} -voc \\ -cns \end{bmatrix}) C_0^1]_V$

Noun-forming -al appears after a stressed vowel, followed by an optional glide, followed by zero or one and only one consonant. Thus, we find words like betrothal, betrayal, disavowal, acquittal, dismissal, rebuttal, and referral but none like *acceptal, *resistal, *convinceal, *fidgetal, *promissal, *abandonal, or *devlopal.

Exceptions to Ross' generalization include rental, reversal, dispersal, rehearsal, and burial. Rental, reversal, dispersal, and rehearsal are exceptional because in these words, more than one consonant precedes the suffix. These words would not be exceptional if we were to allow an optional sonorant to follow the optional glide in (41). This would mean that words like *dispensal, *convinceal, and *cursal are accidental gaps and not systematic gaps. Since there is no reason why the rule of Diphthongization can't be a word level rule, and since -al suffixation occurs before the word level rules apply, I shall replace (41) with (42). (42) allows there to be an optional sonorant in the final syllable of words to which -al attaches.

42) $X \begin{bmatrix} +voc \\ +str \end{bmatrix} (\begin{bmatrix} C \\ +son \end{bmatrix}) C_0^1]_V$

The fact that burial is a counterexample to the

generalization governing -al suffixation is not surprising, since words ending in y are idiosyncratic with respect to a number of processes. First of all, adjectives derived in -ful, as we shall see shortly, are generally derived from final-stressed nouns. Nevertheless, we find words such as fanciful, merciful, weariful, pitiful, plentiful, bountiful, beautiful, and dutiful. Second, final y is disregarded by the SSR. Third, the comparative of bisyllabic adjectives with stress on the first syllable is usually more A rather than A-er. Thus, we find more pallid (*pallider), more vapid (*vapider), more futile (*futiler) and more livid (*livider). However, we find rosier, wearier, daintier, prettier, thirstier, and dustier. Given this exceptional behavior of final y, we shall not concern ourselves further with the fact that burial violates the constraint on -al suffixation.

Besides requiring that the final syllable of the verb it attaches to have stress, -al also requires that if the verb ends in a consonant, the consonant must be [+ant]. As the chart in (43) shows, -al attaches to verbs which end in vowels, labials (only /v/), and coronals. However, there are no words such as *judgeal, *begrudgeal, *redukal, *rebukal, *reneggal, *impeachal, *encroachal, or *detachal.

43)

Vowels	Labials	Coronals	Palato-Alveolars	Velars
deny	retrieve	procure	none	none
decry	deprive	appraise		
try	arrive	surprise		
withdraw	revive	revise		
review	survive	propose		
renew	remove	repose		
bestow	approve	suppose		
avow		dispose		
defray		rehearse		
betray		disperse		
portray		reverse		
		rent		
		recount		
		remit		
		commit		
		acquit		
		rebut		
		refute		

The facts in (43) suggest that we revise (42) to read as follows.

44) $X \begin{bmatrix} +voc \\ +str \end{bmatrix} \left(\begin{bmatrix} C \\ +son \end{bmatrix}\right) \left(\begin{bmatrix} C \\ +ant \end{bmatrix}\right)]_V$

Implicit in Condition (44) is the claim that

*derival and *convinceal are possbile, but non-occurring, words (accidental lexical gaps) but that words like *resistal and *edital are impossible words (systematic lexical gaps).

We have now seen that in order to state the correct generalization governing the appearance of noun-forming -al, we must refer to information introduced by the PSR. Since we have ordered Class II affixation after the cyclic stress assignment rules, the condition on -al suffixation is not global in nature.

The next stress-sensitive Class II suffix we shall consider is -ful. An extensive study of words derived in -ful was made by Brown (1958).

Brown observed that, in the vast majority of cases, -ful attaches to nouns and not to verbs. Many of the words to which -ful attaches are unambiguously nouns: peaceful, gleeful, tactful. A large number of words to which -ful attaches are morphologically related to a verb: prayerful, thoughtful, useful. Since there is no phonetic reason to exclude *prayful, *thinkful, and *use ful (compare playful, thankful, and praiseful), Brown concluded that among noun-verb pairs, -ful attaches to the noun.

There are some counterexamples to the claim that -ful attaches to nouns: forgetful, resentful, mournful, inventful, thankful. Thankful can be explained as belonging to a class of nouns whose normal free form is syntactically

plural. Words in this class typically lose the plural morpheme when they undergo derivational processes. Thus, consider scissors and guts. These words' derivatives in -less are scissorless and gutless. Similarly, thankless could be derived from the noun thanks. No such argument can be made for forgetful, resentful, mournful, and inventful. The obvious question is this: why does -ful attach to the verbs forget, resent, mourn, and invent when we have the nouns forgetting, resentment, mourning, and invention?

Brown attempts to explain this peculiar distribution of -ful by positing a characteristic stress pattern to which nouns must conform in order to serve as bases for -ful derivation.

45) [(_) _·] ⌿ [·_]

Chapin (1970), p. 53, explains the symbolism.

> The horizontal lines represent syllables. The grave accent represents secondary stress, the acute accent primary stress, and the raised point zero stress. The parentheses indicate the optionality of what they enclose, and the brackets a kind of Sheffer stroke relation between the bracketed elements: either may appear, or neither, but not both.

The expansion of the schema (45) is interpreted so as to allow -ful to attach to words of the types (46).

46) a) stressed monosyllables

b) bisyllabic words with zero stress on the first syllable and primary stress on the second syllable

c) trisyllabic words with secondary stress on the first syllable, zero stress on the second syllable, and primary stress on the third syllable

d) bisyllabic words with primary stress on the first syllable and zero stress on the second syllable.

The only trisyllabic words allowed in Brown's schema have the stress contour ˋ · ˊ: disregard, disrepect. In particular, forgetting, resentment, and invention are excluded from undergoing -ful derivation. However, mourningful should be permitted by expansion (46d), which permits pleasureful and worshipful.

There are many other nouns which pass the stress test, as Brown has stated it, but which are still not possible candidates for -ful derivation. For example, nouns ending in /f/ and /v/ are excluded as bases for -ful derivation: *loveful, *griefful. For many excluded forms, however, there is no such explanation. Brown must regard their exclusion as accidental. A few examples are *firmnessful, *judgmentful, *tensionful, *wisdomful,

*weaknessful, *movementful, *actionful, and *daringful.

In (47), I have listed the words which fit pattern (46a). In (48), I have listed the words which fit pattern (46b). In (49), I have listed the words which fit pattern (46c), and in (50), I have listed the words which fit pattern (46d).

47) Pattern (46a)

peace	fate	dream	lust
dread	hate	brim	trust
deed	spite	harm	awe
heed	taste	charm	law
need	waste	spleen	play
mind	wrong	gain	joy
grace	watch	pain	fear
voice	wish	sin	cheer
force	blush	scorn	prayer
pride	death	sap	threat
bode	breath	help	doubt
glee	wrath	tact	right
change	faith	spright	thought
wake	health	fit	fruit
game	sloth	art	sport
mirth	shame	hurt	boast
blame	youth	rest	quest
time	bane	tune	woe

48) Pattern (46b)

suspense	remorse	distress	resent
regard	distaste	neglect	forget
disgrace	reproach	respect	event
resource	disdain	regret	distrust
revenge	despair	delight	mistrust
repose	success	deceit	

49) Pattern (46c)

disrespect

disregard

50) Pattern (46d)

A	B	C
pleasure	fancy	wonder
worship	mercy	master
purpose	weary	
sorrow	pity	
	plenty	
	bounty	
	beauty	
	duty	

It is clear from the lists in (47)-(50) that there are very few nouns which serve as a basis for -ful derivation which fit stress pattern (46d) = (50). Of these words, the eight in Column B show the exceptional behavior of

words which end in y. As we have seen, y is typically not counted as a syllable. Therefore, the words in Column B actually belong in (47).

The appearance of wonder and master in Column C of (50) simply reflects the surface fact that r is syllabic after a consonant and before #. Actually, these words are underlyingly monosyllabic, as we see from wondrous. Wonder and master, then, belong in (47).

This leaves us with only four words which fit pattern (46d): pleasure, worship, purpose, and sorrow. Clearly, with these four exceptions, the suffixation constraint on -ful is that it attaches to nouns with final stress.

Having made this generalization, we now see why *firmnessful, *resentmentful, *inventionful, *vengeanceful, *judgmentful, *tensionful, *wisdomful, *movementful, *actionful, and *daringful do not exist. These words do not have final stress.

Recalling the discussion of syntactic word derivation in Chapter 1, it also becomes apparent why *mourningful and *forgettingful are underivable. The words mourning and forgetting are derived in the syntactic component. Therefore, they are not among the lexical entries to which -ful has access. Furthermore, mourning and forgetting are verbs -- not nouns.

We may now observe that the morphological component has made a very resourceful move. Since the nouns vengeance, resentment, and invention do not have final stress, and since these nouns are derived from verbs which have final stress, -ful attaches to the verb rather than to the noun: vengeful, resentful, inventful.

Similarly, since there are no lexically derived nouns derived from the verbs mourn and forget, and since these verbs satisfy the stress criterion for -ful derivation, we get mournful and forgetful.

Rather than violate the constraint which says that -ful attaches to words which have final stress, the grammar chooses to violate the constraint which says that -ful attaches to nouns.

The -ful data show quite clearly that there are constraints on suffixation which crucially refer to stress information present in the word which is attached to. Since -ful suffixation occurs after the words which form the bases for -ful derivation have received stress assignment, the constraint on -ful derivation does not have to be global in nature.

I know of one other suffix which behaves like -ful in relaxing the constraint pertaining to category of the word attached to rather than violate some other constraint. This is the verb-forming suffix -en.

The constraints on this suffix's attachment are stated in (51).

51) a) -en attaches to monosyllabic adjectives: whiten, blacken vs. *morosen, *afraiden.

b) -en cannot attach to adjectives ending in nasals or liquids: *greenen, *slimmen, *thinnen, *strongen, *nearen, *tallen.

c) -en does not attach to adjectives ending in vowels: *bluen, *slowen, *grayen.

-en normally attaches to adjectives, not to nouns. In a small number of cases, however, -en appears on nouns. -en attaches to the noun, rather than to the adjective, only if the adjective form violates one of the above constraints and if there is a morphologically related noun in the lexicon which is monosyllabic and ends in a non-sonorant. So, for example, we get lengthen rather than *longen, heighten rather than *highen, and strengthen rather than strongen. Long and strong end in nasals. High ends in a vowel. But length, height, and strength end in non-sonorants. The condition on -en attachment to adjectives is relaxed so that -en can attach to nouns which do not violate the segmental conditions on -en attachment.

Sometimes it happens that an adjective ends in a consonant which permits -en suffixation but which happens to contain more than one syllable, violating condition (51a).

In this case, if there is a related nominal form which is monosyllabic, we find -en attaching to the noun. For example, afraid contains two syllables and thus is not a candidate for -en suffixation: *afraiden. However, fright, which is related to afraid, is monosyllabic and ends in a permitted consonant. Therefore, we are able to get frighten.

Next, we turn to data involving the suffix -(e)teria. Superficially, this suffix appears to have three allomorphs: -eria, -teria, and -eteria. Their distribution is shown in the three columns of (52), and the suffix is separated from the word attached to for ease in viewing the data.

52)

A	B	C
basket eria	candy teria	cake eteria
chocolate eria	soda teria	clean eteria
restaurant eria	radio teria	lunch eteria
garment eria	grocer teria	shoe eteria
valet eria	grocery teria	shave eteria
market eria	haber teria	rest eteria
casket eria	honey teria	bob ateria
spaghett eria	millin t ria	groc eteria
		health eteria
		farm eteria
		mot oteria
		cash ateria
		wreck eteria
		hat ateria
		kalf eteria
		smoke eteria
		scarf eteria
		drug eteria
		furniture eteria
		fruit eteria

We see immediately that all the words in Column A to which the suffix attaches end in /t/. Therefore, it is probable that these words belong in Column B and that the initial /t/ of the suffix is lost through Degemination.

Thus, we are dealing with a suffix which has only two allomorphs: -teria and -eteria.

Comparing Columns A and B with Column C, we note the following difference. In Columns A and B, stress in the words attached to is one syllable or more away from the end of the word. In Column C, the words attached to have final stress.

Clearly, the choice of the proper allomorph of -(e)teria depends on stress information contained within the words which the suffix attaches to. If the word has final stress, we get -(e)teria. Otherwise, we get -teria.

Since -(e)teria is sensitive to stress, it is a Class II affix. Its behavior is exceptional, though, for the following reason. I have claimed that Class II affixes are stressless, yet -(e)téria is stressed. To account for this fact, we shall say that the # boundary with which -(e)teria is introduced gets simplified to + after affixation. Then, words derived in -(e)teria undergo a pass through the stress rules.

-(e)teria is not the only suffix whose # boundary gets simplified to +. The same is true, under certain conditions, of -ly, whose status as a Class II suffix is unquestionable. -ly forms words only from words; it never attaches to stems. Furthermore, it never causes a shift in stress inside the word it attaches to except under extraordinary conditions.

These conditions were noted in SPE, p. 142, fn. 96.

> It should . . . be mentioned that there are apparently some marginal subsidiary rules that prevent long sequences of unstressed syllables after primary stress in many cases. Thus, on syntactic grounds we should expect the affix -ly, for example, to appear with a # boundary and to be neutral with respect to stress placement . . . Under certain conditions, however, the # boundary is simplified to +, so that -ly places stress by the affix rule . . . We thus have forms such as ordinárily, obligatórily, and, as an optional variant, evidéntly, where stress is shifted to the right by -ly regarded as a regular affix. When affixed to words such as satisfáctory of perfúnctory, however, -ly does not cause stress to be shifted to the right and thus remains a neutral affix preceded by #. The conditions for replacement of # by + before -ly are fairly clear; the basic point seems to be that a barrier is placed against long strings of unstressed syllables following primary stress.

The # boundary before -ly simplifies to + whenever -ly's affixation creates a string of four unstressed syllables. Thus, we have satisfáctory and satisfáctorily, perfúnctory and perfúnctorily; but órdinary and ordinárily, obligatory and obligatórily.

The Class II suffix -(e)téria loses its # boundary for the same reason that -ly does; if -(e)teria's boundary were not weakened to +, a string of four unstressed syllables would be created.

The last class of examples which shows that conditions governing word formation may be stress-dependent comes from words containing expletive infixes. Since

infixation is such a marginal process in English, I have not referred to infixes in my discussion of English formatives. Nevertheless, facts about expletive infixes show clearly that word formation conditions may refer to stress information, so I shall discuss them here.

There are a number of words in currect usage like fan-fuckin'-tastic, Jesus H. Christ, Ala-goddam-bama, and guaran-damn-tee which are composed of a word, like guarantee, and an infix, like damn. The problem with these words is to determine whether a word can take an infix like this at all; and, if it can take one, to specify where in the word the infix will reside.

Consider words like *Chi-fuckin'-cago and *Tur-fuckin'-in. Comparing these words with the grammatical specimens above, we see that infixes get inserted into words which have two stressed syllables.

*Monong-fuckin'-ahela shows that the infix cannot land just anywhere between the two stressed syllables. Expletive infixes, apparently, must insinuate themselves immediately to the left of the [1 stress] syllable which is nearest the end of the word, as we see from Mononga-fuckin'-hela, Santa-fuckin'-Cruz, and

3 1
Kalama-fuckin'-zoo.[6]

Clearly, the generalization regarding the possibility of inserting one of these infixes, as well as the generalization regarding where it is inserted, both crucially depend on information which is supplied by the cyclic stress assignment rules.

Expletive infixes are unquestionably Class II affixes. First, they appear only in words and never in stems. Second, they must be introduced with the # boundary, since they are words. Consider the word 3 1
emanci-mother-fuckin'-pator, which appears in the song "Abey Baby" from the rock musical Hair. The final vowel of emanci- is not underlyingly tense, for we don't get *3 1
emancipator. However, this vowel is tense before the expletive infix. There is a rule which tenses non-low vowels before #. If the infix is introduced with the # boundary, we can naturally explain the tense quality of the circled i in 3 1
emanc(i)-mother-fuckin'-pator.

We have now seen that four different Class II affixes and expletive infixes have conditions which refer to stress information contained within the words they attach to. It has been shown that the independently motivated ordering of Class II affixation after the cyclic stress assignment rules obviates the need for global conditions

on word formation.

It should be pointed out that no Class I affixes have conditions on affixation which refer to stress. In a theory which permits global constraints on affixation, this facts is an accident. However, (36) provides an explanation for this fact. Since Class I affixation precedes the rules which assign stress, Class I affixation does not have access to stress information.

5.2. The Stacking-Up of Class I and Class II Affixes

Ordering Class II affixation after Class I affixation has a second consequence. Class II affixes may appear outside Class I affixes, but Class I affixes may not appear outside Class II affixes. This fact is predicted by (36), since Class I affixation feeds Class II affixation, but Class II affixation does not feed Class I affixation. The ordering claim embodied in (36) thus restricts the generative capacity of the lexicon by making it impossible to derive Class I-affixed words from Class II-affixed words.

Instead of discussing every possible combination of every Class I affix and every Class II affix, I shall illustrate the above claim by considering the affixes un- and -less.

There are no words of the form un-X-less: *unspeechless, *unharmless, *unhopeless, *untasteless.

I would like to claim that the ungenerability of these words hinges on the fact that un- is a Class I prefix and that -less is a Class II suffix.

-less' status as a Class II suffix is well-established. First, when -less attaches to a noun ending in /l/, one of the /l/s is not lost through Degemination, for Degemination does not operate across #. Thus, the /l/s in (53) are longer than the /l/s in (54).

53) sailless, tailless, soulless

54) merciless, penniless, weariless, pitiless, shadowless, lawless

Second, the /g/ of the words in (55) drops, indicating that there is a # boundary introducing -less.

55) fangless, kingless, meaningless, springless, stingless, wingless

Third, -less is stress-neutral.

If *unharmless existed, it would have to have the bracketing (56) and not the bracketing (*57), for negative un- attaches only to adjectives.[7]

56) [#[un+][#[#harm#][#less] #]#]
P N Suf A A

57) *[#[#[un+][harm#]#][#less] #]
P N N Suf A

If negative un- is a Class I prefix, (36) prevents (56) from being generated. Thus, we must show that negative un- is a Class I prefix.

The fact that adjectives derived in un- may be nominalized by the Class I suffix -ity suggests that un- is a Class I prefix: ungrammaticality, undesirability. If un- were a Class II prefix, we would not expect it to be inside the Class I suffix -ity.[8]

Second, un- undergoes the Destressing Rule in the environment $[\#\text{unV}^{1}_{1}\text{Q}]$: unáble, unaíded, unéasy, unópen, unúsual. As we saw in Section 3.2.2., Class II prefixes do not undergo the Destressing Rule.

Despite these facts, there might appear to be evidence that un- is not a derivational prefix at all, for un- seems to attach to past participles, which are syntactically derived. I shall now argue that there is a -d which is a Class I adjective-deriving suffix, and that where un- appears to attach to past participles, it is actually attaching to adjectives derived by this Class I -d.

First, there are adjectives derived in -d which have no conceivable verbal source.

58) bearded, landed, three-fingered, spirited, fanged, pebbled, wooded, conceited, pointed, dog-eared, hunch-backed, heavy-handed, reputed, one-armed

The words in (58) could not be syntactically derived, for syntactically derived words always belong to the same lexical category as the words from which they are derived. Since the adjectives in (58) are derived from nouns, -d must be a derivational suffix.

Second, among the words derived in -d, there are many which have meanings which are distinct from the meanings of orthographically identical past participles. For instance, the adjective composed means calm; but the past participle composed means, roughly, written. The adjective animated means lively; but the past participle animated means, roughly, brought to life.

Third, determined in (59a) and resigned in (59b) are clearly adjectives and not past participles, for when the passive reading is forced, (59a) and (59b) become ungrammatical, as (*60) shows.

59) a) John was determined to help Bill
b) John was resigned to losing

60) a) *John was determined to help Bill by Sam
b) *John was resigned to losing by Fred

Having established that there is a -d which is a derivational suffix, we can show that this -d is a Class I suffix.

If -d is a Class I suffix, -d should be able to attach to stems as well as to words. This is indeed the

case: sacred, wicked, demented.

Since -d is a Class I suffix, words of the form un-X-ed are no longer counterexamples to the claim that un- is a derivational prefix. Furthermore, evidence has been presented to show that un- is a Class I prefix and that -less is a Class II suffix. Words of the form un-X-less, then, are underivable because adjectives formed by -less suffixation are not the input to Class I affixation, where words derived in un- are built.

It might appear that the word monophthongization is a counterexample to the claim that Class I affixes do not appear outside Class II affixes. The fact that the final /g/ of monophthong drops before -ize indicates that -ize is a Class II affix. Yet, -ation, a Class I affix, is outside -ize.

Despite the fact that the final /g/ of monophthong drops before -ize in monophthongize and monophthongization, there is abundant evidence to indicate that -ize is indeed a Class I suffix.

First, -ize may attach to stems: catechize, minimize, necrotize, mechanize, baptize, narcotize, feminize. Class II suffixes do not attach to stems.

Second, -ize is stress-determining, as the pairs in (61) show.

61) mísanthròpe misánthropize
cátholic cathólicize
hýdrogen hydrógenize
díplomàt diplómatize
démocràt demócratize

Third, the final /k/ of the words italic and catholic softens before -ize: italicize, catholicize. Velar Softening does not occur before #.

To account for the fact that the /g/ of monophthongization drops before -ize, it will be claimed that Rule (38) idiosyncratically fails to apply in monophthongize.

The failure of this rule to apply also explains why $\overset{1}{\text{monophthongize}}$ is stressed $\overset{3}{\text{monophthongize}}$ and not $\overset{1}{\text{monophthongize}}$.

Monophthongize has the structure [#[#monophthong#]$_{N}$[+ize]$_{Suf}$ #]$_{V}$. On the first cycle, case (d) of the PSR yields $\overset{1}{\text{monophthong}}$, and case (b) of the SSR yields $\overset{1}{\text{monophthong}}$. On the second cycle, Rule (38) idiosyncratically fails to apply. Thus, we have the string [#[$\overset{1}{\text{monophthong}}$#]$_{N}$[+ize]$_{Suf}$ #]$_{V}$. Case (d) of the PSR, whose environment is ___C_0, puts [1 stress] on -ize.

The SSR is blocked by the internal # boundary. We now have $[\#[_{N}[\text{monophthong}\#]][_{Suf}[+\text{ize}]_{V}\ \#]]$.

Since the internal # boundary has not been deleted, /g/ deletes. Furthermore, the CSR and the NSR will apply on the noun cycle to yield monophthong.

On the verb cycle, the CSR and the NSR yield monophthongize. The [5 stress] vowel reduces to schwa.

FOOTNOTES TO CHAPTER 2

1. Exceptions to this generalization are the prefixes a- and en-. A- derives adjectives from verbs (asleep, awake, astir, aflutter). En- derives verbs from verbs (enliven, embrighten, enlighten); but it also derives verbs from adjectives (embitter, endear, enable, enrich, enlarge, ensure) and derives verbs from nouns (enslave, endanger, entrance).

2. (6) is the definition of underived prefix. There are also derived prefixes in English. Examples include socio-, politico-, squamo-, and parallelo-. Socio-, politico-, and squamo- are derived from stems. Parallelo- is derived from an adjective. The o is an augment which has the representation $[+o+]_{Aug}$. The representations of these derived prefixes are $[[soci]_{S}[+o+]_{Aug} \#]_{P}$, $[[politic]_{S}[+o+]_{Aug} \#]_{P}$, $[[squam]_{S}[+o+]_{Aug} \#]_{P}$, and $[[\#parallel\#]_{A}[+o+]_{Aug} +]_{P}$, respectively.

3. The + boundary does not block the application of phonological rules. However, if + is mentioned in a rule, + must appear in the string which is to undergo the rule.

4. Shortly, when I consider Halle's new stress rules,

I shall claim that the generalization actually is that stress elsewhere in the verb is subordinated to stress on the stem in stem-final verbs.

5. Rule (40) is strikingly similar to Rule (38). This fact suggests that we should replace Rules (40) and (38) with a rule which captures the fact that the same phenomenon is occurring in both rules.

6. Howard Lasnik has pointed out to me that there is a clear difference in acceptability between *abso-goddam-lute and abso-goddam-lutely. The constraints on expletive infixation are probably much more convoluted than is apparent from the discussion in the text.

7. Negative un- shows up on derived adjectives (undecided, unnatural), on underived adjectives (unkind, unhappy, inside derived nouns (untruth, unkindness), and inside derived adverbs (ungracefully, unendingly). In each of these cases, un- appears in a word which contains an adjective somewhere in its derivation. Un- does not show up on underived nouns or adverbs. Thus, in the simplest analysis, un- derives adjectives only from adjectives.

8. Adjectives derived in -less, which is a Class II suffix, are never the bases for -ity derivation. Thus, there are no words of the form X-less-ity.

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BIOGRAPHICAL NOTE

The author was born in New York, New York on April 25, 1947. In 1951, her family moved to Birmingham, Alabama, where she received her elementary and high school education. She was graduated from Shades Valley High School in 1965. She attended Brandeis University from 1965 until 1967, whereupon she dropped out of college for a year to find herself and found linguistics instead. The author returned to Brandeis University in 1968 and was graduated in 1970. The author was made a Woodrow Wilson Fellow in 1970. Her graduate work at MIT was supported by an NIH Training Grant. In September, 1974, she will begin a postdoctoral fellowship at MIT, funded by the Center for Neurological Diseases and Stroke of the NIH.

The author is married to T. Scott Johnson, a physician. They live in Jamaica Plain with their pooch extraordinaire, Otis.