

THE PHRASE PHONOLOGY OF ENGLISH AND FRENCH

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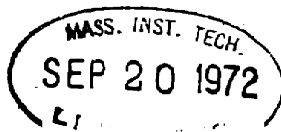
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Submitted to the Department of Foreign Literatures and Linguistics on August 14, 1972, in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

ABSTRACT

This study concerns certain aspects of the relationship between syntax and phonology in English and French. In particular, it represents an investigation of the universal conventions and language-particular readjustment rules which create the proper surface structure input to the phonological rules operating beyond the level of the word in French and English, i.e., the phonological rules of the phrase, and it offers a description of those phonological rules.

A new prosodic rule, the Monosyllable Rule, is motivated for English; at the surface structure, it destresses monosyllabic non-lexical items in the appropriate syntactic contexts. The phonological rules operating on the output of the Monosyllable Rule create the "contractions" of English. Evidence is also given for the existence of a variety of encliticizing rules in English, one rule for the tenseless auxiliaries have and be/been, several other rules for pronominal clitics. A survey of the external sandhi rules of English is made as well.

The phenomenon of liaison in French is examined in great detail. An analysis of the syntactic determinants of liaison is made. The syntax of liaison is studied from a stylistic point of view. Certain liaison readjustment rules are considered to apply only within the grammars of certain styles. Much attention is also given to the phonological rules operating in the contexts of liaison.

All the data from English and French provide sound support for the universal conventions on word boundaries enunciated in The Sound Pattern of English. Moreover, liaison phenomena of French and the operation of the Monosyllable Rule in English give support for a universal Traces Convention, whereby any transformation moving or deleting a constituent will not move or delete the word boundaries associated with that constituent. These residual word boundaries (traces) may block the operation of phonological rules in surface structure.

Thesis Supervisor: Morris Halle
Title: Professor of Linguistics

In the memory of Antonio Gramsci,

who chose not to continue his
promising career in linguistics

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Introduction

This study concerns certain aspects of the relationship between syntax and phonology in English and French. In particular, it represents an investigation of the universal conventions and language-particular readjustment rules which create the proper surface structure input to the phonological rules operating beyond the level of the word in French and English, i.e., the phonological rules of the phrase, and it offers a description of those phonological rules of the phrase.

There are two formally distinct sorts of phonological rules which operate within the domain of the phrase in English, French, and other languages as well. On the one hand there are prosodic rules, the rules responsible for the suprasegmental features of groups of words, for their stress or intonation contours. Such rules mention phrase structure units in their structural descriptions. (In English, the relevant phrase structure units for phrase stress rules are compounds, noun phrases, sentences, and perhaps adjective phrases and verb phrases, too. The prosodic rules of other languages may make reference to a different set of phrase structure units.) The application of a prosodic rule, e.g., a stress rule, to one element of such a phrase structure unit affects the relative stress level of other elements in that unit. These prosodic rules are to be contrasted with external sandhi rules which, on the other hand, alter the segmental

phonology of words in a phrase. These rules operate between words and are strictly local in application. They depend only on the boundaries and the composition of the segments in the immediate environment of the segment(s) being affected by them. They do not appeal to phrase structure. The number and kind of boundaries separating words in a string may have been determined by readjustment rules which are sensitive to phrase structure (as is the case in French, cf. Chapter III), but the external sandhi rules mention only sequences of segments and boundaries in their structural descriptions.

A further difference between prosodic rules and external sandhi rules lies in the relative obligatoriness of their application. Phrase stress rules and rules providing for intonational contours always apply. No group of words will be without an accentual and (or) intonational contour. Yet, the local segmental rules of the phonological phrase may, in some languages at least, be subject to a great deal of variation. Their operation may be idiosyncratically, stylistically, or socially determined. In no way can they be considered obligatory--in the same sense as the prosodic rules. To take a simple example, look at the variant pronunciations of the English sentence I can go: [aj kən gow], [aj kɪ gow], [aj kɔ gow], and [a kɔ gow]. The pronunciation of I and can may vary, but the stress contour remains the same.

In Chapter I an analysis of the rules accounting for the stress of non-lexical items in English is presented. This work thus complements work on the stress of lexical items--the Nuclear

Stress Rule and the Compound Rule--that has been carried out in the framework of generative phonology. Chapter II makes a rather brief survey of the external sandhi rules of English. In Chapters III and IV we turn to French. Both chapters concern the phenomenon of liaison. In Chapter III an analysis of the syntactic readjustment rules involved in liaison is given. These readjustment rules prepare the surface structure for the external sandhi rules, which are discussed in Chapter IV. No discussion of the prosodic rules of French is presented in this study, nor is there any discussion of intonation in English. This study does not purport to give a complete analysis of the phrase phonology of French and English, though it has made some important steps towards that end.

Through a close investigation of many of the rules of phrase phonology in English and French, a greater understanding is obtained about what sorts of syntactic objects are required for the correct operation of these rules. Two very important conventions for the assignment of word boundaries to elements of phrase structure that were proposed by Chomsky and Halle in The Sound Pattern of English (hereafter SPE) prove on the whole to be supported by a great deal of new data from English and French. A further universal convention concerning word boundaries, the Traces Convention, is proposed and defended here. And, in addition to these universal conventions, readjustment rules that are particular to English and French are motivated and examined.

Allow me to review the SPE conventions here. The first, which I will call SPE-I, is formulated as follows:

SPE-I

The boundary # is automatically inserted at the beginning and end of every string dominated by a major category, i.e., by one of the lexical categories "noun", "verb", "adjective", or by a category such as "sentence", "noun phrase", "verb phrase", which dominates a lexical category. (p. 366)

According to this convention, then, the prepositional phrase for her good friends would be correctly represented as:

[#[for] [#[her] [#[#[good#]#]#] [#[#friends#]#]#]#]
 PP N" A"A'A AA'A" N'N NN'N"PP

(I will return to an explanation of the notation N", A", A', etc., below.) The second convention, which is implicit in Chomsky and Halle's entire discussion of word boundaries in SPE, could be expressed as follows:

SPE-II

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

delete the "inner" word boundary.

(S' is the initial symbol, according to Bresnan (1970), whose analysis I am adopting here. I return to this question below.) SPE-II has the effect of deleting "superfluous" word boundaries. For the sake of illustration, let us examine the labelled bracketing of the sentence His illustrious boss was buying gifts for her good friends. By SPE-I the representation of this sentence is:

[#[#[#his] [#[#illustrious#]#]#] [#boss#]#]#] . .
 S'S N'' A''A'A AA'A'' N'N NN'N''

. . [#was] [#buying#] [#[#gifts#]#]#] . . .
 V'' V'V V N''N'N NN'N''

. . [#for] [#her] [#[#good#]#]#] [#friends#]#]#]
 PP N'' A''A'A AA'A'' N'N NN'N''

. . #]#]#]#]#]
 PPN'N'' SS'

By SPE-II the number of word boundaries is reduced in such a string:

[##[[his] [# [illustrious]]#] [# boss]]#] . .
 S'S N'' A''A'A AA'A'' N'N NN'N''

. . [#was] [# buying#] [# [gifts]]#] . . .
 V'' V'V V N''N'N NN'N''

. . [#for] [#her] [# [good]]#] [# friends]]]
 PP N'' A''A'A AA'A'' N'N NN'N''

. .]]]#]#]
 PPV'V'' SS'

As a result of the operation of SPE-II no more than two word boundaries are ever found in sequence in a sentence. This convention thus embodies the claim that the distinction # vs. ## is adequate to the needs of the phrase phonology of any language. It makes the prediction that no language will need to make appeal to the sequences ###, ####, ... As for SPE-I, it predicts that non-lexical items may exhibit different phonological behavior from lexical items. Between two lexical items, two word boundaries will always appear, but between a non-lexical item and a lexical item there will be a single #, while between two non-lexical items which are sisters there will be no #'s. These predictions made by SPE-I and SPE-II are borne out in English and French.

Certain puzzling facts of English and French led me to consider seriously an elaboration of the standard theory which was suggested (but, unfortunately, not developed) by Brame and Baker (1972):

any language particular rule which moves or deletes constituents leaves a special boundary symbol at the site of the missing constituent, and particular phonological rules may be blocked by the presence of this boundary within the domain of the rule. (p. 56)

Such a convention seems to be necessary, since, in both French and English, phonological rules are blocked at the site of a missing constituent. Consider now the possibility that it is not just any arbitrary "special boundary symbol" which is left behind by movement and deletion transformations, but rather the familiar word boundary, earlier inserted by SPE-I. Since the need for such word boundaries was thought to be limited to the phonological component, SPE-I was assumed to operate on surface structure. Let us suppose instead that SPE-I operates in the base, and, furthermore, that SPE-I contains a provision that when any new node is created by a transformation, that node is automatically supplied with word boundaries. Allow me to revise the convention formulated by Chomsky and Halle as follows:

SPE-I (revised)

The boundary # is automatically inserted at the beginning and end of every string dominated by a major category, i.e., by one of the lexical categories "noun", "verb", "adjective", or by a category such as "sentence", "noun phrase", "verb phrase", which dominates a lexical category, whether the phrase category be present in the base or introduced by a transformation.

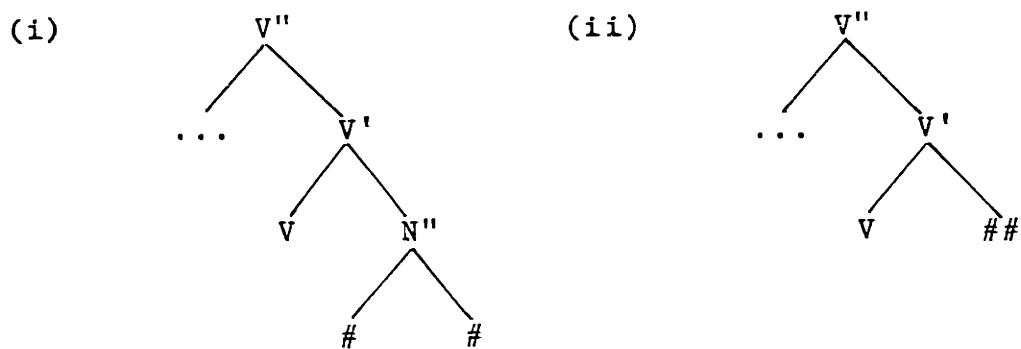
The effect of this revised version of SPE-I is the same as that

of the old version. Yet, in adopting the idea that it applies in the base and that any transformation creating a new category in the tree in effect recapitulates SPE-I, one gives grammars the possibility of dealing with word boundaries in the course of a syntactic derivation. Specifically, one has the opportunity of proposing the following convention (a variation on Brame-Baker):

Traces Convention

Transformations which move or delete constituents do not move or delete the word boundaries associated with these constituents.

Within this framework, then, the boundary symbols left behind by transformations (I will call them traces) are not new ad-hoc devices. They are independently required and always have been included in the standard theory. The innovation lies in the suggestion that SPE-I be revised along the lines sketched above and in the proposal for the Traces Convention. The Traces Convention does not specify whether the sub-tree derived by deleting or moving a noun phrase from a verb phrase, for example, should be (i) or (ii):



(I have omitted for simplicity's sake the #'s which would be hanging from V'', V' and V.) For the purposes of phonology, it is

not important that the N'' node itself remain. The #'s could simply be attached to what had dominated the N'' before the deletion or movement.

There is independent motivation for adopting the revised version of SPE-I that I proposed above. It comes from Bresnan's (1971a, 1972a) work on the Nuclear Stress Rule in English. Her proposal, the Ordering Hypothesis, is that the phrase stress rules operate after all the transformational rules on each cycle. Since the Nuclear Stress Rule (NSR) makes essential use of word boundaries in its environment, SPE-I must have operated prior to the NSR. If the NSR operates at the end of each transformational cycle, then SPE-I cannot operate on surface structure. The revised SPE-I is just what the Ordering Hypothesis requires. Below, the SPE schematization of the Compound Rule and the Nuclear Stress Rule show what a crucial role word boundaries play in the rules:

$$V \rightarrow [1 \text{ stress}] / [## X \left[\overline{\quad} \right] Y \langle ## Z \rangle ##] \langle N, A, V \rangle$$

Conditions: Y ≠ ... [1 stress]..., Z ≠ ...##...

If the convention SPE-I operates (for the most part) in the base, where does SPE-II? Clearly, SPE-II must follow the NSR, because it can erase word boundaries that are necessary to the NSR. Suppose, for instance, that a noun phrase were found in the context below:

..... [# #]#]#]#]#]
 N'' N''V'V'' SS'

SPE-II would erase most of the #'s, producing:

... [#]]]#]#]
 N" N"V'V" SS'

Now the noun phrase, lacking word boundaries on one side, does not meet the environment of the NSR. The NSR should precede SPE-II. And so should all transformations, in fact. What is the point of SPE-II erasing #'s from constituents which may later be moved by transformations into positions where those #'s shouldn't be missing? SPE-II is a convention operating on surface structure. Moreover, it will be shown that if the surface structure readjustment rules for French liaison are to be most simply formulated, they must precede SPE-II. It could well be that SPE-II is the last operation of the syntactic component before the rules of the phonological component operate on surface structure. One could call SPE-II the Universal Word Boundary Readjustment Rule; by calling it a readjustment rule one unequivocally relegates it to a mediatory position between syntax and phonology.

Besides showing how strongly these universal conventions on word boundaries--SPE-I, SPE-II, and the Traces Convention--are motivated by the facts of English and French, this study makes a detailed presentation of the language-particular readjustment rules of these languages. Among these readjustment rules are a fair number which delete (or add) word boundaries in designated syntactic contexts. In addition, one might consider the encliticization rules proposed for English as a type of readjustment rule. (These clitic rules are for the most part

post-cyclic and could very well follow all transformations.)

The data from French show that a single # between two words is the environment for liaison and provide a basis for rejecting Dell's (1970) claim that liaison is accomplished by the metathesis of a word boundary and a phonological segment. As a result, it is possible to continue to hypothesize that readjustment rules do not perform such operations whereby segments and boundaries metathesize, move, or whatever.

Because this study relies so heavily on phrase structure considerations, I would like to make clear at the outset which phrase structure rules will provide the foundation of the description. I have adopted Bresnan's (1970) analysis of complementizers and thus assume there to be a rule

$$S' \rightarrow \text{Comp} \text{ ___ } S$$

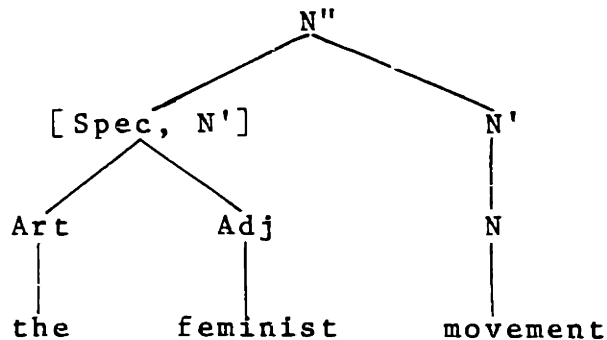
(In this paper, the "bars" of \bar{S} , \bar{X} , and $\bar{\bar{X}}$ will be replaced for convenience by S' , X' and X'' , respectively.) Furthermore, I employ the base rules proposed by Chomsky (1970) in his paper "Remarks on Nominalization":

$$X'' \rightarrow [\text{Spec}, X'] \text{ ___ } X'$$

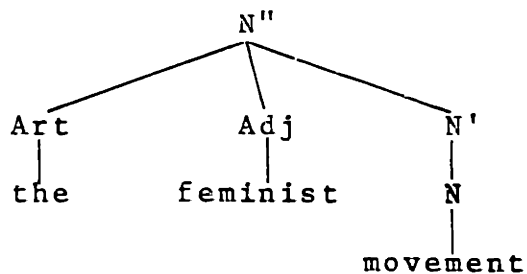
$$X' \rightarrow X \text{ . . .}$$

The X'' notation provides a schema for the phrase categories Adjective Phrase (A''), Noun Phrase (N''), and Verb Phrase (V''). At the moment, I see no way of deciding whether there is indeed a node $[\text{Spec}, X']$ which itself dominates all the specifier material or whether instead all material in the specifier is directly dominated by X'' . Using the noun phrase as an example, according

to the first alternative, an article and an adjective would both be dominated by [Spec, N']:



According to the second alternative, this phrase would have the following structure:



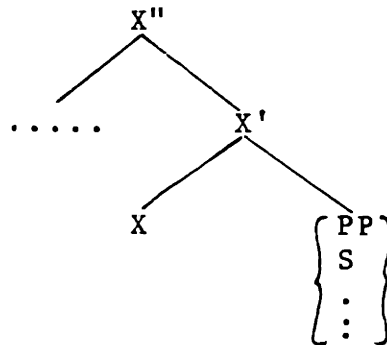
I will assume this second alternative. It could be generated by the following rule:

$$X'' \rightarrow [\text{Spec}, X']^n, X'$$

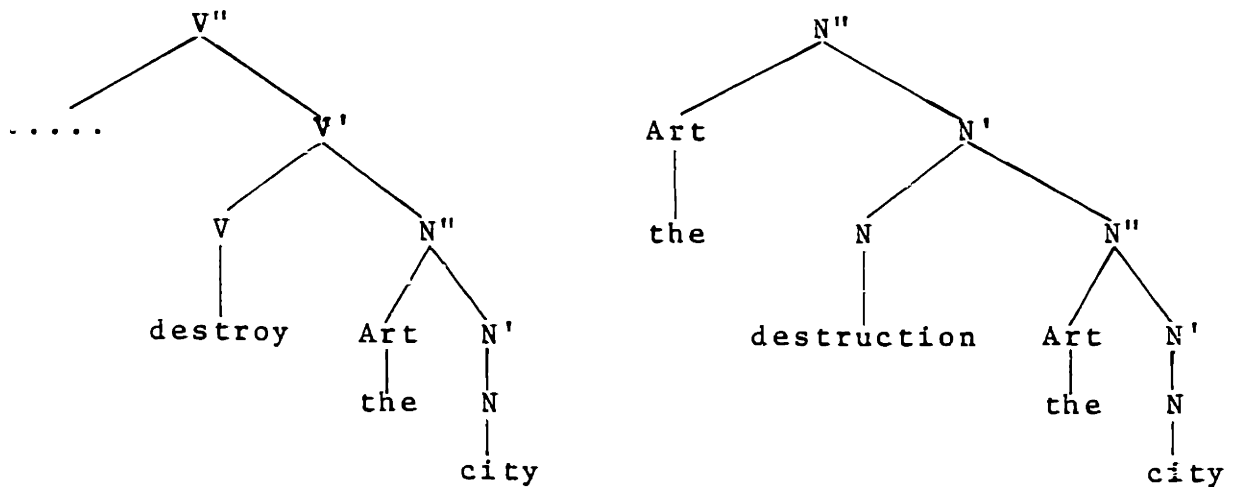
where $[\text{Spec}, X']^n$ means a sequence of specifier elements, i.e., $\dots[\text{Spec}, X']^i, [\text{Spec}, X']^j\dots$. For the noun phrase one would find, for example, $[\text{Spec}, N']^i \rightarrow \text{Art}$ and $[\text{Spec}, N']^j \rightarrow \text{Adj}$.

The ' . . .' in the rule $X' \rightarrow X \dots$ is the "Complement" of X and may be either a Sentence, a Prepositional Phrase (PP), or another X'' even. The X'' notation will be useful in this description for it allows for a distinction between two types of nodes, X'' and X' (the variable X being the representative of the lexical categories Adjective, Noun and Verb). The former I will call a

phrase node or category and the latter I will call a minor phrase node or category. We know from the phrase structure rules that X'' dominates (immediately) X' and that X' immediately dominates the "Complement" material contained within X'':



Such a conception of the phrase categories was motivated in part by the necessity of providing parallel structures to verb phrases like destroyed the city and their corresponding noun phrases like the destruction of the city:



The noun destruction and the verb destroy are provided with an identical strict subcategorization within the phrases N' and V', respectively. It is actually under the node X' that the parallelism of the strict subcategorization relations in verb phrases, noun phrases and adjective phrases emerges. The material

introduced under X", i.e., the Specifier material of the phrase, is more idiosyncratic. Whereas the specifier in V" contains auxiliary verbs and perhaps some adverbials, the specifier of N" contains articles, quantifiers and probably the prenominal adjectives.

To make sure that the nomenclature concerning phrase structure categories is quite clear, allow me to review it. The 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.

Chapter I

The Stress of Non-Lexical Items in English

Generative descriptions of phrase stress in English have traditionally been concerned only with the levels of stress on the lexical category items, i.e., nouns, verbs, and adjectives, appearing within larger syntactic units. But recent papers (by King (1970), Baker (1971), Lakoff (1970), Zwicky (1970), Bresnan (1971b), Fiengo (1971), and Brame and Baker (1972)) have discussed phenomena which are related to the stress of non-lexical items. They have brought to light many facts which have long lain dormant in dusty volumes by phoneticians, as well as new facts which only a generative approach to language could reveal as important. These extremely interesting discussions have made clear the need for a comprehensive understanding of the processes of stress reduction in non-lexical category items in English. Below I will propose an analysis of this stress reduction and the vowel reductions stemming from it.

1. The Weak and Strong Forms of Grammatical Formatives in English

Traditional phoneticians all take care to point out that the monosyllabic "form-words" (=non-lexical items) of English have "strong" and "weak" forms.¹ Strong forms are stressed. Weak forms are unstressed, and quite often have a different phonetic

shape from the corresponding strong form. For example, while the strong form of the auxiliary have is [hæv], its weak form is [həv] (or one of the variants [əv], [v], or [ə]). Without exception, the phoneticians describing English emphasize that it is necessary to employ the weak (unstressed) forms in speaking--except under special syntactic circumstances.² To use the strong forms in inappropriate contexts is artificial and incorrect. Use of the weak forms constitutes correct, normal, "cultivated" speech.

In normal speech, only monosyllabic form words are destressed. Polysyllabic ones retain some degree of secondary stress. Contrast the normal pronunciation of till tomorrow [tɪ̃ təmɔ̃row] with that of until tomorrow [əntɪ̃l təmɔ̃row]. Till has no word stress, but until does. In particularly fast or colloquial speech, however, even polysyllabic form words may lose their word stress. The pronunciation of until may become [ntɪ̃]. Similarly, gonna [gʌnə] may be pronounced [gənə] in fast casual speech. My concern in this chapter is only with the rule affecting the stress reduction on the monosyllables. Presumably, some extension of this rule in fast speech accounts for the stress reduction in polysyllables, but this possibility will not be pursued in this study.

Below I have compiled lists of the strong/weak pairs of form words in English. Essentially the same items are listed by Sweet, Jones, Ward, Gimson, Palmer, and Kruisinga for British English, and Kenyon, Thomas, and Huitzén for American English. Accompanying the lists are sample sentences illustrating the contexts for

appearance of weak and strong forms. Many of the sentences have been drawn from Kenyon and Hultzén. I am including these lengthy lists here in order to illustrate the great variety of words which have unstressed weak forms. In all of the contexts where weak forms appear, by definition, some stress reduction has taken place. It is obvious that the explanation for the appearance of weak forms in any one of the groups below should not be divorced from the explanations for the other cases. The same principle of stress reduction is at work within the noun phrase, the verb phrase and the other phrase constituents of English. A unified description of stress reduction in non-lexical category items must be made.

The lists show the range of possible realizations of the weak forms. The particular realization depends in most instances on the larger context, both phonetic and syntactic, in which the form is found. For example, in the first list below one sees that is is either [ɪz], [z], or [s]. The shape is takes is determined by the final segment of the preceding word. Notice also that the auxiliary have loses its /h/ fairly automatically, but the /ə/ is deleted only if a personal pronoun precedes it (cf. Zwicky (1970)). And the form of do, [du(w)] or [də], depends on whether the next word begins in a vowel or a consonant. There may be [də] for Do Tom and Andy?, but only [duw] for Do Andy and Tom?. And so on... In the lists, I mention all the possible realizations of the weak forms, mostly for the sake of completeness. In many cases, the fact that a form has, for example, a

consonant which changes in voicing, or one which is elided, is not of direct importance here. The phonological rules responsible for these variant forms will be discussed in large part in the next chapter. What's significant here is the stresslessness of the vowels and the consequent reduction in most cases to [ə] or [ɪ]. As will be seen, the reduction to [ə] or [ɪ] of the non-tense vowels in weak forms is next to automatic. Tense vowels (long or diphthongal) tend to reduce to [ə] or [ɪ] less readily. It is also possible that some speakers will find certain pronunciations permissible only under conditions of fast or familiar speech. Thus these readers may be inclined to regard as "Rapid or Familiar" what I have classed as "Normal".

As for the example sentences which have been provided, there is probably no need to point out that not all variants of a weak form are necessarily possible in any one example. The phonological and syntactic conditions may not be appropriate for certain variants. The sentences simply provide contexts where at least one of the weak forms and never the strong form will appear under normal speech conditions.

The system of phonetic transcription used here for the vowels is a variation on that of Kenyon and Knott (1953). The symbols for some of the vowels require comment. Kenyon and Knott use the symbols [i], [e], [u] and [o], without the off-glides [j] and [w], to represent the vowels in the American words bee, rate, tooth, and go, respectively. They regard the off-glides [j] and [w] as optional redundant features of these tense vowels and thus do not

note their presence. I may depart from their custom and add the off-glides when it seems useful in the discussion. When they appear in the text, the symbols [ij], [ej], [uw] and [ɔw] should be taken to be the same as Kenyon and Knott's unitary phonetic symbols. I will adhere to Kenyon and Knott's practice in using the small capital [ɪ] for the vowel in bit, small capital [ʊ] for the vowel in full, [ɛ] for yet, [ɔ] for gorge, [æ] for sang, [a] for far, [ʌ] for up, and [ə] for the initial vowel in above. I will use their symbol [ɜ] for the stressed vowel in further, but for the unstressed vowel will use the sequence [ər] instead of their [ɚ]; the phonetic representation of further is thus [fɜ̄ər]. Finally, the sequences [aj], [aw] and [ɔj] for the diphthongs in while, how, and toy, respectively, will replace Kenyon and Knott's [aɪ], [aʊ], and [ɔɪ]. The representation of the consonants will, I think, be self-evident.

Auxiliary-I

Orthographic	Strong	Weak	
		Normal	Rapid or Familiar
am	æm	əm, ṃ, m	
is	ɪz	ɪz, z, s	
are	ər	ər, r	
was	wʌz	wəz	əz
were	wɜ	wər	
have	hæv	həv, əv, v	
has	hæz	həz, əz, z, s	
had	hæd	həd, əd, d	
do	duw	du(w), də	d
does	dʌz	dəz	z, s
did	dɪd	dɪd	d

StrongWeak

<u>am</u>	Indeed I am.	I am ready. Why am I going? I am leaving today.
<u>is</u>	I think she is.	The grass is wet. Joan's here. Frank's leaving town.
<u>are</u>	Yes, they are, too.	All are mortal. They're hearing things.
<u>was</u>	And there he was.	He was there. He was not here. John was going slowly.
<u>were</u>	Do you know where they were?	The rafters were all rotten. They were very kind. They were left behind.
<u>have</u>	They've spent more time than we have.	What have you done? None have come yet. You could have tried.
<u>has</u>	I believe she has.	The fire has gone out. It has been very good. Has she come yet?
<u>had</u>	While they had at eight.	Before we had finished. It had already left. Had he seen it?

<u>do</u>	You earn more than I do.	Who do they know? How do you do it? Why do John and Sue care?
<u>does</u>	I know she does.	What does it matter? Does she make them herself? How does it work?
<u>did</u>	John took fewer beans than Sam did peas.	Why'd I lose it? How did you know? Did he find her?

Auxiliary-II

Orthographic	Strong	Weak	
		Normal	Rapid or Familiar
will	wɪl	wɪ, əl, ɪ, l	
would	wʊd	wɔ̃d, ɔ̃d, d	
shall	ʃæ l	ʃəl, ʃɪ	
should	ʃʊd	ʃəd	ʃd, ʃt
can	kæn	kan, kɪ	kɪ, kɪ
could	kʊd	kəd	kt
must	mʌst	məst, məs	
may	mej	me(j)	mɪ
might	majt	majt	mat
have	hæv	həv, əv, v	ə
be	bij	bi(j)	bɪ
been	bɪn	bɪn, bɛn, bɪ	
not	nat	nat, nɪ, nt	n, n

StrongWeak

<u>will</u>	No more than you will.	That will do. The room will be full. No one will believe you.
<u>would</u>	He'd go if she would.	You would like to. It would be a pity. This piece would fit.

<u>shall</u>	I don't think I shall.	Where shall we go? What shall we do?
<u>should</u>	Tell me why I should.	I should have thought so. Should they take some. You should be up.
<u>can</u>	But you can in New York.	George can go. How can I get one? Mary can do it easily.
<u>could</u>	Do you think John could?	He could have told me. You could all leave now. Where could they go?
<u>must</u>	If you really must.	We must go now. You must regret it deeply.
<u>may</u>	Yes, you may.	You may leave. They may be kidding you.
<u>might</u>	I thought she might.	June might arrive tomorrow, or she might not.
<u>have</u>	Should she have? ³	She should already have left. There's no way she could have.
<u>be</u>	It's what she's always wanted to be.	She wants to be a dancer. Her earnings will be room and board.
<u>been</u>	Where have you been?	What have you been up to? I've been pulling legs. You must be fed up.
<u>not</u>	You tried not to.	It's not the best of the lot. We aren't pleased with it. Why aren't you?

Prepositions

Orthographic	Strong	Weak	
		Normal	Rapid or Familiar
at	æt	ət	
for	fɔr	fər	fɹ̩
from	frʌm	frəm	fr̩m, f̩m
of	ʌv	əv, ə	v
by	baj	bəj	bə
to	tuw	tu(w), tə	
in	ɪn	ɪn, ɪ̇	n
on	an	an, ən	
with	wɪθ	wəθ	ɔθ

StrongWeak

<u>at</u>	Who're you looking at?	Look at that. It took no time at all.
<u>for</u>	What did you do it for?	They did it for fun. I walked for an hour. These are for you.
<u>from</u>	Where is that from?	From time to time. From now on it will be different. Get one from Sam.
<u>of</u>	Who were you thinking of?	A blade of grass. It's a type of boll weevil. We're thinking of Harry.
<u>by</u>	Which girl was it written by?	It was haunted by bats. Two by two they passed. Put it by the door.
<u>to</u>	The one we were talking to.	They're going to Spain, or maybe to Italy. John's going to leave, too.
<u>in</u>	Tell me which square it's in.	It's in Union Square. All in all, I like it. He stayed in his hole.
<u>on</u>	Did she put it on?	She's always waiting on John. On the other hand. It's on top of the case.
<u>with</u>	Who'll you do it with?	The man with the grey flannel suit. I'll sing with Sue.

Pronouns⁴

Orthographic	Strong	Weak	
		Normal	Rapid or Familiar
I	aj	aj, ə	ə
you	juw	ju(w), jə	jə
she	ʃij	ʃi(j), ʃɪ	ʃɪ
he	hij	(h)i(j), (h)ɪ	(h)ɪ
it	ɪt	ɪt	
we	wij	wi(j), wɪ	wɪ
they	ðej	ðe(j), ðe	eɪ
me	mij	mij	mɪ
him	hɪm	hɪm, ɪm	ɪm
her	hɜ	hɜr, ər	
us	ʌs	ʌs, əs	
them	ðɛm	ðəm, əm	ðm, m
there	ðeər	ðər	
one	wʌn	wən	wn
some	sʌm	səm	sm

StrongWeak

I She's sadder than I.
you You and Harry skipped out.
she We were taught: "This is she."
he John's yellower than HE is.
it It is a 2-letter word.

I'll leave today. I know I won't like it. I'm so sad.
 Do you like it? Will you answer? You asked me a question.
 She'll never be a star. Where is she? She was here a minute ago.
 He'd laugh so hard. Where is he? I know he did.
 It was a foggy day. Why it isn't lost I'll never know. What of it?

<u>we</u>	We four all came together.	We're in bad shape. We must get out of here soon.
<u>they</u>	But were THEY?	They'll be coming round the mountain. When they said that...
<u>me</u>	Give it to her, not to me.	When did you see me last? They'll do me in.
<u>him</u>	That's him.	We don't know him at all. They taught him all wrong.
<u>her</u>	Why did you give it to HER?	Give her to me. They carried her away.
<u>us</u>	You're smaller than us.	Give us a little pep talk here. We'd like you to join us. Let's go.
<u>them</u>	I never saw THEM.	Keep them for me. I don't like them very well.
<u>there</u>	-----	There were only ten left. I know there were. Now there isn't a chance.
<u>one</u>	The one who remained wept.	This one was rotten. No one will ever know. The red one or the black?

Determiners

Orthographic	Strong	Weak	
		Normal	Rapid Familiar
my	maj	maj	mɪ
your	jur	jər	
his	hɪz	hɪz, ɪz	
her	hɜ	hər, ər	
its	ɪts	ɪts	
our	awr	ar	
their	ðeər	ðər, ðer	
a	ej	ə	
an	æn	ən, n	n
the	ði	ðr, ðə	
some	sʌm	səm	sɪ
any	eni	eni	ni, ni, ði
such	sʌʃ	sʌʃ	səʃ
so	sow	so(w)	sə
as	æz	əz	

StrongWeak

my That's MY hat.

your That's your problem,
not mine.

his It's HIS job.

her No it's her job.

I don't like my new book. They
want to decide my fate.

Want your name on it? How's
your mother?

John removed his gloves and put
on his goggles.

She likes her job. That's her
inclination.

<u>its</u>	-----	It came to its logical conclusion, its self-destruction.
<u>our</u>	I say it's OUR job.	He says it's our duty to win. That's not our opinion.
<u>their</u>	And they say it's their job.	We saw their pictures sitting up on their mantelpiece.
<u>a</u>	We said A penny, not THE penny.	A dime will get you no further than a penny.
<u>an</u>	We said AN apple, not A apple.	We bought an apple and an orange. Did you buy an apple?
<u>the</u>	It's THE place to visit.	The atmosphere stinks, but the music is nice.
<u>some</u>	They won SOME money, but not much.	I want some tea. Leave him some money.
<u>any</u>	Did you win ANY money?	Did you see any bears? Did you get any farther?
<u>such</u>	Mildred has SUCH pains.	They're all such bothers. I'd never heard of such a thing.
<u>so</u>	Little John is just so tall.	I'm not so sure of that. Why's it so absurd?
<u>as</u>	They might be AS tall.	They're as tall as trees. It's not as interesting.

Conjunctions, Complementizer Elements

Orthographic	Strong	Weak	
		Normal	Rapid or Familiar
and	ænd	ænd, ɲd, ɲ, n	n
but	bʌt	bət	
as	æz	əz	
than	ʒæn	ðæn, ɲ	
that	ʒæt	ðæt	
for	fɔr	fər	
if	ɪf	ɪf	f
who	huw	hu(w)	
what	(h)wæt	wət	
when	(h)wɛn	wən	wɲ
that	ðæt	ðæt	t
or	ɔr	ɔr, ər, r	
nor	nɔr	nɔr, nər, nr	
till	tɪl	tɪl, tɪ	

StrongWeak

and No, Mary AND Cathy came.

but But, she said, it'll soon be over.

as -----

It's nice and snug. The pros and cons. He turned and cackled. They came, but said nothing. But on the other hand. We can't but hope.

It's the same as yours. Lynn's as hopeless as Gary.

<u>than</u>	I said different FROM, not different THAN.	Better than nothing. They've been here longer than John has.
<u>that</u>	We knew THAT he came, not WHY he did.	We knew that he came. They hid so that the cops wouldn't find them.
<u>for</u>	-----	We want so much for Gladys to en- joy dance. They waited for Alice to go.
<u>if</u>	IF he comes...	I wonder if he'll come.
<u>who</u>	WHO is it who's left?	Did you like the woman who spoke? Who'd you want to speak to?
<u>that</u>	-----	The meat that's in the frig is old. The one that you told me about.
<u>when</u>	-----	I'll tell you when it's happening. They know when she'll come.
<u>what</u>	Do you know <u>what</u> hap- pened as well as where?	I know what'll happen. We didn't hear what you said.
<u>or</u>	Either John <u>or</u> Mary will leave.	It's the first or second that she did. Come now or wait till Friday.
<u>nor</u>	Neither John NOR Mary will leave.	Neither she nor he has any idea at all.
<u>till</u>	-----	Please wait till they come. I did it till the rain stopped.

A graphic illustration of the stress reduction in form words and its phonological consequences is provided by neutralizations of the weak forms. In the examples cited below (most of which are drawn from Gimson (1962)) the underlined sections of the sentences are virtually identical in their phonetic composition. Words whose strong forms have distinct vowels and sometimes different consonants can have indistinguishable weak forms.

1a) [z] = is, has

Where's he put it ('s = has)

Where's he going (' = is)

1b) [s] = is, has

What's he like ('s = is)

What's he lost ('s = has)

2a) [d] = had, would

I'd put it there if I were you (I'd = would)

I'd put it there before you left (I'd = had)

2b) [əd] = had, would

Pat would put it on, if it began to rain
[pæt əd pʊt...]

Pat had put it on, before it began to rain
[pæt əd pʊt...]

3) [əv] = have, of

Some of one vs. Some have won

The boys of Eton fish vs. The boys have eaten fish

4) [ər] = are, or

Ten or under vs. Ten are under

5a) [n̩] = and, not

Didn't he do it? [dɪdn̩ i duw ɪt]

He did and he didn't. [hi dɪdn̩ i dɪdn̩t]

5b) [n̩] = in, an

It's in allophonic variation vs.

It's an allophonic variation

The weak forms are in sentences which represent normal uncolloquial speech (with the possible exception of in and an in (5b) whose shapes may be typical only of faster speech). What (2b), (3), and (4) show is not only that the deletion of initial /h/ and /w/ is perfectly regular (cf. Zwicky (1970)), but that the vowel contrasts /æ -ʊ/, /æ -ʌ/ and /a -ɔ/ in these words are neutralized to [ə] in normal speech.

To recapitulate a bit, then, the phonological processes responsible for the phonetic shape of monosyllabic non-lexical category items articulate in the following way. First there is a completely automatic reduction of stress, unless certain syntactic conditions, to be described directly below in §2, prevail. The stress reduction is not optional. Then certain changes, i.e., reduction, in the quality of the stressless vowels may come about. In general, the resulting vowel is [ə] or the lax [ɪ]. Word-initial [h] and [w] will delete as well. The deletion of the reduced vowels--as in the auxiliaries is, has, would, had, etc., or in the negative particle not--is idiosyncratic and quite restricted. Not all the monosyllabic form words are susceptible to vowel deletion, but they are for the most part quite susceptible to vowel reduction. I will consider that the rule of Auxiliary Reduction (deletion of the reduced vowel in auxiliaries) described by Zwicky (1970) is simply a "third-level" process particular to auxiliaries. Whereas all the other non-lexical items are affected by stress reduction and vowel reduction, only the reduced vowels of the auxiliaries go on to be deleted in normal speech.⁵

This approach that I have just outlined--insofar as it describes the phonological characteristics of auxiliaries--is quite explicitly advocated by Baker (1971) in his paper "Stress Level and Auxiliary Behavior in English". Baker takes vowel reduction to be a sign of a prior stress reduction and understands destressing to be a normal process operating on auxiliaries, except

before deletion sites.

There may be idiosyncrasies in the susceptibility of unstressed forms to vowel reduction. For example, many speakers may have no reduced pronunciation for stressless may, by, my, with, such, or others. And, furthermore, there are some monosyllabic form words for which no speaker has a reduced vowel. For example, the adjective determiner too does not reduce to [tə], and the prepositions off and up have no reduced form either. (This lack of vowel reduction will have to be marked as an idiosyncratic property of each of these words.) That the vowel doesn't reduce does not mean that the word is stressed. The presence of an unreduced vowel must not be taken to indicate the presence of stress on that vowel. However, the appearance of [ə] is an indication that a vowel bears no stress.

Some of the form words--determiners, conjunctions, and complementizers--are always unstressed or weak, unless explicitly emphasized, as in, e.g., it's THE book to read, and so normally appear in their reduced phonetic forms. This is because they never stand alone in surface structure. I will say that they are always "dependents of a head"⁶ syntactically. (I will define this notion directly below in §2.1.) Pronouns often exhibit their unstressed weak forms, but not always. I will explain the behavior of pronouns by positing pronoun clitic rules (see below §3.2). The remaining types of non-lexical category items with strong/weak pairs--auxiliaries and prepositions--appear in surface structures with strong as well as weak forms. In describing

the facts about auxiliaries and prepositions, Henry Sweet (1908) said:

The weak forms of the verbs and prepositions with a or a dropped vowel occur only when they are followed without a pause by the word they modify or belong to; if they come at the end of a sentence, they assume the medium or unstressed strong form; before a parenthetical insertion, they take strong stress as well.
(p. 68)

And even earlier, he remarked (Sweet, 1890) that "the weak forms of the auxiliary occur only before the chief verb, and in the case of bi before the predicate." (p. 31) To illustrate his point, Sweet offered these examples:

- 1) a) I thought of it. [əv]
b) What are you thinking of? [ʌv]
- 2) a) He's here. [z]
b) I know he is. [ɪz]
- 3) a) He's a fool. [z]
b) What a fool he is. [ɪz]
- 4) a) Is he ready? [ɪz] (sic)
b) I wonder whether he is. [ɪz]
- 5) He is, if I may be allowed to say so, mistaken. [ɪz]
- 6) a) I can do it. [kən]
b) At least, I think I can. [kæn]
- 7) a) I shall go. [ʃəl]
b) I think I shall. [ʃæl]
- 8) a) I don't know whether she'll do it or not. [l]
b) I don't know whether he will or not. [wɪl]

Sweet's formulation, though incomplete, expresses the important insight that weak forms appear before words they 'modify or belong to' in a sentence, as in the (a)-sentences above. The formulation is incomplete because strong forms appear not only at

the end of sentences (as in (1b) through (4b), (6b) and (7b)) and before parentheticals (as in (5)), but before various adverbials and complement phrases within the sentence. King (1970)(K), Lakoff (1970)(L), and Bresnan (1971)(B) bring up examples of the latter sort:

I wonder where Gerard is today.	(K-9)
I asked where she is now.	(B-53)
Sam's richer than Bill is these days.	(L-e)
Ready I am to help you.	(L-c)
Mary's more adept at poker than John is at pool.	(B-87)

I will adopt Sweet's insight as the basis for my description of the stress reduction of non-lexical category items. Since the stress reduction is limited to monosyllables I will call my rule the Monosyllable Rule. I will arrange it that the rule will be formulated in such a way that the auxiliaries and prepositions which appear at the end of a sentence, before parentheticals, before certain adverbials and before complement phrases of the adjective, verb and noun phrases will not satisfy the structural description of the Monosyllable Rule and will thus be impervious to stress reduction. My claim is that a phrase structure dependent stress reduction rule operating on surface structures will account for the cases of destressing among non-emphatic auxiliaries, prepositions, pronouns, determiners, conjunctions and complementizers. I will show that there is no need for Lakoff's global constraint, nor a need for the procliticizing Tense Contraction transformation proposed by Bresnan.

The Monosyllable Rule cannot explain all the intricacies of lower level syntactic stress reduction in English, however.

There need to be clitic rules which rearrange the syntactic relations of these non-lexical items such that they provide the correct input to the Monosyllable Rule. The well-known NOT-Contraction (or Encliticization) is such a rule. By attaching to the Aux, not adds an extra syllable to it. Not thus prevents the Aux from reducing itself by the Monosyllable Rule. The not is then deprived of stress by a rule I'll call the Clitic Stress Reduction Rule, a rule which destresses all enclitics. The NOT rule as well as other enclitic rules involving to (cf. Bresnan (1971b)), tenseless have and be, and pronouns will be discussed in §3. But now, let's get on to the formulation of the Monosyllable Rule.

2. The Monosyllable Rule

2.1 The Formulation

2.1.1 Its environments

The basic generalization embodied in the Monosyllable Rule is

- (φ) Monosyllabic syntactic dependents become stressless when they precede their heads.

The following definitions make precise the phrase structure environments of the Monosyllable Rule:

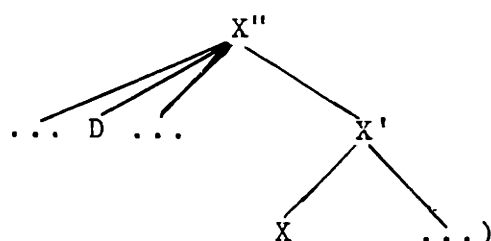
- (α) All non-lexical categories are syntactic dependents.
- (β) A dependent D is a dependent of the category X if one of the conditions (I), (IIa) or (IIb) is fulfilled. In these circumstances, X is called the head of D.

Conditions (I), (IIa) and (IIb) have been separated in order to provide a clearer exposition. At the end of this section I will

show that they may be collapsed into a single condition, Condition Σ .

Condition I:

D is an element of the specifier in X'' , i.e., the [Spec, X'], and X is in X' . (They appear in the structural configuration



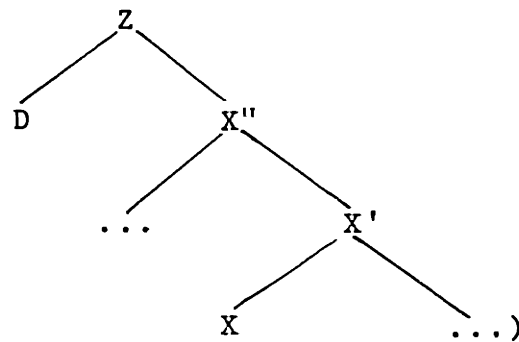
By Condition I, determiners in the noun phrase, auxiliaries in the verb phrase and determiners of the adjective phrase will be dependents of the head N, V or A. When they precede their heads, if they are monosyllabic, they will be destressed by the Monosyllable Rule:

th^o w^oman, its imp^ortance, an^o an^oswer, h^os j^oie de v^oivre
 is sl^oeeping, h^os b^oeen ex^oaggerated, h^oave l^oeft, c^on surm^oise
 s^o s^oundly, qu^oite fr^oquent, as tr^oifling

(Unless it is important for the description, I will not mark the distinctions between secondary and tertiary stress. The symbol 'o' will represent no stress; the symbol '^' indicates primary stress and '~' indicates non-primary stress.)

Condition IIa:

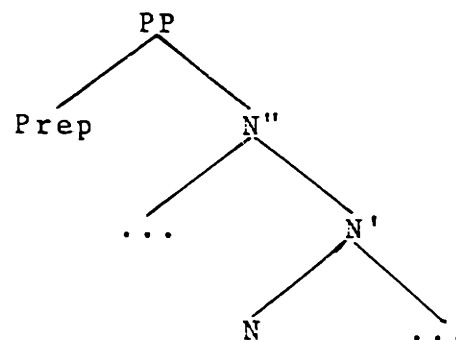
D is immediately dominated by the category Z, which immediately dominates X'' , and X is dominated by X'' . (The tree illustrating this relationship is



Quite obviously, this configuration matches that of a prepositional phrase, which is generated by the rule

PP → Prep — N''

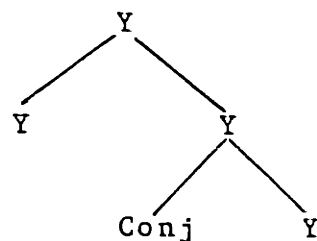
Condition IIa permits prepositions to be defined as dependents of the N in the N'' of the PP:⁷



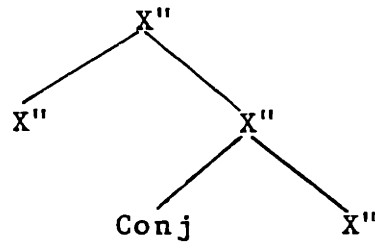
This being so, the Monosyllable Rule can account for the lack of stress on prepositions in such phrases as:

in the room, at her request, of a leaflet, for the time being

Conjunctions, too, fall under Condition IIa if one accepts Ross's analysis of coordination (Ross, 1967, §4.2.1). Ross argues quite convincingly that the derived structure for conjunctions is



In terms of the X'' notation, one would find conjoined structures like



Thus the destressing of the conjunction particles in the following phrases can be explained:

Màry ^o and Ándrea, swèet ^o and sóur, ùp ^o or dówn

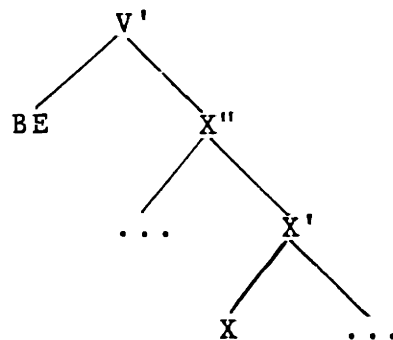
Nèither Àlice n^or Péter⁸

In addition, the configuration specified by IIa matches that of the copula phrase. I will assume Emonds's (1970a) analysis, whereby the copula is generated by the general rule for V':

$$V' \rightarrow \left\{ \begin{array}{c} V \\ BE \end{array} \right\} (N'') (A'') (PP)^* (S)^9$$

A descriptive statement of what actually appears in the complement

of the copula would be $BE \left\{ \begin{array}{c} N'' \\ A'' \\ PP \end{array} \right\}$. The structural configuration



satisfies IIa and thus BE is a dependent of X here. So BE will be deprived of stress by the Monosyllable Rule in such phrases as:

is ^o an áctress, ^o are v^oluable t^ex^ts, ^o am s^o tíred, w^ere unlíkely

Notice that BE is the head of the auxiliary has by Condition I in

Jàne hàs bēen àn àctress fòr 12 yéars

which has the internal structure

[[Jane] [[has] [[been] [[an] [[actress]]]] ..]
 SN'' N'' V'' V' N'' N'N NN'N'' S

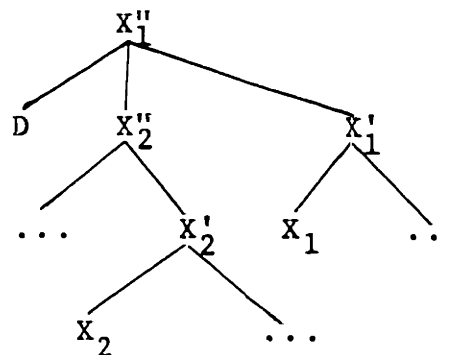
Yet being itself a non-lexical category, i.e., not a "real" verb, BE is itself the dependent of a head in its complement, and consequently loses its own stress.

Notice also that in the phrases

Mary will sòn jòin her sísters.

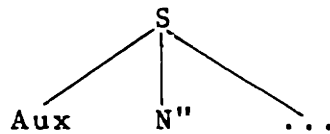
It's à polìtical báttle.

the non-lexical specifier items will and a, which by Condition I are dependents of the head verb and noun, respectively, are definable as dependents of the modifier phrases soon and political, also in the specifier, by IIa. The structure of these phrases is



Thus there is a certain indeterminacy about which of these X is the head of the dependent causing it to destress by the Monosyllable Rule. This indeterminacy represents no problem for the analysis, however, since in either case the correct operation of the Monosyllable Rule is obtained.

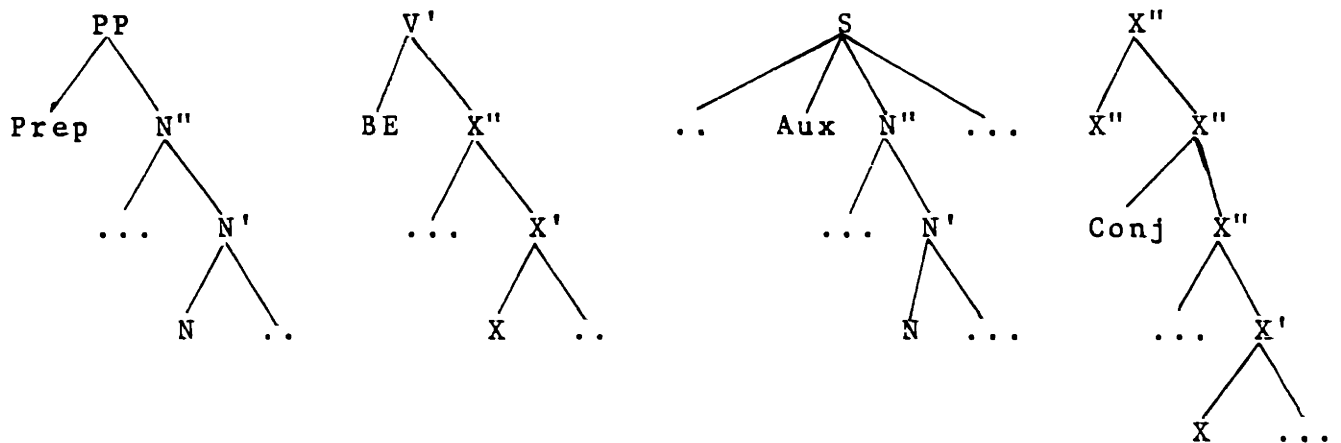
If D and X'' were permitted by Condition IIa to have sisters under Z then the Condition IIa could be extended to yet another case. For example, after the transformation of Subject-Auxiliary Inversion takes place, there is a derived tree



If D = Aux, X'' = N'' and Z = S according to Condition IIa then the reduction of stress on the Aux, as in

is Jòhn sléeping, hàve thê còps léft, còuld ànyone sée ít can be accounted for by calling Aux a dependent of the N in the subject N''. In this case, Z (which is S) does not exhaustively dominate D and X'', however. So it will simply not be required that Z do so.

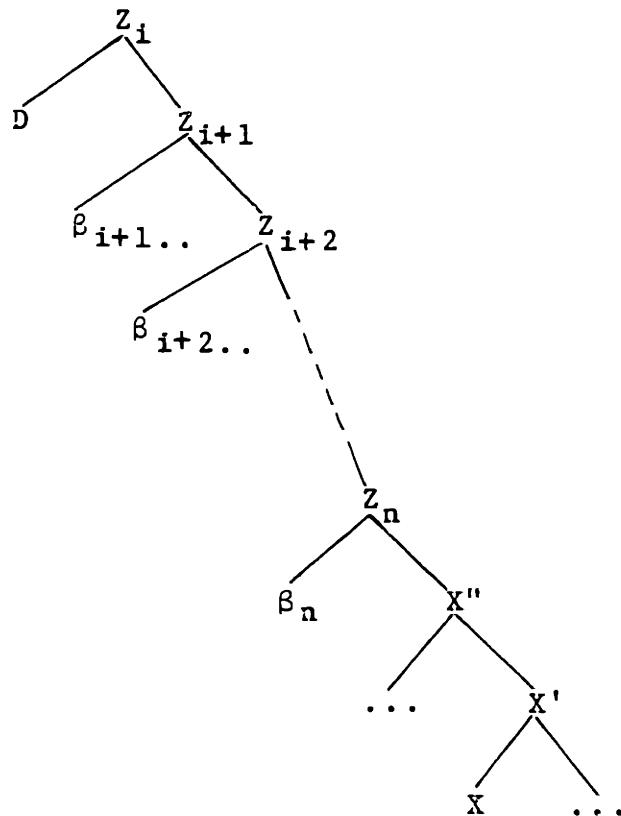
So, in sum, the Condition IIa covers the structural configurations:



The syntactic dependents on the left may all be defined as dependents of heads in the X'' on the right, and thus will be rendered stressless by the action of the Monosyllable Rule.

Condition IIb

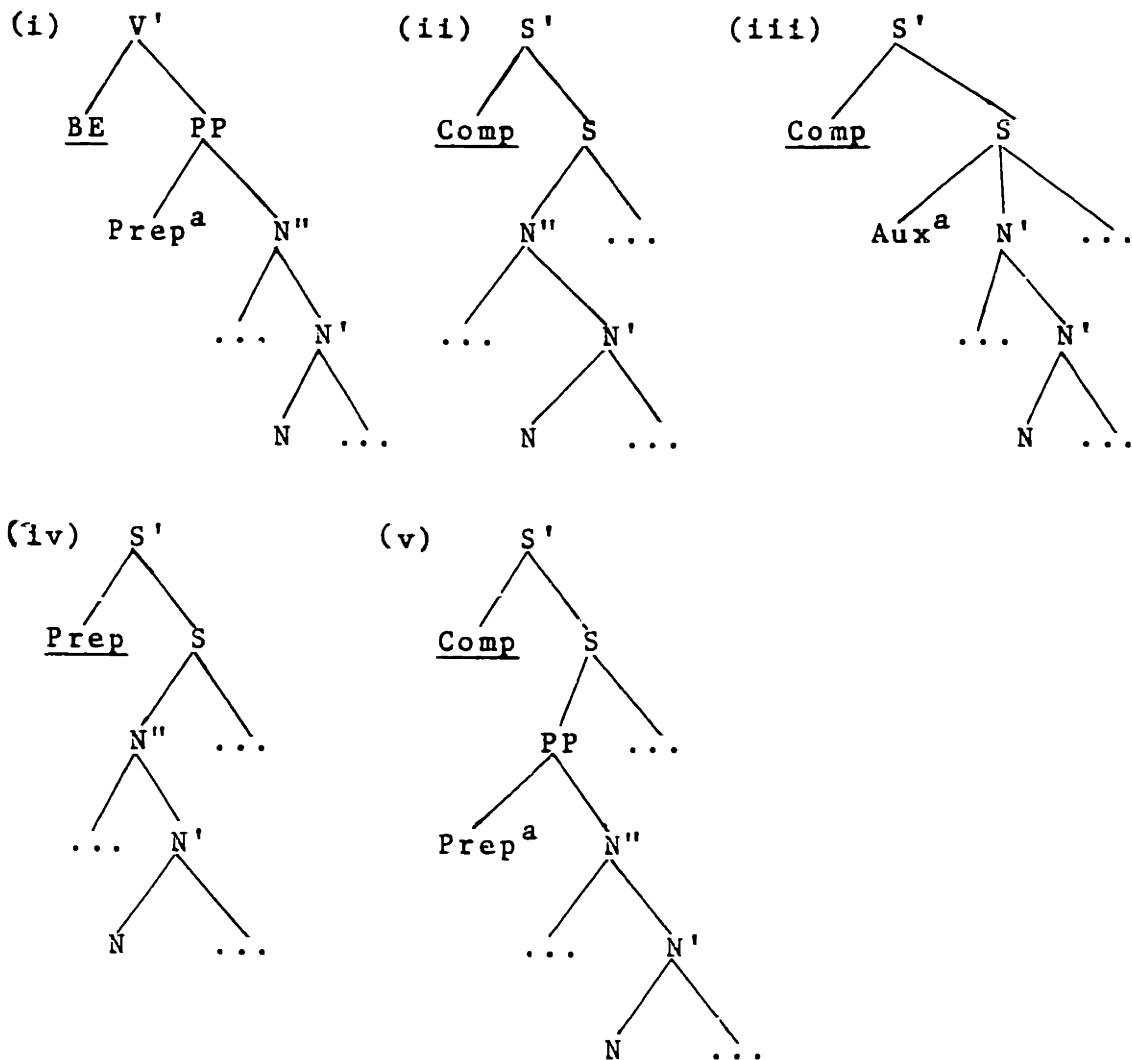
D is a dependent of X if (1) it is immediately dominated by Z_i and Z_i dominates X'' containing X, and (2) a node Z_{i+a} intervening between Z_i and X'' dominates on its left branch(es) only non-lexical categories (other dependents), β_{i+a} , β_{i+a+1} , ... The relevant structure here is



Condition IIb is simply an extension of Condition IIa. Provision (1) of this condition is identical to Condition IIa except that the requirement that Z_i immediately dominate X'' has been dropped. Provision (2) expresses the idea that D will be a dependent of X as long as that which intervenes between it and X in the terminal string is also a dependent.

Condition IIb will now permit the underlined non-lexical

categories in the trees below to be defined as dependents of a head X. (In all the examples below X happens to be a Noun.) The non-lexical categories with the superscript a are definable as dependents of the head by Condition IIa:



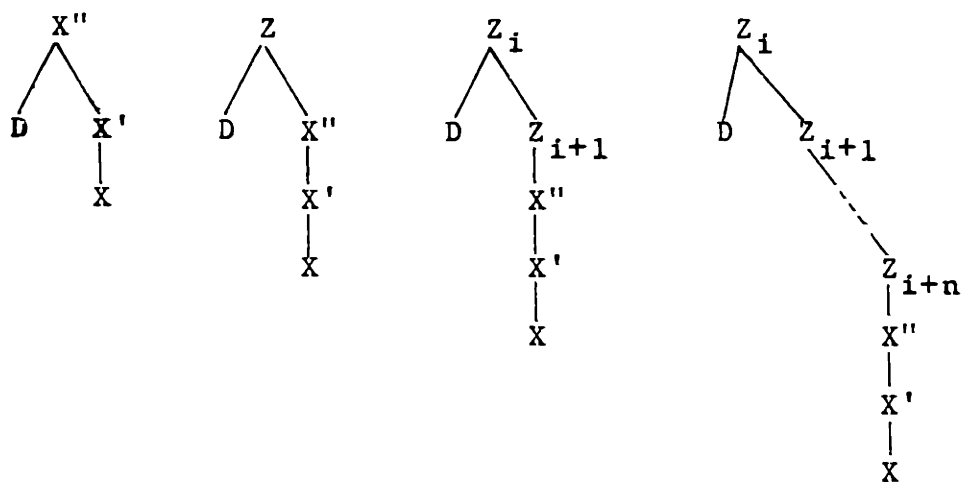
Sentences exemplifying (i)-(v) are

- i) a) They wêre ìn à colléctive.
- b) Lou wàs ùnder thê wéather.
- ii) a) They wanted very much fôr Glàdys tò enjoy dancing.
- b) We were glad thât yôur pèople came to the SDS convention.

- c) It was bigger than last year's was.
- iii) a) Who has Otto Hécker been talking to?
 b) Why have those people left?
- iv) a) They stayed till the cops came.
 b) While Silber fussed, the students were organizing.
- v) a) They knew that in a short while more would be involved.
 b) The prisoners feared that after the press left the shit would come down.

In all these sentences, the monosyllabic dependents of a head are deprived of stress.

All the conditions I, IIa, and IIb could be collapsed into one. According to these conditions, a non-lexical item appearing in the following configurations will be the dependent of the head X:



as long as no non-dependent intervenes between D and X . We are now in a position to give a final definition of the notion dependent of a head.

Condition Σ

D is a dependent of a head X if

- 1) D is a non-lexical 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 non-dependents in the terminal string.

An amendment must be made to the Monosyllable Rule. So far I have defined the relation dependent of a head and have said that the stress of a monosyllabic dependent reduces to zero when it precedes its head. It turns out that this formulation is inadequate, for the stress will reduce in a string of dependents, except for the rightmost one, when the head is absent from surface structure. Observe the following examples:

I asked whose house the party's at ___ this week. (B-54)

Do you know which doors those keys are for ___ ? [ər]

It was longer than the other one could have been ___. [kədə]

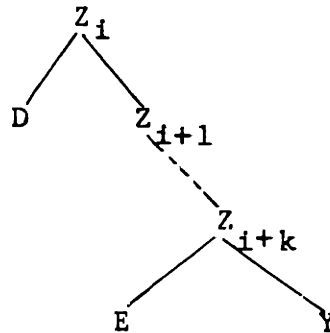
Shell's been digging deeper than Gulf's been ___.

Only the rightmost non-lexical items (at, for, been and been, respectively) retain stress and have vowels impervious to reduction. In order that stress get reduced on the non-lexical items that are not final in a string, I will modify the Monosyllable Rule to say that

- (φ') A monosyllabic dependent loses its stress when it precedes its head or a co-dependent in surface structure.

The notion "co-dependent" will be defined as follows:

D is a co-dependent of E if D and E are dependents and are directly dominated by the same node Z_i or appear in the structural configuration



where they are not separated by any non-dependents in the terminal string.

2.1.2 Its formalization

Recall that according to SPE-I, non-lexical categories are not supplied with word boundaries, while phrase categories and lexical categories are. Given this convention, the Monosyllable Rule can be formalized as below:

(Provisional)

$$V \rightarrow [-\text{stress}] / [\#X[C_0_C_0] Y [(\#)\dots\acute{V}\dots(\#)] Z\#]$$

$$\text{Condition: } Y \neq R[\#T\#]U$$

$[C_0VC_0]$ is the affected monosyllabic dependent. $[(\#)\dots\acute{V}\dots(\#)]$ is either its head or a co-dependent, the variable material identified by '...' being phonological segments. The condition on Y assures that no non-dependent intervenes between the monosyllable and its head or co-dependent. Thus, clauses (1), (2) and (4) of Condition Σ defining a dependent of a head, and the

co-dependent amendment as well, are incorporated into the formulation of the Monosyllable Rule. In order to incorporate clause (3) of Condition Σ into this formulation, one would have to add the condition that $X \neq G[\# \text{ and } Y \neq \#]H$. I will not bother to add this condition, because a minor modification in the formulation of the Monosyllable Rule will make this condition unnecessary. This modification concerns the location of the variable between the monosyllable and the stressed word to its right. By giving the formulation as follows,

(Provisional)

$$[\#W[C_0 \text{ __ } C_0] [(\#)X \hat{V} Y(\#)]Z\#]$$

we allow clause (3) of Condition Σ to be included in the rule: the non-lexical category and the category to its right must be sisters.

A further and final refinement of the rule is possible, given that the Monosyllable Rule operates on surface structure and therefore is preceded by the application of the convention SPE-II which deletes superfluous word boundaries. (SPE-II should be considered the last rule of the syntax--in any language. It therefore applies before the Monosyllable Rule, which, being a phonological rule which operates on surface structure, follows all transformational rules working to create that surface structure.) SPE-II assures that the only sequences of two word boundaries in surface structure are located in the following configurations of labelled bracketing:

$$\begin{array}{ccc} \#] [\# & & \#[\# \\ & & S'S \\ & & \#]\#] \\ & & S S' \end{array}$$

This being the case, in surface structure, any bracket $[\#_Z$, where $Z \neq S'$, can be contiguous on the right only with labelled brackets having no associated word boundaries, i.e., $[\#_Z[[[...]$. Similarly, one will find only $...]]]#_Z$, where $Z \neq S'$. Hence, the condition on the variable X in the Monosyllable Rule can be taken to read $X \neq T\#\#U$. This is equivalent to the former statement $X \neq R[\#T\#]U$ inasmuch as the presence of $[\#T\#]$ would require that $U = [\#G$; that is, if there were $[\#T\#]$ in X, there would be $\#\#$ in X. So let the final formulation of the Monosyllable Rule be:

Monosyllable Rule

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

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

2.2 The Theory of Traces

2.2.1 Their effect on the Monosyllable Rule

The discussion must turn now to a whole class of sentences of the sort discussed by King (1970)(K), Bresnan (1971b)(B), Lakoff (1970)(L), Baker (1971), and Zwicky (1970). The following are typical:

- 1) a) Someday he'd like to be what you àre ___ now. (K-10)
 Whose children do you think those àre ___ over there?
 (B-38)
- b) I asked where she ìs ___ now. (B-53)
 I wonder how much wine there ìs ___ in the bottle.
 (L-18a)
- Sam's on the job in the mornings and Harry ìs ___ in the afternoons. (L-18b)

The copulas in the sentences in (1a) have only the representation [àr], and not *[ə̄r] or *[r]. The copulas of (1b) have only the representations [ìz], and neither *[īz] nor *[z]. One must also consider sentences of the type in (2), where the Modal or Auxiliary also has its unreduced strong form with some degree of stress:

- 2) You can dance in New York, and you càn ___ in Paris, but you'll never dance in L.A.
- Some had left at 11:00 and certain others hàd ___ at midnight, but at 2:00 a.m. there were still 20 left.
- Mary will eat more at breakfast than Sarah wìll ___ at dinner.
- We had attended more meetings in one week than we hàd ___ during the entire preceding year.

They were building more apartments in the country than they wère ___ in the city.

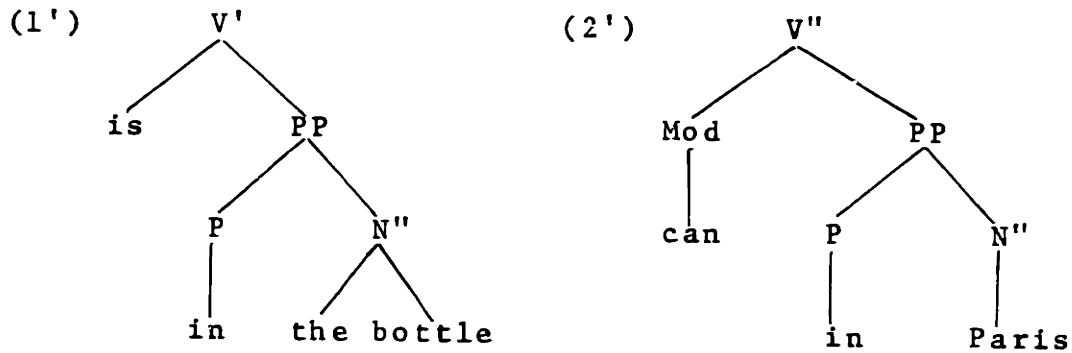
The sentences in (1) contain forms of the copula BE whose predicates have been either moved away (by Relative Clause Formation or Question Formation) or Deleted (by VP-Deletion). Those in (2) have Auxiliaries or Modals whose head verb has been deleted (by VP-Deletion or Comparative Deletion). In both sets, the copula, Aux or Modal precedes a time or locative adverbial in surface structure. Yet in none of these sentences are these non-lexical elements stressless. The Monosyllable Rule can't have operated on them. But then these forms must not be definable as syntactic dependents with the adverbials as their heads, that is, the sequences copula-adverbial and Aux-adverbial or Modal-adverbial must not meet the structural description of the Monosyllable Rule.

Given the current state of syntactic theory, however, the sentences in (1) and (2) could very well meet the structural description of the Monosyllable Rule. For example, if one were to claim that locative and time adverbials were generated as the rightmost prepositional phrase by the following two base rules:

$$(p) \quad V' \rightarrow BE \left\{ \begin{array}{l} PP \\ A'' \\ N'' \end{array} \right\} (PP)$$

$$(q) \quad V'' \rightarrow [Spec, V'] V' (PP)$$

then the sentences in (1) and (2) would have derived surface structures of which (1') and (2') are representative:



In (1') the predicate would have been deleted or extracted, and in (2') the main verb would have been deleted. These surface structures, whose labelled bracketings are (1'') and (2'') do indeed meet the structural description of the Monosyllable Rule:

(1'') [# [is] [# [in] [# [the] [#bottle]]]] #]
 V' PP V'

(2'') [# [can] [# [in] [#Paris]] #]
 V'' PP

Given rules (p) and (q) the monosyllabic non-lexical items in (1') and (2') are directly dominated by the nodes which dominate the prepositional phrases. If, however, the prepositional phrases were generated not in V' or V'', but as daughters to S, then the monosyllables would not be affected by the Monosyllable Rule, their labelled bracketings being something like the following:

[# ... [# [[is]] #] [# ...] ... #]
 S V''V' V'V'' PP PP S

[# ... [# [can] #] [# ...] ... #]
 S V'' V'' PP PP S

Therefore, since the Monosyllable Rule does not operate on (1'') and (2''), either the phrase structure rules (p) and (q) which allow these surface structures to be generated are wrong,

or some mechanism must be added to linguistic theory which allows for the blocking of phonological rules when their environments contain a "site" from which a constituent has been removed by either deletion or extraction. I think that the most promising approach is the latter one, though I do also believe that the phrase structure rules (p) and (q) are wrong.

Yet before this latter approach is developed, some additional relevant cases must be discussed. In addition to the sentences in (1) and (2), the sentences in (3) and (4) are also problematic for the Monosyllable Rule. In (3), deletion processes have removed a head verb, leaving an Aux or Modal in a position preceding the complement of the verb in surface structure:

3) They would take more from Belia Abzug than they would ___ from him.

Sam's run longer after that cat than you have ___ after that dog.

This won't have the effect on us that it will ___ on you. (B-36)

These non-lexical elements bear some degree of stress and their vowels cannot reduce. Similarly, in (4) the various forms of the copula, retaining some stress, appear in their strong forms. The predicate adjectives of the sentences in (4a) have been moved out (by Relative Clause Formation and Adjective Topicalization), while the predicate adjectives of the sentences in (4b) have been deleted (by Comparative Deletion):

4) a) I can't get over how gentle they are ___ with you. (K-11)

Ready I am ___ to help you. (L-a)

b) Mary's more adept at poker than John is ___ at pool.
(B-37)

Jane's more involved in politics than you are ___ in organic foods.

The copula *is* left in surface structure in a position preceding the complement of the adjective. Evidently, the Monosyllable Rule must be prevented from applying to these non-lexical items in (3) and (4) as well.

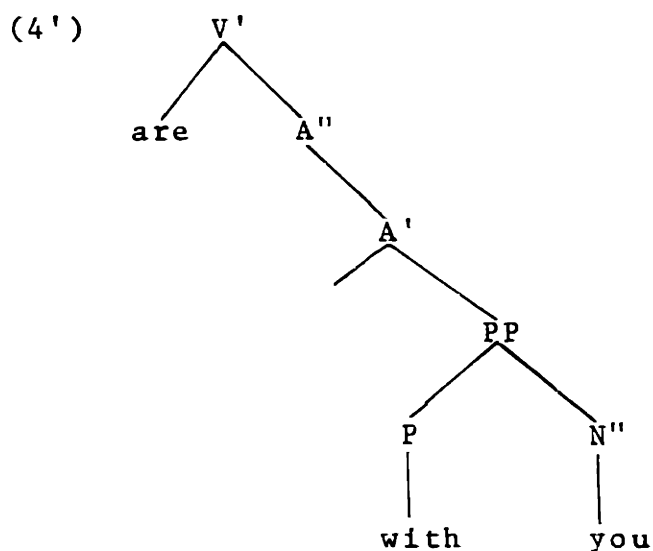
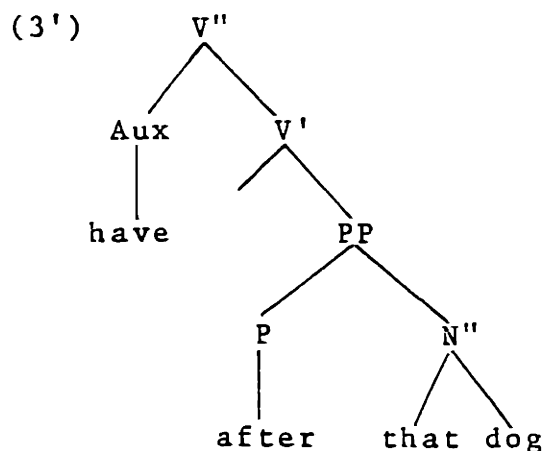
The verb complements of (3) are generated by the base rule (r)

(r) $V' \rightarrow V (N'') (PP)$

and the adjective complements by the rule (s),

(s) $A' \rightarrow A (PP)$

Thus, the derived structures of the sentence types in (3) and (4) are, for example,



And, indeed, these structures, represented by the labelled bracketings (3'') and (4''), do meet the structural description of the Monosyllable Rule:

(3") [# [have] [# [[after] [#that dog]]]]#
 V" V'PP N"

(4") [# [are] [# [[with] [#you]]]]#
 V' A"A'PP N"

In these cases, there is no doubt that rules resembling (r) and (s) are responsible for generating the verb and adjective phrases of (3) and (4). Therefore, one must accept that something is actually blocking the operation of the Monosyllable Rule.

The obvious observation to make in all these cases, (1) through (4), is that the item which would have been the head of the monosyllabic syntactic dependent has been removed by some transformational process. More simply, one can say that a constituent has been removed from the right of a non-lexical item, and thus that that non-lexical item precedes a "removal site" in surface structure. (I use the term "removal site" instead of the term "deletion site" that has been employed in the earlier literature on this subject because it is neutral. They may be either deletion or extraction (movement) transformations which remove a constituent from a "removal site".) Apparently, this "removal site" has an inhibitory effect on the Monosyllable Rule. The Monosyllable Rule does not destress non-lexical items preceding "removal sites". The problem, therefore, is how to formally represent the effect of the removal sites on the operation of a phonological rule.

It was for just these cases of English that Brame and Baker (1972) made their suggestion about leaving "a special boundary symbol at the site of the missing constituent". In the

Introduction, I proposed the following convention, developing this idea of Brame and Baker's:

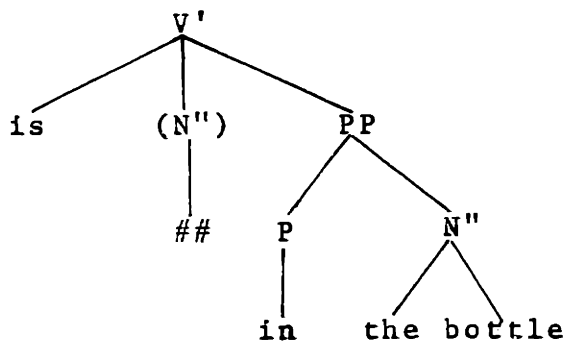
The Traces Convention

Transformations which move or delete constituents do not move or delete the word boundaries associated with these constituents.

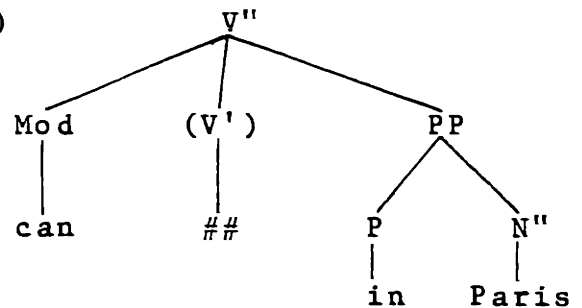
I call these residual word boundaries traces and this convention is therefore named the Traces Convention. These word boundary traces are the formal representation of removal sites. They give to the phonological component the information that in the syntactic component a constituent was either moved or deleted from the place they now occupy in surface structure.

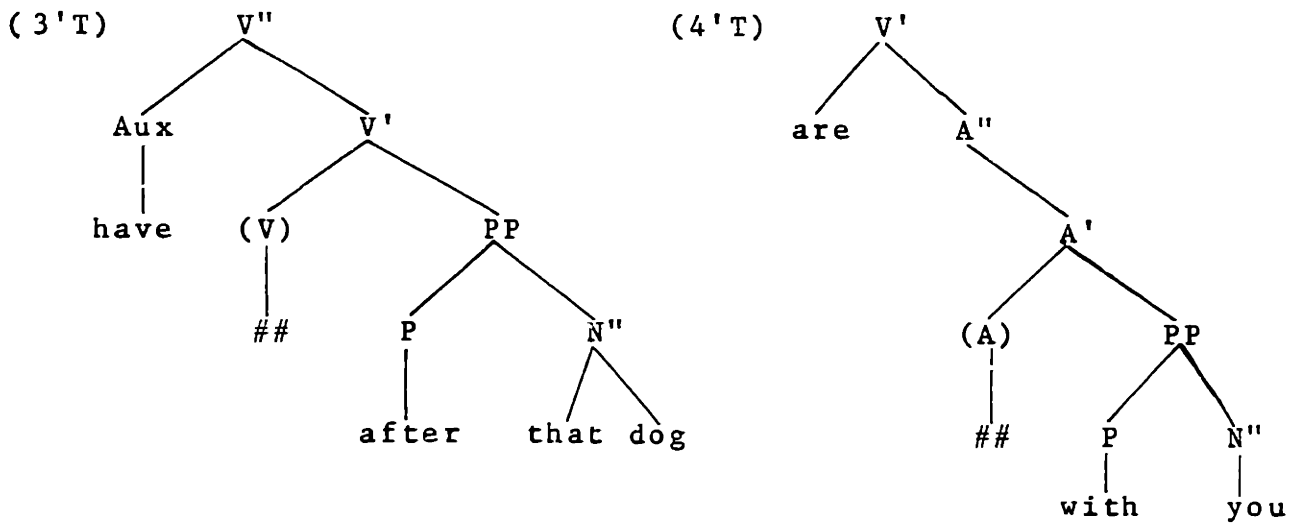
I will now show that the presence of word boundary traces in the surface structure is sufficient to block the operation of the Monosyllable Rule in the appropriate cases. Consider the trees (1'T), (2'T), (3'T) and (4'T) which are identical to the trees (1'), (2'), (3') and (4') except for the presence of traces in the position in the tree from which a constituent was deleted or extracted at an earlier stage.

(1'T)



(2'T)





I put parentheses around the nodes which exclusively dominate the traces to indicate that I am not committed to the claim that the nodes themselves are present, along with the traces, in surface structure. As far as phonological matters are concerned, the node labels are superfluous; the two word boundaries are themselves sufficient to block the phonological processes.

Notice now that the labelled bracketings (1''T), (2''T), (3''T) and (4''T) corresponding to the trees above do not meet the structural description of the Monosyllable Rule. The traces are in essence non-dependents and their presence in the string between the monosyllabic non-lexical item and a stressed item that follows blocks the destressing rule.

- (1''T) [# [is] [##] [# [in] [# the bottle]]#]
V' PP N''
- (2''T) [# [can] [##] [# [in] [# Paris]]#]
V'' PP N''
- (3''T) [# [have] [# [##] [# [after] [# that dog]]]#]
V'' V' PP N''
- (4''T) [# [are] [# [##] [# [with] [# you]]]]#]
V' A'' A' PP N''

The is, can, have and are of these phrases will remain stressed because of the ## which intervenes between them and what follows.¹⁰

(Note that even if SPE-II were to erase one of the word boundaries from [##] in (3''T) or (4''T), the resulting strings would be ...[# [#][#[after]... and ... [# [[#][#[with]...., respectively.
 V' A''A'

There would still be at least the two #'s necessary to block the rule.) Allow me to repeat the Monosyllable Rule here for the reader's convenience:

$$V \rightarrow [-\text{stress}] / [\# W [C_o \text{ __ } C_o] [(\#) X \hat{V} Y (\#)] Z \#]$$

Condition: $X \neq T##U$

Quite obviously, the theory of traces gives just the right result for the sentences in (1), (2), (3) and (4).

For sentences containing prepositions whose objects have been deleted, as in (5), the theory of traces is not essential in the blocking of the Monosyllable Rule, which, in the sentences in (6), operates to destress the prepositions.

5) Who was the strike led b[̂]y in Philadelphia?

I left the meeting she stayed àt till ten.

It's the woman we look t[̂]o for help.

6) It was led b[̂]y Helga Shimmel in Philadelphia.

She stayed [̂]at the meeting till ten.

We looked t[̂]o that woman for help.

The derived structure of the prepositional phrases in (5) is representable by the labelled bracketing (5''):

(5'') ...[# [$\left. \begin{array}{c} \text{by} \\ \text{at} \\ \text{to} \end{array} \right\}$] [##]#] [#
 PP PP

Obviously, these prepositions will not be destressed by the Monosyllable Rule in such a context. Yet, even if there were no traces, the prepositions would not be susceptible to the Monosyllable Rule, as (5''') shows:

(5''') ...[# [$\left. \begin{array}{c} \text{by} \\ \text{at} \\ \text{to} \end{array} \right\}$]#] [#
 PP PP

The Monosyllable Rule cannot operate on a preposition which itself is a prepositional phrase, bounded by brackets accompanied by word boundaries, [# [Prep]#].

Notice that the inability of the Monosyllable Rule to operate on a structure like (5''') can immediately explain why verb particles are never stressless, if one accepts Emonds' (1970a, 1970b) analysis of particles as intransitive prepositions which are prepositional phrases. The sentences (7) and (8), where the prepositional particle always carries some degree of stress, would, according to Emonds, have the trees (7') and (8').

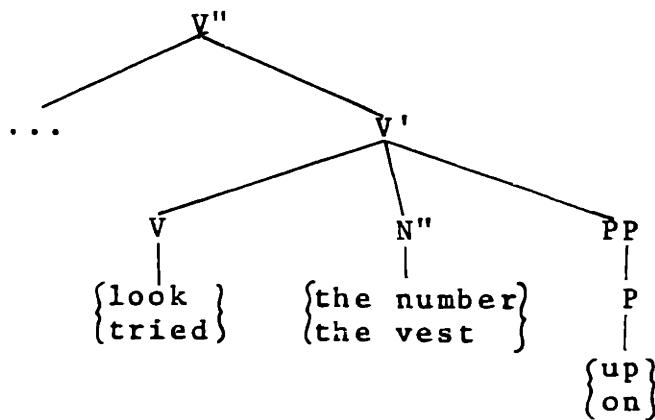
7) Will you lòok the nùmer úp.

Lou trièd the vèst ón. (or: the vést òn)

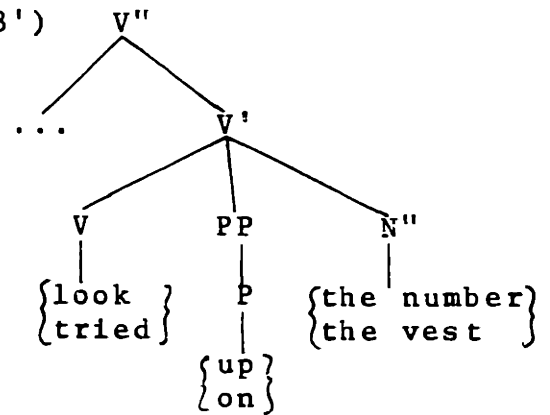
8) Will you lòok ùp the nùmber.

Lou trièd òn the vést.

(7')



(8')



If a particle were not dominated by PP then it would be destressed by the Monosyllable Rule when it appeared in structures comparable to (8') where it precedes a constituent which is its sister--just as a preposition destresses when followed by its object in a prepositional phrase. Evidently Emonds' analysis, motivated on exclusively syntactic grounds, has just the right consequences for the phonology of particles.

2.2.2 Further remarks

It is not the case that the deletion or extraction of just any constituent produces traces which block the operation of phonological rules. It has been pointed out by Baker (1971) that the movement of the auxiliary in Subject-Auxiliary Inversion does not create a removal site which inhibits stress reduction of a pronoun preceding the site. Compare the sentences (9) and (10):

9) It's working well these days. [it̩ ɪz], [ɪts]

10) Is it working well these days? [ɪz ɪt̩], [zɪt̩]

In (9) and (10) both the auxiliary is and the pronoun it are stressless. Yet notice that in (10), though it precedes the

site from which is was extracted, the Monosyllable Rule has operated to destress it. (In §3.2.4 of this chapter I will show that personal pronouns which appear in the context $\begin{matrix} \#[\text{Pronoun}]\# \\ N'' \qquad \qquad N'' \end{matrix}$ are given the surface structure $\begin{matrix} [[\text{Pronoun}]] \\ N'' \qquad \qquad N'' \end{matrix}$, without #'s, through the operation of a readjustment rule. Consequently, they are susceptible to the Monosyllable Rule.) The removal of the auxiliary cannot have left behind traces which would block the Monosyllable Rule. In fact, the traces theory outlined in the Introduction makes this very prediction.

Recall that according to the Traces Convention, transformations which move or delete constituents do not move or delete the word boundaries associated with these constituents. Recall, too, that according to SPE-I non-lexical items do not have word boundaries associated with them. Consequently, the removal of an Auxiliary, which has no word boundaries to begin with, will not leave behind any word boundary traces.

The fact that Subject-Auxiliary Inversion does not create a phonologically relevant "removal site" thus provides evidence that the formalization of "removal sites" by means of word boundary traces that is proposed in this study is correct. It is evidence that the formalization of "removal sites" should be linked to the universal convention SPE-I which distinguishes between lexical and non-lexical items. The essential link is provided by the Traces Convention.

Yet another consideration also shows how interesting the

traces theory is. Notice that traces block the application of phonological rules only when they appear in the environment of those rules. In this way, the effects of traces are extremely local. Look for example at sentences (11) and (12).

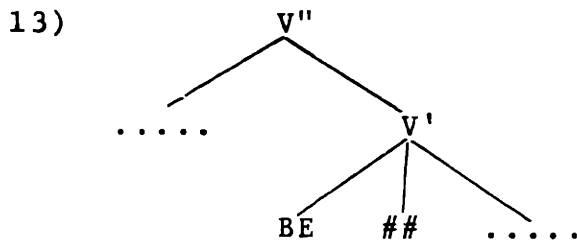
11) Do you realize how brutal the cops àre ## in Boston?

12) How brutal àre the cops ## in Boston?

In (11) are appears in its strong form, since it precedes a removal site represented by traces, and is thus impervious to the Monosyllabic Rule. In (12), where it has been moved away from the traces and put into an environment where it is reduceable by the Monosyllabic Rule, are takes on its weak form. Obviously, the fact that are preceded traces (=a removal site) at an earlier stage in the derivation has no effect on its ability to be de-stressed later on. Traces simply have no effect on the operation of phonological rules whose domains do not include them.

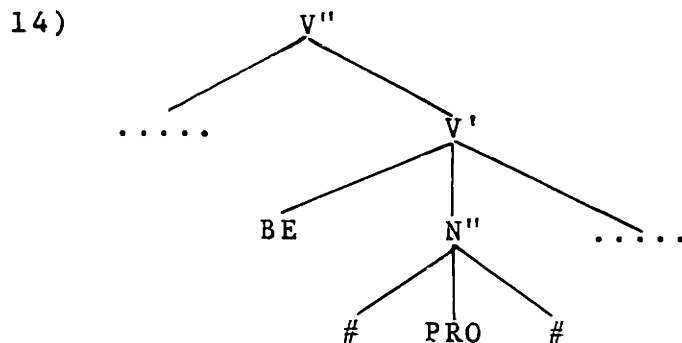
2.2.3 The syntax of traces

I have not committed myself to anything but the presence of word boundary traces in derived structure after a transformation extracts or deletes a constituent (that is, a constituent which has #'s in the first place). Thus, according to what's been assumed thus far, the derived structure of a verb phrase after the deletion of an A'' or N'' predicate would be (13):



Recent work in syntax, which I will describe briefly below, seems to indicate that certain transformations which operate on noun phrases leave behind a pronominal element in that place in the tree from which the noun phrase was moved or deleted. This pronominal element is subsequently referred to by other transformational processes.

Let us suppose, then, that traces are not simply a pair of #'s. Suppose instead that they are still dominated by their original node-parent, and that in the case of certain transformations operating on noun phrases a PRO element is part of the trace as well. With this extension, a noun phrase trace left in a structure comparable to (13) would have the form of (14):



In a recent paper which bears on this topic, Chomsky (1971) elaborates a quite general condition on transformations, the specified subject condition:

In a structure of the form (α), no rule can involve X and Y if Z is the subject of the phrase WYV and Z is not controlled by the category containing X:

(α) ...X...[...Z...WYV...]...

(p. 48)

This condition permits one to explain the various peculiarities of sentences containing each and (the) other. For example, it predicts that (15), whose underlying representation is, roughly, (16), will be grammatical, while (17), which corresponds to the underlying (18), is ungrammatical.

15) We promised Bill to kill each other.

16) We each promised Bill [COMP PRO to kill the other(s)]

17) *We persuaded Bill to kill each other.

18) We each persuaded Bill [COMP PRO to kill the other(s)]

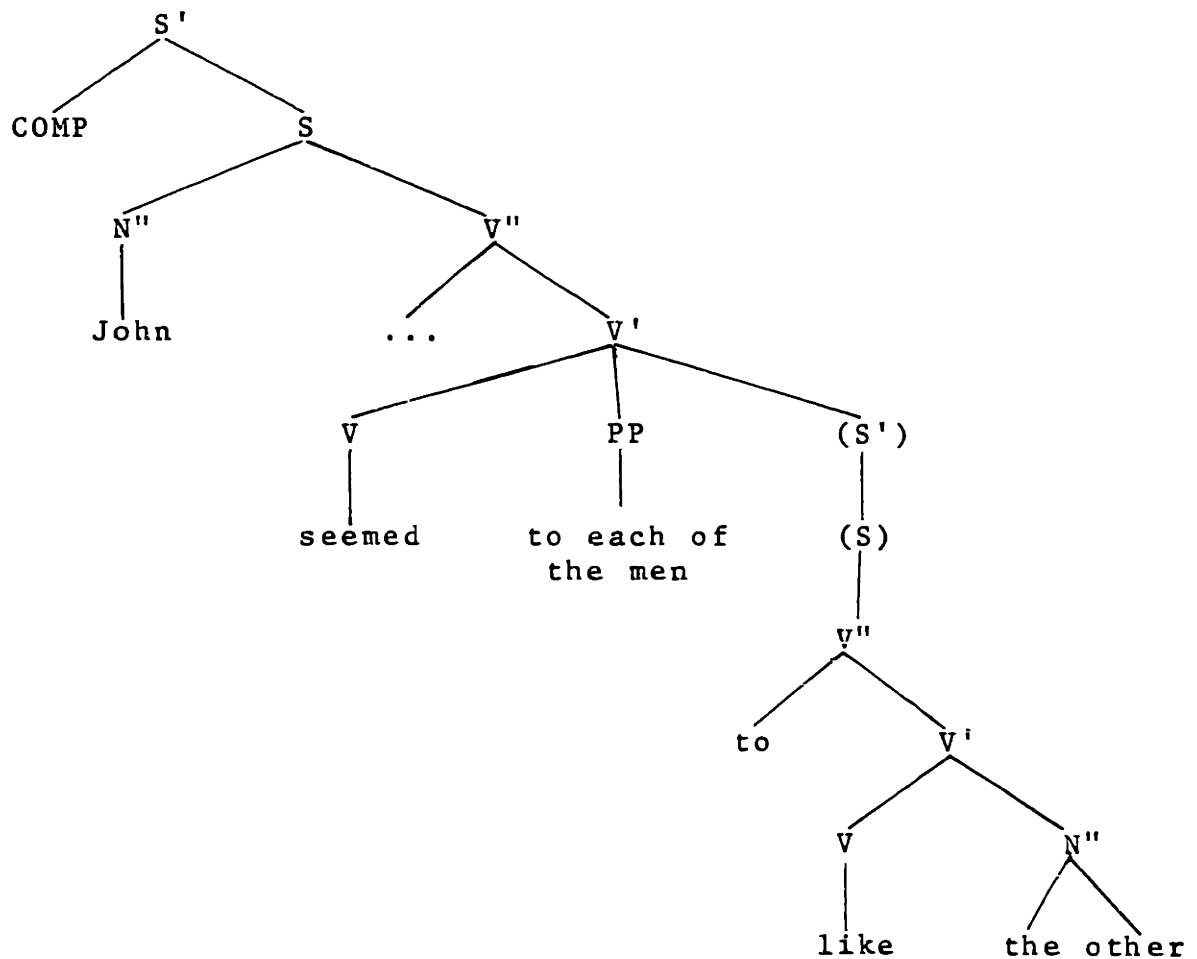
(17) is ungrammatical because according to the specified subject condition each cannot move over the subject in the embedded sentence if that subject is not controlled by the noun phrase where the each originated.

Relevant to the question of traces is the following case. Chomsky claims that a sentence like (19)

19) *John seemed to the men to like each other.

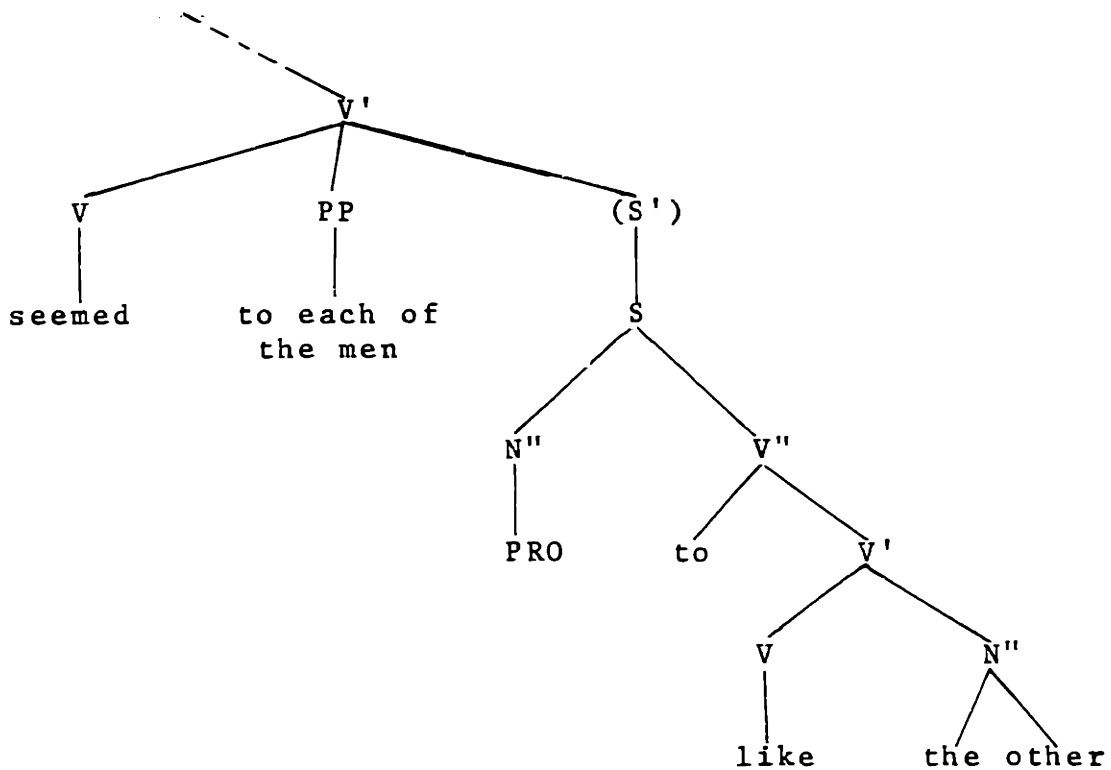
would be generable as a grammatical sentence of the language if its derived structure after Subject-Raising¹¹ were simply (20):

(20)



He claims that the transformation of each-movement would simply attach each to the other, not violating any condition on transformations. But he adds that this operation of each-movement can be blocked if the transformation of Subject-Raising leaves behind a pronominal trace, where the derived tree would be, in part, (21):

(21)



With this trace left as a subject in the lower S, each-movement is blocked by the specified subject constraint. Here the trace PRO is, in an obvious sense, controlled by the raised subject of which it is a copy. It is not under the control of the N'' in the matrix S upon which each-movement would operate.

In another recent study, Wasow (1972) posits the existence of such traces in order to solve certain ordering paradoxes in the description of English pronominalization. The problem facing Wasow is as follows. The underlined noun phrases may be co-referential in (22) but not in (23):

22) Which of the men Bill saw did he hit?

23) *He hit one of the men that Bill saw.

This indicates that Question Formation precedes Pronominalization, or Co-reference Marking. But the sentences (24) and (25) seem to

show that the opposite ordering of these rules is necessary:

24) *Who did he say Mary kissed?

25) Who said Mary kissed him?

Wasow's theory is that Question Formation leaves behind a trace, a copy which is obligatorily anaphoric with the wh-question word. The sentence (24) would actually have the structure (24'):

24') Who_i did he_i say Mary kissed NP_i

Now, Wasow has proposed a Transitivity Condition to the effect that if A and B are anaphoric and B and C are anaphoric, then A and C are anaphoric. The trace and the question word who_i must be anaphoric (by his convention on traces). Then if who_i is to be anaphoric with he_i, by the Transitivity Condition, he_i must be anaphoric with the trace. And if the trace NP_i is marked as [-PRO] and is therefore the antecedent of the pronoun he_i, Wasow argues, then that anaphoric relation between the trace and he_i will be ruled out for the same reason that the anaphoric relation in (23) is ruled out. The Transitivity Condition would be violated, and (24) would be marked ungrammatical.

It is not only the rule of Question Formation which would leave behind a trace, but, if the claim is to have any value, all movement transformations. Wasow points out that the ungrammatical sentences produced by Clefting and Topicalization can be explained in the same way as (24). One finds the following pairs:

26) It was John_i that said that Mary kissed him_i.

27) *It was John_i that he_i said Mary kissed.

28) John_i, Mary claimed said Jane kissed him_i.

29) *John_i, Mary claimed he_i said Jane kissed.

If (27) and (29) were provided with [-PRO] noun phrase traces, then the conditions on anaphora, combined with the Transitivity Condition, would rule the sentences out.

Finally, Perlmutter (1972) claims that in French, Portuguese, Arabic, Japanese and Turkish (i.e., universally) transformations like Relative Clause Formation and Question Formation leave behind a "shadow pronoun" which is a pronominal copy of the noun phrase being removed from the sentence. In all these languages--except for Arabic and, rarely, Japanese--the shadow pronoun does not appear in surface structure. So he posits a rule of Shadow Pronoun Deletion. Perlmutter also claims that transformations like Relative Clause Formation and Question Formation which move noun phrases are not themselves subject to the island constraints of Ross (1967). Instead, he claims, it is the rule of Shadow Deletion which is sensitive to island constraints.

One might take these results from syntax to be confirming evidence for the theory of traces that I have been proposing in this study. I have reservations, though, about considering the pronominal traces which are motivated by the syntax and the word boundary traces which block phonological rules to be one and the same thing. First of all, the only evidence that transformations leave behind some syntactic object as a trace (besides #'s) is for noun phrases. Yet the word boundary traces are left behind by transformations removing other categories as well--verb, verb

phrase, adjective, adjective phrase. Second, the authors of all these papers in syntax presume that the pronominal element is deleted at some point in the syntactic derivation (presumably after the rules which need to refer to it have applied). Thus, according to them, this pronominal trace is not present in surface structure. Yet it is in surface structure, and only in surface structure, that the effect of the word boundary traces is felt. Pronominal traces would play their role only in the syntax, while word boundary traces interact only with phonological processes.

It must be recognized, I think, that the theory of word boundary traces is quite independent of Chomsky's PRO, Wasow's pronominal element, and Perlmutter's shadow pronouns.

2.3 Alternatives to the Monosyllable Rule

2.3.1 Cliticization: Bresnan's theory

The Monosyllable Rule, buttressed by the theory of traces, provides an entirely general account of the reduction (and non-reduction) of stress on the non-lexical categories of English sentences. The rule operates on surface structure. It has access only to information contained in surface structure. The Monosyllable Rule therefore differs from recent proposals by King (1970), Lakoff (1970), Zwicky (1970) and Bresnan (1971b), who sought to employ various syntactic mechanisms and appeal to other levels of the syntactic component in accounting for the

stress reduction (and non-reduction) of the English auxiliary. I will turn now to a discussion of these other proposals, and will show why the Monosyllable Rule hypothesis is preferable to them.

The first point is, of course, that the Monosyllable Rule can account for the problematic presence of stress on the Auxiliary (and on Prepositions) in all the sentences that were examined in the articles of King, Lakoff and Bresnan. In the last section, I mentioned at appropriate points which were the sentence-types which preoccupied these authors, and I will give a few additional examples here:

30) Titus is more proud of his son than he is ___ of his
daughter. [ɪz]

What fantastic backgammon players they are. [àr]

Linda can drink more wine than Jane can ___ beer. [kæn]

Do you know where the meeting is ___ this afternoon?
[ɪz]

They've been at it for ten years, and John has ___
for twelve. [hæz]

King was the first to point out the facts about these sentences, noticing that auxiliaries fail to reduce in stress when they precede a site from which an element has been moved or deleted, as well as when they are phrase-final. Lakoff picked up on King's remarks, and, limiting himself to a discussion of BE, made a global rule to explain the phenomenon:

If, at any point in the syntax, a constituent immediately following be is deleted, then, later in the phonology, that be cannot undergo stress-lowering (and subsequent contraction). (p. 632)

Bresnan takes quite a different approach, and suggests that there is a cyclic transformation which optionally procliticizes the auxiliary to what follows, thus causing it to lose stress. She argues that were the stress-reducing procliticization to have operated in the sentences in (30), they could not have been derived; in these sentences there has been no procliticization, hence no stress reduction. Zwicky takes the controversial position that auxiliaries may be stressless before removal sites, and argues therefore that the inhibitory effect of removal sites on the "contraction" of auxiliaries is direct, unmediated by stress considerations. Baker (1971) argues very effectively against this position, so I will not go into Zwicky's claim here. I do, however, make extensive reference to other parts of Zwicky's article, in particular his rules for the vowel and glide elision in the unstressed auxiliary. His rules operate in the phonology, after the destressing and the reduction of the auxiliary vowel to /ə/ (or /ɪ/, as the case may be).

I would like first to discuss Bresnan's proposal, which is extremely thought-provoking. Her basic innovation is the suggestion that clitic rules exist in English. In the following parts of this chapter I make extensive use of this idea and show that encliticizing transformations make an essential contribution to the understanding of certain low-level stress contours on

non-lexical categories. Bresnan has argued for a rule encliticizing the particle to to a preceding verb, accounting for wanna, hafta, gonna, etc., and this will be discussed in §3.1.3. At present, though, I find the existing arguments for procliticizing rules in English unconvincing, and I would like to argue against Bresnan's Tense Contraction transformation.

Essentially, this rule operates only on tensed auxiliaries. It procliticizes an auxiliary to what follows, so the derived structure of John's meditating would be [[John] ['s meditating]]. Bresnan says the rule is only optional. To show that it is a procliticization (or rightward-sensitive) and not an encliticization (or leftward-sensitive) rule which reduces the stress on the auxiliary, she gives sentences of the following sort:

- 31) a) Here's something that, I think, ^owill surprise you. [ə^ol]
 b) *Here's something that ^owill, I think, surprise you.*[ə^ol]
 c) Here's something that w^lill, I think, surprise you. [w^lɪl]
- 32) a) What I say, my dear, ^ocould interest you quite profoundly.
[kə^od]
 b) *What I say ^ocould, my dear, interest you quite profoundly.
*[kə^od]
 c) What I say c^ould, my dear, interest you quite profoundly.
[k^ovd]
- 33) a) John and Harry, they say, ^oare true bastards. [ə^or]
 b) *John and Harry ^oare, they say, true bastards.*[ə^or]
 c) John and Harry ^oare, they say, true bastards. [ə^or]

- 34) a) The Vietnamese, it seems, c^oan survive the most terroris-
tic attacks on their population. [kɲ]
- b) *The Vietnamese c^oan, it seems, survive the most terroris-
tic attacks on their population. *[kɲ]
- c) The Vietnamese can, it seems, survive the most terroris-
tic attacks on their population. [kɛn]

The insertion of a parenthetical between the subject and the auxiliary in the (a)-sentences in no way inhibits stress reduction of the auxiliary. This is predictable within Bresnan's analysis and within the Monosyllable Rule analysis I am defending. If there were a rule encliticizing the auxiliary, the auxiliaries in weak form in the (b)-sentences should have been acceptable, just as the negative particle not, which, it is argued (cf. §3.1.1 and elsewhere in the transformational literature), is an enclitic, can have a reduced form before parentheticals:¹²

- 35) This isn't, I believe, too surprising for you.
We haven't, if you'll recall, been here all that long.
They won't, it seems, be addressing the problem at all.

The stress level of the auxiliary in the (c)-sentences and the ungrammaticality of the (b)-sentences follow from the Monosyllable Rule analysis. Parenthetical insertion sufficiently alters the derived phrase structure so that the auxiliary or modal cannot be defined as the dependent of any head. The stress level in the (c)-sentences would possibly be explicable in a similar way in Bresnan's framework.¹³ But an encliticization of the auxiliary would allow the destressing of the auxiliary in

the (c) cases--just where it shouldn't happen. It makes the wrong predictions about stress and must be rejected.

The notion that the auxiliary is encliticized to what precedes is very much alive, though, and I will continue with a critique of the encliticization approach before getting back to a further examination of Bresnan's procliticization proposal. A common objection that has been raised against Bresnan's Tense Contraction proposal, and one that I will have to deal with myself, concerns the phonological behavior of the "contracted" form of is and has: 's. The phonetic form of the "contraction" 's is determined by exactly the same principles that govern the phonetic form of the plural, the verb inflection, and the possessive s, i.e., by what the final segment of the preceding noun (or element of N") or verb is. Lakoff (1972) has given these examples:

[s]	Jack's boring.	Jack's book.	The jacks bounced.
[z]	Ted's tall.	Ted's teacher.	The Feds tried.
[ɪz]	Liz's tall.	Liz's teacher.	The fezzes turned yellow.

Since the plural and the possessive morphemes are incontestably attached to what precedes, then, certain people argue, the contracted auxiliary 's should also be attached to the preceding noun phrase, i.e., the subject noun phrase. The proponents of the encliticization of is and has thus regard the traditional orthography of, e.g., Mary's leaving, as giving the correct constituent structure of the surface structure string upon which the phonological rules operate. Both Bresnan, who is committed

to a procliticization of the auxiliary, and I, who claim that there is no cliticization either way, are committed to a surface constituent structure where the Aux is in the same major constituent as its verb or predicate, that is, where it is in a different constituent from the subject noun phrase. I think this position is correct, and will argue that the phonological behavior of the auxiliary can be explained without recourse to an Aux enclitic rule. The discussion will assume some familiarity with Zwicky (1970), "Auxiliary Reduction in English".

First of all, as Zwicky was careful to point out, only reduced is and has, i.e., /ɪz/ and /əz/, show any resemblance to inflections of the noun or verb in their phonological comportment. The auxiliaries had and would have reduced forms /əd/ and /d/, but they do not alternate under the same conditions as the inflection /ɪd/~d/~t/ of the preterite. The auxiliary /d/ appears only when the preceding segment terminates in a non-consonant. This should be contrasted with the examples from the preterite below:

<u>had/would</u> ¹⁴		<u>preterite</u>	
Bob would leave	[əd]	She bobbed her hair	[d]
Trash had collected	"	They trashed the bank	[t]
It'd been a long ride	"	John pitted the cherries	[ɪd]
Sam would like to speak	"	The door slammed	[d]
I'd won another	[d]	They eyed one another	"
Mar'd climbed the hill	?"	They dared to climb up	"

In the preterite ending, the /ɪ/ is present only when the stem ends in a coronal stop. If the auxiliaries had and would were to encliticize to what precedes, as is proposed for is and has, the rules governing the presence and absence of /ɪ/ would still have to differentiate the auxiliary [əd] from the other inflectional morphemes, singling it out for special treatment. This suggests to me that it would only complicate matters if had and would were to be encliticized.

The auxiliaries will, have, am and are which may also lose their vowels (after /w/ and /h/ deletion, of course) are subject to far more severe limitations than the others. Zwicky shows that the vowel of these forms will delete only after a vowel in the preceding word and then only if that vowel is contained in a personal pronoun which is alone in the noun phrase. For example, Aux Reduction operates in he'll, we've, I'm, they're, you'll, etc., and in who'll go, why've you done that, How'm I to know, who're you seeing, but not in *He and I'll go, *John and you've been there, *The people who saw you're there (where you is the object of see), etc. Also, Aux Reduction of these forms is impossible after a full noun phrase. The Aux in Ray'll go, though written as a contraction, is pronounced as [əɪ], not [ɪ]. This constraint on Aux Reduction will be discussed in detail in the section on pronouns (§3.2.4). Suffice it to say here that the phonological behavior of the class will, have, am, are, provides no particular motivation for an enclitic rule for the Aux.

The second point I'd like to make is that the phonological

characteristics shared by is, has, the plural s, the possessive s and the third person present indicative s are not typical "word-internal" consonant behavior. The underlying /z/ of all these forms assimilates in voicing to what precedes it. This is the only instance of progressive voicing assimilation in the language. The overwhelming tendency, between words as well as within them, is towards the opposite, regressive assimilation:

width	/wɪd+θ/	→ [wɪtθ]
length	/lɛŋg+θ/	→ [lɛŋkθ]
have to	/hæv tuw/	→ [hæftuw]
has to	/hæz tuw/	→ [hæstuw]
newspaper	/nuzpejpər/	→ [nuspejpər]
with the flu	/wɪθ ðə flu/	→ [wɪð:ə flu]
of course	/əv kɔrs/	→ [əfkɔrs]

etc.

Moreover, the only segments affected by the progressive voicing assimilation are the single-segment morphemes -z- (and -d- in the preterite). A special rule of progressive voicing assimilation, which I shall henceforth call Morpheme Assimilation, must be written. In the case of the inflectional morphemes it could be stated as

$$\left[\begin{array}{l} +\text{coronal} \\ -\text{syllabic} \\ +\text{obstruent} \end{array} \right] \rightarrow [\alpha\text{voice}] / [\alpha\text{voice}] \# _ \#$$

It would apply in the derivations:

<u>bags</u>	<u>backs</u>	<u>climbs</u>	<u>tries</u>	<u>Bill's</u>
#bæɡ#z#	#bæk#z#	#klaɪm#z#	#traɪ#z#	#brɪl#z#
--	bæks	--	--	--

And a small modification of the rule would bring reduced is and has within its domain:

$$\left[\begin{array}{l} +\text{coronal} \\ -\text{syllabic} \\ +\text{obstruent} \end{array} \right] \rightarrow [\alpha\text{voice}] / [\alpha\text{voice}] [-\text{seg}]_0 \text{ ___ } [-\text{seg}]$$

where $[-\text{seg}]_0$ stands for any number of boundaries, '#', '+' or otherwise. This rule is obligatory. It will provide for these sorts of derivations:

<u>Peg's pouting</u>	<u>Peg's brooding</u>
#pɛɡ#z#pawt#ɪŋ#	#pɛɡ##z#brud#ɪŋ#
-----	-----
<u>Jack's pouting</u>	<u>Jack's brooding</u>
#dʒæ k##z#pawt#ɪŋ#	#dʒæ k##z#brud#ɪŋ#
dʒæ k##s#pawt#ɪŋ#	dʒæ k##s#brud#ɪŋ#
<u>Mary's pouting</u>	<u>Mary's brooding</u>
#mæri##z#pawt#ɪŋ#	#mæri##z#brud#ɪŋ#
-----	-----

One might wonder why the effect of this morpheme-particular progressive assimilation is not undone by the regressive assimilation active in English that I mentioned above. That is, what prevents [pɛgz pawtɪŋ] from converting to *[pɛgs pawtɪŋ]? Of course, by ordering the regressive (phonetic) assimilation rule before morpheme assimilation, one could always be sure that the latter's effects would not be undone. But this doesn't seem to be the correct move. The regressive assimilation rule of English is a very low-level phonetic rule whose effects become more

marked as the speed of the utterance increases. (One might call it optional.) The morpheme assimilation rule, on the other hand, goes counter to the general phonetic tendency in requiring progressive assimilation, and, what's more, is sensitive to non-phonetic information, i.e., boundaries and particular morphemes. (It is obligatory.) One would thus expect morpheme assimilation to precede such a rule as regressive assimilation. But then regressive assimilation would be in a position to change the voicing of the morphemes affected by morpheme assimilation. And, in fact, regressive assimilation can change the voicing of the auxiliary 's. Notice that in the sentence pairs Denise passed her boards and Denny's passed her boards, and Kay's called the cops and Case called the cops, the pronunciations of the subject-final sibilants may be identical, i.e., [s].¹⁵ The 's will have regressively assimilated to what followed. Yet in Jack's brooding and Peg's pouting the 's will not assimilate in voicing to what follows. I think this is simply because regressive assimilation normally operates only on a consonantal segment which is itself preceded by a vowel. This is why the 's of Denny's and Kay's may vary, but not the 's of Jack's and Peg's. Or one may express it differently, saying that one element of a consonant cluster will not assimilate in voicing to what follows it all by itself.¹⁶ This seems to be the proper generalization, since regressive assimilation is possible where neither a vowel nor a consonant precedes, i.e., in initial position:

'z Jack going; 's Pete here?
 'z Will angry; 's Kay mad?

Thus, in the environment $C_i[-\text{seg}]_o \text{ ___ } [-\text{seg}]_o C_j$, /z/ will not assimilate to C_j , though in the environment $V[-\text{seg}]_o \text{ ___ } [-\text{seg}]_o C_j$ or simply $[-\text{seg}]_o \text{ ___ } [-\text{seg}]_o C_j$, the /z/ may (optionally) assimilate to C_j by regressive assimilation. The environment of regressive assimilation is, thus, (XV) $[-\text{seg}]_o \text{ ___ } [-\text{seg}]_o C$.

In sum, the voicing assimilation of the auxiliary 's to what precedes (and what follows) can be explained without invoking an encliticization rule for Aux. The progressive assimilation rule for the s inflectional morphemes of English can, with a minor modification, be made to apply to the 's auxiliaries is and has.

A further fact lingers in the background, waiting to be described. The fact is that the maintenance of [ɹ] in the reduced auxiliary is governed by the same principles which govern the maintenance (or, perhaps, epenthesis) of [ɹ] in the inflectional endings. A [ɹ] will always intervene between the morpheme /z/ and a preceding [+coronal, +strident] segment, e.g., lurches, churches, busses, buzzes, budges, fudges, Butch's dreaming, The fuzz's screaming. Without stating whether the inflectional endings are to be underlying /ɹz/ or simply /z/, I will simply say that the rule governing the presence of [ɹ] is sensitive to the environment

$$\left[\begin{array}{l} +\text{coronal} \\ +\text{strident} \end{array} \right] [-\text{seg}]_o \text{ ___ } Z [-\text{seg}]_o$$

A morpheme /z/, be it one or two word boundaries away from the

preceding segment, will be accompanied by a [ɪ] or a [ə], should that preceding segment be of the designated class. Again, no recourse need be made to an encliticization transformation.

So, in view of the fact that there are no other facts besides the behavior of 's and the orthographic conventions themselves that provide a basis for musing that the auxiliary may be enclitic to what precedes, in view of the fact that a description of the phonology of 's can be made without encliticization, and in view of the fact that encliticization makes the wrong predictions about the stress on the auxiliary in crucial cases, I conclude that there is no encliticization of the auxiliary.

These arguments I've presented against the encliticization of the Aux do not choose between Bresnan's Tense Contraction hypothesis and my Monosyllable Rule hypothesis. I would like now to show how our proposals differ.

First, the reduction of stress on auxiliaries which precede their head (or co-dependent) is not at all optional. As I mentioned above in §1, the vowel reductions and elisions of /h/, /w/ and /ʒ/ which come about as a result of stress reduction may be optional, but the stress reduction itself is not optional. Baker and Brame (1972) raise this same point in a footnote to their discussion of the treatment of auxiliaries in Bresnan's paper:

One problem yet to be solved is raised by the fact that, for many speakers of English, Stress lowering in auxiliaries is obligatory in sentences where movement or deletion does not occur. For example, pronunciation of the following with full vowels on either or both occurrences of the auxiliary has is felt to be highly unnatural: John has come in first, but Bill has only

placed thirteenth. Within the analysis proposed here, this pronunciation is allowed, in addition to the more natural pronunciation in which both vowels are reduced.
(p. 57)

(Allow me to repeat that stress reduction does not entail vowel reduction and so the failure of vowel reduction does not indicate that an item is stressed. The possibility for vowel reduction does indicate that a vowel is unstressed, however.) From what the phoneticians say, it is not merely many of the speakers, but all of them, who have this obligatory stress reduction on auxiliaries in normal speech. One must conclude from this, then, that the mechanism by which stress is reduced on tensed auxiliaries, in Bresnan's case the Tense Contraction procliticizing transformation, is obligatory.

Compare for example the bracketed words in these sentences:

35) Frankie and Johnny {sang
is} a song.

SDS {loves
was} being obnoxious to Gordon Hall, rightly so.

Larry {had
had} cut off {∅
his} pants.

They {tried
were} demanding 30 hours work for 40 hours pay.

The upper word, a "real" verb in all these cases, bears some degree of stress, call it tertiary. The lower words, the copula and the auxiliaries, are stressless, or at least comparatively stressless. The moment the lower words are given stress on the level of the upper words, they are interpreted as being emphatic. Stress reduction on the auxiliaries here is the normal case.

Secondly, it is not just the tensed auxiliaries which have

reduced stress. All auxiliaries, tenseless or not, can be de-stressed. In the examples below, the phonetic transcriptions on the right correspond to the underlined words in the sentences:

36) She c^ould h^ave b^een killed. [kəDə {^{bɪŋ}_{bŋ}}]

They'll h^ave b^een s^een by everyone. [l ə(v) {^{bɪn}_{bŋ}}]

The record sh^ould h^ave énded by now. [ʃəDə(v)]

The scissors h^ave b^een shárp^ened. [əv {^{bɪn}_{bŋ}}]

Those pictures m^ust b^e t^errible. [məs bi(j)]

True, these vowel reductions are not all obligatory, but they are possible only because all the auxiliaries may be stressless--in normal speech.

If one were to describe the stress reduction on two or three successive auxiliaries in the spirit of Bresnan's proposal, one would have to have an Auxiliary Contraction rule operating on each successive Aux. This Aux Contraction would have to be constrained in order to prevent one Aux from cliticizing to another in just that case where they all should cliticize to a verb or predicate on the right. Notice that though will would cliticize to be (on Bresnan's account) in (37)

37) Do you know what the program will b^e? [ə1]

both will and be would have to attach to divided in (38):

38) The program will b^e divided into three parts. [ə1 bi(j)]

Will couldn't attach to be here because in Bresnan's analysis this would prevent be itself from reducing in stress (cf. her

Subject-Aux Inversion being, presumably, (44),

44) [[is] [the party].....]
 S Aux Aux N" N" S

This violates the principle of strict cyclicity (Tense Contraction being a cyclic rule), and is inconsistent with Bresnan's argument concerning sentences like (39a).

In general, it seems that the procliticization rules which have been proposed for English are redundant, in the sense that they only attempt to bring "closer" those elements which are already members of the same phrase structure constituent. We already know that the phrase structure constituent has certain stress reduction rules operating within it (the NSR for example) which are independent of any clitic-type movement. My proposal for a Monosyllable Rule affecting the non-lexical categories complements the NSR and makes the description of stress reduction within a phrase structure constituent complete. The Monosyllable Rule can account for stress reduction on prepositions, complementizers, conjunctions, determiners, auxiliaries, and pronouns in certain contexts. Are independent procliticization rules to be required for each of these types of non-lexical categories?¹⁸ A procliticization analysis offers no advantages that cannot be gained by simply making reference to surface phrase structure within a stress reduction rule.

2.3.2 Global rules: Lakoff's theory

Lakoff takes the failure of the auxiliary to reduce in sentences like (30) to indicate that there must be a global rule

to the effect that:

If at any point in the syntax, a constituent immediately following be is deleted, then, later in the phonology, that be cannot undergo stress-lowering (and subsequent contraction). (1970, p. 632)

In this case, "global rule" is simply another name for a descriptive statement. The formulation has no explanatory value, and, moreover, it is false as it stands. This global rule claims (erroneously) that the be in So is Thelma, and Who is John?, which at one point in their derivations most certainly did precede a deletion site, couldn't undergo stress-lowering and contraction. But one finds So's Thelma and Who's John?. The theory of global rules in no way predicts this. The Monosyllable Rule, accompanied by a theory of traces, does predict this. Obviously, only when be precedes traces left by the deletion or movement of a constituent will it fail to be subject to the Monosyllable Rule. When be is moved away from the traces, it is free from their influence. These traces are not an ad-hoc device. They are left behind by any deletion or movement rule. And they make precisely the correct predictions about stress-reduction in English. It will be shown in Chapter III of this study that the same theory of traces accounts for liaison phenomena in French. The important thing about the theory of traces is that it makes predictions about phonological phenomena of English--something the global rule theory is incapable of doing. And the traces theory makes the correct predictions.

Besides heralding the existence of another global rule,

Lakoff does not put forth any analysis of the normal stress reduction processes on non-lexical categories. For this reason, he does not need to remark that the examples of the type in (31)-(34) that he himself (1972) cites from Bresnan present a problem for the global rule hypothesis. In order to explain the lack of stress reduction and contraction on the auxiliaries preceding parentheticals Lakoff would have to add a corollary to the global rule enunciated for be. The corollary must say that if something is inserted after the auxiliary in the syntax, then, in the phonology, no stress-lowering takes place. But no principled connection can be made between the two parts of a now-amended global rule. Why should the insertion of a parenthetical and the deletion of a deep structure clause mate have similar effects? The Monosyllable Rule can explain it. Global rules cannot. Moreover, even the insertion corollary would be inadequate, unless it could distinguish between the insertion of parentheticals and the insertion of adverbs. Sentences with adverbs following the auxiliary can stress-reduce:

John's often been there.

They've hardly begun their work.

Mary and Sue were cleverly leaving it till last.

3. The Clitic Rules of English

3.1 NOT, HAVE/BE, TO

3.1.1 NOT

Surely one of the more well-known rules of English is the rule of NOT-Contraction. This transformation encliticizes the negative particle not to a preceding Modal or Auxiliary, e.g., isn't, musn't, won't, haven't, can't, aren't, etc. The rule is formulated as (45):

$$45) \quad X \left[\begin{array}{c} \text{Modal} \\ \text{Aux} \end{array} \right] \text{not } Y \left[\begin{array}{c} \text{V}'' \\ \text{V}'' \end{array} \right] Z$$

$$1 \quad 2 \quad 3 \quad 4 \quad \implies \quad 1 \ 2\#3 \ 4$$

The constituents $\left[\left[\begin{array}{c} \text{Modal} \\ \text{M} \end{array} \right] \left[\begin{array}{c} \text{not} \\ \text{M} \end{array} \right] \right]$ or $\left[\left[\begin{array}{c} \text{Aux} \\ \text{Aux} \end{array} \right] \left[\begin{array}{c} \text{not} \\ \text{Aux} \end{array} \right] \right]$ would

be the output of this rule.

NOT-Contraction is ordered prior to Subject-Aux Inversion. Thus Subject-Aux Inversion, which takes a tensed element, Aux or Modal, and moves it around the subject noun phrase, may also take along the not:

Isn't she here? Won't he be going?

Aren't the Joneses eating dinner?

No change in the formulation of Subject-Aux Inversion (SAI) would be required to permit not to move along with the Modal or Aux because not forms a single constituent with them. Since NOT-Contraction is only optional, the not can be left in the verb phrase when SAI preposes the Modal or Aux:

Is she not here? Will he not be going?

Are the Joneses not eating dinner?

When not, which is underlying /nat/, encliticizes to the Aux or Modal which precedes, it becomes stressless, and is phonetically realized as syllabic n plus t [nt̚], or simply as [nt], if it follows a vowel. In order to describe the unstressing of the enclitic not, I would like to propose a rule which will reduce to zero stress a vowel in a particle that is enclitic to another word. Call it the Clitic Stress Reduction Rule (CSRR):

$$46) \quad V \rightarrow [-\text{stress}] / X \left[\begin{array}{c} [Y] \\ H \quad H \quad H \end{array} C_o \text{ --- } C_o \right] Z$$

where H is not a phrase category

What this rule says is that if a noun, verb, adjective, modal, auxiliary, determiner, preposition, etc., has an enclitic attached to it, the enclitic will always be stressless.¹⁹ This enclitic rule for not thus explains the two variants (47a) and (47b):

- 47) a) Jack was not, it seems, a very strong supporter of hers.
- b) Jack wasn't, it seems, a very strong supporter of hers.

In sentence (47a), there has been no encliticization of not. Not precedes no head or co-dependent (because of the insertion of the parenthetical) and thus does not get reduced in stress by the Monosyllable Rule. The was in this sentence does lose its stress by the Monosyllable Rule because it precedes its co-dependent not. In (47b), however, not is stressless. It couldn't have lost its stress by the Monosyllable Rule. Rather, it has been encliticized

to was and automatically loses its stress by the CSRR. The generalization is that no matter what syntactic context not is in, if it is enclitic to what precedes, it can (and will) lose its stress.

Concomitantly, the Aux or Modal to which not encliticizes does not become stressless. It is quite clear why. Not attaches, forming a derived structure like $\left[\begin{array}{c} \text{Aux} \\ \left[\begin{array}{c} \text{Aux} \\ \left[\begin{array}{c} \text{has} \\ \text{Aux} \end{array} \right] \text{not} \\ \text{Aux} \end{array} \right] \end{array} \right]$, for example.

But the Monosyllable Rule can't reduce stress on this dependent to zero because the word is not monosyllabic. The encliticization of not has ensured that the stress on has will not be completely lost. Naturally, then, one finds that any Aux or Modal to which n't is appended is pronounced with a non-reduced vowel: isn't [ɪznt], hasn't [hæznt], wouldn't [wʊdnt], aren't [ərnt]. And, in a sentence, that Aux or Modal will carry some degree of non-main stress (at the minimum). Compare the (a) sentences, where not has encliticized, to the (b) sentences below:

- 48) a) The cats { mʌsn't } like it here. [mʌsnt]
 b) " " { mʊst nɔt } " " " [mʌs nat]
- 49) a) They { əren't } demanding to strike. [ərnt]
 b) " { 're nɔt } " " " [r nat]
- 50) a) The boys { həven't } finished their game. [hævnt]
 b) " " { həve nɔt } " " " [əv nat]

The Auxiliary Reduction rule, which deletes a reduced, stressless vowel, will operate only if the not enclitic rule has not operated (cf. (49b)). So there's no way in this system that *'rn't [rnt]

or *'sn't [znt] (for are not and is not or has not, respectively) can be generated. (What is not explained is why the unencliticized form [nat] does not have a reduced form, e.g., [nət].)

This analysis also predicts that if both Aux or Modal and not have been preposed by SAI, then the vowel on that Aux or Modal will never be reduced, for the only way for not to accompany Aux or Modal is for it to be encliticized. Only (51a) is possible if there is a preposed not. (51b) is excluded. Yet (51c) shows that it's not impossible to have sentence-initial reduction of has. (51d) shows that the not, which must be enclitic, can't receive stress.

- 51) a) hasn't Mary left yet [hæznt]
 b) *'sn't Mary left yet *[əznt]
 c) 's Nat left yet [znæt]
 d) *'s not Mary left yet *[znat]

I should point out that the Aux have in Mary's having been gone is also unreduced. It is always pronounced with the initial [h] and the full vowel [æ]. (Compare with have in John and Denise have been gone, which is pronounced [ə(v)].) This is because having is never destressed by the Monosyllable Rule, being a bisyllable, and consequently it never undergoes vowel reduction. Clearly, the lack of stress and vowel reduction in having and haven't can be explained by precisely the same mechanism.²⁰

3.1.2 Tenseless HAVE and BE

3.1.2.1 HAVE

Joan Bresnan pointed out to me that the pronunciation of tenseless have in the sentences like (52) and (53) might indicate that the word had encliticized to the preceding word:

52) a) Mary didn't go, but I would h^oave if I were her. [əv]

53) a) She's done as much as she should h^oave. [əv]

I think her point is very well taken, for insofar as have doesn't precede a head in these sentences there is no accounting for its stress reduction--except by saying it's cliticized to what precedes. Such a have enclitic rule would be parallel to the not enclitic rule, which accounts for the stress reduction of not in the sentences

54) Mary wants to go, but I wouldn't if I were her. [nt]

55) She smokes three packs a day and knows she shouldn't. [nt]

The have encliticizing rule creates the syntactic object

[[should] have]. Then the CSRR removes stress from have. The
 M M M M

Monosyllable Rule cannot apply to this newly created word because it is bisyllabic, so the stress on should will not be reduced to zero.

If we examine other sorts of sentences with tenseless have, we see that there are some contexts where it cannot be stressless, i.e., where it cannot have been encliticized to the preceding word:

- 56) Some people left early (but I don't know who).
 a) Could John and Larry hàve? [(h)əv], *[əv]²¹
 b) Could they hàve? " "
- 57) Everyone should have left.
 a) Should Mary hàve? [(h)əv], *[əv]
 b) Should I hàve? " "
- 58) Sue and John did complete their projects.
 a) But if you hadn't been there, they'd néver hàve.
 [(h)əv], *[əv]
- 59) They could never have finished their projects.
 a) No, you're wrong. They could cértainly hàve,
 if you hadn't interfered.
 [həv], *[əv]

Sentences in (56) and (57) show that have cliticizes only to elements of the verb phrase, and those in (58) and (59) indicate that even within the verb phrase have will not attach to a preceding adverb.²² The transformation could be formulated so that tenseless have only attached to Modals, i.e.,

- 60) X [[Modal] [have] Y] Z
 V" M M Aux Aux V"
 1 2 3 4 = 1 2#3 4

The operation of the CSRR on the strings derived from this transformation would yield the grammatical phrases:

I might hàve; They would hàve; You must hàve; etc. [əv]

Some speakers may be able to pronounce a stress-reduced have in sentences like

No, they could not hàve; She may not hàve. [əv]

In this case, the rule above would be modified:

$$61) \quad X \left[Y \left\{ \begin{array}{l} [\text{Modal}] \\ [\text{not}] \end{array} \right\} [\text{have}] Z \right] W$$

1 2 3 4 \Rightarrow 1 2#3 4

So the reason that tenseless have does not reduce in (56)-(59) is 1) that it is not subject to encliticization in these contexts and 2) that it has no head or co-dependent following it in the sentence and thus will not be reduced in stress by the Monosyllable Rule. When the have is followed by its head it will reduce by the Monosyllable Rule, as these non-elliptical versions of the sentences in (56)-(59) show:

- 56) Could John and Harry h^oave left? [əv]
 57) Should I h^oave gone away? "
 58) They'd never h^oave completed their projects. "
 59) They could certainly h^oave finished their projects on time. "

At this point I would like to point out certain phonological peculiarities of this tenseless have. First of all, this have is subject to a rule optionally deleting its final /v/ in pre-consonantal context:

- 60) They woulda gone.
 The woman mighta blown up the bridge.
 Chris willa passed her boards.
 We shoulda left earlier.
 They coulda won the teddy-bear.
 You maya seen her.

But the deletion will not occur when the following word is vowel-initial (except, perhaps, in quite rapid or colloquial speech):

- 61) ?You coulda injured them.
 ?They shoulda asked you.
 ?Mary mighta allowed him to go.

The rule could be formulated as:

62) /v/ → Ø / +ə ___ # [-syllabic]

Certain examples show that the rule may operate when have is phrase-final:

63) I woulda, but then I decided against it.
You didn't go, but you shoulda.

The possibilities of deleting /v/ in this context are somewhat constrained, however:

64) ?But Chris willa; ?You maya.

At this point I will not give the rule a more detailed formulation, but will leave it as above in (62).

What's interesting is that the tensed have does not undergo the rule:

65) Mary and Chris have^o known each other for a [əv], *[ə]
long time.

So have^o Susan and Joan. " "

Now they all have^o gotten together. " "

This difference might be taken to show that the tensed auxiliary should be distinguished by some feature, say [+T], from the non-tensed one, [-T], to ensure that the rule (62) operates only on the right have.

In fact, on independent grounds, the tensed auxiliary must be distinguished from other non-lexical category items, including the non-tensed have. Only the tensed auxiliaries experience the Auxiliary Reduction rule (cf. Zwicky (1970)) which will delete the unstressed initial vowel in Mary's gone, Mary'd done it, They've left, etc. True, the Auxiliary Reduction rule is tightly

[[kú d] [n á t] [h ə v]]
 V" M M Aux Aux V"

[[[kú d] n á t] [h ə v]]
 V" M M M M Aux Aux V"

Not-enclitic

[[[[kú d] n á t] h ə v]]
 V" M M M M M M V"

Have-enclitic

n á t h ə v

CSRR

[kú d n t ə v]

Segmental Phonology

Again, like not enclitic, have enclitic is only an optional transformation. Corresponding to the pair in (70), one has the pair in (71):

70) a) Jane isn't writing for the paper. [ɪ z n t̃]

b) Jane's not writing for the paper. [z n á t̃]

71) a) They will have written the article by Monday. [wɪ l̃ ə ṽ]

b) They'll have written the article by Monday. [l̃ ə ṽ]

In the (a) sentences the enclitic rules have operated, bringing about stress reduction on the clitics and blocking stress reduction by the Monosyllable Rule on the "stem" of the new word. In the (b) sentences, there has been no encliticization. Therefore both dependent items reduce by the Monosyllable Rule. This is why you can get Aux Reduction of the vowels in is and will while the not and have in the same sentences remain stressless, too. If have enclitic were obligatory, there would be no way to derive the reduced stress (and subsequent Aux Reduction) of will in (71b); the bisyllable [[wɪ l l] h ə v] would go unaffected by the Monosyllable Rule. Quite generally, the modal followed by

tenseless have may have either a low-stressed non-vowel-reduced form or a stressless vowel-reduced form:

72) He must have really annoyed you. [m^ost ə̃(v)], [mλst ə̃(v)]

The caucus could have defeated the motion 2 to 1. [k^od ə̃(v)], [k^ud ə̃(v)]

You can have won all sorts of concessions, and it won't make a difference. [k^on ə̃(v)], [k^əna(v)]?²⁵

I shall have lived here 10 years come June 31. [ʃl ə̃(v)], [ʃ^əl ə̃(v)]

They { 'd
would } have won their demands, given two more weeks of striking. [d ə̃(v)], [w^ud ə̃(v)]

If have enclitic is optional then the sentence (52a),

52) a) Mary didn't go, but I would have if I were her. [w^ud əv]

with which this section was introduced should have the variant (52b)

52) b) Mary didn't go, but I 'd have if I were her. [d h^əv]

And it certainly does. In (52b) there has been no operation of the have enclitic rule; the stress on would is reduced to zero by the Monosyllable Rule, but this rule can't affect have, which is followed neither by its head nor a co-dependent. Other sentences showing the alternations of stressed and stressless forms of tenseless have are:

73) (Who would have made a mess like that?)

THEY { 'd h^əve
w^uld h^əve } , but I don't know about the others. { [d h^əv]
[w^ud əv] }

(She can't have been there for twenty years.)

Yes, she CÁN {^hàve } . She was there when I { [kæ̃ n hæ̃ v] }
 {_hàve } was in grade school. { [kæ̃ n ə̃ v] }

(Did she go to jail?)

She MÁY {^hàve } . { [méj hæ̃ v] }
 {_hàve } { [méj ə̃ v] }

SHE may {^hàve } , but the others didn't. { [mèj hæ̃ v] }
 {_hàve } { [mèj ə̃ v] }

(Has Mary come yet?)

She músn't {^hàve } . { [mʌsnt hæ̃ v] }
 {_hàve } { [mʌsnt ə̃ v] }

It follows from this account that though I'd hâve gône [ajd ə̃v] and I wòuld hâve gône [aj wɔ̃d ə̃v] are permissible variants of a non-elliptical sentence, only I wòuld hâve [aj wɔ̃d ə̃v] and I'd hàve [ajd hæ̃v] are possible in the elliptical version. The pronunciation *[ajd ə̃v] for the elliptical sentence I'd have is ungrammatical. It cannot be generated by this analysis, though the first two can be:

<u>I'd hâve</u>	<u>I wòuld hâve</u>	
[aj] [[wɔ̃d] [hæ̃v]]	[aj] [[wɔ̃d] [hæ̃v]]	
V''M M V''	V''M M V''	Syntax:
-----	[[wɔ̃d] hæ̃v]	<u>Have</u> -enclitic
	MM M M	
<hr/>		Phonology:
-----	hæ̃v	CSRR
wɔ̃d	-----	Monosyllable
d	ə̃v	Rule
[ajdhæ̃v]	[aj wɔ̃d ə̃v]	Segmental Rules
		Output

What I've shown, in sum, is that there is an enclitic rule attaching tenseless have to a preceding Modal (or to not). The rule is optional. When have does attach to the Modal, the Modal does not later reduce in stress by the Monosyllable Rule. When have does not attach, both it and the preceding Modal (if unemphatic) may reduce in stress by the Monosyllable Rule.

3.1.2.2 BE

If one examines sentences with tenseless be or been, one finds, quite as expected, that the be or been is always reduced in stress when it precedes its head:

- 74) a) I've b^oeen thinking about this. [b^oi^on]~[b^oɪ̃]
- b) Why has John b^oeen sleeping so much? " "
- c) We should have b^oeen ready before this. " "
- d) He should b^oe writing them soon. [b^oi(j)]
- e) It'd b^oe fine with me. "
- f) Won't the weather b^oe settling down? "

The Monosyllable Rule will take care of the destressing of be and been here. As a result of stress reduction, the lax [ɪ] and nasal [n] of been may turn into a syllabic nasal, and the diphthongal [j] of be may be lost and the vowel laxed.

The Monosyllable Rule is inapplicable when be does not precede its head. In such cases, be is not destressed:

- 75) a) Where have you b^eeen? [bɪn]
- b) Had Súe b^eeen? (sleeping) "
- c) No, but Chrís had b^eeen. "

- d) Who could it bé? [bij]
- e) Why should Máry bè? (making coffee) "
- f) How tall must those trees bè? "

And the vowels aren't reduced. The Monosyllable Rule applies without distinction to the auxiliary verb be (cf. 74a, b, d, f) and the copula (cf. 74c, e), but when it doesn't apply, as in the sentences in (75), differences between the two be's may show up. The fact is that the copula may bear the main stress of a sentence without emphasis (cf. 75a, d, f), while the tenseless aspectual bè of the auxiliary cannot (cf. 75b, c, e). So, for example, the main-stressed been of (75a) may only be the copula; the sentence is not ambiguous. But (76a), where been is not main-stressed, is ambiguous:

76) a) Well, where háve you bèen?

It could be uttered in response to either assertion (76b) or (76c):

76) b) I haven't been to N.Y., Boston, S.F., or L.A.

c) I haven't been doing political work in any American city.

In appropriate cases, when be is secondary-stressed, a sentence may be ambiguous. But primary stressed be can (normally) only be the copula.

Having demonstrated that be can behave like a normal syntactic dependent, I would now like to show that, like have, be may be optionally encliticized to certain items that precede it and thus lose its stress even when not preceding its head. Take the elliptical sentence John must be, which could be uttered in

response to a question like Is anyone at the house?. It seems that either John or must may take the focus or emphasis in the response:

77) a) JÓHN must be.

78) a) John MÚST be.

Assuming that the encliticization of be to must is optional, then the following stress patterns should be possible for the response:

77) b) JÓHN múst bè [məs bi(j)]

c) JÓHN mùst bè [mʌs bi(j)]

78) b) Jòhn MÚST bè [mʌs bi(j)]

c) Jòhn MÚST bè [mʌs bi(j)]

Admittedly, these are fine distinctions, especially since the vowel reduction which would assure one that stress reduction had taken place on be is not obligatory or even possible for all speakers. I think the case is clearest in (77b) and (77c), which for me are pretty much free variants. In (77b), where be has not encliticized, be is not destressed, and the stress on must is lost through the action of the Monosyllable Rule (be being a co-dependent of must). So must is pronounced with a reduced [ə]. But in (77c), must is stressed and be is unstressed, because be has encliticized to the modal. Here must has the non-reduced vowel [ʌ], and be may lose its [j] and lax. Below are additional examples where the sequences Mòdal Bè and Mòdal Bè seem to be in free variation:

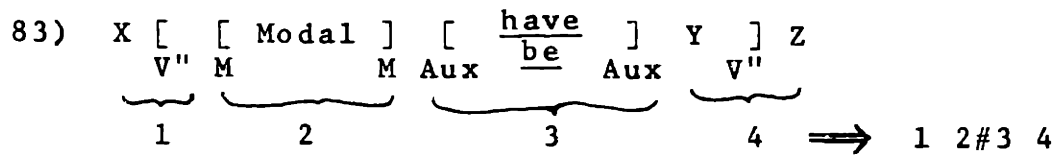
79) a) Do you know what time it $\left\{ \begin{array}{l} \underline{\text{còuld}} \underline{\text{bè}} \\ \underline{\text{còuld}} \underline{\text{bè}} \end{array} \right\} \left\{ \begin{array}{l} [kʊd bi(j)] \\ [kəd bi(j)] \end{array} \right\}$
 right now?
 b)

- 80) Jane should be getting more satisfaction from her
 a) job at the garage than Helen $\left\{ \begin{array}{l} \text{shòuld bē} \\ \text{shòuld bē} \end{array} \right\} \left\{ \begin{array}{l} [\text{ʃvd bi(j)}] \\ [\text{ʃəd bi(j)}] \end{array} \right\}$
 b) from her job at Filene's.
- 81) At times, Merle can be more reactionary than
 a) Lee $\left\{ \begin{array}{l} \text{càn bē} \\ \text{càn bē} \end{array} \right\} \left\{ \begin{array}{l} [?\text{kæn bi(j)}] \\ [\text{kæn}] \sim [\text{kŋ}] \sim [\text{kŋ}] [\text{bij}] \end{array} \right\}$
 b)
- 82) Harry might be working at GE, and who knows but
 a) Georgia $\left\{ \begin{array}{l} \text{mìght bē} \\ \text{mìght bē} \end{array} \right\}$ at Sylvania. $\left\{ \begin{array}{l} [\text{majt bi(j)}] \\ [\text{ma(j)t bij}] \end{array} \right\}$
 b)

In corresponding sentences (79c, d)-(82c, d) where the heads of be and the modals have not been deleted, one still finds free variation, this time between Mòdal Bē and M̀dal Bē. When both are destressed by the Monosyllable Rule, it means that no encliticization has taken place:

- 79) c) It $\left\{ \begin{array}{l} \text{còuld bē} \\ \text{còuld bē} \end{array} \right\}$ ten in the afternoon. $\left\{ \begin{array}{l} [\text{kəd bi(j)}] \\ [\text{kvd bi(j)}] \end{array} \right\}$
 d)
- 80) c) Jane $\left\{ \begin{array}{l} \text{shòuld bē} \\ \text{shòuld bē} \end{array} \right\}$ enjoying her job. $\left\{ \begin{array}{l} [\text{ʃəd bi(j)}] \\ [\text{ʃvd bi(j)}] \end{array} \right\}$
 d)
- 81) c) At times, Merle $\left\{ \begin{array}{l} \text{càn bē} \\ \text{càn bē} \end{array} \right\}$ reactionary. $\left\{ \begin{array}{l} [\text{kŋ bi(j)}] \\ [?\text{kæn bi(j)}] \end{array} \right\}$
 d)
- 82) c) Georgia $\left\{ \begin{array}{l} \text{mìght bē} \\ \text{mìght bē} \end{array} \right\}$ working at Sylvania. $\left\{ \begin{array}{l} [\text{ma(j)t bi(j)}] \\ [\text{majt bi(j)}] \end{array} \right\}$
 d)

So it seems that the enclitic rule (62) proposed above for tenseless have must be extended to allow encliticization of be as well:



The output structure is $[[\text{Modal}] \text{have}]$ or $[[\text{Modal}] \text{be}]$.
 $\text{M M} \quad \text{M} \quad \text{M} \quad \text{M M} \quad \text{M M}$

CSRR will deprive have and be of stress and the Modal will never be destressed by the Monosyllable Rule. And again, as with the encliticizing of have, it seems possible that be encliticizes to the negative not. In the following paired examples, there seems to be no appreciable semantic difference between the sentences with differences in stress on not and be:²⁶

84) Mary may not be a communist, and Hélen may $\left\{ \begin{array}{l} \text{nòt bè} \\ \text{nòt bè} \end{array} \right\}$
 but Doris surely is.

85) Doris might not be planning on moving to Chicago, and
 Helen might $\left\{ \begin{array}{l} \text{nòt bè} \\ \text{nòt bè} \end{array} \right\}$, either.

86) Doris is not sure of her plans, so Helen must $\left\{ \begin{array}{l} \text{nòt bè} \\ \text{nòt bè} \end{array} \right\}$.

Stressed not is not emphatic, and so since no independent emphatic stress rule has operated, the stress must come from another source. I'm saying that there is secondary stress on not because be has encliticized to it. Accordingly, the structural description of the tenseless auxiliary enclitic rule will be modified to include $\left\{ \begin{array}{l} [\text{Modal}] \\ [\text{not}] \end{array} \right\}$.

Be follows have in the canonical order of the English auxiliary: (Modal) (have) (be). But tenseless be does not cliticize

to tenseless have; the stress contour M^odal h^ave b^e is not permissible:

87) *They sh^ould h^ave b^een gone by now. * $[\text{ʃəd hæv bɪ}]$.

*Doris and Helen m^ust h^ave b^een eager to leave. * $[\text{məst hæv bɪ}]$

*They were more eager than the others

c^ould h^ave b^een. * $[\text{kəd hæv bɪ}]$

Nor is the stress contour h^ave b^e permissible in an infinitive where the have is tenseless:

88) *They were happy to h^ave b^een sent on this trip. * $[\text{hæv bɪ}]$

A tenseless Aux cannot simply encliticize to just any Aux element that precedes. It is not possible for tenseless be to attach to tenseless have. But it may be possible for it to attach to tensed have:

89) a) Mary { 's been } extremely busy of late. { $[\text{z bɪ}]$ }
 b) { ?h^as b^een } { $[\text{?hæz bɪ}]$ }

90) a) But Doris has been busier than Mary { 's b^een } { $[\text{z bɪn}]$ }
 b) { ?h^as b^een } { $[\text{?hæz bɪ}]$ }

91) a) I { 've b^een } thinking about this for a while. { $[\text{v bɪ}]$ }
 b) { ?h^ave b^een } { $[\text{?hæv bɪ}]$ }

92) Sue's been going to SDS meetings, and I know that

a) Neil { 's b^een } , but what about Lee? { $[\text{z bɪn}]$ }
 b) { ?h^as b^een } { $[\text{?hæz bɪ}]$ }

My intuitions about the sequences h^ave b^een or h^as b^een in these sentences vary. (89b) and (91b) are unnatural, if not given an emphatic interpretation. (90b) and (92b) are more natural and

the tensed auxiliary to what follows. I've already argued that the facts about stress reduction in non-lexical categories need not, and indeed should not, be captured by a procliticization transformation. Here I would like to discuss the claim that only tensed auxiliaries undergo stress reduction. I will argue that any non-lexical category item which is a member of the specifier system of the V" (i.e., Modals and Auxiliary verbs), whether tensed or non-tensed, is susceptible to the Monosyllable Rule. In the two foregoing sections, it was shown how tenseless have and be reduce in stress by the Monosyllable Rule when a) they are not enclitic to what precedes, and b) they do precede a head or co-dependent. It's obvious, then, that as far as auxiliaries are concerned, no differences in stress reduction may be ascribed to the presence or absence of Tense on an auxiliary. Let us turn then to the modals.

Fiengo (1970a) claims that stress can reduce on root modals, but not on epistemic modals. And since, he claims, it is a procliticization transformation which accounts for such stress reduction, then that transformation must distinguish between root and epistemic modals. Fiengo argues that epistemic modals carry no syntactic tense and that root modals do carry it, concluding then that the procliticization rule operates only on tensed auxiliaries and modals. I believe Fiengo is wrong on two counts. First of all, there is no stress distinction of any interest between root and epistemic modals. Secondly, the claim that epistemic modals carry no syntactic tense is a dubious one.

The following sentences contain modals whose meanings can (and, in most cases, must) be epistemic. I think they all are pronounced with reduced stress; on the right I have given a phonetic representation of the modal in the sentence on the left. The vowel reduction in the modals shows they must have undergone stress reduction:

94) You must go there often, to be so aware of [məs]
what's happening.

You may see them often, but it doesn't mean [me(j)]
that you know them.

I could sit here all day, and no one would [kəd]
say hello to me.

Can Kathy be telling the truth? [kən], [kɪ], [kɪ]

What must John have said? [məs]

Where could Mary have gone?²⁷ [kʊd]

I'm not denying that the modals in these sentences may receive stress. Clearly they can, and I think that in that case they are somewhat emphatic. What's obvious from these examples is that the epistemic modals can be stressless.

In the examples below, epistemic modals are adjacent to tenseless auxiliaries. By the optional enclitic rule, have or be may attach to the modals. In such a case the modal will not reduce in stress by the Monosyllable Rule. And the modal does not have an emphatic interpretation.²⁸ If have or be does not encliticize, then the modal will also reduce by the Monosyllable Rule. Looking just at the phonetics, then, one could say that in a sentence where the modal precedes a tenseless auxiliary, its

stressed and stressless forms are in free variation:

95) Louise may have been exploited herself, but [mèj]~[mè(j)]
she exploits her servants far more.

Irma may be living a life of sin, but she's " "
earning a good living.

Hattie can have been there longer than any [kæn]~[kən]
of the men and she still won't get the pro-
motion.

I can be sitting here all day, and they'll " "
only say hello to me when they need some-
thing from me.

Ann could have run away because her parents [kəd]~[kəd]
quarreled.

She could be traveling to Berkeley to find " "
her friends.

Mother Jones must have spoken for three [mʌs(t)]~[mʌs(t)]
hours running.

She must be leading an active and dangerous " "
life.

Perhaps not all these cases are crystal clear. In some cases there may be preferences for or against encliticization. But it is quite evident that stress can reduce on epistemic modals in these contexts, too. Allow me to give some examples of stress-reduced root modals to assure the reader that the mechanism of stress reduction (in my analysis, the Monosyllable Rule) sees no difference between the two types:

96) You could leave if you wanted to. [kəd]

Must Bob get up so early? [mʌs]

The applicants must be finishing their last " "
year of high school.

Prospective employees may not have spent [mè(j)]
more than 6 months in prison.

Though they can work very hard, no one [kə̃n]~[kɨ̃] will hire them.

Even if Fiengo's claim that root modals bear tense and epistemic modals do not is correct, this syntactic difference is not relevant to the stress reduction on modals.

I regret that I have not the time or space in this study to give Fiengo's claim about the lack of tense on epistemic modals the consideration it deserves, but I would like to make a few comments about it. First, and I owe this observation to J.R. Vergnaud, a theory which does not give syntactic tense to epistemic modals may have trouble explaining why in many languages, the Romance languages for example, these modals carry the morphemes, i.e., verb endings, of tense, just as the root modals do. If tense morphology is introduced on a verb only if that verb is [+ x Tense], and if the presence of [+ x Tense] on a verb is determined by the syntax, then it would appear that epistemic modals have tense in Romance.

Secondly, I would like to use an argument parallel to one found in Fiengo (1971b) which indicates that epistemic modals do have tense. Fiengo observes that the complementizer if requires syntactic tense in its complement sentence (Fiengo's examples):

10a) *If Godot come, be sure to let Didi know.

10b) *Godot couldn't decide if to come.

He points out that the epistemic modals cannot appear in if clauses:

12a) *If it might rain, the Trojan war will be postponed.

12b) *If the Trojan could be interesting, I will buy my tickets now.

And he says that the ungrammaticality of (12) is explained by assuming that epistemic modals are tenseless. I might point out, however, that the complementizer that (the non-subjunctive one) requires tense in its complement sentence:

97) *They all assumed that a French company be manufacturing the lousy French telephone system.

*Nixon mused that Dita Beard have made a grievous error.

*Le Figaro says that ITT beware²⁹ of making sumptuous gifts to the Gaullists.

Yet epistemic modals appear freely in these that sentences:

98) They all assumed that a French company must be manufacturing the lousy French telephone system.

Nixon mused that Dita Beard could have made a grievous error.

Le Figaro says that ITT might be wary of making sumptuous gifts to the Gaullists.

By this argument, then, epistemic modals should be tensed.

Finally, Fiengo says that structures of the form

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are not interpretable. That is, if a modal occurs with aspect, it must be epistemic (i.e., tenseless). But clearly the sentences in (99) are ambiguous:

99) You must have bought your ticket before boarding time.

The applicants may have been absent from the university for no more than four years.

Must and may may each have root interpretations, as well as epistemic interpretations, though they appear with aspect. Moreover,

the sentence (100) is ambiguous; the jail term being referred to may have been completed in the past or may be continuing at present:

100) She must have been in jail for a long time.

In order to distinguish the two possible meanings, it seems logical to posit the underlying structures (101a) and (101b):

101) a) Past must have

b) Present must have

Also, the sentence (102) is in the present:

102) You can have been absent only twice this year because the record says that you were here all days but two.

In a theory which assigns no tense to epistemic modals, this fact is inexplicable. But in a theory where epistemics do receive tense, one can say that can is the present form of could and that must is either past or present.

3.1.3 TO

Joan Bresnan (1971b) has proposed that a transformation encliticizing the particle to to a preceding verb under certain conditions will account for the forms wanna, gonna, hafta, gotta, and oughta, which are derived from want to, going to, have to, got to and ought to, respectively. I accept her proposal and thus will add the rule of To-enclitic, which is formulated as

103) [NP V to V . .] → [NP [[Verb] to] V . .]
 S S S V V V V S

to the expanding repertoire of English clitic rules. Bresnan's proposal is extremely interesting and is important to an

understanding of the entire set of English clitic rules, so I would like to make an exposition of her analysis here.

She notes that a sentence like (104a) is ambiguous:

104) a) I wrote the woman who I want to visit.

and the corresponding sentence containing the contraction wanna is not:

104) b) I wrote the woman I wanna visit.

(104a) can have the meaning of (104b) as well as the meaning of (104c):

104) c) I wrote the woman I want to visit (me).

In (104b) it is I that is the underlying subject of visit; in (104c) the woman is its underlying subject:

104) b')

[I wrote [[the woman] [I want [for I to visit the woman]]]]
S N"N" N" S S SSN"S

104) c')

[I wrote [[the woman] [I want [for the woman to visit (me)]]]]
S N"N" N" S S SSN"S

If to enclitic were to operate at a point in the derivations of (104b) and (104c) where the two sentences were structurally differentiated then the non-ambiguity of the sentence with the contraction could be explained. So Bresnan proposes that to enclitic is a cyclic transformation which operates at the end of a syntactic cycle:³⁰

encliticization to occur.

A similar case is provided by the ambiguous sentence (105a):

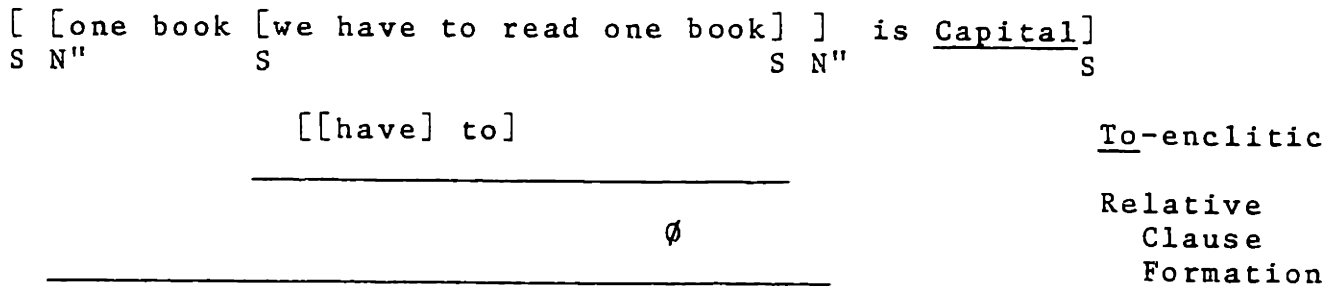
105) a) One book we have to read is Capital.

and the non-ambiguous sentence (105b):

105) b) One book we hafta read is Capital.

The two deep structures underlying (105a) are (105b') and (105c') and their derivations are as follows:

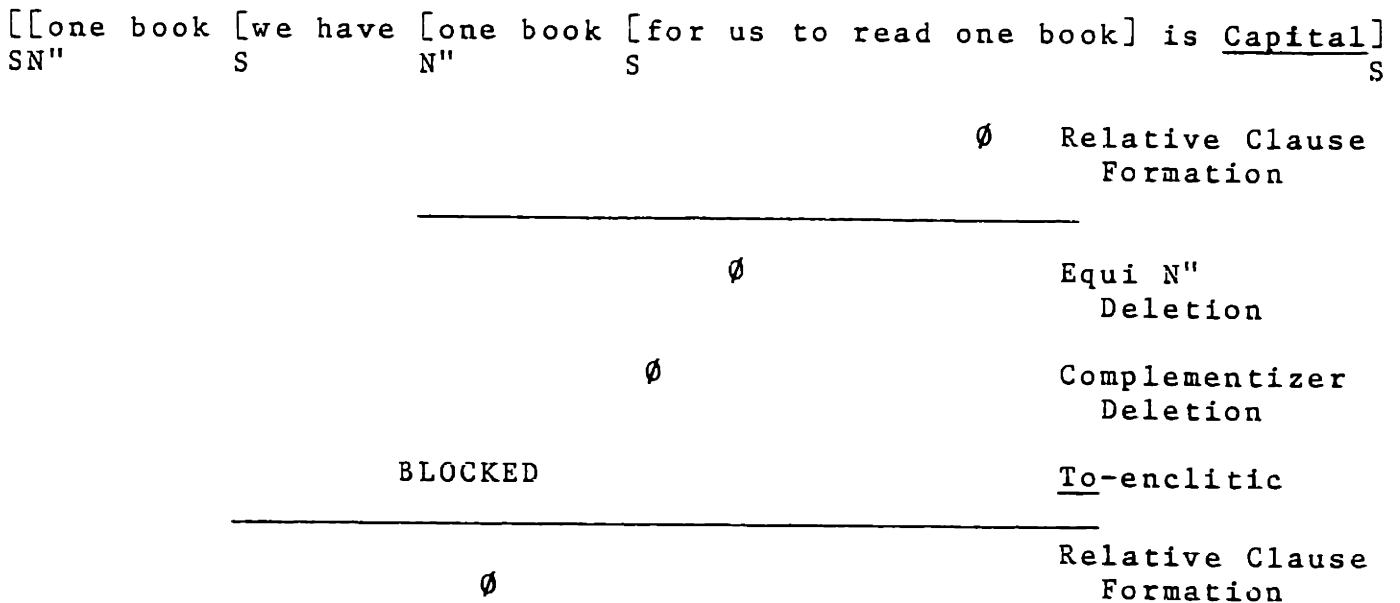
105) b')



====>

One book we hafta read is Capital.

105) c')



====>

One book we have to read is Capital.

Again, the presence of an intervening noun phrase, removed only on a later cycle, makes the to enclitic rule inapplicable, this time in (105c').

The assumption here is that the to enclitic transformation, being a cyclic transformation, obeys the principle of strict cyclicity (Chomsky 1971) and is prohibited from applying on a cycle S_j to a domain entirely within an earlier cycle S_i . In fact, the to-encliticization facts provide a very strong argument for the principle of strict cyclicity.

The encliticized to will be deprived of all stress by the CSRR:
$$\left[\begin{array}{ccccc} [w\grave{a}nt] & t\grave{u}w & & & \\ \underset{V}{[} & \underset{V}{]} & \underset{V}{[} & \underset{V}{]} & \underset{V}{[} & \underset{V}{]} & \underset{V}{[} & \underset{V}{]} \end{array} \right] \rightarrow \left[\begin{array}{ccccc} [w\grave{a}nt] & t\acute{u}w & & & \\ \underset{V}{[} & \underset{V}{]} & \underset{V}{[} & \underset{V}{]} & \underset{V}{[} & \underset{V}{]} & \underset{V}{[} & \underset{V}{]} \end{array} \right].$$
 Then a further optional vowel reduction rule may convert $[t\acute{u}w]$ to $[t\text{ə}]$. Other rules of the segmental phonology, to be discussed in detail in the next chapter, will generate wannuw or wanna from $[[want] tuw]$ or $[[want] t\text{ə}]$. Since the to can cliticize to a verb, it may reduce in stress (by the CSRR) regardless of whether or not its head follows it in surface structure:

106) a) You can't go even if you wánna. $[w\acute{a}n\text{ə}]$

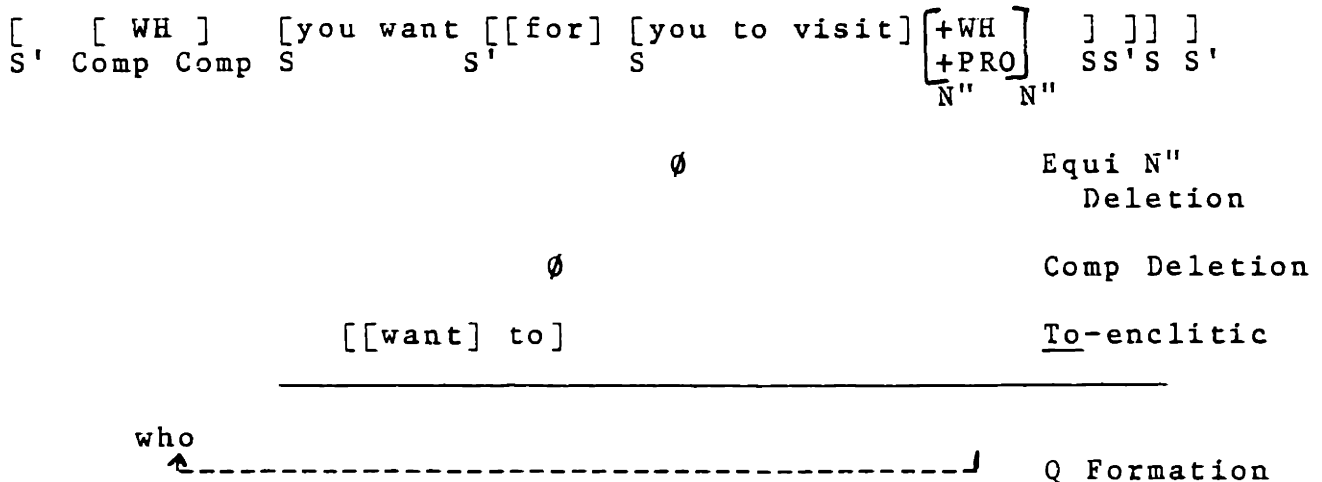
The to enclitic rule can fail to apply:

106) b) You can't go even if you wánt tò. $[w\acute{a}nt t\grave{u}w]$

In this latter sentence to is not in the environment of the CSRR and it is not in the environment of the Monosyllable Rule. It would be in the environment of the Monosyllable Rule if its head were present, as in (106c)

106) c) You can't go even if you wánt tò go. $[w\acute{a}nt t\text{ə}]$

I wish to clear up one misunderstanding introduced by Brame and Baker's (1972) exposition of Bresnan's analysis of To-enclitic. They claim that to cannot encliticize to inflected verbs and, therefore, that To-enclitic must follow the Affix Hopping rule which attaches inflectional material to a verb, if it is to be most succinctly formulated. Since Affix Hopping follows Subject-Aux Inversion, To-enclitic would also have to follow S.A.I. This order SAI > To-enclitic would pose real problems for Bresnan's ordering hypothesis, for, though she doesn't make this explicit in her paper, the To-enclitic rule is the last rule on the S cycle while Question Formation and SAI would have to be on the S' cycle. This ordering is essential in differentiating who do you wanna visit from who do you want to visit. The derivation of the contracted sentence is:



If To-enclitic were to operate on the same cycle as Q Formation, it would have to precede it, and Bresnan's ordering hypothesis that contraction or clitic rules along with phrase stress rules follow all other syntactic rules on a cycle would be lost. So if

To-enclitic operates at the end of the S cycle, how could it possibly follow SAI, which presumably has to operate on S', where it can "know" what is in the complementizer (i.e., "know" whether to operate)?

Fortunately this is not a problem. Brame and Baker's facts are wrong. To most certainly can encliticize to inflected forms:

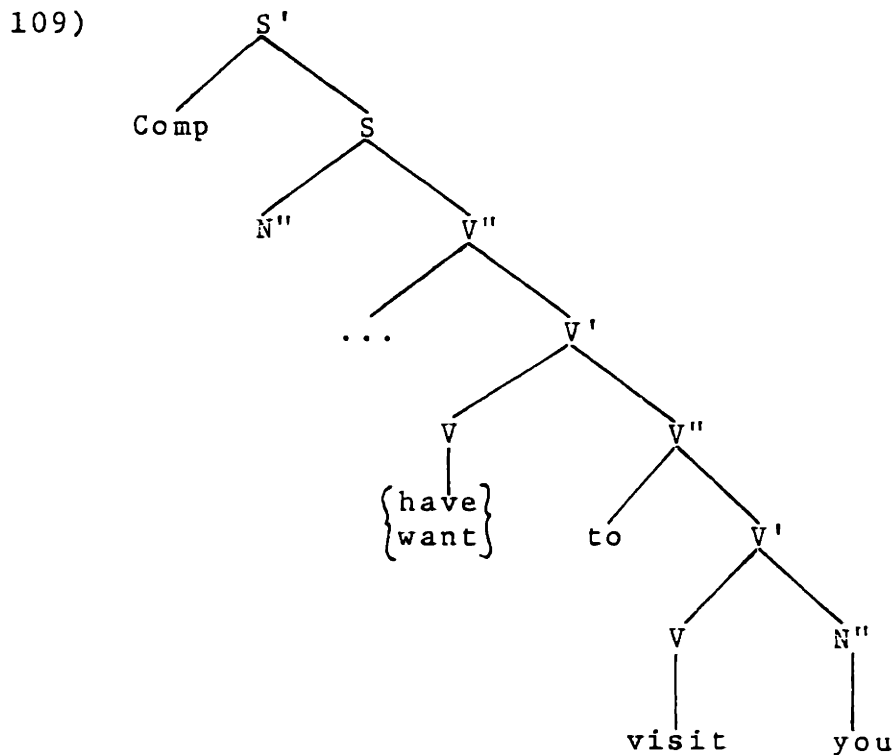
<u>Present</u>		<u>Past</u>
<u>2nd sing.</u>	<u>3rd sing.</u>	
you hafta	she hasta	you hadda, she hadda
you wanna	she wants ta	you wanted ta, she wanted ta

All of these are possible elliptical sentences where the verb which is the head of to has been deleted. The fact that to can still lose its stress shows it must be an enclitic. No contracted forms for want, except for wanna, are ever given orthographic representation. But one should not be led astray by the inconsistencies of those who attempt to depict "colloquial" speech. The form wants ta is pronounced [wantstə] or [wanstə] in my dialect, and in the Middle West (Chicago), I am told, as [wantsə]. The form wanted ta is pronounced [wantədə], [wanədə] or [wan(t)ədta].

Finally, let's look at To-enclitic with respect to the theory of traces I've put forth. In the sentence I wanna visit, To-enclitic has to have operated after the operation of Equi Noun Phrase Deletion. But if this transformation leaves behind a trace of the former noun phrase, the trace couldn't be allowed to block the operation of To-enclitic, though a noun phrase with a

transformation is going to move something into it. An empty node, or trace, will not appear in the environment of a structural change.

An alternative is simply to consider that the deep structure of I wanna visit you is precisely parallel to that of I hafta visit you, that it is like (109)



With such a structure, there would be no EQUI, therefore no traces between want and to, and consequently no problem. Notice that want would have to have two strict subcategorizations, if it does indeed appear in a deep structure like (109). They would be

110) want: N'' — V''

111) want: N'' — [for S]
S' S'

The strict subcategorization (111) is well established; it allows

for I want very much [_{S'} for you to visit me]_{S'}. The argument for (110) would be based primarily on the modal-type status that want, and, most particularly, wanna, do have. Wanna, if given the deep structure (109), would pattern entirely like the other "contracted" modal-type words hafta, gotta, gonna, oughta, which also have the deep structure (109).

3.2 Pronominal Clitics

3.2.1 The Post-Preposition Pronoun Clitic Rule

Prepositional phrases comprised of a monosyllabic preposition and a non-emphatic personal pronoun object may, quite optionally it seems, exhibit two different stress contours. The locus of stress in the phrase may be either on the pronoun or on the preposition:³¹

- 112) a) Mary will give the documents {tò yòu} { [tuwɹj {^uw}] }
tomorrow. {tò yòu} { [t^uw} juw] }
- b) {tò yòu} { [t^uw} juw] }
- 113) a) She has worked {fòr hìm} for ten years. { [fɔrm] }
b) {fòr hìm} { [fr hɪm] }
- 114) a) Did he ask for something {fròm yòu} { [frʌm j^uw] }
b) {fròm yòu} { [frɪm juw] }
- 115) a) The other bosses were looking {àt thèm} { [ætɪm] }
b) {àt thèm} { [ətʃɛm] }
- 116) a) They'll be thinking {òf yòu} { [ʌv j^uw] }
b) {òf yòu} { [ə(v) juw] }

- 117) a) Sal will be going {with h^oer} {[wɪʃr]}
 b) {with h^oer} {[wɪʃ(h)ər]}

But in no case will both the preposition and the pronoun be without stress. The phrases *to you [təjə], *at them [ətɪ], *from you [frɪmjə], etc., are ungrammatical.³²

The stress contours in the (b)-sentences will be generated in a straightforward way by the Monosyllable Rule:

- 118) [[t^uw] [j^uw]]
 PP P P N'' N'' PP
 t^uw Monosyllable Rule
 [t^uwj^uw] Output
 or [t^əj^uw]

The vowel reduction rules will optionally convert the stressless vowel of to into a [ə], i.e., [tə]. Within the analysis so far presented, however, there is no way of generating the stress contour of the PP's in the (a)-sentences. All such PP's, by virtue of their phrase structure, would have to undergo derivations parallel to (118). But suppose there were a transformation which encliticized the pronoun to the preposition.³³ The following derivation (119) would then become possible:

- 119) X [[t^uw] [j^uw]] Y
 PP P P N'' N'' PP
 [[[t^uw] j^uw]] Post-Prep PN Clitic Rule
 PP P P P PP
 inapplicable Monosyllable Rule
 [[t^uw] j^uw] Clitic Stress Reduction Rule (CSRR)
 t^uw jə Vowel Reduction (optional)

Attaching the pronoun to the preposition makes the preposition impervious to any stress loss, and makes the pronoun subject to the CSRR. The optional tensed vowel reduction could then derive [jə] from stressless you. I will adopt this clitic analysis.

By no means are all pronouns cliticizable. Those which are not personal pronouns, i.e., those pronominal elements like the possessives (his, hers, yours, ours, etc.), the demonstratives (this, that, these, those) and forms like some, which are not members of the set {I (me), you, she (her), he (him), it, we (us), they (them)}, will not cliticize. The stress contour Prēp Prónoun is the only one possible in these examples:³⁴

- 120) He went looking fòr sòmè. [fɹ sʌm], *[fɔ̃r sṃ̃]
 They were staring àt thàt. [ət ʒæt], *[æt̃ (ʒ)ṁ̃t]
 He took a spoonful fròm hèrs [frɪm hɜːz], *[frʌm ṁ̃rz]
 and added tò hìs. [tuw hɜːz], *[tùw ṁ̃z]

Such morphemes are not inherently irreducible. Certainly some and the possessives are stressless as specifiers of a noun phrase:³⁵

- 121) Would you care for sòmè tea? [sṃ̃, səm]
 She looked at $\left\{ \begin{array}{l} \text{hìs} \\ \text{hèr} \end{array} \right\}$ face. [ər; ɪz]

(The syllabification of [m] in some, and the loss of initial [h] in her and his will only take place if the adjacent vowel is stressless; the destressing of these words in this environment is accomplished by the Monosyllable Rule.) Yet, when they serve as proforms for noun phrase, they are never rendered stressless.

So encliticization can apply only to personal pronouns. But, even then, not to all personal pronouns. The pronoun must be

non-emphatic, and it must not be conjoined. The preposition would never be stressed (a result of encliticization) in the sentences in (122):

122) The bosses were staring at THEM, not you.

She worked for HIM during that time.

He asked for a favor from you and her.

They'll be thinking of you and him in this light.

Only personal, non-emphatic, non-conjoined pronouns can cliticize. These restrictions are mirrored in a number of other languages (e.g., the Romance languages, Serbo-Croatian, Slovenian) and may even be a universal constraint on pronoun cliticization. Let us say, then, that only noun phrases of the form

$$N'' \left[\begin{array}{c} \# \\ \left[\begin{array}{c} +PRO \\ +Personal \\ -Possessive \\ -Emphatic \end{array} \right] \\ \# \end{array} \right] N''$$

meet the structural description of cliticization rules.

Just what is the transformational operation which the Post-Prep PN Clitic Rule performs in English? More particularly, what is moved by the clitic rule? Essentially, there are two possibilities. One is that the pronoun is a Determiner, as has been proposed by Postal (1966), and that only the Determiner is moved, creating a derived structure like $\left[\begin{array}{cc} [Prep] & [+PRO] \\ P & P \quad Det \quad Det \quad P \end{array} \right]$. The other possibility is that the entire noun phrase is moved. (In this case it wouldn't matter whether the pronoun were a Determiner or not.) The structure resulting from this operation would be

[[Prep] [[+PRO]]], or, provided with the appropriate word

$$\begin{array}{c} P \ P \quad P \ N'' \quad N'' \ P \end{array}$$

boundaries, [[Prep] [# [+PRO]#]]. It seems quite unlikely

$$\begin{array}{c} P \ P \quad P \ N'' \quad N'' \ P \end{array}$$

that the CSRR should operate on elements provided with word boundaries. The essence of this rule is that it ensures that the stress on affix-like elements is null. But since when can an element contained in a labelled bracketing [# . . #] be considered affix-like? I will argue in §3.2.4 that the #'s are deleted from noun phrases which are non-emphatic, non-conjoined personal pronouns. Assuming such a convention, the Post-Prep PN Clitic Rule would produce the structure [[Prep] [[+PRO]]] if it moved

$$\begin{array}{c} P \ P \quad P \ N'' \quad N'' \ P \end{array}$$

noun phrases. I see little way of choosing between this structure and the structure [[Prep] [+PRO]] here, and will

$$\begin{array}{c} P \ P \quad P \ Det \quad Det \ P \end{array}$$

avoid making any decision about it. In the text, I will simply use the symbols [+PRO] to designate the cliticized pronouns, leaving the bracketings unlabelled.

Let the Post-Prep PN Clitic transformation be formulated as:

123) X [[Prep] [[+PRO]]] Y

$$\begin{array}{c} \underbrace{PP \ P}_{1} \quad \underbrace{P \ N''}_{2} \quad \underbrace{N'' \ PP}_{3} \quad \underbrace{PP}_{4} \quad \Rightarrow \quad 1 \ 2\#3 \ 4 \end{array}$$

3.2.2 The Post-Verb Pronoun Clitic Rule

The reader's mind has undoubtedly travelled on to muse about the personal pronouns following verbs which one occasionally finds joined (very clitic-like) to the verb in the orthography,

as in gimme some, lemme go, betcha five dollars, etc. It is the case that the phonetic shape of the pronoun and the verb may be altered in such verb-pronoun sequences. The most significant phonetic trait is the lack of stress on the vowel in the pronoun, as evidenced by the reduced vowels in:

- 124) She really let h^oim have i^ot. [ɾm, m], [ɪt]
 He lent y^ou the shoes. [juw, jə]
 What did he lend y^ou? " "
 It was before I saw th^om. [ʒm, m]

None of these vowel reductions would be possible if the pronoun were stressed. In the analysis being presented here, such a lack of stress on a form-word, especially sentence-finally, is taken to mean that the stressless item has encliticized to what preceded it. So I will propose that there is a Post-Verb PN Clitic Rule.³⁶ It has the following effect:

- $$125) \quad X \begin{array}{c} \text{[Verb]} \\ \text{V} \end{array} \begin{array}{c} \text{[[+PRO]]} \\ \text{V N''} \end{array} Y \Rightarrow X \begin{array}{c} \text{[[Verb] [+PRO]]} \\ \text{V V V} \end{array} Y$$
- 1 2 3 4 1 2#3 4

The encliticized pronoun will be deprived of stress by the CSRR; after that, vowel reduction may take place.

Encliticization and subsequent stress reduction by the entirely general CSRR seem to be the proper explanation for the stress level of post-verbal personal pronouns. The alternative would be to say that English has a special stress reduction rule for the non-emphatic, non-conjoined personal pronouns. The rule would be obligatory when the pronoun followed a verb, but only

optional when it followed a preposition. The rule would not affect other sorts of pronouns, which, following the verb, are low-stressed, not unstressed:

- 126) I bóught sòme. [s^m], *[sm̩]
 We learned thàt from Sam. [ðæt], *[ðæt̩]
 She's already seen yòurs. [jurz, jərz]

Notice the contrast in the stress of the pronoun objects in (127a) and (127b):

- 127) a) They saw h^oer in the window. [ər]
 b) They saw h^eers in the window. [(h)ərz]

Both the enclitic analysis and the special stress reduction analysis are capable of generating the proper stress contours on the personal pronouns. But the enclitic analysis is preferable, for it ties the behavior of personal pronouns in English to the behavior of the same types of pronouns in other languages. Personal pronouns cliticize; cliticization accounts for stress reduction. If one opts for a special personal pronoun stress reduction rule in English, one has to regard as simply coincidental and unrelated the fact that the same personal pronouns are clitics in other languages.

There is another consideration which provides support for the enclitic analysis. It involves fairly subtle phenomena of the segmental phonology of the phrase. First, I will show that if one is to describe certain phonological processes coherently, only one word boundary, #, can intervene between the verb and the post-verbal pronoun. Secondly, I will show that the description

of certain other processes requires two #'s between the pronoun and what follows it. So the enclitic analysis is the only one compatible with the facts of segmental phonology. It produces a string

$$\begin{array}{ccccccc} [\# & [\# \text{Verb}\#] & [+ \text{PRO}] & \#] & [\# & . & . & . \\ \text{V} & \text{V} & \text{V} & \text{V} & \text{V} & & & \end{array}$$

If the pronoun were not cliticized, it would enter into one of the following sorts of structures:

128) $\begin{array}{ccccccc} [\# \text{Verb}\#] & [\#[+ \text{PRO}]\#] & [\# & . & . & . \\ \text{V} & \text{V} & \text{N}'' & \text{N}'' & & & \end{array}$

or

129) $\begin{array}{ccccccc} [\# \text{Verb}\#] & [[+ \text{PRO}]] & [\# & . & . & . \\ \text{V} & \text{V} & \text{N}'' & \text{N}'' & & & \end{array}$

In §3.2.4 I will argue that uncliticized pronouns have the structure of the pronoun in (129)--with no word boundaries. In this section, the choice between (128) and (129) is not important. Either one of them will fail to meet the requirements of the segmental phonology, i.e., that there be a string Verb#PRO##...

The phonetic form of the verb with a consonant-initial pronoun object gives evidence that only one # intervenes between the two forms. Three rules are relevant. One rule optionally deletes the final /v/ from the verb in such phrases as:

130) Gimme some. $[gɜmij]$

131) Leave them alone. $[lij \text{ɜ}m]$ ³⁷

132) Will he save them a seat? $[sej \text{ɜ}m]$

133) You'll forgive me my intrusion? $[fɔrgɜ: mij]$

Zwicky (1968) first discussed this rule. He pointed out that such a /v/-deletion was historically responsible for the forms has and had, from underlying have plus the inflectional endings. Now, of

course, these forms are frozen. One never hears [hævd] or [hævz]. I believe it is also possible to find the /v/ deleted from other verbs with inflectional s: she believes me [bəlɪjz], he saves pennies [sejz], it behaves badly [bɜːhejz], etc. But with inflectional /d/, the deletion seems wrong: believed *[bəlɪjd], saved *[sejd], behaved *[bɜːhejd]. This /v/ deletion also takes place in tenseless have, e.g., I woulda gone, when the word following it is consonant-initial, and it also operates on the preposition of, e.g., how mucha that do you want?³⁸ In all of these instances, a single word boundary separates the /v/ at the end of the morpheme from the following segment: had = [# [hæv#] d#], believes = [# [bəlɪjv#] z#], would have gone = [# [wɜːd] [hæv] [# [gɔn]]#], of that = [# [ʌv] [# [ðæt]]#]

$$\begin{array}{ccccccc} V'' & & V'V & & VV'V'' & & PP \ P \ P \ N'' \\ & & & & & & N''PP \end{array}$$

(after SPE-II deletes superfluous word boundaries). The enclitic analysis of object pronouns puts the pro-form only one # away from the /v/-final verb: give me some =

[# [[[gɪv#] [mɪj] #] [# [sʌm]]]#]. A non-clitic analysis, selecting structure (129) would have

$$\begin{array}{ccccccc} V''V'V & & V & & V & & N'' \\ & & & & & & N''V'V'' \end{array}$$

lecting structure (129) would have

[# [[gɪv#] [[mɪj]]] [# [s m]]]#. So one could formulate the

$$\begin{array}{ccccccc} V''V'V & & V & & N'' & & N'' \\ & & & & & & N''V'V'' \end{array}$$

rule:

134) $v \rightarrow \emptyset / _ \# C$

It would be optional, and subject to a variety of constraints that I won't spell out here, but the present formulation of the rule with the single word boundary makes the prediction that no consonant separated by two word boundaries from /v/ will cause it

finds:

140) I can't find it. [k ǣʔ]

We want Phil to go. [wǣʔ]

The /t/ will convert to [ʔ] in the environment __ # (#) C. Yet another rule, deleting the [ʔ] derived from /t/, will operate only in the environment __ # C.³⁹ One finds variants with and without glottal stop in such sentences as (141):

141) I can't find it. [k ǣʔ], [k ǣ]

They won't leave. [wǒʔ], [wǒ]

Let me go. [lɛʔ], [lɛ]

Get me a pencil. [gɛʔ], [gɛ]

Do you want me to go? [wǣʔ], [wǣ]

Yet, in my dialect at least, it doesn't seem possible (or might one say 'as possible'?) to delete the [ʔ] from the end of the verb when a non-pronoun object follows:

142) Let Maureen go. [lɛʔ], *[lɛ]

They got Larry a pencil. [gaʔ], *[ga]

Do you want my sister to go? [wǣʔ], *[wǣ]

The differences can be explained by formulating the rule

143) ʔ + Ø / V __ # C

and allowing only one # between a pronoun object and its verb.

A third argument for a single # between verb and personal pronoun object comes from Abercrombie (1964). He points out that whereas the l of feel is phonetically "dark" in feel ill, it is "clear" in either feeling or feel it. In feeling, of course, only one # separates feel from -ing. If one were to say the same for

feel it, the contrast with feel ill could be explained.⁴⁰

Admittedly, the three phonological processes described do not choose between the enclitic analysis and the analysis in (129) which simply deprives personal pronoun noun phrases of their word boundaries. Both would posit only a single # between the verb and the pronoun. But the next phonological rule to be presented will indicate that two #'s separate a pronoun object from what follows and thus will provide the basis for selecting the enclitic analysis.

The phoneticians⁴¹ point out that the vowels of certain "form-words" vary in quality according to whether the segment which follows the vowel is a consonant or a vowel. The relevant words are the, do, to, you. In front of a consonant-initial word, one may find the reduced forms [ðə], [də], [tə], and [jə], respectively, but when it is a vowel that follows, only the non-reduced forms [ði(j)], [du(w)], [tu(w)], and [ju(w)], respectively, appear:

<u>[ðə]</u>	<u>[ði(j)]</u>
the tree	the earth
the rod	the end
the will	the underworld
the difference	the anguish
<u>[də]</u>	<u>[du(w)]</u>
What do they want?	What do I know?
Why do spiders scamper?	Do icebergs float?
Do Sam and Sal chat often?	Do any of you smoke?

[tə]

easy to do
go to town
to those meetings
right to the end

[tu(w)]

from heaven to earth
easy to annoy
to a meeting
There's no reason to insult
him.

[jə]

How do you do?
You like L.A., don't you?
You speak well.

[ju(w)]

You ought to.
You interest me.
Do you expect too much?

If one allows the assumption that the uncliticized subject pronoun you has the structure $\left[\begin{array}{c} \text{[you]} \\ \text{N''} \quad \text{N''} \end{array} \right]$ without word boundaries, then one can easily see that the, to, do and you, being non-lexical items having no word boundaries of their own, are all separated from what follows by at most one word boundary. Suppose then that the rule for the reduction of stressless [+tense] vowels to [ə] were formulated as (144):

$$144) \left[\begin{array}{c} \text{V} \\ \text{-stress} \\ \text{+tense} \end{array} \right] \rightarrow \text{ə} / _ \# \text{C}$$

One way to test whether the number of word boundaries is relevant is to look at a case where the stressless vowel is separated by two #'s from what follows. The case of the to enclitic is germane. According to what was described above (cf. §3.1.3), the to may encliticize to a preceding verb, producing the derived structure $\left[\begin{array}{c} \text{#[Verb\#]} \\ \text{V V} \end{array} \right] \left[\begin{array}{c} \text{[to]\#} \\ \text{V V} \end{array} \right] \left[\begin{array}{c} \text{\#...} \\ \text{V V} \end{array} \right]$. Here the to is stressless because of the CSRR, and it is two #'s away from what follows. I believe the sets of sentences below show that when to is encliticized, it may reduce to [tə] regardless of what follows, be it a

vowel or a consonant. Yet when the to is not encliticized, and is separated by only one # from its deep structure verb, its reduction is restricted, as expected:

- 145) a) They want John to bother Sam. [tu], [tə]
 b) They want John to annoy Sam. " *[tə]
 c) They want to bother Sam [wanu], [wanə]
 d) They want to annoy Sam. " "
- 146) a) Who do you want to clarify this for us? [tu], [tə]
 b) Who do you want to explain this to us? " *[tə]
 c) What do you want to clarify for us? [wanu], [wanə]
 d) What do you want to explain to us? " "
- 147) a) What facts do you have to persuade them [tu], [tə]
 with?
 b) What facts do you have to interest them? " *[tə]
 c) Why do you have to persuade them? [hæftu], [hæftə]
 d) Why do you have to interest them? " "
- 148) a) Where are they going__(in order) to [tu], [tə]
 join the fight?
 b) Where are they going__(in order) to " *[tə]
 attack?
 c) Where are they going to join the [g^nu], [g^nə]
 fight__?
 d) Where are they going to attack__? " "

In the (c) and (d) sentences, the to can have cliticized to the preceding verb, and it seems perfectly all right to have [tə] precede a vowel-initial word. But in the (a) and (b) sentences, where to can't have cliticized, the [tə] pronunciation before a vowel-initial verb feels extremely awkward, and is probably

possible only in fast speech. These facts can be captured by formulating the reduction rule as (149)⁴² instead of as (144):

$$149) \quad \left[\begin{array}{l} \text{V} \\ \text{-stress} \\ \text{+tense} \end{array} \right] \rightarrow \partial / _ \# \left\{ \begin{array}{l} \text{C} \\ \# \end{array} \right\}$$

Keeping this in mind, look now to the sentences below:

- 150) a) Although you shouted at John... [ju], [jə]
 b) Although you insulted John... " *[jə]
 c) I saw you shouting at John. [ju], [jə]
 d) I saw you insulting John. " "
- 151) a) Yet you tired Sara out. [ju], [jə]
 b) Yet you interested Sara in it. " *[jə]
 c) That'll get you tired out. [ju], [jə]
 d) That'll get you interested in it. " "
- 152) a) Have you cleaned the shirts? [ju], [jə]
 b) Have you ironed the shirts? " *[jə]
 c) Jane'll have you clean the shirts. [ju], [jə]
 d) Jane'll have you iron the shirts. " "
- 153) a) But you bother them. [ju], [jə]
 b) But you annoy them. " *[jə]
 c) They'll let you bother them. [ju], [jə]
 d) They'll let you annoy them. " "
- 154) a) Were you capricious? [ju], [jə]
 b) Were you unfair? " *[jə]
 c) They'll call you capricious. [ju], [jə]
 d) They'll call you unfair. " "

In the sentences (c) and (d) it seems equally possible to reduce

the you to [jə]. Yet in sentences in (b), this pronunciation is, again, quite awkward. The you in (a) and (b) must therefore have a relationship with what follows which is different from the relationship it has in (c) and (d). The enclitic analysis provides such a differentiation, in terms of word boundaries. In the sentence (152b)

152b) [# [Have] [[you]] [# [[ironed#] [#the shirts]]]]
 S N" N" V"V'V V N" N"V'V"S

there is only one word boundary after the pronoun, whereas in the sentence (152d)

152d) [# [Jane#] [# [will] [# [[have#] [you]#] [# [iron.....
 S N" N" V" V'VV V V V"

two word boundaries intervene between you and the following word. If there were no encliticization, the (d) sentence would be:

 [# [will] [# [have#] [[you]] [# [iron.....
 V" V'V V N" N" V"

and there would be no distinction between the (b) sentences and the (d) sentences on the basis of word boundaries.

To sum this up, the enclitic analysis, which posits a Post-Verb Pronoun Clitic Rule, makes the correct predictions about the stress of object pronouns as well as about the segmental phonology of verb-pronoun sequences. For these reasons, it is preferable to other possible descriptions of the facts.

3.2.3 The Post-Auxiliary Pronoun Clitic Rule

Let us now turn to sentences where, after Subject-Aux Inversion, a personal pronoun subject follows an auxiliary. Notice

that in all the examples below, the auxiliary is stressed while the pronoun is stressless. The auxiliary may not undergo vowel reduction and subsequent Auxiliary Reduction, while the vowel of the pronoun may reduce:

- 155) i) Where áre yóu? [ar j^uW], *[ə r j^uW], *[r̥ j^uW]
 How ís ít? [ɪz ɪt], *[z ɪt]
 Who ám í? [æ m aj], *[ə m aj], *[ṃ aj]
 Why ís hē? [ɪz ij], *[z hij]
 How wíll thēy? [wɪl ʃej], *[əl ʃej], *[ḷ ʃej]
 What áre wē? [ar wij], *[ə r wij], *[r̥ wij]

ii) ⁴³How yellow is it? [ɪz ɪt], *[z ɪt]

What color are they? [ar ʃej], *[ə r ʃej], *[r̥ ʃej]

How militant were you? [wə r j^uW], *[wə r juw]

How stupid was he? [waz ij], *[wə z hij]

iii) Was he? [waz ij], *[wə z hij]

Will they? [wɪl ʃej], *[wɪ ʃej]

Could we? [kʊd wij], *[kəd wij]

Is she? [ɪz ʃij], *[z ʃij]

Are you? [ar j^uW], *[ə r juw]

iv) They wouldn't go, would they? [wʊd ʃej], *[wəd ʃej]

You could see, couldn't you? [kʊdnt j^uW], *[kʊdnt juw]

She didn't go, did she? [dɪd ʃij], *[d ʃij]

It's not finished, is it? [ɪz ɪt], *[z ɪt]

If the pronoun is stressed, it must be interpreted as emphatic. In this case the auxiliary will have no stress and its

vowel may reduce:

- 156) Where are YOU? [ər juw]
 Who am I? [m əj]
 What are WE? [ər wij]
 How interesting was SHÉ? [wəz ʃij]
Could WE? [kʊd wij]

Moreover, if the pronoun is conjoined, or is not a personal pronoun, the auxiliary will also lose its stress, and the stress will be on the pronoun:

- 157) How are you and they? [ər]
 Who are she and I? [ər]
 What kind is yours? [ɪz], [z]
 How yellow are his? [ər]
 How interesting was that? [wəz]

Finally, if the auxiliary is followed by a full noun phrase, it will not be stressed:⁴⁴

- 158) How is Guadalajara? [ɪz], [z]
 Where are the pens? [ər]
 Why could Helen? [kəd]
 How old is de Beauvoir? [ɪz], [z]
 In what state are the Badlands? [ər]
Was Jane? [wəz]

The lack of stress on the Aux in (156), (157), and (158) is attributable to the operation of the Monosyllable Rule. These are three representative derivations:

- 159) [[whò] [[àre] [[YÓU]]]]
 S' S N'' N'' S S'
- whò are Monosyllable Rule
- [hu(w)][(ə)r] Vowel Reduction, etc.
- [hu(w)(ə)r júw] Output
- 160) [[[[hòw] [yéllow]]]] [[àre] [[hìs]]]]
 S' Comp A'' A' A'A'' Comp S N'' N''S S'
- hòw are Monosyllable Rule
- [ha(w)] [əɾ] Vowel Reduction, etc.
- [ha(w) jélow əɾ hìz] Output
- 161) [[Hòw] [[ìs] [Guadalajára]]]
 S' Comp Comp S N'' N'' S S'
- hòw ìs Monosyllable Rule
- [haw] [(ɾ)z] Vowel Reduction, etc.
- [haw (ɾ)z] Output

((159), (160) and (161) are drawn from (156), (157) and (158) respectively.)

Yet, if the Monosyllable Rule were to operate on the sentences in (155), it would produce the wrong stress contour. In these sentences, too, the Aux would be destressed:

- from (155-i) [[Whère] [[àre] [[yóu]]]]
 S' S N'' N'' S S'
- whère are Monosyllable Rule
- [əɾ] Vowel Reduction, etc.
- [wɛɾ əɾ júw] Output

If, however, the non-emphatic, non-conjoined personal pronouns of (155) were to encliticize to the auxiliary preceding them then

the auxiliary would not lose its stress, and the pronoun would:

- 162) [[whÿ] [[[ìs] [[hè]]]]]
 S' S Aux Aux N'' N'' S S'
- [[whÿ] [[[ìs] h è]]]] Post-Aux PN Clitic Rule
 S' S AuxAux Aux Aux S S'

whÿ ^o	-----	Monosyllable Rule
	hè ^o	CSRR
	[ij]	Vowel Reduction, etc.
[waj 'z ij]		Output

- 163) [[whàt cólor] [[àre] [[yòu]]]]
 S' S Aux Aux N'' N'' S S'
- [[whàt cólor] [[[àre] yòu]]]
 S' S AuxAux Aux Aux S S' Post-Aux PN
 Clitic Rule

whàt ^o	-----	Monosyllable Rule
	yòu ^o	CSRR
	[jə]	Vowel Reduction, etc.
[wət kálar àr jə]		Output

With a Post-Aux PN Clitic Rule, the derivation of the sentences in (155) is perfectly straightforward. Stress reduction on the Aux is blocked while stress reduction on the pronoun is accomplished by the CSRR. This analysis fits in quite nicely with what was observed about personal pronouns following verbs and prepositions. But the situation is more complex with pronouns following the auxiliary.

In all the examples examined so far, the auxiliary-personal pronoun combination was sentence-final. Here the auxiliary was

stressed. Yet, when a predicate or verb follows the auxiliary-pronoun sequence, neither the auxiliary nor the pronoun is stressed (and they may reduce). Contrast the sentences in (155') with the sentences of (155):

155') i)	Where <u>are</u> <u>you</u> living now?	[ə r jə]
	How 's <u>it</u> going?	[z ɪ t]
	How <u>will</u> <u>they</u> know?	[əl ʒ e j]
	What <u>could</u> <u>you</u> do?	[kəd jə]
	What <u>do</u> <u>you</u> want?	[də jə]
	Who <u>is</u> <u>she</u> manager for?	[(ɪ)z ʃ i j]
	What <u>are</u> <u>they</u> good at?	[ər ʒ e j]
	Why <u>am</u> <u>i</u> so opinionated?	[m ə j]
	Why <u>are</u> <u>we</u> in Boston?	[ər w i j]
ii)	What color <u>are</u> <u>they</u> using?	[ər ʒ e j]
	How militant <u>were</u> <u>you</u> claiming to be?	[wər jə]
	How stupid <u>was</u> <u>he</u> acting?	[wəz i j]
	What time 's <u>it</u> leaving?	[z ɪ t]
	At what time <u>was</u> <u>it</u> over?	[wəz ɪ t]
	In what section <u>are</u> <u>you</u> the head?	[ər j u ^w]
iii)	<u>Was</u> <u>he</u> upset?	[wəz i j]
	<u>Will</u> <u>they</u> leave?	[wɪ ʒ e j]
	<u>Could</u> <u>we</u> go?	[kəd w i j]
	<u>Is</u> <u>she</u> in New York?	[(ɪ)z ʃ i j]
	<u>Are</u> <u>you</u> at work?	[ər j u w]

Though when a prepositional phrase which is not a predicate

follows the auxiliary-pronoun sequence, the Aux will still be stressed.⁴⁵ Notice the stress contours in the questions:

- 164) The film's not playing in New York.
 a) Then why is it ___ in Boston? [ɪz ɪt], *[z ɪt]
 The film's not in New York.
 b) Then why {[◦]is [◦]it} in Boston? [(ɪ)z ɪt]
 (is it)
- 165) The films are awful on Saturday.
 a) How are they ___ on Sunday? [ar ðej],
 The films are not on Saturday. *[ər ðej]
 b) Why {[◦]re [◦]they} on Sunday? [ər ðej]
 (are they)
- 166) That film was playing yesterday.
 a) is it ___ today? [ɪz ɪt], *[z ɪt]
 The concert wasn't yesterday.
 b) is it today? [(ɪ)z ɪt]
- 167) The busses are a drag in Boston.
 a) Are they ___ in San Francisco? [ar ðej],
 The busses left Somerville an hour ago. *[ər ðej]
 b) Are they in Boston by now? [ər ðej]
- 168) The weather's good in September.
 a) How is it ___ in October? [ɪz ɪt], *[z ɪt]

In the (a) questions, the PP's are not the predicates of the BE, but are adverbs. In these conditions, the stress contour of the auxiliary-pronoun sequence is the same as in (155). Here the destressing of the pronoun can't have been accomplished by the Monosyllable Rule, for the pronoun is followed by traces and has

no head. The destressing can be performed by the CSRR after encliticization, however. The (b) questions are simply included for contrast. They are parallel to questions in (155') where the PP is a predicate phrase and the auxiliary has zero stress. In such sentences both the Aux and the pronoun reduce in stress by the Monosyllable Rule.

To summarize, the auxiliary is stressed in the environments

169) (WH Phrase) Aux Pronoun

170) (WH Phrase) Aux Pronoun PP_{Adv}

The auxiliary is unstressed in the environments

171) (WH Phrase) Aux Pronoun Verb

172) (WH Phrase) Aux Pronoun $\left\{ \begin{array}{l} A'' \\ N'' \\ PP \end{array} \right\}$

(as well as in the environments

173) (WH Phrase) Aux $\left\{ \begin{array}{l} \text{Noun Phrase} \\ \text{Pronoun}_{\text{-personal}} \\ \text{PRO} + \text{PRO} \end{array} \right\})$

Encliticization of the Pronoun to the Aux in (169) and (170) would give the proper stress contour. Encliticization in (171), (172) and (173) would give the wrong stress contour. The problem is to block the encliticization in the latter cases. There are two possible ways of doing this. One is simply to formulate the transformation so that it won't operate if there is something in the verb phrase. It could be written as:

174) Post-Aux PN Clitic Rule

$$X \left[\begin{array}{c} [Aux] \\ S \end{array} \right] \left[\begin{array}{c} [+PRO] \\ N'' \end{array} \right] (PP_{Adv}) \left[\begin{array}{c}] \\ S \end{array} \right] Y$$

1 2 3 4 \Rightarrow 1 2#3 4

An alternative would be to formulate a subject pronoun proclitic transformation which would attach a personal pronoun to the verb phrase in case the verb phrase was not empty. (This alternative would require that the adverbial PP be generated outside the verb phrase.) Such a proclitic rule would precede the Post-Aux PN Clitic Rule. The attachment of the pronoun to the verb phrase would then have to be the factor preventing the encliticization of the same pronoun to the Aux. The pronoun would not be procliticized to an adverbial PP, and in this case encliticization of the pronoun to the Aux would be possible.

I think there are drawbacks to a subject proclitic analysis. The subject proclitic transformation would presumably attach the pronoun to the first element of the verb phrase. If this were an auxiliary, you'd expect a derived structure like

[[[+PRO] [Aux]]]. The sentences (175a)-(177a)
 V" Aux Aux AuxAux V"

175a) It had solved the problem. [ɪt əd]

176a) We know why they have gone. [ðej v]

177a) You are beginning a new phase. [ju^{uw} r]

would have the surface structures (175b), (176b) and (177b):

175b) [[[[[it] [had]] [[solved] [the problem]]]]]
 S'S V"Aux Aux AuxAux V'V V N" N"....

176b) [.....[[why] [[[they] [have]] [[gone]]]]
 S' S' SSV" Aux Aux AuxAux V'V V....

177b) [[[[[you] [are] [[beginning] [a new phase]]]]]
 S'SV"Aux Aux AuxV'V V N" N"....

However, either the [Pronoun] or the [Aux] in these structures would be susceptible to something like the CSRR and neither would

be susceptible to the Monosyllable Rule. Consequently, either one or the other should be stressed. Neither one is stressed, as the possibilities for vowel reduction in the (a) sentences show. So I will reject the idea of a subject proclitic rule and opt for the formulation of the Post-Aux PN Clitic Rule in (174).

3.2.4 Word boundary deletion in personal pronoun noun phrases

With no subject proclitic rule, the surface structure of (175a), (176a) and (177a) will be of the form:

178) [[[[+PRO]] [[Aux] [[Verb]]]]]
 S' S N" N" V" Aux Aux V' V V S'

Since the pronominal element is a noun phrase, it will not be susceptible to the Monosyllable Rule. This is a problem for the analysis being defended here. One could respond to this by extending the notion of syntactic dependents, adding an amendment to the effect that a personal pronoun is a dependent. A better approach would be the following:

(i) Introduce a convention whereby

$$\left[\begin{array}{c} \# \\ \left[\begin{array}{l} +\text{PRO} \\ +\text{personal} \\ -\text{emphatic} \\ -\text{possessive} \end{array} \right] \\ \# \\ \text{N}'' \end{array} \right] \Rightarrow \left[\begin{array}{c} \left[\begin{array}{l} +\text{PRO} \\ +\text{personal} \\ -\text{emphatic} \\ -\text{possessive} \end{array} \right] \\ \text{N}'' \end{array} \right]$$

(ii) Define as a syntactic dependent any item not bounded by word boundaries.

(iii) Have the Monosyllable Rule apply to items of the form $[C_0VC_0]$ or $[[C_0VC_0]]$ in the proper syntactic environments.

Clause (ii) is simply a combination of my definition of non-lexical categories as syntactic dependents and the SPE convention

180) We drank s^ome tea.

They ate hⁱs biscuits.

Similarly, a verb particle, whose derived structure is

$[\#[\text{Prep}]\#]$ (on Emonds' analysis) is not a dependent, and will
 PP P P PP

not lose its stress in:

181) He t^akes ìn wáshing. [ɾn], *[ṇ]

She lòoked ùp the càrd in the cálogue. [ʌp]

Yet as a preposition in the structure $[\#[\{\text{in}\}_{\text{up}}]\# \dots]\#]$,
 PP P P N" PP

the same words will lose their stress:

182) He skates ìn Wáshington. [ɾn], [ṇ]

She walked ùp the yárd. [ʌp]

Instead of adding an ad-hoc amendment concerning personal pronouns to the definition of syntactic dependents, I have changed the definition of syntactic dependent in a natural way: a syntactic dependent is an item with no word boundaries. (This definition has, in fact, already been embodied in the formalization of the Monosyllable Rule (cf. §2.1.2).) A new convention removing word boundaries from personal pronouns makes them syntactic dependents themselves. This solution can thus attribute the lack of stress on personal pronoun subjects to the operation of the Monosyllable Rule.

The convention for deletion of #'s on personal pronoun noun phrases seems correct, for it can help explain certain puzzling facts about Auxiliary Reduction. Recall that, as Zwicky observed, the lax vowel of the stressless tensed auxiliaries will [əɪ],

have [əv], am [əm] and are [ər] will delete only when they are preceded by a vowel-final pronominal element immediately dominated by S. So although you'll, we've, they're, I'm are possible, Auxiliary Reduction after conjoined pronouns is impossible (Zwicky's examples):

*You and I've gone there once too often. *[ajv]

*Neither we nor they've been very pleasant about it. *[ʒejv]

It's also impossible after full noun phrases (Zwicky's examples):

*Sue'll [suwl]

*Diana'll [dajænal]

*the foci've [ʒə fowsajv]

What distinguishes the non-conjoined personal pronoun noun phrases from all these other noun phrases is its lack of word boundaries. Auxiliaries with personal pronoun subjects are separated from them by only one #, whereas two #'s will separate the auxiliary from any other sort of subject:

[[you]] [# [have] [# [...]]
N'' N'' V''Aux AuxV''V

[# [[you]]] and [[I]]#] [# [have] [# [...]]
N''N'' N'' N''N'' V'' Aux AuxV'V

[# [the] [# [foci]]#] [# [have] [# [...]]
N'' N' N'N'' V''Aux AuxV'V V''

Thus the part of the Auxiliary Reduction rule affecting have, am, will and are could simply be written as:

183)
$$\left[\begin{array}{l} V \\ -\text{tense} \\ -\text{stress} \\ +\text{Auxiliary} \\ +\text{Tensed} \end{array} \right] \rightarrow \emptyset / V \# _$$

There is no necessity for a condition on the Auxiliary Reduction rule itself stating that it will operate on have, will, am and are only if the segment preceding the vowel is "a segment of a pronominal NP immediately dominated by S", as Zwicky puts it. The single # embodies this condition--if one adopts the convention that non-conjoined personal pronoun phrases have no #'s.

Zwicky also points out that Auxiliary Reduction on will, have, am and are can take place in sentences such as (Zwicky's examples):

184) <u>Who have</u> you seen?	[huwv]
<u>Who will</u> see it?	[huw1]
<u>Who will</u> you see?	"
<u>How'll</u> you ever finish that?	[haw1]
<u>Why're</u> you staring at her?	[wajr]
<u>Why've</u> they given up so soon?	[wajv]
<u>How've</u> you been?	[hawv]
<u>Who're</u> they going to see?	[huwr]

Though Zwicky doesn't accept it, I find the following sentence all right:

185) <u>How'm</u> I to know?	[hawm]
------------------------------	--------

So Auxiliary Reduction of have, will, are and am is possible after question pronouns, too. Though it is not possible when the preposed question element is a full noun phrase:

186) *How <u>high'll</u> you be?	*[haj1]
*What <u>story've</u> you heard?	*[stɔrijv]
*How <u>blue're</u> the lakes there?	*[bluwr]
*Which <u>eye'm</u> I favoring?	*[ajm]

For my account to be consistent, I must propose that the WH-pronouns why, how, who (and, of course, what, when, where) have no #'s of their own.⁴⁶ But the question noun phrases like those just above in (186) will, like normal noun phrases, have word boundaries.⁴⁷

Employing Bresnan's account of Question Formation as a complementizer substitution transformation, I would propose (187) as the surface structure of who have you seen

187) [# [[who]][#[have] [[you]]]#[[seen]]]]
 S' Comp CompS N'' N'' V''V'V VV'V''SS'

and (188) as the surface structure of what story have you heard

188)

[# [[#[what] [#[story]] #]] [# [have] [[you]] #[[heard]...
 CompN'' N'N NN'N''CompS Aux AuxN'' N'' V''V'V V

The Aux Reduction rule (183) will operate on have in (187), but not in (188).

Footnotes to Chapter I

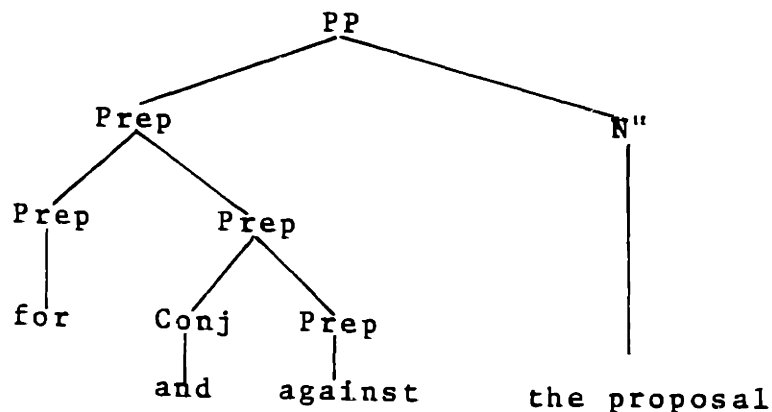
1. Sweet (1890) was one of the earliest to point out that weak and strong pairs of form words existed in English. Since Sweet, most standard phonetics works--Sweet (1908), Kruisinga (1919), Jones (1966), Ward (1931), Gimson (1962), Kenyon (1949), Thomas (1947), Hultzén (1944)--have included detailed discussions of the phonological behavior of such words.
2. Sweet probably has the most detailed discussion of the syntactic contexts for appearance of weak and strong forms. (See below.) Other phoneticians, e.g., Newman (1946) and Gimson, make only passing mention of the syntactic factors. One of the objects of the study I am presenting is to provide a syntactic analysis which will predict the appearance of weak and strong forms in English sentences.
3. For some speakers the pronunciation [əv] for have is possible in Should she have?. This reduced vowel nevertheless bears some degree of secondary stress. One must conclude from this that [əv] is also the underlying representation of the tenseless auxiliary have.
4. Certain pronominal elements have not been included in this list because in their function as noun phrases they are never deprived of stress. These elements are yours, ours, mine, his,

hers, theirs, least, most, less, more. The reasons for the lack of stress reduction will be discussed in §3.2 of this chapter.

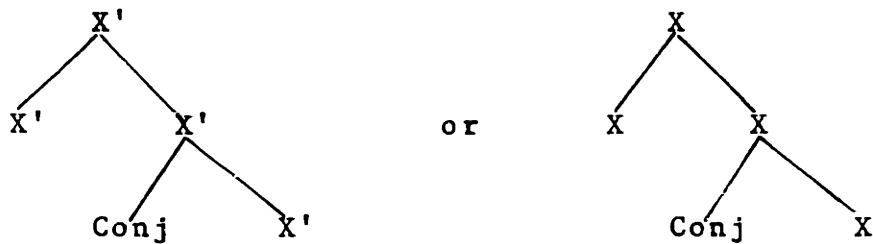
5. John Ross pointed out to me that deletion of a stressless vowel is possible in the first word of the following expressions: it's O.K. [tsowkej], if you want to [fjuwanuw]. My inclination is to consider these as examples of fast speech. The vowel deletion may be restricted to sentence-initial position. It isn't possible for the vowel in it or if to delete when they are in an embedded sentence: I think it's O.K., You can stop if you want to.

6. I owe the term "dependent" to Joan Bresnan (1971b). She first suggested a definition for a syntactic dependent, and was followed in this by Fiengo (1971a). I found their remarks helpful in formulating my ideas about the syntactic basis for stress reduction on non-lexical items.

7. Notice that conjoined prepositions will not be reduceable in stress by the Monosyllable Rule because they are never dependents of a head, not being immediately dominated by Z (Z is PP here):



8. Strictly speaking, only conjunctions of X'' are covered by Condition IIa. A structure with the form



would not satisfy that condition, nor any of the others. This suggests that the use of the node-types X'' , X' and X in the definition of syntactic dependents is unwieldy. The best statement of the definition does not make reference to these node-types; see Condition Σ below.

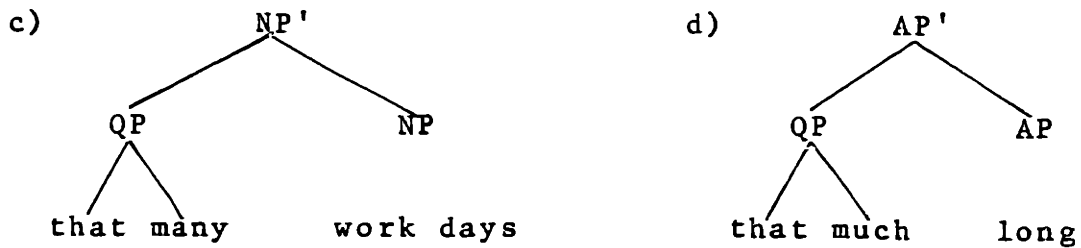
9. This rule is proposed in essence by Emonds (1970a). He did not employ the X' notation.

10. It is also the case that stress cannot reduce on the copula in such sentences as

a) The door is as wide as it is long.
 " " " " " " it's long.

b) There aren't as many holidays as there are work days.
 " " " " " " there're work days.

The theory of traces can account for these if one assumes that long and work days have underlying specifiers which are deleted, leaving traces. We assume, then, with Bresnan (1972b), that the deep structure for long is (d) and the deep structure for work days is (c):



(where NP'=N''', NP=N'', AP'=A''', AP=A'').

Yet, I am not convinced that stress reduction of auxiliaries not directly preceding the traces is possible either:

?Your new house'll be longer than ours'll be ___ wide.
 ?There've been as many holidays as there've been ___ work days.
 ?She's been more involved in politics than Jane's been ___
 in drama.

Perhaps in comparatives, semantic factors require all elements to be somewhat emphasized. In this case traces would be quite irrelevant in explaining (a) and (b).

11. For a very recent analysis of Subject-Raising in English see Bresnan (1972b).

12. Other enclitics of English also reduce in stress regardless of what may be present on the right. Wanna (a result of To-enclitic, cf. §3.1.3) may appear before a deletion site. Stress reduction is not affected by the traces that follow. Unfortunately, there are no examples which work in a parallel fashion with parentheticals, which can't be inserted in these syntactic environments:

I {want to}, I think, go there much later on.
 {wanna}

I {would have}, my dear, gone with you, if you'd wanted.
 {woulda}

13. Bresnan sketches two possibilities for explaining the facts about parentheticals:

If parenthetical placement is accomplished by a late rule, the procliticizing hypothesis itself would explain the non-insertion on the right of a proclitic. If parenthetical placement is early (i.e., cyclic), the fact that it requires relatively heavy stress on the item preceding the insertion, together with the discussion of 65 and 66, would explain why contraction cannot occur. (p. 18)

Without going into a discussion of these possibilities, or a discussion of "65 and 66", I would just like to say that it's not at all sure that parenthetical placement operates only after a heavy stressed item instead of itself causing the item that precedes it to become (or remain) stressed.

14. In some dialects, the reduced pronunciations of would and had are not identical. Here, following Kenyon, I have assigned both the weak form [əd] and assume that Aux Reduction deletes the [ə] in both cases. It may be that in so doing I am not adhering to the greatest possible phonetic accuracy.

15. Perhaps, also, the /z/ of Denny's and Kay's turns into [s] through the tendency of English voiced sounds to partially devoice in final positions (particularly when following consonants). The switch to [s] may therefore not be due to assimilation.

16. When I say that a member of a consonant cluster will not assimilate all by itself to what follows, I am implying that both members of a cluster must assimilate if there is to be any assimilation at all. The assimilation of consonant clusters is uncommon

in English, but one may cite the pronunciation of used to [juwstə] as evidence that such assimilations may apply. The aspectual morpheme used to is derived historically from the verb use [juwz], whose past tense is used [juwzd]. Encliticization of the to has given rise to [juwstə] by voicing assimilation, just as has to has become [hæstə]. Normally, though, assimilation affects only single consonants not in a cluster.

17. The principle of strict cyclicity, most recently defended in Chomsky (1971), may be formulated as follows:

A transformation cycling on α may not involve only elements contained within β , where β is a cyclic node:

$$\dots \underset{\alpha}{[\dots \underset{\beta}{[\dots X \dots Y \dots]} \dots]} \dots$$

The transformation of Subject-Auxiliary Inversion, operating on S' , does not violate this principle, for though Subject and Auxiliary are contained within $S (= \beta)$, the transformation must also refer to (i.e., "involve") the COMP, which is contained within S' .

$$\underset{S'}{[\text{COMP} \underset{S}{[\text{Subject Aux} \dots]}]}$$

The COMP must contain a question marker, a negative, or an emphatic marker in order for Subj-Aux Inversion to operate.

18. Fiengo (1971a) proposes that prepositions are procliticized to what follows them in a PP.

19. Zwicky (1970) compares the stresslessness of the not enclitic to the stresslessness of the "neutral" affixes -ness, -able, etc. and the verb inflectional endings, and suggests that

the same principle accounts for the lack of stress on these latter sorts of syllables and on not. Clearly the Clitic Stress Reduction Rule (CSRR) that I am proposing has the same effect as Zwicky's suggested principle, if inflected verbs have the internal structure $\begin{bmatrix} [X] & [Y] \\ V & V & V & V \end{bmatrix}$ and words with neutral affixes have the parallel structures, e.g., $\begin{bmatrix} [Y] & [Z] \\ X & X & X & X \end{bmatrix}$.

20. Without going into details, Zwicky's rule for Aux Reduction is

$$\begin{bmatrix} V \\ -\text{tense} \\ -\text{stress} \end{bmatrix} \rightarrow \emptyset / \#\# __ [+cons] \#\#$$

He remarks that "the condition that only one segment follow the vowel to be deleted prevents the reduction from applying to the forms with enclitic n't, or to having." This is only a confusion. As Baker (1971) first pointed out, the reason that the vowels in hasn't or having remain is not because of the number of segments following them in the word but because they are stressed and by Zwicky's own rule would not be deletable.

Furthermore, it's not apparent where those two word boundaries would come from in sentences like

John's been gone:

$$\begin{array}{ccccccc} [\#\text{John}\#] & [\#[\text{has}] & [\text{been}] & [\#[\text{gone}]] & \dots \\ N'' & N'' & V'' & V'V & VV' \end{array}$$

John's gone:

$$\begin{array}{ccccccc} [\#\text{John}\#] & [\#[\text{has}] & [\#[\text{gone}]] & \dots \\ N'' & N'' & V'' & V'V & VV' \end{array}$$

Certain facts of the segmental phonology, as well as the SPE

conventions for assigning word boundaries, support the contention that only one # at most separates an Aux or Modal from what follows in the verb phrase. (Cf. Chapter II for a discussion of the facts of the segmental phonology.)

21. Notice that if some speakers do find it possible to give have a pronunciation with the schwa in these sentences, that form, [əv], still has some degree of secondary stress. The sentence Could they have would be [kúð ʒej əv], not [kúð ʒej əv].

22. The fact that have has stress following adverbs in (58a) and (59a) is only a reflex of (i) the fact that have can't encliticize to the adverb and (ii) the fact that have lacks a head in surface structure. It has nothing to do with some special condition giving auxiliaries "relatively heavy stress" (as Bresnan maintains (1971b)) when they follow these adverbs. The following sentences show this:

John would certainly have^o wanted to see you before he [əv] left.

They certainly have^o left in a hurry. [əv]

They've often been^o disappointed in the results. [bɹn], [bɹ]

Here, where have and been precede their heads, they'll lose stress by the Monosyllable Rule.

23. Though certain words like and and in may appear vowelless in the phonetic string, it is not through deletion by a rule like Aux Reduction, but rather by (i) a syllabification of the sonorant (and consequent loss of the vowel) and (ii) a suppression of the

syllabification in certain vocalic environments. (Cf. Chapter II for more details.)

24. This approach was first proposed by Baker (1971, p. 179): "A reasonable alternative to Lakoff's account is simply to require that Auxiliary Reduction apply only to finite auxiliaries."

25. Personally, I find it impossible to give can any sort of stress in such sentences without its becoming emphatic. The preferred sequence is surely the one where have is not encliticized. The notion "preference" does seem to play a role in encliticizations. Notice, for example, that the possibilities for encliticization of not vary considerably according to the Aux or Modal involved. With be, she's not leaving and we're not leaving vary freely with she isn't leaving and we aren't leaving, but she wasn't leaving and we weren't leaving are definitely preferable to she was not leaving and we were not leaving; on the other hand, the encliticization of not is impossible with am, for which only I'm not leaving exists in standard speech (I ain't=I amn't). With have, the encliticization of not is preferable to I've not left, she's not gone anywhere, the better sentences being I haven't left yet and she hasn't gone anywhere. With may and might, encliticization is not in my dialect: *we mayn't leave before noon, *she mightn't be too pleased with that. With must, either form is possible: They must not like fish or they musn't like fish. And finally, with the remaining modals, won't, wouldn't, can't, couldn't, shouldn't are much more acceptable than their

non-encliticized counterparts. I have no explanation for these facts, and can only say that each form seems to have its own "preferences".

26. I choose only these modals to demonstrate the point, because, as I mentioned in footnote 25, the other modals have a heavy "preference" for Not encliticization.

27. I have excluded would, will, should, and shall from consideration because Fiengo did.

28. Some of these sentences do feel somewhat emphatic when the modal has tertiary stress. It is possible that the auxiliary encliticizes only when the modal is emphatic. Yet one will then have to sort out degrees of emphasis, I believe, in order to distinguish between

Mother Jones { $\overset{\circ}{\text{M}}\text{UST } \overset{\circ}{\text{h}}\text{AVE} \}$ spoken for three hours running.
 { $\text{m}\overset{\circ}{\text{U}}\text{ST } \overset{\circ}{\text{h}}\text{AVE} \}$

In comparing these two, only the first one seems really emphatic.

29. Fiengo (1971b) originally observed that beware is a tenseless expression, giving sentences like

Beware of the Greeks.
 The Trojans are warned to beware of the Greeks.
 It was necessary that the Trojans beware of the Greeks.

30. Bresnan mentions that it was Larry Horn who pointed out to her the significance of examples like (104a)-(104c) for her Ordering Hypothesis, according to which phrase stress rules (and, perhaps, clitic rules) operate on each syntactic cycle after the

transformations have applied.

31. Henry Sweet observed a "tendency" for strong forms to substitute for weak forms when the weak form is followed by another weak form. The example he offers is one of a preposition with a pronominal object:

It's a matter of indifference to me.

To me has either the phonetic shape [:tuw mij] or [tə mij] (using Sweet's transcription).

Fischer (1971, p. 52) observes that in prepositional phrases with for, the stress contour fòr hím will have a benefactive interpretation, as in (a),

(a) I washed the dishes for him.

while the stress contour fòr hím is the one usually associated with the dative, as in (b),

(b) I bought the book for him.

32. In fast speech, some speakers find [təjə] for to you or [əvjə] for of you acceptable. I submit that these pronunciations are brought about by the same (fast speech) rule which destresses non-lexical bisyllables like gonna, as in I'm gonna go [ajnə nə gow], and until, as in until then [ntɪ ðen].

33. The only other person that I know of to have suggested an encliticization of a pronoun to a preposition is Mark Aronoff (1971). Morris Halle has pointed out to me that such an encliticization rule is absolutely necessary in Semitic. In Arabic, for

instance, the pronominal objects of prepositions have the same "weak" form as the cliticized objects of verbs. And, furthermore, the possessive pronouns which are clitic to nouns have the same form as the pronominal objects of prepositions:

la-hu	"to him, it"
kataba-hu	"he read it"
baitu-hu	"his house"

34. Note that pronouns like those in (120) have only non-primary stress. Anaphoric or redundant elements tend not to carry main stress. This is not to say that they are stressless, as the (120) sentences show.

35. The demonstratives seem not to be stressless as specifiers of the noun phrase: Do you like this tea?, That incident really bothers me. I don't know how this is to be explained except on semantic grounds.

36. This is no novelty. Aronoff (1971) actually proposed such a transformation.

37. If the object pronoun is them, one may find either [lij ʒ̣m] or [lijv m] for leave them alone. The /v/ deletes only if the optional rule deleting /ʒ̣/ (cf. Zwicky (1970)) has not operated. The [ʒ̣] provides the proper environment for /v/ deletion, but the [m] does not. We will say the environment of the rule is ___ # [-syllabic].

38. The operation of /v/ deletion should be restricted to verbs and the preposition of. It obviously doesn't apply in the noun plurals calves, wives, leaves, etc.
39. The pronunciation of I can't ask that, [aj kã D æsk...], *[aj kã? æsk...], *[aj kã æsk...] shows that the boundary(s) must be followed by a consonant, not a vowel.
40. By saying that clear l appears in the context ___(#)i one cannot explain the pair coolish vs. foolish. In the former, the l is dark, but in the latter it is clear.
41. I cite in particular Kenyon and Hultzén for American English.
42. The fact that these vowels become lax in all but pre-vocalic environments is undoubtedly related to the very general phonological phenomenon of English whereby a vowel becomes tense when it precedes another vowel.
43. The examples in (155-ii) all include polysyllabic adjectives or nouns which are not stress-final. I chose these examples because in examples like
- How old is he?
How high are they?
What time is it?
What kind were they?
- it is less obvious that it is the Aux that is stressed, and it seems that the pronoun may be stressed. This may have to do with a tendency in English to eliminate adjacent high stresses. The

primary-stressed old is adjacent to the secondary-stressed is and is is thus required to drop its stress. Notice, however, that is is probably not rendered stressless because Aux Reduction can't take place: *How old's he? Though it can if nothing has encliticized to is: How old's that old man?

These "rhythmic" aspects of English phrase stress certainly need examination.

44. Let me add here what should be obvious: the stress on Aux is zero whether or not the subject noun phrase is followed by a verb or its predicate:

Where are the boys?
 " " " " going?

How's Guadalajara?
 " " bearing up?

Who are Sue and Millie?
 " " " " " working for?

Who is Jane?
 " " " manager for?

45. When the PP is the complement of an adjective, the facts are not so neat. In the sentences (i)-(iii) the Aux is most definitely the recipient of stress and the pronoun is unstressed.

- i) (I'm very good at sports) Àre y^ou at tennis?
- ii) (We're proud of our children) Àre y^ou of your daughter?
- iii) (She's adept at poker) Ìs sh^e at pool?

Yet in (iv)-(vi) it seems either the Aux or the pronoun may be stressed:

- iv) How is it to live in? [ɪ̇z ðt] or [z ðt] vs. [ɪz °t]
 v) How are you at math? [ə̇r jùw] vs. [à r j^{uw}]
 vi) How are they at pool? [ə̇r ðèj] vs. [à r ðèj]

And in (vii)-(ix) it is better to stress the pronoun than not:

- vii) How delighted are they at the news?
 viii) How gentle is he with Joe?
 ix) How annoying is she to your aunt?

I don't see any explanation for this display of facts at the moment.

46. Removing #'s from WH-pronouns of course predicts that they will become stressless. This is true of the relative clause pronouns, e.g.,

The man who's already left was the one you're looking for.
 The people who've been involved will understand.
 The time when you laughed at the bonzo was really a disaster.

Question pronouns are less obviously stressless, cf. (184).

Notice, though, that if there is a noun phrase subject with initial stress, the WH-pronoun is relatively stressless:

Who'll John be seeing there?
 How's Mary been doing?
 Where's Native Dancer these days?

Two general processes seem to be at work here. One (which might explain (184)) is that there may be some tendency towards initial stressing in phrases, as evidenced by (i) the fact that /h/ never deletes initially (Has she left yet?, Have they all finished?) and (ii) the pronunciation of in initially and medially:

In his room they found a dog. [ɪn], ?[n]

They found a dog in his room. [ɪn], [n]

The second (which might explain the second set of sentences above) is the tendency for non-primary stresses to diminish in the neighborhood of primary stresses.

47. Yet to be explained are the restrictions on Aux Reduction in the sentences:

Never've I seen such large balloons. [əv], *[v]

Of great merit's Tom's proposal. [ɪz], *[s]

Rarely've we seen such sights. [əv], *[v]

Hardly'd John and Mary left... [əd], *[d]

John hasn't gone and neither's Bill. [əz], *[z]

The stress is reduced on all of these auxiliaries; this is accomplished by the Monosyllable Rule. But for some reason, Auxiliary Reduction can't apply.

Chapter II

The Segmental Phrase Phonology of English

1. Introduction

In this chapter a rather brief survey of some important external sandhi rules of English will be made. By external sandhi rules I mean those inter-word phonological processes which are local in effect, involving only the segments at the extremities of juxtaposed words. In part, the purpose of this chapter is to provide independent evidence for the rules involved in a number of rather spectacular derivations, like the derivation of [aɪnə li:v] I am going to leave from /aj æm goʊɪŋ tuw li:v/. I also intend to make a more complete exposition of some of the processes of segmental phonology that were referred to in Chapter I.

I am indebted to the authors of many phonetics handbooks as well as to Zwicky (1968, 1970) for most of the data upon which this chapter is based. This chapter is a compilation of the observations these authors made about English; an attempt has been made to improve upon these observations, by making them more precise. Rules have been formulated, and their environments specified.

The major part of the segmental processes of English phrase phonology are assimilations of consonants and elisions--of both

consonants and vowels. In normal speech, elisions (except for the deletion in the finite auxiliary) are restricted, for the most part, to consonants. In fast speech, or more colloquial speech, vowel elisions, as well as an increasing number of consonant elisions, are at play. The vowel elisions are due in part to the effect of additional processes of vowel reduction in fast speech.

The application of many of these external sandhi rules I will be discussing is optional, but normal. For instance, a number of investigators have shown that full glottalization¹ of /t/ at the end of a word preceding a consonant-initial word is of very high frequency.² But the rule can in no way be called obligatory, in comparison, for example, with the Vowel Shift or the Spirantization Rules of English (cf. SPE). In colloquial or faster speech, the external sandhi rules may operate "more frequently". This increase in frequency can be attributed to two different factors. First, the speaker may simply be making more frequent use of the rule than she or he does in normal speech. In addition, the domain of the rule might be extended, from #C to ##C, or ##C to ##, for example. It will be seen as the chapter proceeds that the faster the speech, the greater the possibility for rules to "reach across" double word boundaries, ##. This is a natural result for fast speech, because many of these rules (assimilations in particular) are determined by the posture of the vocal tract and by ease of articulation. What's interesting is that rules which are in essence phonetic

should nevertheless respect abstract entities like #'s, and respect the number of #'s between words.

I will show that many external sandhi processes are more in evidence when non-lexical items, which may be separated from another word by one or no word boundaries, are involved. 'For example, one rule of coronal assimilation (to be described below) changes a final /s/ to [š] very regularly in has she gone, less regularly in has Sheila gone, and much less so in Barnabas shielded him. The SPE conventions on word boundaries permit just those distinctions in the environments of these sentences, i.e., ...s] [š... vs. ...s] [#š... vs. ..s#] [#s.. that allow one to say quite simply, and quite naturally, that the "closer" the tie is (i.e., the fewer the word boundaries are) between two words, the more easily external sandhi occurs.

2. Vowel Reduction and Vowel Loss

2.1 Reduction

English unstressed vowels most often reduce to [ə] or [ɪ], especially if they are lax vowels to begin with. This reduction is the primary cause of the "contraction" phenomena so characteristic of English, for the reduced vowels quite frequently delete, bringing into juxtaposition consonants which may then undergo changes themselves.

At a normal rate of speech the lax vowels reduce. Examples of this reduction are found throughout Chapter I. Tense vowels

reduce less readily. In faster speech, tense vowels reduce to lax [ɪ] or [ə] more regularly. For example, the [ij] of he, she, we may instead be pronounced as [ɪ], the [ej] of they may be [ɛ], the [uw] of you may be [ʊ] or [ə], and the [aj] of I may simply be [a]. Do and to will be quite regularly [ə].

Additional processes of stress reduction at work on non-lexical items will permit the [ow] of don't to become [ə], as in I don't know (I dunno), or the [ow] of going to become [ʌ] or [ə], as in I'm gonna. The [ij] of being may become [ɪ], e.g., you're being absurd [jər bɪŋ əbsɜːd]. I am presently not in a position to make any more detailed comments on these reductions, and do not know to what extent they are really systematic in many sorts of words in fast speech. In the derivations given in this chapter I will use the term Vowel Reduction to refer to the entire array of vowel reductions in English.

2.2 Elision

The auxiliaries is, has, had, would, will, am, are, have quite normally lose their vowels, through the operation of the rule of Auxiliary Reduction (cf. Chapter I, and Zwicky (1970)). The auxiliary-type words do, did, and does may also lose their vowels through elision. Zwicky tentatively proposed a "special rule applying to forms of do (do did does don't didn't doesn't) to delete the vocalic nucleus of the form."³ But I disagree with his proposal, which says, in effect, that do and did are neutralized. In my dialect, the elision in do is far

more restricted than the elision in did. Observe the differences between the (a) and (b) sentences below. In either set, the sentence, pronounced as indicated, is unambiguous:

- | | | |
|----|----------------------|-------------------------|
| a) | [hawdæʒej now] | How do they know? |
| b) | [hawdʒej now] | " did " " |
| a) | [{wendæʒej } wanə] | When do they wanna ...? |
| b) | [wendʒej wanə] | " did " " |
| a) | [wɛrdə ʒej gow] | Where do they go? |
| b) | [wɛrd ʒej gow] | " did " " |
| a) | [wajdə wij duw ɪt] | Why do we do it? |
| b) | [wajd wij duw ɪt] | " did " " " |

Evidently, different phonological processes produce the elisions in do and did. The elision of the vowel in do may well be restricted to the environment before you illustrated below:

- | | |
|-----------------|---------------------|
| [djə wanə lijv] | Do you wanna leave? |
| ?[wɛn djə wɜk] | When do you work? |

The rule for did may, on the other hand, be more general, and may be in part responsible for the derivation of [ɪDə] from /ɪt wʊd hæv/. An intermediary representation of this phrase is /ɪt əd ə/. The reduced vowel between the two alveolar stops must be deleted before the flap [D] can be formed (cf. §4.3.3 for more on flaps).

Aside from the rules involved with forms of do, I should mention two rules of vowel elision which apply internal to words

and will be important in the derivation of certain contracted forms. One rule may on occasion delete the [r] from the ending [rɨ] when the segment preceding the ending is a glide: being [bijɨɨ → bijɨ], going [gowɨɨ → gojɨ], playing [plejɨɨ → plejɨ]. The second rule, as Zwicky (1968) formulated it, is as follows:

$$\text{ə} \rightarrow \emptyset / \text{C} \left. \begin{array}{c} \text{r} \\ \text{l} \\ \text{n} \end{array} \right\} \left[\begin{array}{c} \text{v} \\ \text{-stress} \end{array} \right]$$

Word-internally, it accounts for separable, temperature, opéra, anniversary, factory, discovery, awfully, eratically, buffalo, definite, robbery, subordinate (n.), arsenal.

2.3 Syllabic Sonorants

Often enough the [ə] or [ɨ] of a sequence [ən], [ɨn] or [əl], [ɨl] in a word is reduced so much that phoneticians are inclined to call the sonorant syllabic and consider that the vowel as such has been lost. Sometimes it is difficult to say whether the reduced vowel is really lost or not, but what is clear is that a reduced vowel preceding a sonorant is far more reduced than one preceding a non-sonorant. The examples below show this.

Will John go [wɨ] vs. with John gone [wɨɨ]

She wants an apple [n] vs. She works at Apple [ət]

Below are some further examples of syllabic sonorants:

Wait till I'm ready [tɨ] We're not allowed to [ɨlawd]

Wait until I'm ready [nɨtrɨl] Alice and Mary [n]

I haven't got any more [ni] too trite an answer [n]

he wouldn't smile [nt]

A syllabic nasal can go on to lose its syllabic quality if it is preceded by a vowel or [r]:

I can't understand [kænt] They aren't kidding [arnt]

Me 'n Mary left real early [mijn]

More 'n more are leaving [mɔrn]

It's too low an altitude for that plane [lown]

The understanding that the sequence [ən] may become either [ŋ] or [n] will contribute to an understanding of the derivations of the highly contracted forms of don't and didn't.⁴ Consider the casual pronunciation of Why don't you leave: [wajŋčə lijv]. I propose the following derivation:

waj	downt	juw	lijv	
	ə	ə		Vowel Reduction
	dənčə			tj → č (cf. §3.3)
	dŋčə			Syllabify
wajŋčə				"Evidently rule"
wajŋčə				Desyllabify

(The only mysterious step of this derivation is the "Evidently rule". This rule deletes a post-vocalic /d/ which precedes a syllabic nasal in evidently: *[évrɪdɛntli] → [evrɪdɛntli] → [evrɪdntli] → *[evrɪntli] → [evrɪntli]. In my dialect, [evrɪntli] is a casual-speech pronunciation of evidently.) For the [dɪŋčə lijv] pronunciation of Didn't you leave, one has:

dɪdɪt juw lijv

ə

Vowel Reduction

dɪdɪtʃə

tj → c (cf. §3.3)

dɪtʃə

"Evidently rule"

dɪnʃə

Desyllabify

The pronunciation of Why didn't you leave is [wajdɪnʃə lijv]. In my dialect, neither [wajdɪtʃə] nor [wajnʃə] are possible pronunciations of Why didn't you.

3. Consonant Assimilations

3.1 Nasal Place Assimilation

In SPE it is suggested that pre-consonantal nasal consonants in the interior of a word be given the underlying representation /N/, where /N/ is the archiphoneme of nasal consonants, unmarked for place of articulation. The reason for doing this is, of course, that nasals always assimilate in place of articulation to the consonant that follows. The rule for nasal assimilation would be:

$$\left[\begin{array}{l} +\text{nasal} \\ +\text{cons} \end{array} \right] \rightarrow \left[\begin{array}{l} \alpha \text{coronal} \\ \beta \text{anterior} \\ \gamma \text{high} \\ \vdots \end{array} \right] / _ \left[\begin{array}{l} \alpha \text{coronal} \\ \beta \text{anterior} \\ \gamma \text{high} \\ \vdots \end{array} \right]$$

In addition to applying in the morpheme-internal environment that the rule above specifies, nasal assimilation commonly applies across the prefix boundary in congress, income, compare, combine, inquire, engage, etc. It also applies so commonly between the

elements of a compound word (e.g., pancake, pincushion, tenpence, moon glow, innkeeper, pawnbroker) that one is inclined to consider the strength of the boundary internal to compounds to be less than the ## specified in the Compound Stress Rule. It will be shown just below that single word boundary # is also a common environment for nasal assimilation, whereas double word boundaries ## present a much greater obstacle to the rule. This being the case, one might posit a Compound Readjustment Rule which would be post-cyclic (and would therefore follow the cyclic Compound Stress Rule (cf. Introduction)):

$$\begin{array}{c}
 \begin{array}{ccc}
 \# & \#X\# & \#Y\#\# \\
 N,A,V & & \bar{N},A,V
 \end{array}
 & \equiv &
 \begin{array}{ccc}
 \# & \#X & \#Y\#\# \\
 & & \text{(or } \# \#X\# \text{ } Y\#\#\text{)}
 \end{array} \\
 & & \text{where } X,Y = N, A \text{ or } V
 \end{array}$$

Given such a rule, one would expect that in the style of speech where the domain of the nasal assimilation rule is extended to include an optional #, i.e., $N \rightarrow \dots / _ (\#) \dots$, the elements of a compound, separated by single # because of the Compound Readjustment Rule, would have nasal assimilation as freely as elements separated by single # because of SPE-I and SPE-II.

The reader will observe that in the examples below the underlined words--all non-lexical items like prepositions, determiners, and auxiliaries--very naturally find their final nasals assimilated to the initial consonant of the following word. The reader will recall that the boundary environment provided for all these words by SPE-I and SPE-II is $\#[\dots N] \#[C\dots]\#$.

<u>in</u> Colorado	[ɹɪ]	<u>in</u> bad condition	[ɪm]
<u>in</u> court	"	<u>in</u> Boise	"
<u>in</u> good company	"		
<u>on</u> call	[aɪ]	<u>on</u> "Bake"	[am]
<u>on</u> Copp's Hill	"	<u>on</u> Boylston St.	"
<u>from</u> Karen	[frɪ]	<u>from</u> Dick	[frɛn]
<u>from</u> good to bad	"	<u>from</u> New Guinea	"
do you want <u>some</u> coffee	[sɪ]	did you have some tea?	
do you want <u>some</u> good tea	"		[sɪ]
I <u>can</u> get it	[kɪ]	She <u>can</u> bear it	[kɛ]
We <u>can</u> call you	"	They <u>can</u> moo all night	"
I' <u>m</u> coming	[ɪ]	I' <u>m</u> draining my energy	[n]
I' <u>m</u> good as gold.	"	I' <u>m</u> disappointed in you	"

I wager that speakers of English will find it much less easy to assimilate the final nasal of the underlined words below to the consonant that follows. In these cases, the nasal and the consonant are in the environment ...N#] [#C....

<u>John</u> banked at the Chase Manhattan.	?[dʒam]
Would they <u>loan</u> Carnegie ten million?	?[lowm]
They always <u>malign</u> credit risks.	?[məlaɪɪ]
Are you <u>goin'</u> boating?	?[gowɪm]
Mary gave the <u>ham</u> to Paul.	?[hæm]

3.2 Voicing Assimilation

In Chapter I, §2.3.1 I briefly mentioned the phonetic regressive voicing assimilation one finds in English. Here in this section I would like to develop the discussion a bit further.

First of all, one must distinguish between the partial devoicing of voiced lenis consonants that one finds at the end of a sentence or in the environment — ## $\left[\begin{array}{c} C \\ -\text{voice} \end{array} \right]$,⁵ and the full-fledged devoicing of voiced sounds through assimilation to voiceless sounds. (For a discussion of partial devoicing see Gimson (1962, §8.03, §11.05), among others.) Second, it must be recognized that the devoicing of a voiced sound is a far more common sort of voicing assimilation than the opposite sort. One cannot help but think that the preponderance of assimilations to voiceless consonants is due, in part at least, to this additional process of partial devoicing in English.

Voicing assimilation is extremely important in disambiguating the sentences orthographically represented as:

Do you know which book Mary has to read?

That's the pen she used to write with.

When the underlying phrase has a modal-type reading, the transformation of To-Enclitic (cf. Chapter I, §3.1.3) will have taken place, and the pronunciations of the resulting constituents are [hæstə], and [juwstə], not [hæz tə] and [juwzd tə]. The internal structure of the constituent created by To-Enclitic is $\left[\begin{array}{c} \# \\ \text{Verb} \\ \# \end{array} \right] \begin{array}{c} \text{to} \\ \# \end{array} \left[\begin{array}{c} \# \\ \text{V} \\ \# \end{array} \right]$ (after SPE-II), where only one # separates to

from the verb. Were to not encliticized, it would be separated from the preceding verb by at least two #'s. One can show that full voicing assimilation takes place very readily across # but not across ##, thereby explaining why the sentences above are disambiguated by that assimilation.

An examination of the following phrases will reveal that the underlined consonants, voiced in underlying representation, can become voiceless in the environment $__ \text{[# } \left[\begin{smallmatrix} \text{C} \\ -\text{voice} \end{smallmatrix} \right] \dots$

You could <u>d</u> pawn it.	[juw kt pɔn ɪt]
I should <u>d</u> think so.	[aj ʃt θɪŋk sow]
<u>o</u> f course	[əf kɔrs]
<u>a</u> s for John...	[əs fər dʒan]
<u>w</u> ith time	[wɪθ tajm] ⁶
<u>I</u> s Pete here	[s pi:t hi:ə]
<u>H</u> as Fred left	[həs fred left]
Have Pat and Jane come	[həv pæt ə dʒeɪn kʌm]

In the environment $__ \text{## } \left[\begin{smallmatrix} \text{C} \\ -\text{voice} \end{smallmatrix} \right]$, a final consonant will not assimilate in voicing, except perhaps in very fast speech. For example, Please shut the door is most normally pronounced [pli:ʒ ʃʌt...], not [pli:ʃ ʃʌt] or [pli:ʃ:ʌt].

3.3 Coronal Assimilations

There are two types of coronal assimilations that seem to operate fairly freely between words in English. The first turns an alveolar consonant (stop or fricative) in final position into

a palatal consonant when the next word begins with a yod, /j/.⁷ The second converts a word-final alveolar fricative (/s/ or /z/) into a palatal fricative (/š/ or /ʒ/) when a palatal fricative is the initial consonant of the next word. These two rules apply when either no, one or two word boundaries separate the words, though it will be clear, I think, that when ## separates the words, the rules apply less readily. Let us call the first rule Coronal Assimilation-Yod (CA-Y) and the second Coronal Assimilation-Fricative (CA-F). Below are examples where these rules have operated, sorted out according to the boundaries that separate the words affected:

CA-Y

no #

did <u>y</u> ou	[dʒ]	didn't <u>y</u> ou	[č]
would <u>y</u> ou	"	don't <u>y</u> ou	"
had <u>y</u> ou	"		

#

feed <u>y</u> ou	[dʒ]	meet <u>y</u> ou	[č]
told <u>y</u> ou	"	want <u>y</u> ou	"
as <u>y</u> ou said	[ʒ]	miss <u>y</u> ou	[š]
Mary's <u>y</u> elling	"	this <u>y</u> ear	"
was <u>y</u> our car there"	"		
all these <u>y</u> ears	"		

##

last <u>y</u> ear	[č]
eight <u>y</u> ears	"
shut <u>y</u> our eyes	"
six <u>y</u> ears	[š]
Do they bus <u>y</u> our kids	?[š]
She tries <u>y</u> our method often	[ʒ]

There is a difference to be found between the two parts of the rule. In environments where two #'s separate the susceptible segments, the Fricative rule applies much more freely than the Yod rule. Contrast the (a)-sentences with the (b)-sentences:

a) Elvis shrieked and yelled. [š]

b) Elvis yawned and stretched. ?[š]

a) I gave Chris show tickets. [š]

b) I taught Chris yoga. ?[š]

The great freedom in application of the Fricative portion of the Coronal Assimilation rule is perhaps due to the difficulty in articulating two successive coronal fricatives having only slightly different points of contact with the roof of the mouth.

4. Consonant Elisions

4.1 Glide Deletion

The consonant elisions which are the most important for the contraction of the Auxiliary are those of initial /h/ and initial /w/. Their deletion, along with the deletion of initial /ǰ/ have been described in ample detail by Zwicky (1970). (He gives the name of Glide Deletion to the rule deleting these three consonants.) Since his discussion is quite complete, I will say no more on the subject.

4.2 /v/ Deletion

In §3.1.2.1 of Chapter I the deletion of /v/ from the reduced form of the tenseless auxiliary have was discussed, and in §3.2.2 of that chapter, further cases of /v/-Deletion were examined, with the conclusion that word-final /v/ is lost (primarily) in the environment __#C. In this section I wish only to continue the discussion of the deletion of /v/ from the particle of. In the sentences below, of may be pronounced either [əv] or [ə]:

What kind of cheese is that?

It's full of holes.

How much of that do you want?

You've got a lot of gall.

Joan Bresnan brought to my attention the fact that the /v/ may also be lost phrase-finally in the expressions kinda and sorta:

Is he a snob? { Kinda.
 { Well, sorta. }

However, in non-idiomatic expressions like

That's something we don't have much of.

the deletion of /v/ from of is not permissible. It's quite likely that kinda and sorta, which have a syntactic and semantic function somewhat similar to that of rather, have been lexicalized as single words lacking final /v/.

4.3 Elisions of /t/ and /d/

4.3.1 The Three Consonant Rules

A number of phonological processes in English have the effect of deleting the middle consonant of a three consonant sequence, i.e., where $C_1C_2C_3 \rightarrow C_1C_3$. In particular, one rule deletes a consonant when there is an obstruent on its left and another C on the right, i.e., $/[-son] _ C$. Another rule deletes a consonant when in the environment $/[+nasal] _ C$. Such processes are not strictly limited to the deletion of /t/ and /d/, but the frequency with which they operate on /t/ and /d/ so far outstrips the frequency of operation on other obstruents that I chose to discuss these processes under the category "elisions of /t/ and /d/". The reader should bear in mind that examples where /k/, /p/, and /θ/ (among others) are deleted are to be found as well.

These deletion rules pay little attention to what kind of consonant it is that appears on the right. What's important is the kind of consonant on the left (i.e., C_1) and what sorts of boundaries (if any) separate C_2 from C_3 . The rules performing the operation $C_1C_2C_3 \rightarrow C_1C_3$ operate within a word, and between words. In many cases, the effect of these rules within a word is now permanent, and, in fact, these rules know few exceptions within the word. Ward (1931) cites Jones, the author of The Expert Orthographer (1701), who says that the /t/ and /d/ are gone in often, Christmas, costly, ghostly, mostly, roastbeef, wristband, friendly, handmaid, fondle, candle, handle, children.⁸

As Ward points out, some of these consonants have since been restored (particularly in the ndC cases).

As external sandhi rules, these deletion processes apply with somewhat less regularity. The frequency or "ease" with which they apply depends in large part on the boundary environment between the two words. The rules operate in the following environments, in order of decreasing frequency.

- (i) [...C₁C₂#C₃] (C₃ is an inflectional ending)
- (ii) [...C₁C₂] [#C₃...]
 or [...C₁C₂#] [C₃...]
- (iii) $\underset{N,A,V}{[[\dots C_1 C_2 \#] \# C_3 \dots]}$ (In a compound; cf. §3.1)
 $\underset{N,A,V}$
- (iv) [...C₁C₂#] [#C₃...]

The alternations apostle [əpɔ́səl], apostolic [əpɔ́stəlɪk] and epistle [ɛpɪ́səl], epistolary [ɛpɪ́stəlɪr] should unequivocally establish the Post-Obstruent Elision Rule as an active phonological process in English words. The examples below show that this rule operates in environments (i), (ii), (iii) and (iv) as well.

- (i) thefts shifts asked asks attempts
 busts lasts basked desks products
 lifts tests retracts acts conflicts
 lengths fifths sixths twelfths
- (ii) I must go. Must Mary go.
 Please dust me off. Don't ask me how.
 Shift me to left field. Don't reject me.
- (iii) aircraft-carrier coast-guard fact-finder
 draft-dodger breakfast time Prospect Park
 left-leaning wrist-watch dialect differences

I leave it to the reader to verify that this rule operates only when there is a consonant on the right, not merely in the environment /__#(#) (*bound ankles, *find it, *granduncle, *wind up).⁹

It seems that the Post-Nasal Elision Rule may delete the articulatory features of a voiceless consonant that are related to the mouth cavity, but not affect the glottal closure associated with that consonant. Look, for example, at these pronunciations of I don't believe it [aj dɒwɪŋ bəli:v ɪt] and It can't be done [ɪt kæn't bi dʌn]. The glottal closure is still present, but the /t/ has been lost, allowing the nasal to assimilate to the following /b/.

4.3.2 Glottalization

In earlier sections of this study I have made reference to a phonological process which replaces a voiceless stop by a glottal stop. This replacement ("full glottalization") is only one of the two processes involved in the "glottal reinforcement" of voiceless stops; the other is "preglottalization", where the stop closure in the oral cavity is accompanied by a closure at the glottis.¹⁰ Glottal reinforcement is fairly widespread in standard English (British and American), and especially in Cockney (see Sivertsen, 1960, §4.14). A number of authors¹¹ have investigated the phonetic and syntactic environments of this reinforcement, and have come to the following general conclusions. (1) Glottal reinforcement affects all voiceless stops, but

primarily /t/. (2) Glottal reinforcement occurs when a voiceless stop is preceded by a vowel, liquid, or nasal, and followed by another consonant, not necessarily in the same word. If the preceding consonant is an obstruent, glottal reinforcement does not occur. It occurs most often when the following consonant is an obstruent or a nasal, less often when that consonant is a liquid or semi-vowel. The environment is thus basically $[+sonorant] __ [-seg]_o C$, where the variable elements of the rule seem to be the number and kind of boundaries, and the type of following consonant. (3) Full glottalization occurs in the following different boundary environments, in order of increasing frequency:

- (i) $__ (+) C_x$ (C_x = obstruent or nasal)
- (ii) $__ \# \left\{ \begin{matrix} t \\ s \end{matrix} \right\} \#$ ($\underline{t}, \underline{s}$ are inflections)
- (iii) $__ \# (\#) C$

Preglottalization occurs in pausa, i.e., $__ \#\#$], and word-internally when the following consonant is a non-nasal consonant.

The examples below illustrate these environments of glottal reinforcement:

- (i)

mount <u>ain</u>	apparent <u>ly</u>	sweet <u>ly</u>	lik <u>eness</u>	lik <u>ely</u>
Clint <u>on</u>	evident <u>ly</u>	discret <u>ely</u>	rip <u>eness</u>	frank <u>ly</u>
butt <u>on</u>	antl <u>er</u>	quiet <u>ly</u>	whit <u>eness</u>	amp <u>ly</u>
glutt <u>on</u>		prick <u>ly</u>	passionat <u>eness</u>	cheap <u>ly</u>
- (ii)

That got <u>t</u> me going.	She lent <u>t</u> me a dollar.
Let <u>t</u> me go.	I don' <u>t</u> believe it.
We can' <u>t</u> go.	We didn' <u>t</u> promise a thing.
- (iii)

I went <u>t</u> fishing.	He sent <u>t</u> some letters.
We get <u>t</u> pushed around.	Let <u>t</u> the cat out.
She got <u>t</u> real mad.	We bought <u>t</u> pizza.

And these next sentences, where a final /t/ precedes a vowel, show that the environment of glottal reinforcement is truly pre-consonantal:

Don't ask questions.	[D], *[?]
I can't argue with you.	" "
We got Arlene to go.	" "
They sent a letter to her.	" "

Recall that in §3.2.2 of Chapter I, a rule deleting the glottal stop produced by glottal reinforcement was brought forth as evidence for the enclitic analysis of pronoun objects. It was shown that the glottal stop elision rule operated in the environment $_\#C$, but not in the environment $_\#\#C$. This rule does not really constitute a part of the overall glottal reinforcement processes, for while glottal reinforcement appears regularly in normal speech, the glottal stop elision is a secondary process, operating primarily in fast or colloquial speech.

4.3.3 Medial allophones of /t/ and /d/

Within a word, medial /t/ and /d/ become an alveolar flap [D] as a result of the rule of Flap Formation:

Flap Formation:

$$t, d \rightarrow D / V \left(\left\{ \begin{array}{c} 1 \\ n \end{array} \right\} \right) \text{ — } \left[\begin{array}{c} V \\ \text{-stress} \end{array} \right]$$

Words containing such a flap are, among others,

better	writer	city	battle
twenty	rider	ladder	puttering
malted	pity	latter	

The Flap Formation rule must be extended to the environment

$\left[\begin{array}{c} \# \\ V \end{array} \left[\dots \left\{ \begin{array}{c} t \\ d \end{array} \right\} \right] \begin{array}{c} \# \\ V \end{array} \right] \left[\begin{array}{c} tuw \\ V \end{array} \right] \# \left[\begin{array}{c} \\ V \end{array} \right]$ in order to produce the right pronunciations

for gotta [gaDə], oughta [ɔDə], and hadda [hæDə], which must be derived from underlying /gat#tuw/,¹² /ɔt#tuw/, and /hæd#tuw/, respectively. Evidently, a rule of Cluster Simplification must precede Flap Formation, if Flap Formation is to be able to apply:

Cluster Simplification:

$$\begin{bmatrix} +\text{cons} \\ \alpha\text{coronal} \\ \beta\text{anterior} \\ \gamma\text{continuant} \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} +\text{cons} \\ \alpha\text{coronal} \\ \beta\text{anterior} \\ \gamma\text{continuant} \end{bmatrix} (\#) _$$

Then, with Flap Formation reformulated as:

Flap Formation:

$$t, d \rightarrow D / V \left(\begin{Bmatrix} 1 \\ n \end{Bmatrix} \right) _ (\#) \begin{bmatrix} V \\ \text{-stress} \end{bmatrix}^{13}$$

the derivations of [gaDə] and [hæDə] are possible:

[#[gat#]	[tuw]#]	[#[hæd#]	[tuw]#]	
	ə		ə	Vowel Reduction
	∅		∅	Cluster Simplification
	D		D	Flap Formation
[gaDə]		[hæDə]		Output

The rules of Cluster Simplification and Flap Formation are essential in the derivations of other sorts of contractions. In particular, they participate in the derivations of the alternants [wʌtʃə wənə seɪ] and [wʌDəɪə wənə seɪ] of What do you want to say?, and of the alternants [wʌDəz ɪt seɪ] and [wʌts ɪt seɪ] of What does it say?.

What do you want to say

wʌt duw juw...	wʌt duw juw...	
ə ə	ə ə	Vowel Reduction
wʌt ə jə	wʌt ə jə	Cluster Simplification
-- -- --	wʌt ø j	/ə/-elision (opt.)
wʌDə jə	BLOCKED	Flap Formation
BLOCKED	wʌč ə	Coronal Assimilation
[wʌDəjə wənə seɹ]	[wʌčə wənə seɹ]	Output

These are the only contracted pronunciations of What do you..., and these rules derive them. The only pronunciations of What does... are similarly derivable:

wʌt dʌz ɹt seɹ	wʌt dʌz ɹt seɹ	
ə	ə	Vowel Reduction
wʌt əz	wʌt əz	Cluster Simplification
-----	wʌt z	/ə/-elision (opt.)
wʌDəz	-----	Flap Formation
-----	wʌts	Morpheme Assimilation
[wʌDəzɹt seɹ]	[wʌts ɹt seɹ]	Output

One might think of the /ə/-elision rule as actually being the Auxiliary Reduction rule, which, after the operation of Cluster Simplification, deletes the now-initial vowel of the finite auxiliary does, or do.

Flap Formation obviously has to enter into the derivation of [ɹDə bɹn fʌni] It would have been funny. It might do it in the following way:

it wʊd hæv bɪn fʌni	
ə ə	Vowel Reduction
∅ ∅	Glide Deletion
∅	/v/-Deletion
ɪt əd ə bɪn fʌni	
∅	/ə/-elision
∅	Cluster Simplification
D	Flap Formation
[ɪDə bɪn fʌni]	Output

(See §2.2 of this chapter for a discussion of the vowel elision rule which may be at work here.)

Another rule, affecting the output of Flap Formation, deletes [D] in the environment / n — $\left[\begin{smallmatrix} V \\ -\text{stress} \end{smallmatrix} \right]$. Note the following words:

wint er	ban ter	cent er
splint er	decan ter	hunt ing
print er	plan ter	

A [D] may also delete from in front of, kind of.

What's interesting is the role this rule plays in the structures formed by the encliticization of pronouns and the encliticization of to. Both want her to go [wanər tə gow] and want to go [wanə gow] can be explained by means of Flap Deletion:

/want#hər##tuw gow/	/want#tuw##gow/	
ə	ə	Vowel Reduction
∅		Glide Deletion
	∅	Cluster Simplification
wanDər	wanDə	Flap Formation
∅	∅	Flap Deletion
[wanər tə gow]	[wanə gow]	Output

Flap Deletion also operates in the derivation of I am going to go
[aɪnə goʊ]:

aj æm goʊɪŋ tuw goʊ	
ə	ə
	Vowel Reduction
∅	
	Auxiliary Reduction
ŋ n	
	Nasal Assimilation
aj ŋ goʊɪn tə goʊ	
	D
	Flap Formation
	∅
	Flap Deletion
gʌn ə	
	Mystery (cf. §2.1, 2.2)
	Fast speech:
a ə	
	Vowel Reduction (cf. §2.1)
a ŋ gn ə	
	Vowel Elision (cf. §2.2)
ŋ n	
	Post-Nasal Elision
[aɪnə goʊ]	
	Output

Though the processes accounting for the reduction and elision of vowels in this derivation are not well-understood, it is pretty clear what rules are affecting the consonants and their elision. A significant step has thus been made towards understanding the derivation of [aɪnə].

Footnotes to Chapter II

1. For a definition of this term, see below. The term is drawn from Higginbottom (1964).
2. Both André sen (1958) and Higginbottom (1964) performed statistical studies showing the variant frequency of glottalization in different grammatical environments. The work of Christopherson (1952) and O'Connor (1952) on this subject is more anecdotal, but nevertheless indicative of the same results.
3. Zwicky (1968, NEC-V, p. 5).
4. Zwicky (1968) has discussed derivations for these forms, but since the rules he proposes are different, and since I have no space here to explain why those I propose are preferable, I will not discuss his derivations in the text.
5. The underlined consonants in the sentences below would be given the phonetic representations [b̥], [d̥]:
Rub b some oil on it.
He paid d for it.
The symbol under the voiced consonant symbol indicates partial devoicing.
6. With may usually be pronounced either as [wɪθ] or as [wɪð], but in a voicing assimilation environment it will appear only with the consonant required by the rule.

7. This rule also applies word-internally, though its application varies considerably within different dialects. In American speech, the underlined consonant in the following words may be pronounced as an alveolar or a palatal: issue, education, grandeur, individual, sociology, associate, appreciate. It is the /j/ (or /i/) following the consonant that allows for this variation. Though in these words the /j/ is not usually dropped after a palatal consonant, in some dialects, particularly British English, the /j/ may drop. Witness the pronunciations of duke [dʒuwk], Indian [ɪndʒən] (i.e., Injun), during [dʒurɪŋ].

8. Given this pronunciation of children, it is easy to see how the /r/ could have assimilated to its neighbor /l/ and produced chillen (or 'chilluns'). When Standard English restored the d to children, the speakers of chillen simply maintained a pronunciation that was common to all speakers at an earlier stage.

9. The exception to this claim is and, which Daniel Jones declares to have the underlying representation /æn/: Pat and Ann.

10. The terms "full glottalization", "preglottalization" and "glottal reinforcement" are Higginbottom's (1964).

11. Christopherson (1952), O'Connor (1952), André sen (1958), Higginbottom (1964).

12. Notice the contrast between [gaDə], which means hafta, and [gaʔtə], which means had a chance to. The latter pronunciation would indicate that the surface structure of I got to go is $\underset{V''V'}{\#}[\underset{V''V'}{[got\#]} \underset{V''V'}{\#}[to] \underset{V''V'}{\#}[go]]\dots$ whereas the surface structure of I gotta go is $\underset{V''V'}{\#}[\underset{V''V'}{[[got\#] [to]\#}] \underset{V''V'}{\#}[go]]\dots$

13. Some other principle of Flap Formation, yet to be determined, must account for the presence of [D] in

sit down
put down

a góod dèal (nicer)
not at all

Chapter III

The Syntax of Liaison in French

1. Introductory Comments

In French, there is a very general tendency to delete word-final consonants. A word in isolation is pronounced without its final consonant(s). So is a word uttered in a phrase or sentence-- unless the word appears in certain syntactic contexts. In these syntactic contexts, which I will call the contexts of liaison, the final consonant of a word will delete only if the following word begins with a consonant. If it is a vowel that begins the next word, the final consonant of the first word remains. For example, in the sentence Lorenzo est petit en comparaison de Jean, [lɔʁɛnzɔ ɛ pətɪ ã kɔ̃parezɔ̃ də ʒã], the final /t/ of petit is lost because that word is not in a liaison context. The final /t/ of est, on the other hand, is lost only because the following word begins with a consonant. The copula est is in a liaison context, as the pronunciation of Lorenzo est un petit enfant [lɔʁɛnzɔ ɛt œ̃ pətɪt ãfã] shows. In this sentence, the final /t/ of est is pronounced. Moreover, the adjective petit is in a liaison context in this sentence and retains its /t/, the following word being vowel-initial.

The purpose of this chapter is to provide an account of the

syntax of liaison. I will develop an analysis which will predict all the occurrences of liaison in French,¹ therefore eliminating the necessity of making lists of the contexts where liaison can and can't occur, as the traditional grammarians do. It will be shown why certain syntactic contexts are liaison contexts and others aren't.

In essence, "liaison" is a syntactic term. It is a name for the syntactic contexts where certain phonological phenomena take place. I mentioned above the behavior of the rule deleting final consonants in liaison contexts. The presence of a word-final consonant (preceding a word-initial vowel) is surely the most salient phonological reflex of liaison. But there are others--involving nasalization, vowel quality changes and so on. The diverse phonological aspects of liaison will be discussed in Chapter IV. In this chapter, the simple presence of a final consonant in a word W_i preceding a vowel-initial word W_j will be used as an indicator that W_i and W_j are in a liaison context. This will be done primarily for convenience. It must not be forgotten that various other phonological processes operate in liaison contexts as well. Two words appearing in a liaison context will, where relevant, be joined by the symbol '∩', as in Lorenzo est∩un petit∩enfant. If two words are not in a liaison context, I may on occasion use the symbol '/' to indicate this, e.g., J'ai donné un jouet/à Lorenzo.

Traditional approaches to the problem have usually sorted out syntactic contexts into three categories, depending on whether

liaison is "obligatory", "optional" or "prohibited" in these contexts. These distinctions will not be used as such in this study. For example, there will be no need to enumerate a list of the "prohibited" liaison contexts since these will simply be the complement of the contexts where liaison is possible. I will not employ the terms "obligatory" and "optional" in classifying liaison contexts either. Instead I will introduce the terms "basic" and "stylistic" to describe these types. Liaison contexts are "basic" if they always appear in any style of speech. Liaison contexts are "stylistic" if their appearance in speech is determined by stylistic factors.

Following Fouché's (1959) approach to liaison in French, I will divide this study into a description of three distinct styles of speech: the style of conversation familière (Style I), the style of conversation soignée (Style II), and the style of lecture or discours (Style III). The names given to these styles by Fouché are conversation courante, conversation sérieuse et soignée, and style soutenu, respectively. Style I is the least elevated style of speech, the style that has the fewest liaison contexts. The liaison contexts which do appear in Style I are the "basic" contexts. These basic contexts appear in Styles II and III as well. In Style II, one class of stylistic liaisons, call it S_{ii} , appears in speech, and in Style III, another class, call it S_{iii} , appears, along with S_{ii} . In other words, the most elevated style has the richest repertoire of liaison contexts, while the most familiar or least elevated style is the most barren

with respect to liaison:

<u>Style I</u>	<u>Style II</u>	<u>Style III</u>
basic	basic stylistic--S _{ii}	basic stylistic--S _{ii} S _{iii}

To be sure, these are "ideal" styles, and any empirical study of liaison in the speech of French people would reveal intrusions of the features of one style into discourse characterized for the most part as being typical of another style. Yet I think it is necessary to employ this idea of distinct ideal styles as a point of departure in a sociolinguistic study of French liaison. Only with such an approach can one provide a descriptively adequate account of the phenomenon, for one must be able to say, for example, that in familiar conversation one finds les[^]enfants affamés, but never les[^]enfants[^]affamés. The latter is reserved for a more elevated style of speech, while the former, a basic liaison context, appears in every style of speech--and these facts every French person knows.

My theory is that the phonological phenomena characteristic of liaison operate when just one word boundary, #, separates one word from the next. More specifically, the words P and Q are in a liaison context in the string ...P] [# Q... (This approach is not new. It was suggested by Milner (1967), who, in his article "French Truncation Rule", saw the necessity of readjusting word boundaries in order to create the proper conditions for the phonological processes involved in liaison environments.) The

conventions on word boundaries elaborated in SPE and in this study will produce quite a variety of strings of this type. The liaison contexts thus generated by the universal conventions form part of the set of basic contexts. The SPE conventions make the correct prediction that, for instance, the sequence Article-Noun is a basic liaison context, since articles have no word boundaries of their own:
$$\begin{array}{c} \#[\text{Art}] \\ \text{N}'' \end{array} \begin{array}{c} \#[\text{Noun}] \\ \text{N}'\text{N} \end{array} \begin{array}{c}]\# \\ \text{NN}'\text{N}'' \end{array}$$
. In French one always pronounces the final consonants of articles preceding vowel-initial nouns: sonˆennemi, cetˆaspect, lesˆatrocités.

In addition, French-particular readjustment rules contained in the grammars of the various styles operate to convert sequences like P#] [#Q into liaison contexts P] [#Q. So, for example, the liaison contexts S_{iii}, particular only to speech in Style III, are created by a readjustment rule. That readjustment rule, call it R_{iii}, is present in the grammar of Style III, but not in the grammars of Styles II and I. The stylistic approach, according to which each style has its own grammar, its own set of rules, thus allows one to say that a liaison context is impossible in one style while possible in another. Only in the grammar of the latter style would the readjustment rule creating that liaison context be present. I leave open the question about whether or not the operation of a readjustment rule contained in the grammar of a particular style is obligatory or optional. Only an empirical study can reveal whether in speech spoken in a particular style the liaison contexts characteristic of that style always or

only sometimes appear.

In Style I one finds only the basic liaisons of French. It is the style most representative of the language's inexorable tendency to denude words of their final consonants. The basic liaison contexts remaining in French are for the most part comprised of a non-lexical item (e.g., a preposition, article, pronominal clitic) and what follows it. In Style II, one finds the possibilities for liaison in the specifiers of verb and adjective phrases expanded so that lexical categories preceding heads of phrases may retain their final consonants. Finally, in Style III the inflected noun, verbs and adjectives and elements of their complements are in a liaison context. Each style will be characterized by a set of readjustment rules operating to give a single # in the liaison contexts of that style (and double #'s where there is no liaison).

2. Conversation Familière: Style I

Style I is the domain of basic liaisons. In the noun phrase, anything that precedes the head noun (i.e., that which is in the specifier of the noun phrase) is always in an environment of liaison. This goes for determiners, quantifiers and adjectives. However, in the adjective phrase and the verb phrase, the liaison environments are much more restricted. Only certain members of their specifiers have liaison in Style I. The liaison properties of the adjective and verb phrases are quite parallel. They will be examined first.

In the following sentences, there is a basic liaison context in the adjective phrases:

1) On le considère très[^]incommode.

C'est une personne bien[^]aimable.

L'histoire de l'affaire est fort[^]intéressante.

Ils avaient l'air tout[^]ému.

Elle est plus[^]âgée que lui.

Il est moins[^]utile de lire l'Express que de lire l'Humanité.

Ils s'habillent toujours d'une façon trop[^]élégante.

There is no liaison in adjective phrases like the following in Style I.

2) Je trouve leur histoire extrêmement/amusante.

Les détails en étaient particulièrement/exacts.

Elle est suffisamment/honnête pour l'admettre.

Les dirigeants se sont montrés profondément/aveugles.

Il est drôlement/aimable avec ses camarades.

Ce livre est tout à fait/inutile.

The adjectival modifiers in (2) are obviously lexical items, comparable to the -ly adverbs of English. The class is open; most any new adverb can be formed by adding -ment to an adjective. In fact, these modifiers may simply be adjectives redundantly specified as adverbs because of their presence in an adjective phrase, as Emonds (1970a) has suggested. Let us say then that the relevant words in (2) are members of the lexical category Adverb (or Adjective). The modifiers in (1) are of a totally different sort; the

first four, très, bien, fort, tout, all have meanings corresponding to the English very, quite, rather, or some combination of them, and the latter three, plus, moins and trop are degree modifiers or comparative-type modifiers. Clearly the modifiers from (1) are not members of an open class of lexical items. They qualify as grammatical formatives, and should be regarded as non-lexical items.

So the major distinction which emerges from the examples in (1) and (2) is the lexical/non-lexical distinction. Non-lexical items make basic liaison while lexical items do not. This distinction is not fine enough, however, for the modifier assez, which surely belongs in the class of degree modifiers along with plus, moins and trop, does not make basic liaison. In Style I one has:

3) Leurs rapports avec l'administration sont assez/intimes.

Ce sont des travailleurs assez/enclins à la révolte.

Elles sont assez/inquiètes pour réagir de cette façon.

In the verb phrase, pronominal clitics will always be in liaison with the auxiliary or main verbs which follow, or with another clitic which follows:

4) Vous[^]avez fini. Il vous[^]a donné la réponse.

Nous[^]avons déjà mangé. Elles nous[^]ont bourrés.

Je les[^]ai vus.

Nous[^]y pensons assez souvent.

Vous vous[^]en[^]êtes allés.

(None of the other clitics me, te, se, la, le, lui or y are

relevant because they are vowel final; leur is irrelevant because /r/ is never deleted finally.) In addition, there is liaison in Style I with monosyllabic forms of the auxiliary verbs être:

5) Jeanne est[^]allée voir le résultat.

Je suis[^]arrivée trop tôt.

Ils sont[^]entrés dans la salle.

Vous[^]êtes arrivés à l'heure.

Nous sommes[^]entrés dans une chambre sombre.

and with ont of the auxiliary verb avoir:²

6) Les commerçants ont[^]augmenté toutes les prix.

Ils ont[^]essayé d'en tirer de grandes bénéfices.

Not all the grammarians put these auxiliaries in the category of "obligatory" or basic liaison. Yet, all agree, such locutions as (5) and (6) are quite permissible in familiar conversation. One does not have to await the level of conversation soignée to hear monosyllabic auxiliaries in liaison environments with past participles.³ The same is true of the monosyllabic forms of the copula être and a predicate:

7) Il est[^]insupportable que tu y ailles tout seul.

C'est[^]obligatoire pour tous les étudiants.

Marie est[^]astucieuse. Marie est[^]artiste.

La chambre est[^]en désordre.

Ses copains sont[^]ambitieux. Ces fromages sont[^]à point.

Je suis[^]odieuse de le faire.

Tu es[^]un type minable.⁴

Vous êtes[^]assises sur des chaises bien fragiles.

Nous sommes impatient^s de vous voir à Paris.

However, non-monosyllabic forms of the copula or the auxiliary are not in liaison environments in conversation familière:

8) Vous avez/étonné tout le monde.

Nous avons/envoyé tout ce qu'il y avait comme nouvelles.

Les soviétiques auraient/annoncé la fin des négociations.

J'avais/avancé cette idée moi-même.

Vous seriez/arrivés si tout avait marché comme prévu.

Ils étaient/allés voir un bon film tchèque.

Les mères seront/impatientes de voir leurs fils.

So among the non-lexical specifier items in the verb phrase there is a distinction between monosyllables and polysyllables. Monosyllables have liaison in Style I. Polysyllables do not. Notice that this distinction would hold in the adjective phrase for assez versus bien, trop, plus, moins, tout, très, and fort.

The lexical/non-lexical distinction that was apparent in the liaison of the adjective phrase specifier is also at work in the verb phrase; adverbs, which may precede the past participle of the verb, do not have liaison with the verb in Style I:

9) Les soldats nord-vietnamiens ont facilement/avancé de la zone démilitarisée jusqu'à Hué.

Ils ont été chaleureusement/accueillis.

Les soldats fantoches se sont précipitamment/enfuis.

Ils ont été profondément/attirés par des régions plus méridionales.

Ils se sont brusquement/emparés des moyens de transport publics.

Ils ont toujours/eu de mauvais rapports avec les gens du pays.

In sum, in Style I, everything in an adjective phrase or a verb phrase that is in a basic liaison environment with what follows is a non-lexical item, more specifically, a monosyllabic one. Those elements which do not make liaison fall into two classes--polysyllabic non-lexical items and lexical items. What's interesting is that it is non-lexical items and not lexical items which make basic liaison. It doesn't seem surprising that this should be the case; yet there is this lack of surprise only because linguistic theory makes the appropriate distinctions between lexical and non-lexical items. The SPE conventions on word boundaries partially predict the facts of liaison in French, if one assumes that at most one word boundary, #, separates items in liaison contexts, for according to these conventions, a non-lexical item will be separated from what follows by only one #, while two lexical items are separated by two #'s. Limiting ourselves to lexical items and monosyllabic non-lexical items (both of which the SPE conventions correctly describe) we find the following types of labelled bracketings in the adjective phrase and verb phrase:

Adjective Phrase

Degree Modifiers

$$A^n \left[\begin{array}{c} \# \\ \left[\begin{array}{c} \left. \begin{array}{l} \text{moins} \\ \text{plus} \\ \text{trop} \end{array} \right\} \right] \\ Q \end{array} \right] \left[\begin{array}{c} \# \\ \left[\text{Adjective} \right] \right] \# \\ Q \quad A' \quad A \quad \quad \quad AA' A'' \end{array} \right]$$

Others

$$\begin{matrix} \left[\# \right. & \left[\begin{matrix} \left\{ \text{très} \right\} \\ \left\{ \text{bien} \right\} \\ \left\{ \text{tout} \right\} \end{matrix} \right] & \left. \right] & \left[\# \left[\text{Adjective} \right] \right] \# \\ \text{A}'' & \text{Det} & & \text{Det} & \text{A}'\text{A} & & \text{AA}'\text{A}'' \end{matrix}$$

Adverb Modifiers

$$\begin{matrix} \left[\# \right. & \left[\left[\left[\begin{matrix} \left\{ \text{extrêmement} \right\} \\ \left\{ \text{profondément} \right\} \end{matrix} \right] \right] \right] \# & \left. \right] & \left[\# \left[\text{Adjective} \right] \right] \# \\ \text{A}'' & \text{A}''\text{A}'\text{A} & & \text{AA}'\text{A}'' & \text{A}'\text{A} & & \text{A} & \text{A}'\text{A}'' \end{matrix}$$

(Recall that prior to the operation of the SPE convention deleting superfluous word boundaries, SPE-II, the phrase above had the labelled bracketing:

$$\begin{matrix} \left[\# \left[\# \left[\# \left[\begin{matrix} \left\{ \text{extrêmement} \right\} \\ \left\{ \text{profondément} \right\} \end{matrix} \right] \right] \right] \# \right] \# \left. \right] \# & \left[\# \left[\# \text{ Adjective} \# \right] \# \right] \# \left. \right] \# \left. \right] \# \\ \text{A}''\text{A}''\text{A}'\text{A} & & \text{AA}'\text{A}'' & \text{A}'\text{A} & & \text{AA}'\text{A}'' \end{matrix}$$

Verb Phrase

Auxiliaries

$$\begin{matrix} \left[\# \right. & \left[\begin{matrix} \left\{ \text{sont} \right\} \\ \left\{ \text{suis} \right\} \\ \left\{ \text{ont} \right\} \\ \left\{ \text{est} \right\} \end{matrix} \right] & \left. \right] & \left[\# \left[\text{Verb} \right] \right] \# \\ \text{V}'' & \text{Aux} & & \text{AuxV}'\text{V} & & \text{V} & \text{V}'\text{V}'' \end{matrix}$$

Copula

$$\begin{matrix} \left[\# \right. & \left[\left[\begin{matrix} \left\{ \text{sont} \right\} \\ \left\{ \text{est} \right\} \end{matrix} \right] \right] & \left. \right] & \left[\# \dots \dots \dots \right] & \left. \right] & \# \\ \text{V}'' & \text{V}' & & \left\{ \begin{matrix} \text{PP} \\ \text{A}'' \\ \text{N}'' \end{matrix} \right\} & & \left\{ \begin{matrix} \text{PP} \\ \text{A}'' \\ \text{N}'' \end{matrix} \right\} & \text{V}' & \text{V}'' \end{matrix}$$

Clitics

Object clitics attach to either the Auxiliary or the Verb. I give here only the example of attachment to the Verb, assuming the mechanism of attachment to the Aux to be the same. Also I give here two possible derived structures of the clitics,⁵

without committing myself to either one for the moment:

$$\begin{array}{ccccccc} [\# [[\text{Clitic}] [\text{Clitic}] [\# \text{Verb}]]] \#] \\ \text{v}''\text{v}'\text{v} & & \text{v} & & \text{v} & \text{v} & \text{v}'\text{v}'' \end{array}$$

or

$$\begin{array}{ccccccc} [\# [[\text{Clitic}] [\# [\text{Clitic}] [\# \text{Verb}]]]] \#] \\ \text{v}''\text{v}'\text{v} & & \text{v} & & \text{v} & \text{v} & \text{v}'\text{v}'' \end{array}$$

(Notice that, as in English, one must have a convention which says that pronominal clitics do not have their own word boundaries.)

Adverbial Modifiers

$$\begin{array}{ccccccc} [\# [\dots] [\# [[\left. \begin{array}{l} \text{brusquement} \\ \text{toujours} \end{array} \right\}]] \#] [\# [\text{Verb}]] \#] \\ \text{v}'' \text{Aux} \quad \text{Aux} \text{A}''\text{A}'\text{A} & & \text{AA}'\text{A}'' & \text{v}' & \text{v} & & \text{v} & \text{v}'\text{v}'' \end{array}$$

The universal SPE conventions make the wrong predictions about polysyllabic non-lexical items in French, however. A French-particular readjustment is required for Style I in order to make a distinction between monosyllabic and polysyllabic non-lexical items. What seems to be required is a rule which will add word boundaries to the polysyllabic ones. In this way, the non-lexical modifiers in assez important and avons acheté or était allé will have the same liaison behavior as the lexical modifiers in extrêmement important and chaleureusement accueilli. So let there exist a rule for Style I:

Polysyllabic Non-Lexical Category Rule (Poly NLC):

$$[C_0 VC_0 VC_0 X] \Rightarrow [\# C_0 VC_0 VC_0 X \#]$$

After the operation of this rule, the derived structure of the relevant phrases would be

[# [#assez#] [#[#important#]#]#]
 A" Q Q A'A AA'A"

[# [#avons
 était#] [#[#acheté
 allé#]#]#]
 V" Aux Aux V'V VV'V"

SPE-II would then yield

[# [assez#] [#important]]#
 A" Q Q A'A AA'A"

[# [avons#] [#acheté]]#
 était allé
 V" Aux Aux V'V VV'V"

Interestingly enough, this rule has the proper effect on prepositions. In Style I only monosyllabic prepositions are in liaison with the following N":

10) en [^] été	chez [^] elle
sans [^] aucun sou	dans [^] une salle publique
dès [^] à présent	(sans [^] être allé)

Polysyllabic prepositions do not have liaison in conversation familière:

11) pendent/une semaine	depuis/un an
apres/une révolution	avant/un orage
(après/être allé)	devant/une maison

According to the Poly NLC rule, such phrases would be represented as, for example, [# [après#] [#une révolution]]# in the input

PP P P N" N"PP

to the phonological rules.

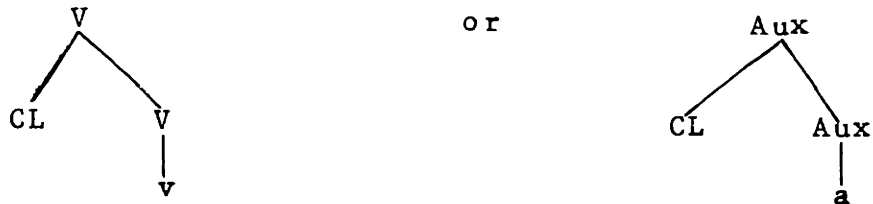
The Polysyllabic NLC Rule is interesting in that it represents the one case I know of where a language-particular rule re-adjusting word boundaries adds #'s to the string that is the

output of the syntactic component. It seems to be the appropriate device, for without it one would be unable to explain the liaison facts of French in a simple and straightforward way on the basis of the universal conventions on word boundaries.

It is not so strange that a distinction between polysyllabic and monosyllabic non-lexical items should manifest itself in French. We have already seen that only monosyllabic non-lexical items undergo stress reduction in English. And in Russian, monosyllabic prepositions (with the exception of one) are not inherently stressed and have obligatory voicing assimilation when a voiced sonorant follows, while most polysyllabic prepositions have their own stress and do not have obligatory assimilation.⁶ In Italian, only monosyllabic pronouns can cliticize to the verb, while the bisyllabic loro (equivalent to French leur) remains uncliticized.⁷ It's quite probable that many comparable cases from other languages could be cited.

The distinction between monosyllables and polysyllables may help shed some light on the derived structure of pronominal clitics in French. It has been assumed by both Kayne (1969) and Perlmutter (1970) that both subject and object clitics attach to the verb or auxiliary of the sentence. It is quite obvious that object clitics, which are underlying direct objects (la, le, les), indirect objects (lui, leur) or prepositional phrases (y, en), must have been affected by some kind of attachment transformation since their surface structure positions are so removed from their deep structure sources. And Kayne has effectively demonstrated

that the unit object clitic-verb (or Aux) is regarded as a verb (or Aux) by transformations; he concludes that their derived structure must be dominated by a verb node. The clitic is adjoined to the verb (or Aux), giving



(where v and a are terminal symbols).⁸ Given this structure the clitic has the possibility of affecting the "syllable count" of the derived word. And indeed it does. A monosyllabic auxiliary to which an object clitic is attached does not display the same liaison behavior as a lone monosyllabic auxiliary; in the (a) sentences below, liaison is required, but the (b) sentences are like the (c) sentences in that liaison is not necessary and would indeed be typical only of Style II, conversation soignée:

- 12) a) Maurice est[^]amoureux de Céleste.
 b) Maurice en est/amoureux.
 c) Maurice était/amoureux de Céleste.
- 13) a) Louli et Lala ont[^]acheté des gâteaux hier.
 b) Louli et Lala les ont/achetés hier.
 c) Louli et Lala avaient/acheté des gâteaux hier.
- 14) a) Les voyageuses sont[^]arrivées à la gare en retard.
 b) Les voyageuses y sont/arrivées en retard.
 c) Les voyageuses étaient/arrivées à la gare en retard.

The sequences en est, les ont, y sont, behave like polysyllabic

non-lexical items. This confirms Kayne's hypothesis about the derived structure of object clitics, for quite evidently the Poly NLC rule adds #'s to the polysyllabic derived auxiliaries [[y] [sont]], etc., and thus eliminates a liaison context in Style I.

It is only with the object clitic pronouns that this effect on the "syllable count" of the auxiliary or copula is felt. Subject pronouns, which Perlmutter and Kayne have assumed to cliticize to the auxiliary or verb just like object pronouns, do not affect the liaison behavior of the auxiliary or copula. The possibilities for liaison are the same in the (a) sentences as they are in the (d) sentences:

- 12) a) Maurice est[^]amoureux de Céleste.
 d) Il est[^]amoureux de Céleste.
- 13) a) Loui et Lala ont[^]acheté des gâteaux hier.
 d) Ils ont[^]acheté des gâteaux hier.
- 14) a) Les voyageuses sont[^]arrivées à la gare en retard.
 d) Elles sont[^]arrivées à la gare en retard.

One should conclude from this that subject and object pronouns do not have the same syntactic relation to the Auxiliary (or Verb). It suggests that it is quite possible that subject pronouns are not cliticized to the verb (or Aux) at all. Instead, it is conceivable that the convention for depriving personal pronoun noun phrases of their word boundaries that was motivated for English would be adequate for a description of the behavior of French personal pronoun subjects. The erasure of word boundaries around

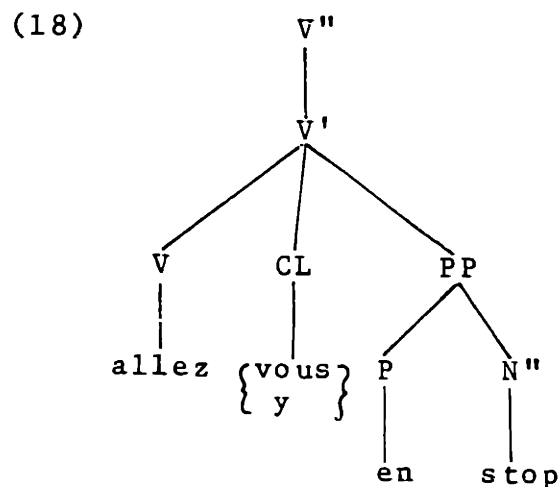
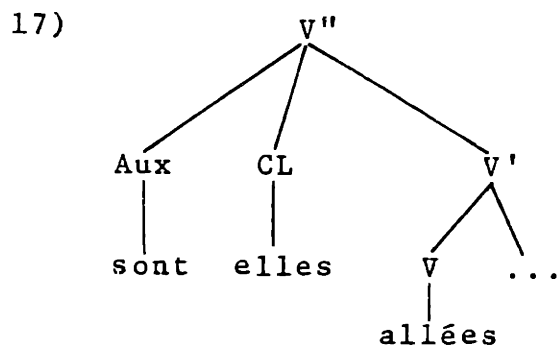
the pronominal noun phrases would account for the obligatory liaison of these pronouns and also for their stress reduction.⁹

When pronoun clitics are moved around the verb or auxiliary by either subject pronoun inversion or imperative formation, they and the verb (or Aux) form a liaison context:

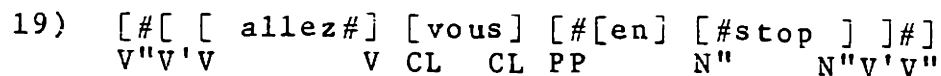
- | | |
|----------------------------|--------------------------------|
| 15) Sont-ils/arrivés? | Ont-elles/accepté de la faire? |
| Est-elle allée à Paris? | Entend-il des nouvelles? |
| A-t-on/appelé les parents? | Arrivent-ils/à midi? |
| Mange-t-on des pommes? | Voyaient-elles/une solution? |
| 16) Allez-vous-en. | Donnez-en/aux enfants. |
| Vas-y. | Mettez-les-y. |
| Faites-en beaucoup. | Allons-y tous ensemble. |

As the sentences in (16) show, the clitics postposed by imperative formation are in a liaison context with each other as well. And certain sentences in (15) show that it's not possible for there to be liaison between a postposed clitic and the past participle of the main verb. Certain other sentences in (15) and (16) show that it's not possible for the clitic to be in a liaison context with the complement of the verb.¹⁰

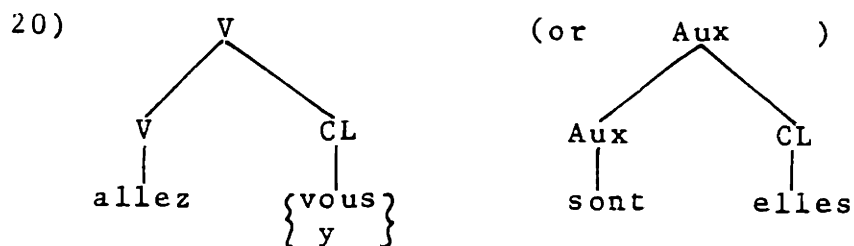
The fact that there is liaison here indicates that at most one # separates the verb from the postposed clitics or one clitic from another. And the fact that there is no liaison between the clitic(s) and the verbs, noun phrases, prepositional phrases, etc., that follow indicates that at least two #'s must intervene between them. If the pronouns were to be simply sister-adjoined to the verb or auxiliary, as in the trees (17) and (18),



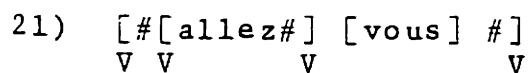
the correct result would not be obtained, for the clitic would be separated from what followed by only one word boundary, as in (19),



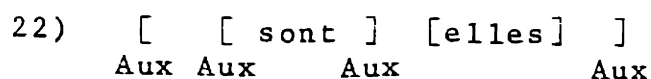
But if the postposed pronouns were attached to the verb or the auxiliary, the derived structures (20) would be possible:



The conventions on word boundaries would give the verb in (20) the labelled bracketings (21):



This structure will put the necessary number of #'s between the clitic and the complement of the verb. However, the conventions on word boundaries that are articulated in SPE would provide the labelled bracketing (22) for the Aux structures in (20):



But, according to the revision of SPE-I that I've proposed, the labelled bracketing (22) would automatically be replaced by (23):

23) [# [sont] [elles] #]
 Aux Aux Aux Aux

So even though the preterminal Aux node, being a non-lexical category, is not assigned #'s by the universal conventions, a derived Aux node would be.¹¹

Turning now to the noun phrase, it becomes apparent that there is no distinction between lexical and non-lexical items, or monosyllabic and polysyllabic non-lexical items. Everything is in a liaison environment in Style I. All determiners have liaison:

24) un[^]abri des[^]ennemis vos[^]ingénieurs
 son[^]opinion ses[^]opinions nos[^]angoisses
 ton[^]écriture tes[^]écrits tels[^]effets
 mon[^]oeil mes[^]oignons quels[^]assauts
 cet[^]effort ces[^]efforts leurs[^]opresseurs

Numbers and other sorts of quantifiers have liaison:

25) vingt-trois[^]oignons plusieurs[^]écrits
 trente-deux[^]assauts aucun[^]officier
 trois[^]ingénieurs quelques[^]expériences
 deux[^]efforts maint[^]homme
 un[^]opresseur tout[^]oeil
 les mêmes[^]effets

And prenominal adjectives have liaison as well:

- 26) un long^hivier cetⁱintelligent^eenfant
 un doux^aami un^eéminent^aavocat
 cet^aambitieuxⁱingénieur un gros^aarbre
 deux^aaudacieuxⁱofficiers un grand^eeffort
 plusieurs^aaimablesⁱitaliens

Furthermore, liaison is required between the determiners, quantifiers and adjectives which precede the noun, as many of the examples in (26) show.

Nothing needs to be said about the determiners, which have the derived structure $\left[\begin{array}{c} \text{ } \\ \text{Det Det} \end{array} \right]$. As for the numbers vingt-trois, trente-deux, etc., and the quantifiers quelques, tout, aucun, plusieurs, maint, they do not qualify as nouns or adjectives in the true sense of these categories. They are a limited set of grammatical formatives with restricted properties. Though they may bear some resemblance to nouns and adjectives in their syntactic behavior, one benefits from regarding them as a distinct set. Let us call them Quantifiers for the time being and assign them a labelled bracketing $\left[\begin{array}{c} \text{quelques} \\ Q \end{array} \right]$, $\left[\begin{array}{c} \text{aucun} \\ Q \end{array} \right]$, etc. I am assuming that they are non-lexical categories, i.e., grammatical formatives, and hence lacking their own word boundaries. Obviously, the Poly NLC rule must be prevented from operating within the noun phrase or one wouldn't find the liaisons of (25).

Thus, so far, no new mechanism has been required for the description of Style I liaison in the noun phrase. The behavior of the determiners is what one expects from looking at adjective

and verb phrases. The behavior of polysyllabic quantifiers is aberrant, but can be described by putting a condition on the Poly NLC rule which excludes the noun phrase from its domain. However, the liaison of the prenominal adjective goes counter to what is the rule in the adjective and verb phrases, where the adverbs are not in a liaison context in Style I. Again, a French-particular rule is required which readjusts the derived structure of prenominal adjectives so that liaison is automatic. What I propose is a rule deleting the #'s that are to the right of the adjective within the adjective phrase:

Adjective-Noun Rule

$$\begin{array}{ccccccc} [\# X [\# Y [\#[\#Adjective\#]\#]\#] [\#[\#Noun\#] Z \#]\#] & \Rightarrow & & & & & \\ \text{N}'' & \text{A}'' & \text{A}'\text{A} & & \text{AA}'\text{A}'' & \text{N}'\text{N} & \text{N} & \text{N}'\text{N}'' \end{array}$$

$$[\# X [\# Y [\#[\#Adjective]]]] [\#[\#Noun\#] Z \#]\#]$$

(It's obvious from the formulation of this rule that I am assuming that the rule precedes the universal convention on deletion of superfluous #'s (SPE-II). It's likely that this latter convention should be thought of as a late-level clean-up apparatus, reducing sequences of #'s automatically. I will assume that any language-particular rules adjusting #'s apply before this convention does.)

A possible alternative to the Adjective-Noun Rule and to the condition that must be added to the Poly NLC rule in order to remove noun phrases from the latter's domain is an analysis which says simply that any two words appearing in the specifier of the noun phrase are in a liaison context. Such an analysis would account for all the facts presented thus far and would explain in

one fell swoop the obligatory liaison of polysyllabic quantifiers and adjectives. Yet such an analysis could not explain the peculiarities of liaison when a conjoined adjective phrase is prenominal. In predicative position, there is no liaison within a conjunction of adjectives in the singular (several of these examples are Fouché's):

27) Cet homme est méchant/et cruel.

Le bâtiment est grand/et impressionnant.

Cet homme, faux/et arrogant, était détesté de tous.

Laid/ou joli, peu importe.

Qu'on l'amène mort/ou vif.

And, except for the most elevated style of speech, such as one might hear in the classical theater, there is no liaison when the conjoined adjectives are in attributive position:

28) Un grand/et impressionnant bâtiment

Ce doux/et charmant[^]enfant

Un[^]intelligent/et intéressant[^]ami

The lack of a liaison environment within the conjunction shows that it is not the case that any two words within the noun phrase specifier are in a liaison environment. Rather, liaison is localized in the way that the conventions and readjustment rules I've described predict. The Adjective-Noun Rule accounts for the liaison between charmant and enfant, and intéressant and ami. The automatic lack of #'s around un accounts for its liaison.¹²

The discussion in this section has assumed that liaison facts could be explained solely on the basis of syntactic considerations.

An analysis based on the SPE conventions on #'s and readjustment rules which alter the derived structure of certain syntactic categories in terms of word boundaries was considered to be the most fruitful approach to the phrase phonology of French. And, indeed, this reliance on syntax seemed adequate in explaining the facts of the adjective and verb phrases. Yet it is not obvious that such syntactic considerations will provide an explanation for why the noun phrase, whose internal structure is evidently quite similar in many respects to the structure of verb and adjective phrases, should have drastically different liaison properties.

From the point of view of phonology, the noun and the specifier material which precedes it form a close-knit unit. Such a phonological closeness of the noun phrase is not characteristic only of French. In Macedonian, for example, the noun and its specifier are tied together as a stress unit subject as a whole to the word stress rule. According to H.G. Lunt's (1952) grammar of Macedonian, word stress in the language is determined by a rule formalizable as

$$V \rightarrow 1 \text{ stress} / \text{--- } C_0 (VC_0 (VC_0)),$$

an antepenultimate stress rule. Lunt describes the situation in the noun phrase as follows:

A noun may form a single accentual unit with the adjective (+ article) which precedes: *ноба кука* 'a new house', *новата кука* 'the new house'. The stress never moves past the definite article, however, so that one says *белиот ѕид* 'the white wall' (even though the accent is on the penult of the group). Numerals (+ article) also may form a group with the noun: *пет дена* '5 days', *двете раце* 'the two hands'. The indefinite numerical expressions also belong to this category: *многу пати* 'many times'. (p. 24)

The phonology treats these sequences more as words than as phrases. There may be some universal explanation for the phonological cohesion of the noun phrase. Until this is discovered, however, French must have special readjustment rules for the noun phrase.¹³

3. Conversation Soignée: Style II

Style II is characterized by the absence of the Poly NLC rule and by the presence of a rule parallel to the Adjective-Noun Rule which operates here in the adjective and verb phrases. Essentially what this means is that in conversation soignée the same liaison conditions obtain in noun, adjective and verb phrases that obtained only in noun phrases in conversation familière.

Since the Poly NLC Rule has no effect in Style II, I will simply say that the rule is not present in the grammar of Style II. This means that the SPE convention for non-lexical items properly predicts that assez, avez, étaient, etc., are in liaison contexts. In adjective phrases one finds:

- 29) Leurs rapports avec l'administration sont assez[^]intimes.
 Ce sont des travailleurs assez[^]enclins à la révolte.
 Elles sont assez[^]inquiètes pour réagir de cette façon.

In verb phrases one finds:

- 30) Vous avez[^]étonné tout le monde.
 Nous avons[^]envoyé tout ce qu'il y avait comme nouvelles.
 Les soviétiques auraient[^]annoncé la fin des négociations.
 J'avais[^]avancé cette idée moi-même.
 Vous seriez[^]arrivés si tout marchait comme prévu.

Ils étaient[^]allés voir un bon film tchèque.

Les mères seront[^]impatientes de voir leurs fils.

Furthermore, one finds that all prepositions, not just the monosyllabic ones, are in liaison contexts:

- 31) pendant[^]une semaine depuis[^]un an
 après[^]une révolution avant[^]un orage
 (après[^]être alié) devant[^]une maison

As for the lexical adverbial modifiers, their behavior is describable by a generalization of the Adjective-Noun Rule, call it the Lexical Specifier Rule. In the formulation of this rule, the symbol A may stand either for Adjective or Adverb:

Lexical Specifier Rule

$$\begin{array}{l} \left[\begin{array}{c} \# \\ X'' \end{array} \right] Y \left[\begin{array}{c} \# \\ A''A'A \end{array} \right] \left[\begin{array}{c} \# \\ \{ \text{Adjective} \\ \text{Adverb} \} \end{array} \right] \left[\begin{array}{c} \# \\ AA'A'' \end{array} \right] \left[\begin{array}{c} \# \\ X'X \end{array} \right] \left[\begin{array}{c} \# \\ XX'X'' \end{array} \right] \Rightarrow \\ \left[\begin{array}{c} \# \\ X'' \end{array} \right] Y \left[\begin{array}{c} \# \\ A''A'A \end{array} \right] \left[\begin{array}{c} \# \\ \{ \text{Adjective} \\ \text{Adverb} \} \end{array} \right] \left[\begin{array}{c} \# \\ AA'A'' \end{array} \right] \left[\begin{array}{c} \# \\ X'X \end{array} \right] \left[\begin{array}{c} \# \\ XX'X'' \end{array} \right] \end{array}$$

The Lexical Specifier Rule creates the proper environment for liaison in the sentences:

- 32) Je trouve leur histoire extrêmement[^]amusante.
 Les détails en étaient particulièrement[^]exacts.
 Elle est suffisamment[^]honnête pour l'admettre.
 Les dirigeants se sont montrés profondément[^]aveugles.
 Il est drôlement[^]aimable avec ses copains.
 Ce livre est tout à fait[^]inutile.
- 33) Les soldats nord-vietnamiens ont facilement[^]avancé de la zone démilitarisée jusqu'à Hué.
 Ils ont été chaleureusement[^]accueillis.

Les soldats fantoches se sont précipitamment^{en}fuis.

Ils ont été profondément^{attirés} par des régions plus méridionales.

Ils se sont brusquement^{emparés} des moyens de transport publics.

Ils ont toujours^{eu} de mauvais rapports avec les gens du pays.

Notice that though adverbs can appear after the head verb within the verb phrase, they are not in liaison contexts there:

34) Elle s'est appliquée très soigneusement/à son travail.

Il dépense extrêmement/en voyages.

Elle allait fréquemment/à Paris.

In order to be in a liaison context, an adverb modifying an item belonging to category X must be within the specifier of X, i.e., it must precede X. This is what the Lexical Specifier Rule makes precise.

I must add that only adverbs which modify the verb are in a liaison context in pre-verb position. Sentential adverbs, which occupy the same surface position as manner adverbs, are never in liaison with the verb. Taken out of the context of any style, the (a) sentences below, having no liaison between adverb and verb, are ambiguous. But the adverbs in the (b) sentences have only one interpretation--that of manner adverbials.

35) a) Il a naïvement/exprimé ses sentiments.

b) Il a naïvement^{exprimé} ses sentiments.

36) a) Elles ont très intelligemment/utilisé ces renseignements.

b) Elles ont très intelligemment^{utilisé} ces renseignements.

37) a) Elle s'est heureusement/accoutumée à leur manière de vivre.

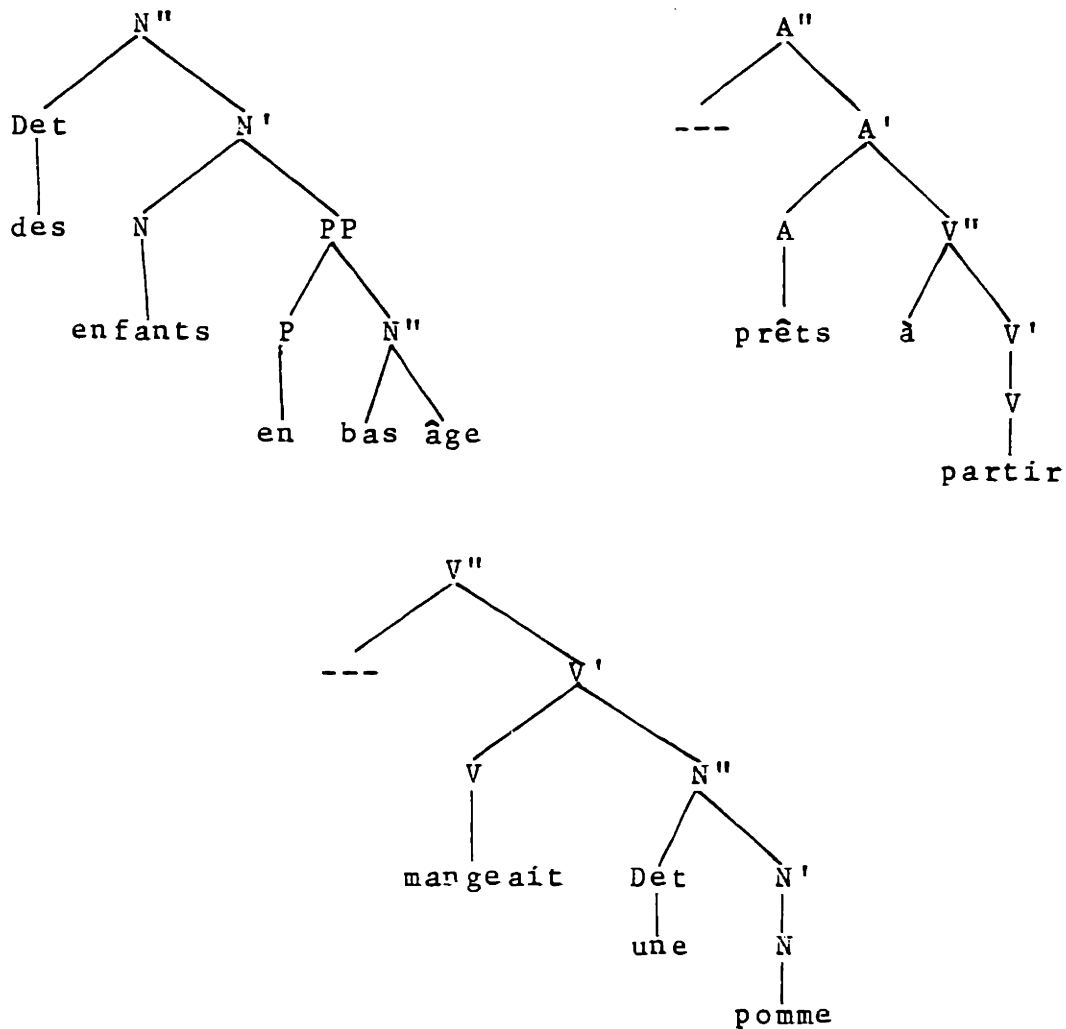
b) Elle s'est heureusement accoutumée à leur manière de vivre.

Evidently, sentence adverbs should not be affected by the Lexical Specifier Rule. Quite possibly the surface structure of a sentence adverb sentence is distinct from that of a manner adverb sentence. The intonation contour of the sentential adverb and the words surrounding it may differ from that of manner adverbs in the same context.¹⁴ It's not unlikely that a sentential adverb actually attaches to the S-node, changing the derived structure of the verb phrase considerably. In this case, of course, the Lexical Specifier Rule would not be applicable.¹⁵

4. Lecture et Discours: Style III

The parallelism between the liaison properties of noun, adjective and verb phrases is again manifested in Style III. Here, an inflected adjective, noun or verb is in a liaison context with the initial element of its complement. Plural nouns and adjectives and verbs marked for person and number will have liaison; singulars and unmarked verbs will not. It is quite obvious that though French has been losing liaison contexts for centuries, the inflected items are resisting this tendency, one that would deprive the inflectional morphemes of any phonetic realization.¹⁶ Yet the result of this resistance has not been random. It is not the case that an inflected item is in a liaison context with anything that follows. The contexts of liaison are restricted to

inflected items and their complements--and this is true of nouns, verbs and adjectives. Such a result is quite abstract, linguistically speaking, and gives support for Chomsky's (1970) X" base schema, which is put forth with the aim of expressing the parallelisms between the phrase categories. In terms of the X" notation, the phrases des enfants en bas âge, prêts à partir, mangeait une pomme, would have the derived structures:



The readjustment rule providing for these liaison contexts I will call the X-Comp Rule. It can be stated in the most general way possible:

X-Comp Rule:

$$\begin{array}{l}
 \left[\begin{array}{l} \# \\ X'' \end{array} Y \left[\begin{array}{l} \# \\ X' \end{array} \left[\begin{array}{l} \# \\ X \end{array} \left[\begin{array}{l} X \\ +\text{inflected} \end{array} \right] \right. \right. \left. \left. \begin{array}{l} \# \\ X \end{array} \right] \begin{array}{l} Z \\ X' \end{array} \right] \begin{array}{l} \# \\ X'' \end{array} \right] \Rightarrow \\
 \left[\begin{array}{l} \# \\ Y \end{array} \left[\begin{array}{l} \# \\ X' \end{array} \left[\begin{array}{l} \# \\ X \end{array} \left[\begin{array}{l} X \\ +\text{inflected} \end{array} \right] \right. \right. \left. \right] \begin{array}{l} Z \\ X' \end{array} \right] \begin{array}{l} \# \\ X'' \end{array} \right]
 \end{array}$$

It will be applicable to nouns, adjectives and verbs.

Having stated this rule I would now like to examine separately noun phrases, adjective phrases and verb phrases to show that it is precisely this very simple rule and no other which describes the contribution of Style III to the repertoire of liaison contexts in French.

4.1 The Noun Phrase

Examples showing that singular nouns do not enter into liaison are the following:

- 38) un endroit/obscur un produit/alimentaire
 un enfant/en bas âge une maison/en pierre
 un marchand/anglais

The expressions sang[^]impur, accent[^]aigu, un fait[^]accompli, un pied[^]à terre, where the final consonant of the singular is pronounced, are exceptions; they are frozen expressions having no relation to the productive liaison of the language.

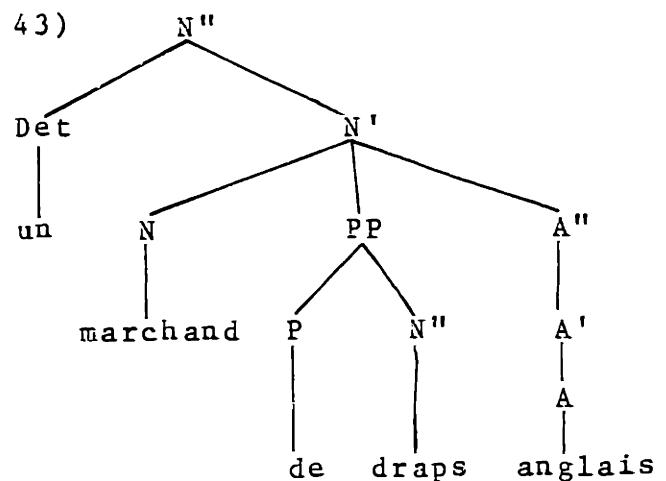
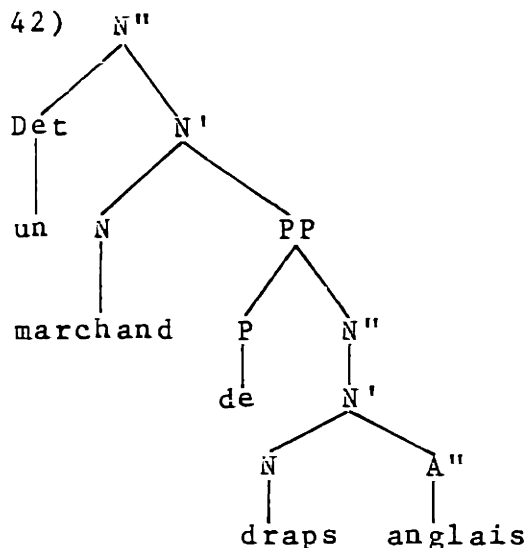
The members of the complement to N within N' may be adjectives, prepositional phrases or verb phrases. All of these are in liaison contexts:

- 39) des gens[^]âgés des langues[^]étrangères
 des endroits[^]obscurs les faits[^]historiques

les savants[^]italiens des marchands[^]anglais
 des gens[^]inquiets

- 40) des voitures[^]à deux chevaux
 des vieux soldats[^]à moustaches grises
 des maisons[^]aux toits rouges
 malgré ses analogies[^]avec la doctrine catholique
 des chats[^]avec des yeux verts
 des enfants[^]en bas âge
 des robes[^]en dentelles
- 41) des contes[^]à dormir debout
 les vins[^]à cuire

A plural noun will not be in a liaison context with an adjective not in its own complement. Therefore the expression un marchand de draps[^]anglais is unambiguous, meaning only "a merchant of English sheets". But the expression without liaison, un marchand de draps/anglais, is potentially ambiguous, having either the former meaning or the meaning "an English merchant of sheets". The surface structures of these phrases are distinct:

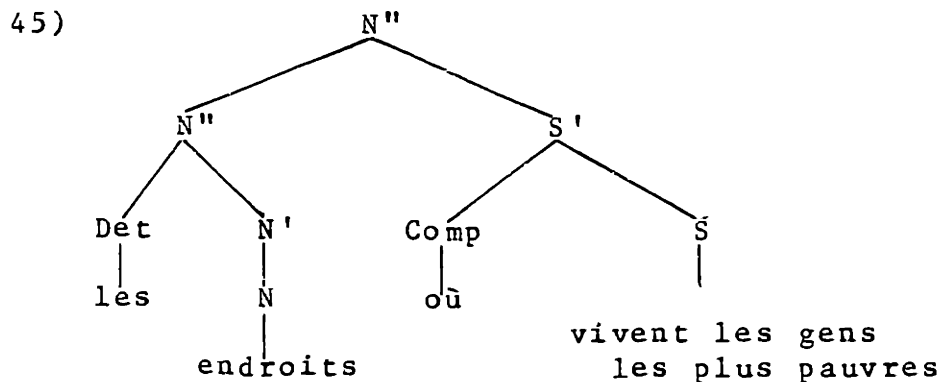


Only in (42) are draps and anglais capable of forming a liaison context.

Furthermore, though in les endroits obscurs one finds liaison, there is no possible liaison between endroits and the relative pronoun où in (44):

44) les endroits/où vivent les gens les plus pauvres

If a relative clause is Chomsky-adjoined to a noun phrase, giving the structure (45)



for the sentence (44), then one predicts immediately that there is no liaison after endroits. If this analysis were correct, one would expect that plural nouns are not in liaison context with elements of reduced relative clauses either. The prediction seems to be borne out by phrases like those in (46):

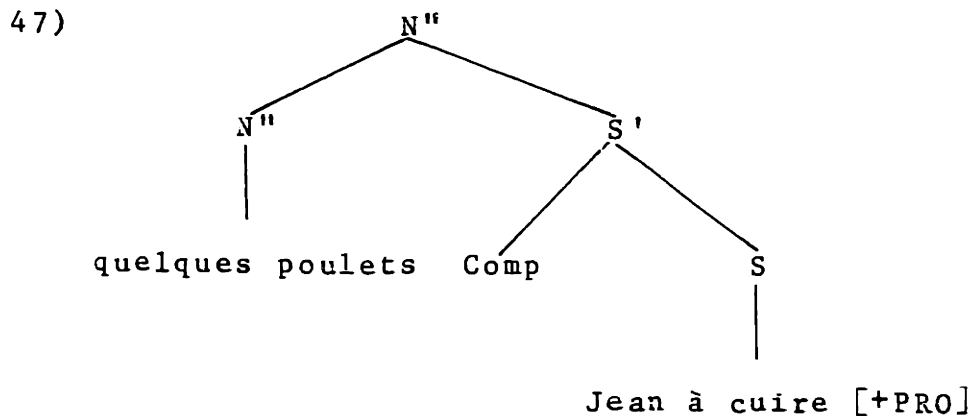
46) J'ai acheté des livres/à lire

Jean a quelques poulets/à cuire

Elle m'a donné des tracts/à distribuer.

Lou a encore trois pantalons/à coudre.

The sequence quelques poulets à cuire, for example, is the surface structure remnant of the (intermediate) structure:



So à cuire is not in the complement of poulets, and liaison is impossible between them. Contrast this with vins à cuire "cooking wines".

Since liaison is possible with all the adjectives in (39), one must conclude that these adjectives are not reduced relatives. It means there is a position for adjectives in the complement of nouns. So it's not really possible to tell whether the lack of liaison between a plural noun and an adjective is due to stylistic considerations or to the fact that that particular adjective is a reduced relative. In addition, it is possible that the possessive phrases à N'' are reduced relatives, for liaison in the sentences (48) is not permitted:

48) Ce sont des gants/à Paul.

Les châteaux/au duc de Berry se trouvent en Berry.

If the noun phrases are derived from those in (49), the lack of liaison could be explained:

49) les gants qui sont à Paul

les châteaux qui sont au duc de Berry

Not enough is known about the noun phrase in French to make hard

and fast claims about the derived structure of these phrases. The liaison information is extremely suggestive, though, and may aid in the syntactic investigation that must be made.

It is quite clear that anything outside of a noun phrase is not in a liaison context with the plural noun in that noun phrase. A direct object will have no liaison with an indirect object:

50) Donnez ces lunettes/à Paul.

Ils envoient des paquets/à leur mère.

nor will an object have liaison with any other element of the verbal complement:

51) On appelle ces termes/adjectifs.

Nous croyons ces gens/amers.

Ils voulaient changer des métaux/en or.

Ils ont vu leurs amis/ivres.

Elle a tourné les généraux/en dérision.

La guerre a rendu les généraux/inquiets.

or with any adverbial:

52) J'ai trouvé mes lunettes/à la mairie.

Elle aime des gâteaux/autant que vous.

J'aime des gâteaux/aussi

And, though this was possible not too long ago, liaison between a plural subject and the verb is forbidden:

53) Les gens/y sont allés.

Les animaux/accouraient.

Les hommes/étaient fatigués.

Les années/ont passé.

These lists of prohibited liaisons clearly demonstrate that the X-Comp Rule describes the only possible liaison contexts with plural nouns.

4.2 The Adjective Phrase

Just as with the nouns, plural adjectives are in liaison with members of their complements in Style III:

54) a) des mois féconds[^]en évènements

des terres fertiles[^]en vignes

des enfants bienveillants[^]à l'égard de leurs parents

des ouvriers qui sont insolents[^]envers leurs patrons

des patrons qui sont impitoyables[^]envers leurs
ouvriers

des petits qui sont doués[^]en maths

b) Ils resteront presque tous fidèles[^]à leurs parti-
pris antérieurs.

Ces crises de pollution sont nuisibles[^]à la santé.

Le niveau de la Mer Noire et le niveau de la
Méditerranée sont inférieurs[^]au niveau de la Mer Rouge.

Les difficultés de l'état seraient imputables[^]à la
négligence du chef de l'état.

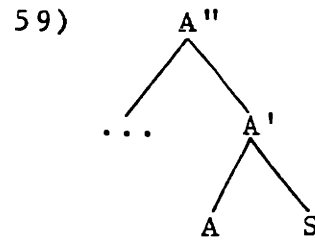
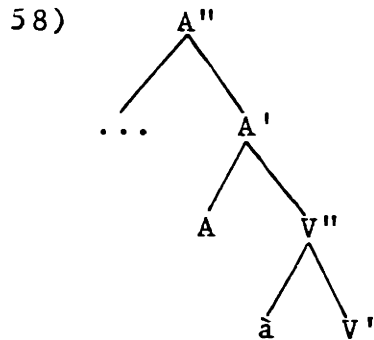
La pitié, l'amitié et l'amour sont également
étrangers[^]à votre cœur.

Ces traits sont propres[^]à certains individus que je
connais.

Elles sont toutes les deux perpendiculaires[^]à la
rue Médéric.

Ces détails sont incidents[^]à l'idée principale de
l'oeuvre.

The majority of adjective complements in French are prepositional



because the subject of the verb is always the same as the subject of the adjective, and it will never appear in surface structure.¹⁸ Certain other sentences may appear to be similar to those in (57), though they do not contain the same liaison context:

- 60) a) Elles avaient été desolées/à voir tant d'affamés et de malades.
 b) Ils sont fatigués/à avoir nagé tout l'après-midi.
 c) Les matelots étaient fins/à convaincre leur capitaine de leurs maladies.
 d) Ces garçons sont vraiment prodigieux/à avoir réparé la maison de la vieille dame.
 e) Eux, je trouve, sont habiles/à avoir évité toute référence à leurs propres idées.

On further investigation it turns out that none of these are adjective complements. First of all, all the infinitival phrases of (60) may have aspect, but aspect (i.e., an auxiliary) is not possible in the infinitival complements of the adjectives in (57), e.g., *bon à avoir monté..., *enclins à être arrivés..., etc. Second, the infinitive phrases in (60) have a quite different semantic function. The infinitive phrases of (60a, b) translate roughly as "from seeing so many sick and famished people", "from having swum all afternoon". The sentences (60c-e) may be

paraphrased under translation as "It was smart of the sailors to convince their captain...", "It was really great of those boys to have fixed...", "They were clever to have avoided...".

The adjectives prodigieux and habile can also take adjective complements:

60) d') Ces garçons sont vraiment prodigieux à réparer des maisons des vieilles dames.

60) e') Ils sont habiles à éviter toute référence à leurs propres idées.

Here, liaison is possible, and the adjective phrases now mean "great at repairing..." and "clever at avoiding...", respectively.¹⁹

As expected, in other contexts where what follows the plural adjective is not its complement, there is no liaison:

61) a) Les grèves continues/entraînaient une répression virulente.

Les gens âgés/ont droit à la retraite.

b) Il a envoyé ces nouvelles décevantes/à ses camarades.

Elle tournait ces généraux minables/en dérision.

c) Ces propos honnêtes/inattendus

Les mots aimables/habituels

Des roses rouges/amoncelées

(In (61c) the second adjective is not complement to the first adjective, but is another modifier of the noun.)

4.3 The Verb Phrase

4.3.1 The non-verbal complements of the verb

Questions of verb phrase constituency in French are not entirely clear. But no doubts have been expressed about the membership of direct object or indirect object in the complement of the verb. As expected, then, there is liaison between an inflected verb²⁰ and either type of object:

62) Elle donnait un cours à l'université.

Le soldat fait un pas vers le lit.

Six soldats américains valent un soldat nord-vietnamien.

Mangez un petit morceau.

Elle prend un livre.

Il écrivait une lettre à sa soeur.

63) On demandait à Marie de le faire.

Nous pensions à la guerre.

Je dis à Jean qu'il le fasse.

Est-ce que vous écriviez à Paul?

Sans cela le monde appartiendrait aux brutes capitalistes.

In addition, the verb is in a liaison environment when what follows is a prepositional phrase closely associated with the verb,

64) Elles causaient avec lui.

Il rompt avec ses amis.

Notre appartement consistait en une unique pièce.

a manner adverb,

65) Elles travailleraient intensément avec ses camarades.

Nous allons[^] immédiatement à la gare.

an "instrumental" phrase,

66) Nous mangerons[^] avec plaisir.

Elle peint[^] avec feu.

Ils reprenaient[^] avec le soleil.

a directional prepositional phrase,

67) Ils vont[^] à l'école recevoir une leçon de grammaire.

Elles arrivent[^] en Argentine.

Il se rend[^] à Paris tous les trois mois.

a certain type of time expression,

68) Il l'aimait et le haïssait[^] en même temps.

On débouchait[^] à ce moment sur le boulevard.

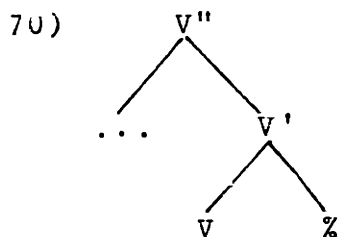
or one of those very mobile adverbs that get inserted fairly freely in many places in French sentences,

69) J'allais[^] aussi au marché.

On distinguait[^] encore de loin.

Elle goutait[^] enfin un si bon repas.

At the moment I have no strong basis for insisting that all of these prepositional phrases and adverbs are the "%" of the structure (70):



though in most of the cases above this approach seems intuitively correct. Putting these expressions in the complement of the verb

would afford us a contrast with prepositional phrases and adverbs which are not in a liaison context with the verb, if the latter are excluded from the verb phrase:

71) Ils mangeaient/après avoir fini un jeu d'échecs.

Il ne mangeaient/après un jeu d'échecs que s'ils le pouvaient.

Elle enrageait/à cause de leur insolence.

Les gosses crièrent/en sortant de la salle.

Je réfléchissais/avant de faire une réponse.

Je réfléchissais/avant mon départ.

Ils s'ennuyaient/en hiver.

Nous dormons/à Paris ce soir.²¹

Tous les soldats maigrissaient/excepté Louis.

Tous les soldats maigrissaient/à l'exception de Louis.

Nous écrivons/à l'insu du sergent.

On parlait/au lieu de se battre.

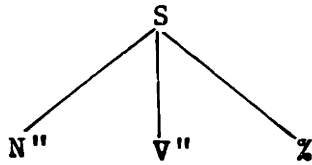
Ils commenceront/aux environs de 1984.

Nous nous en allons/en raison du mauvais climat politique.

Nous rentrerons/à huit heures.

I am not presently in a position to argue on independent grounds that the adverbial phrases of (71) are located outside of the verb phrase in surface structure, but the liaison facts point to a structural difference between the phrases of (71) and those of (64)-(69). If the latter are generated (or derived) as (70) and the former as (72) then the liaison facts will be predictable simply by the X-Comp Rule:

72)



4.3.2 Liaison and the theory of traces

In the discussion of the Monosyllable Rule for stress reduction of non-lexical items in English it was proposed that transformations which move or delete constituents leave behind "traces" (specifically, the sequence '##') of that constituent in the place that the constituent occupied in the phrase marker. The presence of these traces was used to explain the blocking of the Monosyllable Rule in certain cases. It appears that in French, too, there is motivation for these traces, for in just those cases where a constituent is moved or deleted and where the resulting syntactic configuration should qualify as a liaison context, it turns out that the configuration may not be a liaison context. The theory of traces, combined with the analysis of liaison in French that I have been proposing, predicts this result.

I say "may not be a liaison context" because at this point I want to avoid making too strong a claim about French. In the ideolect I am describing in this section it is the case that liaison is unacceptable in contexts where the theory predicts there are traces. In this ideolect quite rigorous judgments are made about whether a liaison is grammatical or not. The judgments of speakers of other dialects are not always so consistent

or so black and white, however. In a variety of instances the liaison may be thought to be "possible" but not "preferable" in a context with traces, or liaison is thought to be "less acceptable" in a context with traces than in one without. I would suggest that even these latter dialects provide support for the traces hypothesis, for without traces no sense can be made of these differences in preference, given that the input to the phonological rules is surface structure and nothing else. Also, the study of the dialect upon which this section is based can be interesting theoretically, for though it's possible that it's not the most general, it is evident that it can provide insights into the properties of other dialects, in the same way as the study of a limiting case provides insight into the properties of the general case.

Finally, I would like to warn that the type of investigation that proceeds by asking individual informants questions about their use of language is most likely inadequate in the study of the many subtleties of the so-called "optional" liaison. A true picture of what people actually do do can only emerge from a sociolinguistic study where people are not being asked about their intuitions. So I can only consider the data on traces in French to be suggestive. On the basis of a certain amount of evidence from French I am putting forth the theory of traces as an hypothesis requiring experimental verification. But I am putting it forth as an hypothesis with a not insignificant empirical foundation.

Let us first examine a simple example. In (73) the verb is in a liaison context with the direct object:

73) Nous donnerons une grande somme à l'organisation révolutionnaire de Dhofar.

In (74), where the direct object must be a dummy or simply non-existent, the verb is in a liaison context with the indirect object:

74) Nous donnons aux institutions charitables les plus chics.

Yet, when the direct object has been removed by a transformation, the verb and the indirect object are no longer in liaison context:

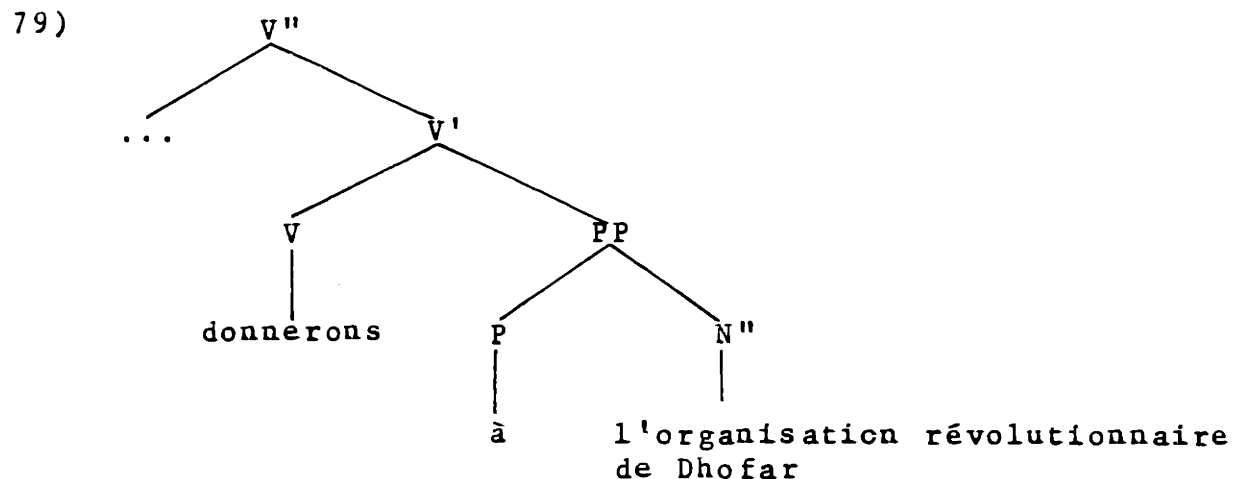
75) La somme que nous donnerons/à l'organisation révolutionnaire de Dhofar est assez grande.

76) Qu'est-ce que nous donnerons/à l'organisation révolutionnaire de Dhofar cette année?

77) C'est une grande somme que nous donnerons/à l'organisation révolutionnaire de Dhofar.

78) Nous la donnerons/à l'organisation révolutionnaire de Dhofar plutôt qu'à celle d'Erythrée.

Without the theory of traces the derived structure of the verb phrases in (75)-(78) would be (79):



The X-Comp Rule would operate on the corresponding labelled

bracketing, (80a), deriving the string in (80b):

80) a) $[\#[\#[\#donnerons\#] \underset{V''V'V}{V} \underset{V \ PP}{\#[\grave{a}] \underset{N''}{\#[\#1'organisation... \#] \#] \#} \#]] \#]$

b) $[\#[\#[\#donnerons] \underset{V''V'V}{V} \underset{V \ PP}{\#[\grave{a}] \underset{N''}{\#[\#1'organisation... \#] \#] \#} \#]] \#]$

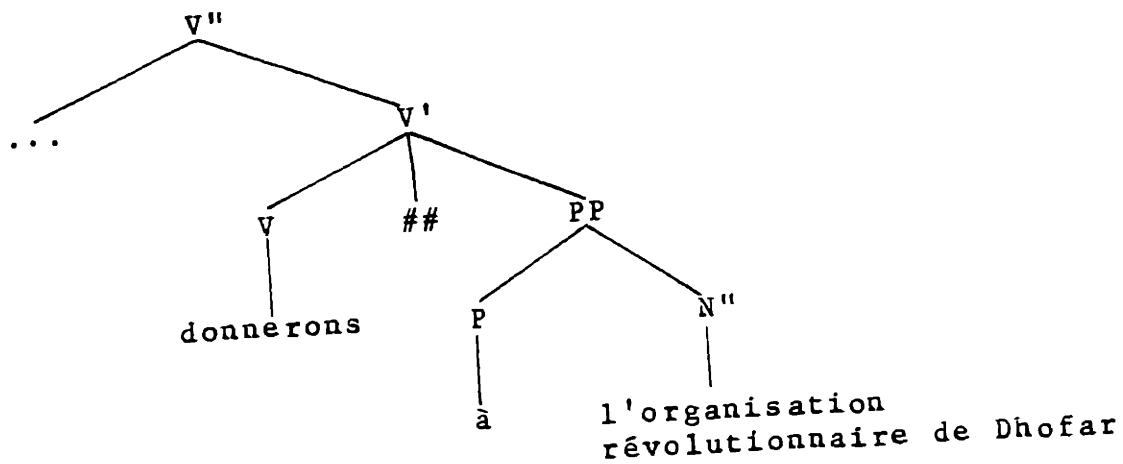
(80b) would be converted into (81) by the convention deleting superfluous word boundaries, and (81) would be the input to the phonological component:

81) $[\#[\ [donnerons] \ \#[\grave{a}] \ \#[\#1'organisation...] \] \] \#]$

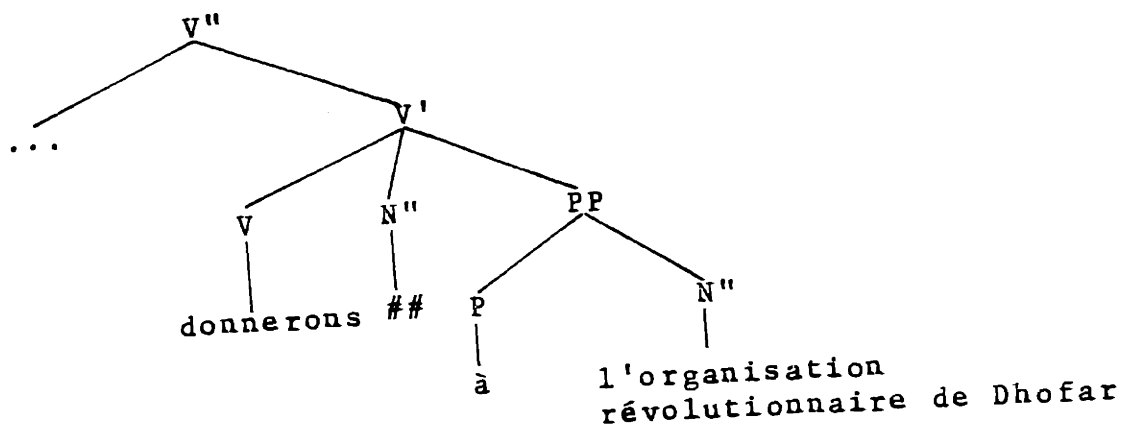
But according to all that's been said in this chapter, donnerons and à are in a liaison context here. Only one # separates them.

The theory of traces would remedy this situation. According to this theory, the derived structure of the verb phrases is (82) (or (83)), not (79):

82)



83)



The X-Comp Rule along with the SPE-II convention would derive

(85), the input to the phonological component, from (84):

84)
$$\begin{array}{ccccccc} \#[\#[\#donnerons\#] \#\# \#[\grave{a}] \#[1'organisation\dots\#]\#\#] \# \\ \text{V}''\text{V}'\text{V} & & \text{V} & & \text{PP} & & \text{N}'' \\ & & & & & & \text{N}''\text{PPV}'\text{V}'' \end{array}$$

85)
$$\#[\ [donnerons] \#\# \#[\grave{a}] \#[1'organisation\dots]] \#]$$

In (85), donnerons and à are not in a liaison context for (far) more than one word boundary separates them.

One alternative to this use of the traces theory in French might be to make the X-Comp Rule cyclic, having it cycle at the end of the S cycle (in Bresnan's sense), but not on the S' cycle. One would then have a derivation like (86) for sentence (75). (See next page.) This alternative is obviously not viable because, even when cyclic, the X-Comp Rule puts donnerons and à in a liaison context.

Suppose instead that not the X-Comp Rule but a rule formulated as in (87) were responsible for creating liaison contexts between inflected verbs, nouns and adjectives and their complements:

87)
$$\begin{array}{l} \#[\ W \#[\#[\ \left[\begin{array}{c} X \\ +\text{inflected} \end{array} \right] \#] \#[\ Y \#] Z \#] \#] \# \\ \text{X}'' \quad \text{X}'\text{X} \quad \text{X} \quad \text{X}'\text{X}'' \end{array} \Rightarrow$$

$$\#[\ W \#[\#[\ \left[\begin{array}{c} X \\ +\text{inflected} \end{array} \right] \#] \ [Y \#] Z \#] \#]$$

With such a rule, derivation (88) is possible. (See next page.) The result of derivation (88) is that there is no liaison context with donnerons and à, a strike in favor of this alternative.

Rule (87) would indeed provide a serious alternative to the traces theory (and the X-Comp Rule)--if it weren't for the fact that it would create liaison contexts where they shouldn't be.

86) [#[#[#1a somme#] [# [] [#nous [#[#donnerons#] [#PRO]#] [#[ã] [#...#]#]
 S'S N"N" N" S'Comp S V"V'V V N" N" PP N"]

S cycle: [#donnerons]
 X-Comp Rule V V

S' cycle: [+PRO]
 RC Formation Comp -wh Comp
 ↑-----J

Output: [# [donnerons] [#[ã] [#...#]#]
 SPE conventions V" V V

88) [#[#[#1a somme#] [# [] [#nous [#[#donnerons#] [#PRO]#] [#[ã] [#...#]#]
 S'S S"N" N" S'Comp S V"V'V V N" N" PP N"]

S cycle: [PRO]#]
 Rule (87)

S' cycle: [[PRO]#]
 RC Formation Comp -wh Comp
 ↑-----J

Output: [# [donnerons#] [#[ã] [#...#]#]
 SPE Convention V"V'V V PP N"

Rule (87) operating cyclically would derive (90) from (89):

89) [# [WH] [#ils [# [# [#accepteront#] [#avec] [#plaisir#]...
 S'Comp S V"V'V V PP N" N"

90) [#accepteront#] [[avec]

Subject pronoun inversion, which must operate on the following cycle on S' (in order to know whether the necessary [WH] element is in the complementizer and whether it is a root sentence), would yield the structure in (91):

91)

[# [WH] [# [# [# [# [#accepteront#] ils#] [[avec] [#plaisir#]...

Now ils and avec are in a liaison environment and one would expect to hear the final [z] of ils pronounced. But this doesn't happen. The sentence is pronounced according to (92):

92) Accepteront-ils/avec plaisir?

A parallel argument against a cyclic rule (87) is provided by imperatives. Imperative formation is presumably a root transformation, therefore necessarily operating on the S' and not the S cycle. If the initial # of the verb complement were deleted on the S cycle, then one would be led to expect a liaison context where it doesn't exist--in the sentences (93)-(95):

93) Donnez-en/à Marie.

94) Rangez-vous/en ordre.

95) Asseyons-nous/immédiatement.

A derivation with a cyclic operation of (87) would give (96) for (93):

96) [# [# [# [# [# [#donnez#] en#] [[à] [#Marie#]#]#]#]#]
 S'S V"V'V V V V PP N" N"PPV"V"S S'

Again a liaison context is incorrectly derived.

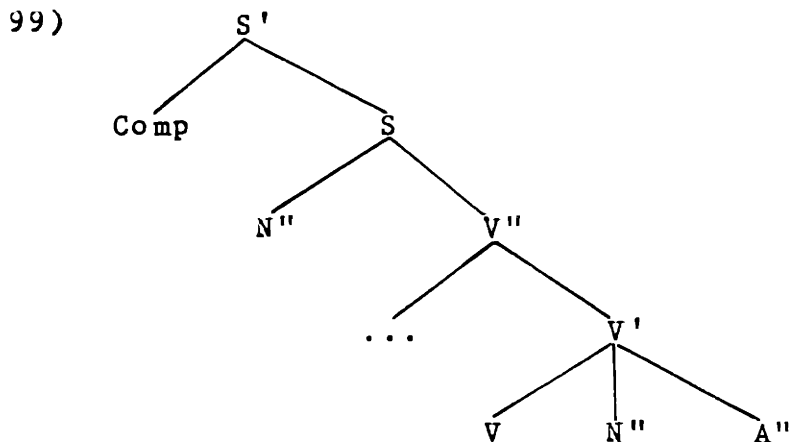
In addition, if the transformation of Heavy N" Shift, which would derive (98) from (97), were not cyclic, but rather post- or last-cyclic, then cyclic (87) would predict that you'd have liaison in (98) in just the place where I've indicated it is impossible:

97) Je donnerais [^]un des meilleurs livres de la collection à Robert.

98) Je donnerais à Robert/un des meilleurs livres de la collection.

In sum, a cyclic rule like (87) does not generate the proper strings and must be rejected in favor of a theory of traces and the X-Comp Rule.

Further examples of the effect of traces on liaison are provided by sentences where the object noun phrase has been extracted (or deleted) from the structure (99):



In the (b) sentences below, the verb and the following adjective are not in a liaison context; liaison is impossible between them:

100) a) On croyait Marianique intelligente.

b) Qui est-ce qu'on croyait/intelligent?

- 101) a) Ce bon vin des Corbières rend les invités ivres.
 b) C'est les invités que ce bon vin rend/ivres.
- 102) a) Nous considérons cette attitude insupportable.
 b) Nous la considérons/insupportable.
- 103) a) On pensait ces choses importantes.
 b) Les choses qu'on pensait/importantes ne le sont pas.
- 104) a) Ces enfants imaginaient les éléphants immenses.
 b) Qu'est-ce que ces enfants imaginaient/immenses?
- 105) a) Vous trouvez vos voisins aimables.
 b) Les voisins que vous trouvez/aimables vivent à côté.

Any of these verbs could be in a liaison context with their N" objects:

- 106) Nous considérons[^]une faillite insupportable.
 Ils trouvaient[^]un des voisins aimable.
 Etc.

and, furthermore, verbs are capable of having liaison with a following adjective:

- 107) La situation devenait[^]inquiétante.
 Jean restait[^]ivre toute la nuit.

What's important, obviously, is that only because a constituent has been removed from the verb complement in the (b) sentences of (100)-(105) does the verb become juxtaposed to the adjective in its complement. The traces incorporate the information that a constituent has been removed and ensure that the surface structure V-A" sequence will not be a liaison context.

4.3.3 The verbal complements of the verb²³

The facts about liaison with verbal complements of the verb further substantiate the theory of traces, and they add a new dimension to this theory, for the indications are that dummy noun phrases (those whose surface representation is null, but which are interpreted as "someone", "something") do not leave traces. In particular, the so-called EQUI-Noun Phrase Deletion transformation does not leave traces. Thus, EQUI must be distinguished from other deletion transformations (like Comparative Deletion in English) which do leave traces behind. It is therefore conceivable that EQUI is not really a deletion but an interpretive rule assigning co-reference between a noun phrase in the matrix sentence and a dummy noun phrase in the embedded sentence. Indeed, the liaison facts raise very interesting questions for research on verb phrase complementation in French.

In the set of sentences below, the verb is in a liaison context with its surface structure object (the (a) sentences). But if that object has been removed by Relative Clause Formation, Question Formation, Clefting or Clitic Movement, liaison is not possible between the verb and the verb phrase following it in surface structure (the (b) and (c) sentences):

- 108) a) Ce comité autoriserait un des chercheurs à faire des enquêtes à long terme.
- b) Le chercheur que ce comité autoriserait/à faire des enquêtes à long terme est celui du C.N.R.S.
- c) Nous vous autorisons/à ne pas y aller.

- 109) a) Le chirurgien aidait un des malades à se rhabiller.
b) Qui est-ce que le chirurgien aidait/à se rhabiller.
c) Le chirurgien l'aidait/à se rhabiller.
- 110) a) Ils n'accoutumaient aucun des malades à travailler.
b) On les accoutumait/à travailler.
c) Qui est-ce qu'ils accoutumaient/à travailler?
- 111) a) Ces nouvelles encourageront un paysan pauvre à travailler avec enthousiasme.
b) Ce sont des paysans pauvres que ces nouvelles encourageront/à travailler avec enthousiasme.
c) Ces nouvelles les encourageront/à travailler avec enthousiasme.
- 112) a) Nous apprenions aux filles à faire des maths.
b) Les filles à qui nous apprenions/à faire des maths sont en Sixième.
c) C'était des filles à qui nous apprenions/à faire des maths.
- 113) a) Il ne forçait aucune personne à jouer au tennis.
b) C'était toujours sa soeur qu'elle forçait/à jouer au tennis.
c) Il me forçait/à jouer au tennis.
- 114) a) Nous inviterons une de nos amis à manger chez nous ce soir.
b) Nous l'inviterons/à manger chez nous ce soir.
c) L'amie que nous inviterons/à manger chez nous ce soir aime beaucoup des pâtes.
- 115) a) Des idées communistes amenaient un groupe des ouvrières à s'organiser d'une façon différente.
b) Des idées communistes les amenaient/à s'organiser d'une façon différente.
c) C'était ce groupe en particulier que des idées communistes amenaient/à s'organiser d'une façon différente.

The theory of traces accounts for this state of affairs.

In the next set of sentences (116)-(121) the verb phrase has the canonical structure V à N" à V". The (a) sentences show that the verb and the prepositional phrase form a liaison context. In the (b) sentences the verb and the complement verb phrase form a liaison context. Here, the prepositional object phrase is a dummy; these verbs do not require a fully specified object. In deep structure that dummy would intervene between the higher verb and the complement verb phrase. Yet this has no effect on liaison. One can only conclude that dummy noun phrases don't leave traces. We shall thus require that only phrases which dominate terminal symbols are assigned word boundaries by the SPE I convention. The (b) sentences should be contrasted with the (c) sentences where liaison is impossible between verb and complement verb phrase. Here the prepositional object phrase has been removed by transformation, leaving behind traces which exclude the possibility of liaison:

- 116) a) L'éponge sert[^]à Louis à laver la vaisselle.
 b) L'éponge sert[^]à laver la vaisselle.
 c) C'est seulement à Louis que l'éponge sert/à laver la vaisselle.
 Á qui est-ce que l'éponge sert/à laver la vaisselle?
- 117) a) C'était un pic qui servait[^]à Paul à creuser des trous.
 b) C'était un pic qui servait[^]à creuser des trous.
 c) Le type à qui le pic servait/à creuser des trous est Paul.

Le pic lui servait/à creuser des trous.

- 118) a) Il restait[^]à Paulette à finir son dernier chapitre.
 b) Il restait[^]à finir le dernier chapitre.
 c) Il lui restait/à finir le dernier chapitre.

La femme à qui il restait/à finir le dernier chapitre est Paulette.

- 119) b) Il faut[^]y aller.
 c) Il vous faut/y aller.
 120) b) Il fallait[^]appeler les pompiers.
 c) Il nous fallait/appeler les pompiers.
 121) a) Un bon maître enseignerait[^]à l'enfant à se passer de lui.
 b) Un bon maître enseignerait[^]à se passer de lui.
 c) Le bon maître leur enseignait/à se passer de lui.

C'est à l'enfant, non au directeur, que le bon maître enseignait/à se passer de lui.

Turning now to a different class of verbs, we see again that the traces theory is borne out. With the perception verbs voir, regarder, entendre, écouter, the subject of the embedded verb may precede that verb, as in J'ai vu Jean partir, or follow it, as in J'ai vu partir Jean. The perception verb will be in a liaison context with the following noun phrase, e.g.,

- 122) On écoutait[^]un bataillon avancer.
 Nous regardons[^]une actrice du TNP entrer dans la salle.
 Nous verrons[^]une difficulté immense apparaître.
 Vous entendez[^]un chien aboyer.
 Elle voit[^]un vieil homme entrer dedans.

But if the noun is postposed, as in (123), or removed by Question Formation, Relative Clause Formation, Clefting or Clitic Movement, as in (124), the verb is not in a liaison context with the following word:

123) On écoutait/avancer un bataillon.

Nous regardons/entrer une actrice du TNP.

Nous verrons/apparaître une difficulté immense.

Vous entendez/aboyer un chien.

Elle voit/entrer un vieil homme.

124) On l'écoutait/avancer

Qu'est-ce qu'on écoutait/avancer?

Nous la regardons/entrer.

C'est une actrice du TNP que nous regardons/avancer.

Nous la verrons/apparaître bientôt.

La difficulté immense que nous verrons/apparaître est celle de l'intransigeance des paysans.

Vous l'entendez/aboyer.

C'est un chien, pas un loup, que vous entendez/aboyer.

L'homme qu'elle voit/entrer est vieux.

Qui est-ce qu'elle voit/entrer?

Vergnaud (1971) has proposed that verbs like voir, écouter, etc., have two different strict subcategorization (SSC) frames, (i) and (ii):

(i) ___ S

(ii) ___ N" V"

The SSC frame (i) is at play in (122), where the subject of the embedded verb precedes it. The structure of the SSC frame (ii)

underlies the (123) sentences. The noun phrases of these sentences can be moved by an obligatory N"-Repulsion transformation into the V", according to Vergnaud's analysis. These two different underlying structures of the perceptual verbs are given support by the control of such adverbs as avec enthousiasme. In (125) the enthusiasm is only the citizens':

125) Les citoyens regardaient partir les soldats avec enthousiasme.

In (126) the enthusiasm may be on the part of the soldiers or the citizens:

126) Les citoyens regardaient les soldats partir avec enthousiasme.

If avec enthousiasme can be interpreted as applying only to the N" subject of a sentence dominated directly by S, then Vergnaud's two deep structures can properly account for its interpretation in (125) and (126).

A verb like laisser also has both SSC frames. One finds the sentences (127), which have a deep structure represented by (i), and where liaison between the verb and the noun is possible:

127) Les policiers laissaient[^]un des camions avancer.

Nous ne laissons[^]aucun rire éclater.

Elle laissait[^]un garçon expédier le paquet.

On ne laissait[^]aucune personne enseigner ces idées réactionnaires.

Nous laissons[^]un organisme différent entreprendre la construction de la route.

Le propriétaire laisserait[^]une famille portugaise emménager ici.

and the sentences (128), whose deep structures are represented by the SSC (ii):

128) Les policiers laissait/avancer un camion.

Nous ne laissons/éclater aucun rire.

Elle laissait/expédier le paquet à un garçon.

On ne laisserait/enseigner ces idées à personne.

Nous laissons/entreprendre la construction de la route à un organisme différent.

Le propriétaire laisserait/emménager une famille portugaise.

In these latter sentences the N" is obligatorily repulsed, and, as a consequence of the traces that are left behind, liaison is impossible.

The verb faire, which is the central subject of Vergnaud's (1971) paper, "The faire construction", is different from voir, écouter, entendre, regarder and laisser in that it has only the SSC frame (ii). Sentences like J'ai fait Jean partir are ungrammatical; only the sentences where the N" has been repulsed are possible, e.g., J'ai fait partir Jean. Liaison is impossible between the verb faire and the embedded verb when the N" has been repulsed:

129) Il faisait/acheter des livres à Paul.²⁴

L'église fait/adorer des idoles aux gens fidèles.

Nous ferons/envoyer des cartes postales à Marie.²⁴

Elle fait/appeler le bureau de postes à Paul.

Elle fait/appeler Paul.

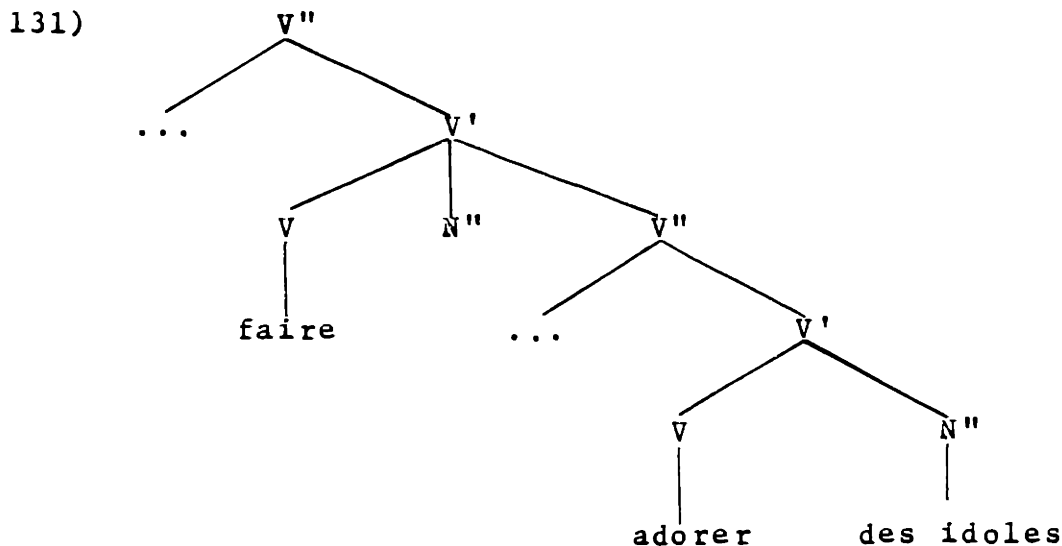
Marie fait/enrager Paul.

Le vent faisait/arriver des nuages.

Yet when there is no N" to be repulsed, faire Verb is a liaison context:

- 130) Il faisait acheter des livres.
 L'église fait adorer des idoles.
 Nous ferons envoyer des cartes postales.
 Partout on faisait éteindre la lumière.
 Elle fait engager l'ancre.
 La drogue fait oublier tous les malheurs.

It is quite possible that this liaison is permitted because the deep structure of those in (130) is, for example, (131), where the N" is a dummy:



As was seen above, dummy noun phrases don't have traces and therefore don't prevent liaison.

Another proposal for the deep structure of the sentences in (130) has been advanced by Vergnaud. His idea, which is quite compelling, is that faire also has the SSC frame (iii):

(iii) — [V X [par] N"]
 [+passive]

Here faire lacks an N" following it and instead has the Agent in a deep structure "by-phrase".²⁵ The structure represented by (iii) would underlie the sentences in (132):

132) Ils faisaient acheter des livres par Paul.

L'église fait adorer des idoles par les gens fidèles.

Nous ferons envoyer des cartes postales par Marie.

as well as those in (130), where the N" in the par phrase would be a dummy. Thus, the fact that there is liaison in the (130) and (132) sentences is an immediate result of the X-Comp Rule, nothing more. These liaison facts seem to provide good support for Vergnaud's analysis.

Vergnaud also proposes that laisser has the SSC frame (iii). The sentences (133) and (134), which have the liaison context laisser Verb, would have deep structures corresponding to (iii):

133) Elle laissait expédier le paquet.

On laissait enseigner ces idées réactionnaires.

Nous laissons ériger les barricades.

On laissait incendier les voitures.

Les généraux laisaient occuper leur pays sans trop d'objections.

134) Elle laissait expédier le paquet par le garçon.

On ne laisserait enseigner ces idées par personne.

Nous laisserons ériger les barricades par les manifestants.

On laissait incendier les voitures par les policiers.

Les généraux laissaient occuper leur pays par les Nazis.

To conclude this discussion of laisser and faire, I mention a few sentences where traces blocking liaison are left behind by familiar sorts of rules:

135) A qui est-ce qu'elle faisait/acheter des livres?

Nous lui ferons/envoyer des cartes postales.²⁴

Qui est-ce qu'elle fait/enrager?

C'est les prix que l'inflation fait/augmenter.

Les gens auxquels l'église fait/adorer des idoles sont les fidèles.

Elle lui laissait/expédier le paquet.

Les policiers le laissaient/avancer.

Qu'est-ce que les policiers laissaient/avancer.

C'était des rires que nous laissions/éclater.

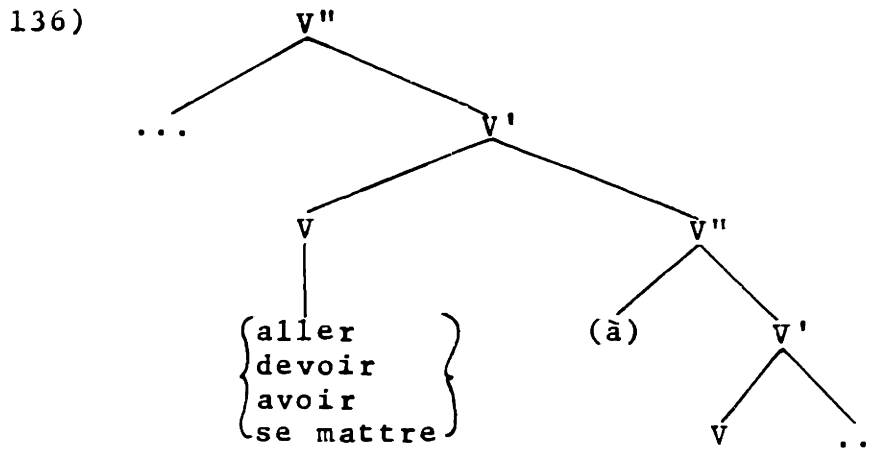
Nous les laissons/éclater.

Jamais on ne lui laisserait/enseigner ces idées.

I would now like to discuss certain verbs which are never separated by a noun phrase from the verb in their complements (in surface structure, at least). Certain of these, the movement verbs (aller, venir, monter, partir, descendre, etc.), the "semi-auxiliaries" devoir, pouvoir, and aller, and assorted others, including falloir, réussir à, avoir à, arriver à, se mettre à, never have anything but a verb complement. They never appear with a sentential complement que S and so might well be thought of as being subcategorized for (iv):

(iv) V"

or as entering into the deep structure (136)



Predictably, then, these verbs are in a liaison context with the following verb (or the particle à), as the sentences in (137) show:

- 137) Il allait[^] accrocher le machin au mur.
 On devrait[^] allonger la piste.
 Elle réussit[^] à le faire.
 Vous avez[^] à finir la chose aujourd'hui.
 Jean se mettait[^] à marcher.²⁶

The X-Comp Rule would simply operate on surface structures like (138) to yield (with SPE II) (139):

138)

[#[#il#[#[#avait#] [#à #[#[apprendre#] [#la leçon#] ...
 S'S V''V'V V V'' V'V V N'' N''

[#[#il#[#[#allait#] #[#[apprendre#] [#la leçon#] ...
 S'S V''V'V V V''V'V V N'' N''

139)

[#[#il #[[avait] [#à #[apprendre#] [#la leçon] ...

[#[#il #[[allait] #[apprendre#] [#la leçon] ...

It is worth noting here that French has sentences with avoir à which are precisely parallel to the English sentences with have to. Just as the English sentence (140) is ambiguous, so is the French (141) ambiguous, and they are ambiguous in the same way:

140) What do you have to read?

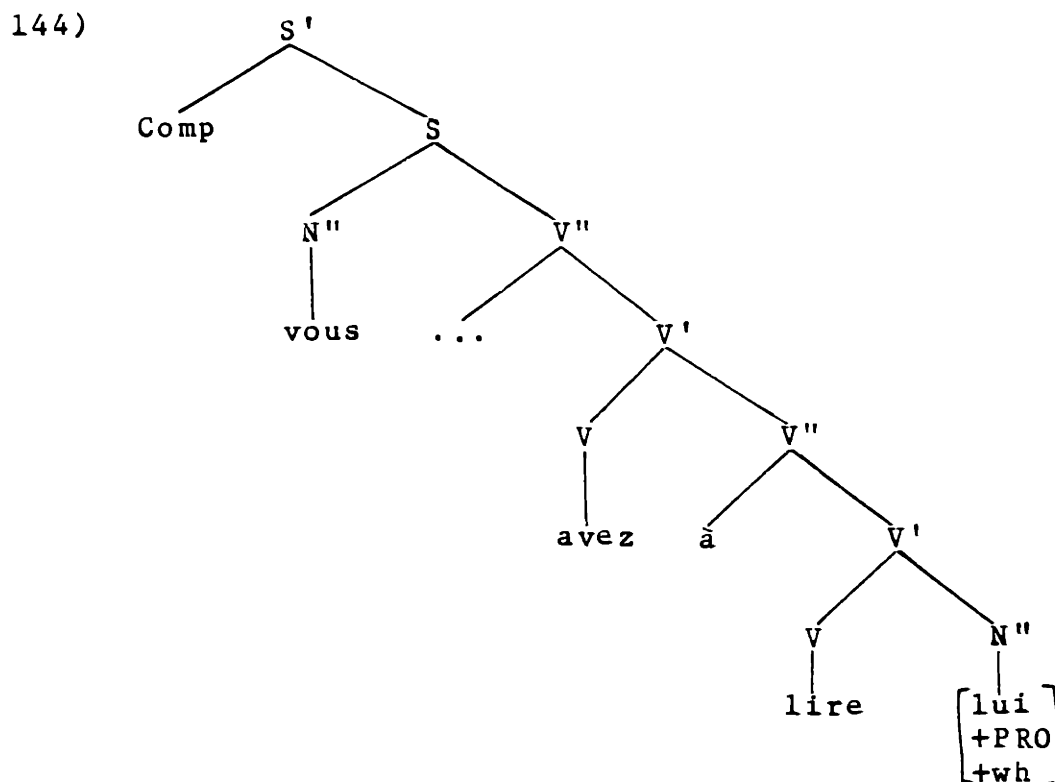
141) Qu'est-ce que vous avez/à lire?

And moreover, both the English (142) and the French (143) are unambiguous:

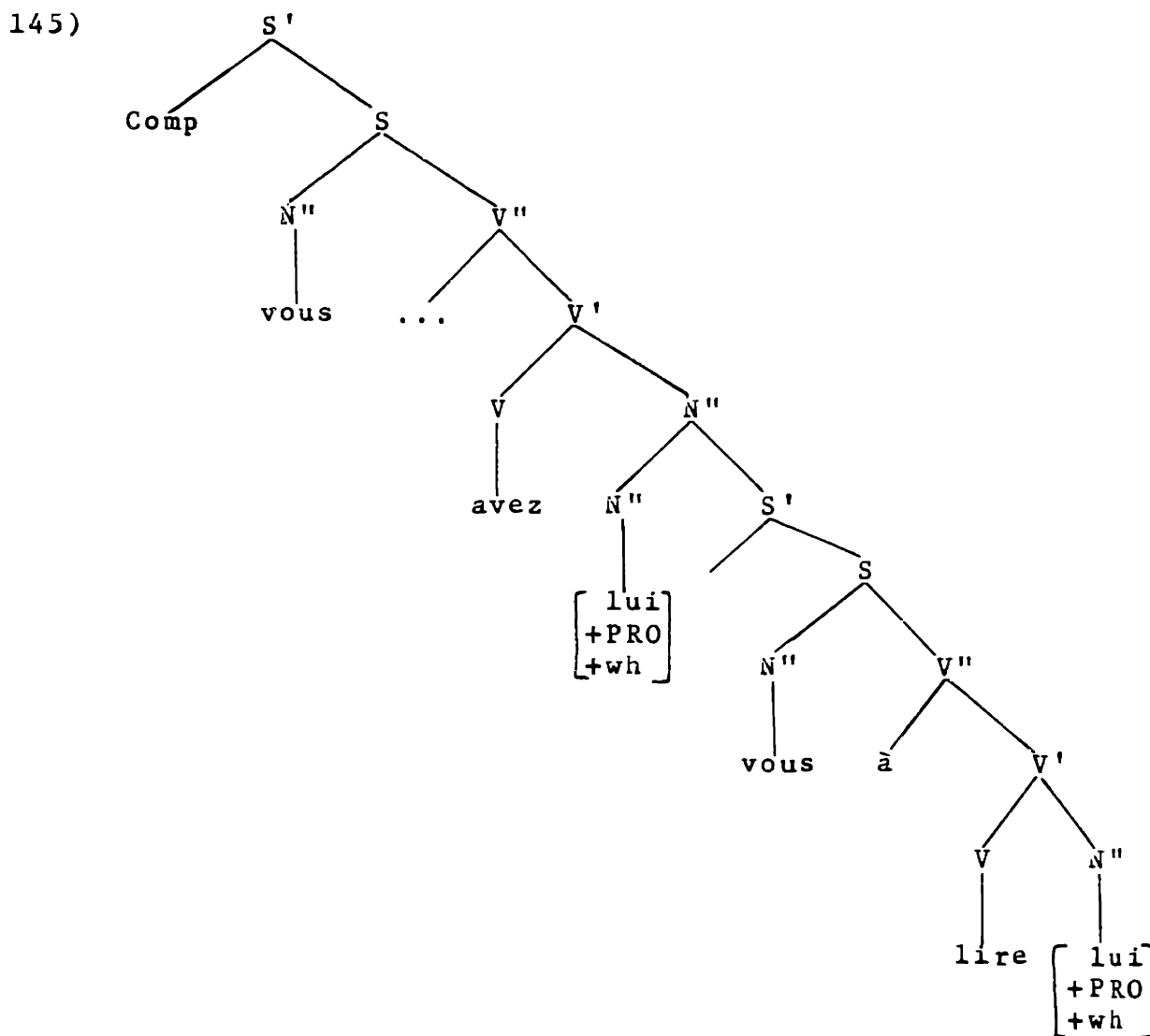
142) What do you hafta read?

143) Qu'est-ce que vous avez^hà lire?

Both (142) and (143) can only mean something like "What do you have an obligation to read?", while for (140) and (141) there is the additional meaning of (roughly) "What do you have that you could read?" In French, the deep structure of (143) is (144):



while the (nearly) deep structure of the other sentence underlying (141) is (145):



In English it was argued that the to particle (which corresponds to à in French) was attached by a cyclic transformation to a verb that preceded it. Such an analysis based on a cyclic à-enclitic transformation would work in French, but it is not at all required,²⁷ for the traces theory will already assign appropriately different surface structures to (143) and to (145). The surface structure of (143), after the X-Comp Rule and the SPE conventions have applied, is (roughly) (146):

146)

[#...[#vous [# [avez] [#â [# [lire#] [#...#]]]#] #]
 S' S V''V'V V V'' V'V V N'' N''V'V'' S S'

while the surface structure of (145) would be (147):

147)

[#...[#vous [# [avez] [# [#...#] [# [à [# [lire]...]
 S' S V''V'V N''N'' N'' S'S V'' V'V V

The traces $\begin{bmatrix} \# \dots \# \\ N'' \quad N'' \end{bmatrix}$ are those left by Question Formation, which

removed the noun phrase object of avoir in (147) and the object of lire in (146). I leave the derivations to the reader. With such traces present in the tree, obviously the avez of (147) cannot be in a liaison context with the à of à lire.

The other verbs which appear in the surface structure configuration $\dots V_i (\hat{a}) V_j \dots$ are verbs which also appear in the configuration $\dots V_i \text{ que } S$. The verbs I'm speaking of are vouloir, aimer, préférer, entendre (intend), penser (intend), s'attendre à, compter, croire, and others. One finds the sentences (148):

- 148) Il s'attend[^]à partir.
 Nous comptions[^]y aller bientôt.
 Vous voulez[^]écouter?
 Elle croit[^]appercevoir Marie.

They contain liaison contexts. It is not unlikely that sentences like (148) derive from the sentences in (149) by obligatory EQUI-Noun Phrase Deletion:

- 149) *Il s'attend (à ce) qu'il parte.
 *Nous comptions que nous y irions bientôt.

*Vous voulez que vous écoutiez.

Elle croit qu'elle apperçoit Marie. (optional EQUI)

The (149) sentences are ungrammatical, but sentences with the same syntactic shape which contain unlike subjects are fine:

150) Il s'attend (à ce) qu'elle parte.

Nous comptons que Mariane irait bientôt.

Vous voulez que Jeanne écoute.

Elle croit que Pierre apperçoit Marie.

Yet, if the (148) sentences are derived from the (149) sentences by EQUI, how can it be that the verbs in (148) are in liaison contexts? Wouldn't the deletion of the embedded subject leave traces of that noun phrase behind? According to the theory presented here, traces would indeed be left behind--unless the EQUI subject is actually a dummy noun phrase (one that would be interpreted as coreferential to the matrix subject). There is also the possibility that the (148) sentences are generated as such by the base, thus having no operation of EQUI in their derivations. I am in no position to examine these possibilities within this study, so the question about EQUI and the (148) sentences will have to remain open. It would be an interesting topic for further research.

Another problematic set of verbs includes the items underlined in the following sentences:

151) Jeanne paraît aimer les huitres.

Elle semblait avoir lu les journaux.

Nous commençons à détester le thon.

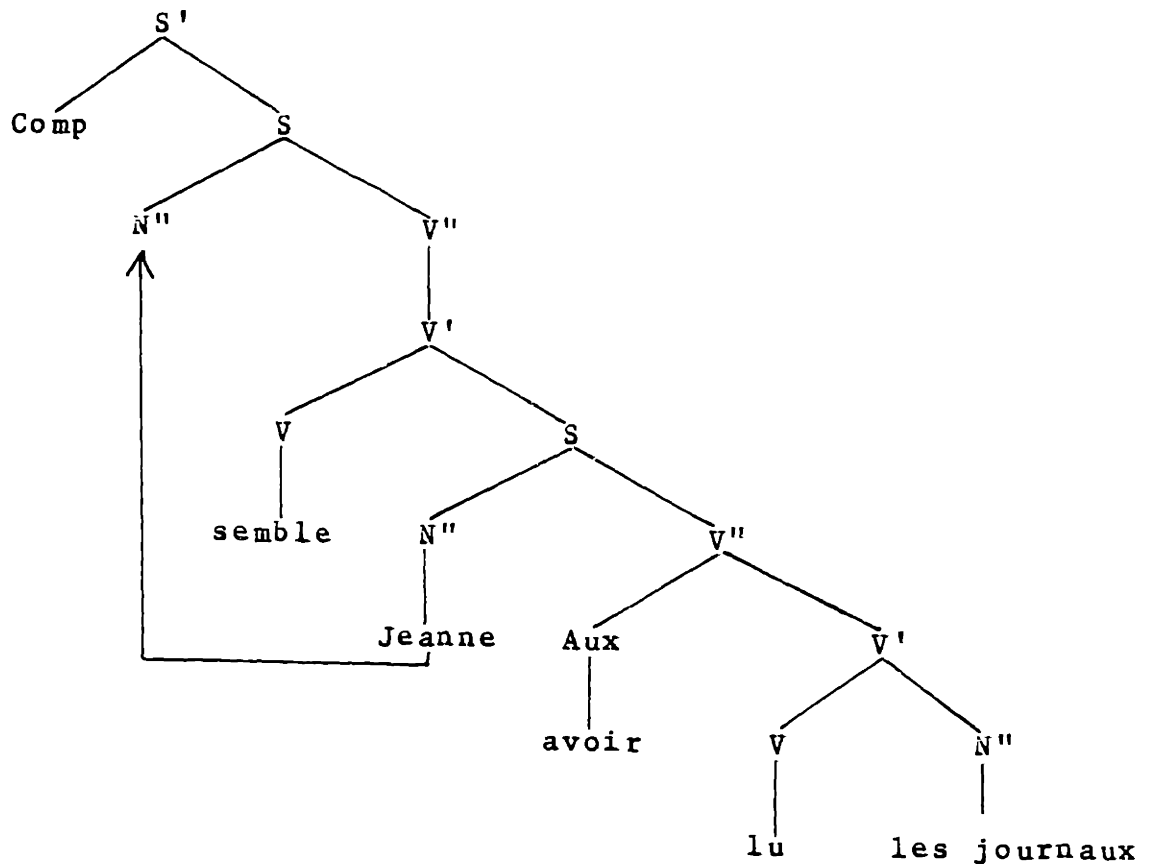
Il tendait à jouer du violon assez souvent.

Vous persistez à ennuyer votre patron.

On continuait à monter des manifestations.

It seems entirely possible that these sentences are derived from a structure of the form (152) by a transformation of Raising which moves the lower subject into the empty N'' of the higher S:

152)



Ruwet (1970) has given good evidence for such an analysis for commencer and sembler, among others, and Bresnan (1972b) proposes such an analysis for these same verbs in English. Thus, if the analysis represented by (152) is correct, one would not expect to have liaison between, e.g., semblait and avoir, for the traces of Jeanne should be lingering between them. Since there is liaison in these contexts, one will have to specify that the transformation

of Subject-Raising in French erases the traces it should, in principle, leave behind.

5. The Basic Syntax of Liaison

5.1 Summary of Rules

In French, when two words are separated by a single word boundary they are in a liaison context. Certain phonological rules, to be described in the next chapter, are capable of "looking past" one word boundary, but not two. So the phonological behavior of words in a liaison context is different from the behavior of words not in a liaison context.

The conventions concerning word boundaries worked out in SPE, namely, (1) the stipulation that non-lexical items do not have their own word boundaries and (2) the elimination of superfluous word boundaries in strings like $[#[#[#...]$, or $...#]#]$, are the foundation upon which the theory of liaison being defended here is built. They, combined with the proposed universal convention on transformations which provides for the presence of word boundary traces in derived trees, account for a large number of the liaison (and non-liaison) contexts in the various styles of French speech.

To supplement these universal conventions on word boundaries it is necessary to posit certain readjustment rules particular to French which insert and delete word boundaries. The rules are summarized as follows, listed under the styles in which they are at play:

Conversation Familière: Style IAdjective-Noun Rule:

$$\begin{array}{c} [\#X[\#Y[\#[\#Adj\#]\#]\#] [\#[\#Noun\#]Z\#]\# \\ N'' A'' A'A \quad AA'A'' N'N \quad N N'N'' \end{array}$$

$$\Rightarrow \begin{array}{c} [\#X[\#Y[\#[\#Adj]]]] [\#[\#Noun\#]Z\#]\# \\ N'' A'' A'A \quad AA'A'' N'N \quad N N'N'' \end{array}$$
Polysyllabic Non-Lexical Category Rule (Poly NLC)

$$[C_0 VC_0 VC_0 X] \Rightarrow [\#C_0 VC_0 VC_0 X\#]$$
Conversation Soignée: Style IILexical Specifier Rule (includes the Adjective-Noun Rule)

$$\begin{array}{c} [\#Y[\#[\#[\# \left\{ \begin{array}{l} Adj \\ Adv \end{array} \right\} \#]\#]\#] [\#[\#X\#]Z\#]\# \\ X'' A'' A'A \quad AA'A'' X'X \quad X X'X'' \end{array}$$

$$\Rightarrow \begin{array}{c} [\#Y[\#[\#[\# \left\{ \begin{array}{l} Adj \\ Adv \end{array} \right\}]]] [\#[\#X\#]Z\#]\# \\ X'' A'' A'A \quad AA'A'' X'X \quad X X'X'' \end{array}$$

where A = either Adjective or Adverb

Lecture et Discours: Style IIILexical Specifier RuleX-Comp Rule

$$\begin{array}{c} X \\ [\#Y[\#[\#[+inflected]\#]Z\#]\# \\ X'' X'X \quad X X'X'' \end{array}$$

$$\Rightarrow \begin{array}{c} X \\ [\#Y[\#[\#[+inflected]]Z\#]\# \\ X'' X'X \quad X X'X'' \end{array}$$

The differences in the styles are characterized by the presence or absence of certain readjustment rules. The need for these rules is evidence that the distinction between one and two word boundaries provided by the universal theory is not adequate for French. The Adjective-Noun Rule, its generalization the Lexical

Specifier Rule, and the X-Comp Rule all convert certain sequences of two #'s that are provided by the SPE conventions into the single # appropriate for French. The Poly NLC Rule produces ## where there was only #. All of these French readjustment rules (except the Poly NLC Rule) make essential reference to the phrase structure of items separated by two #'s, and, if the phrase structure relation between the words is of the proper sort, one of the #'s is erased and a liaison environment is created. What's particularly interesting is the parallelism between the liaison properties of Adjective Phrase, Noun Phrase and Verb Phrase. In Styles II and III, the liaison phenomena are identical in all three phrase types. In Style I, adjective and verb phrases are parallel, and are more denuded of liaison contexts than the noun phrases. In all, this parallelism gives support to the theoretical approach to syntax embodied in Chomsky's \bar{X} (X') notation. Clearly, a very general and simple description of liaison in French is permitted by employing the X' notation.

The assumption has been that syntactic units are the basis for determining liaison. Yet syntactic considerations cannot explain all the peculiarities of liaison. Some other factor must have produced the obligatory liaison in the plethora of "frozen expressions" which French possesses. The examples below represent but a small subset of these expressions:

de mieux ^{en} mieux	sang ^{impur}	franc ^{et} net
petit ^à petit	les Etats ⁻ Unis	le froid ^{aux} pieds
conformément ^à	le pot ⁻ au-feu	les ponts ^{et} chaussées

tout^ˆ à l'heure le cas^ˆ échéant Comment^ˆ allez-vous
 fait^ˆ et cause vingt^ˆ et un tôt^ˆ ou tard

Also, contrary to what one expects from the syntax, auxiliaries separated from their verb by an adverb are not required to make liaison with that adverb. Even in Style II the sentences below are permissible:

Les vaches ont/indolemment descendu la pente.

Elle s'est/intensément appliquée au travail.

Furthermore, the so-called "semi-auxiliaries" vouloir, devoir, aller, pouvoir, can be in liaison contexts in a style of speech where other verbs which are identical syntactically would not be.

5.2 Two Special Cases

The model of liaison presented here fails to account for two sorts of examples. The first sort involve liaison contexts with conjunctions and the second the liaison of pronominal, non-clitic noun phrases.

5.2.1 Conjunctions

Non-inflected nouns, adjectives and verbs are never in a liaison context with the conjunction particles et or ou:

esprit/et matière être comme chien/et chat

avoir faim/et soif

souffrir mort/et passion un homme grand/et fort

un garçon sérieux/et intelligent

il était méchant/et cruel. est-il long/ou court?

Qu'on l'amène mort/ou vif. Laid/ou joli, peu importe.

Il a fait/et refait le lit.

Vous pouvez sortir/et rentrer quand vous voulez.

Inflected items are in liaison with the conjunctions only in Style III, the style of discours:²⁸

les pieds[^]et les mains liés

passer à profits[^]et pertes

Hommes[^]et femmes remplissaient la salle.

Ils étaient, garçons[^]et filles, à peu pres une vingtaine.

des hommes méchants[^]et cruels

Ils sont grands[^]et forts

Bons[^]ou mauvais, on les prend tous.

Des jeunes gens sérieux[^]et appliqués.

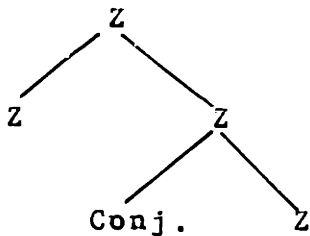
Nous rions[^]et chantons toute la nuit.

Elles voulaient[^]et ne voulaient pas.

Elles parlaient[^]et discutaient depuis deux heures.

(Many of these examples are Fouché's.) It is generally agreed²⁹ that there is no underlying /t/ in et, so it's not possible to find out about liaison between conjunction particles and the second member of the noun phrase.

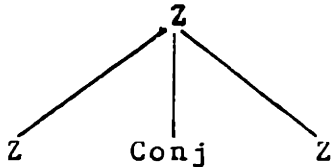
According to Ross's analysis (Ross, 1967, §4.2.1), the derived structure of conjoined phrases is



(see §2.1.2 of this study for a discussion of conjunction in English). Given such a structure, the conjunction particle will not be in a liaison context with the left-hand conjoined element-- unless some special readjustment takes place, for the labelled bracketing of such a structure would be (after the application of SPE I and SPE II)

$$\begin{array}{ccccccc} [\# [\dots \#] & [\# [\text{Conj}] & [\# \dots] &] \#] \\ \underline{Z} \ \underline{Z} & \underline{Z} \ \underline{Z} & \underline{Z} & \underline{Z} \ \underline{Z} \end{array}$$

The conjunction particle is separated by #] [# from what precedes it. The facts of French seem thus to support Ross's analysis and do not favor an alternative analysis giving conjoined phrases the structure below:



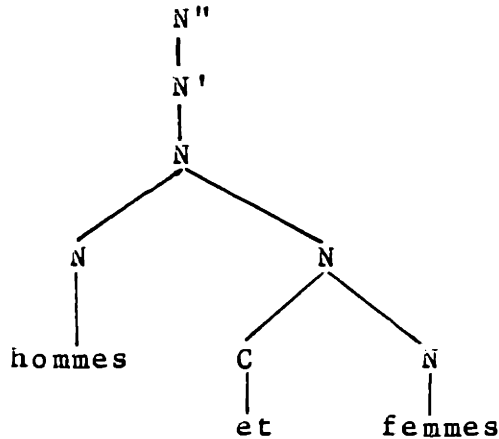
With such an analysis, the labelled bracketing would be

$$\begin{array}{ccccccc} [\# [\dots \#] & [\text{Conj}] & [\# \dots] &] \#] \\ \underline{Z} \ \underline{Z} & \underline{Z} & \underline{Z} & \underline{Z} \ \underline{Z} \end{array}$$

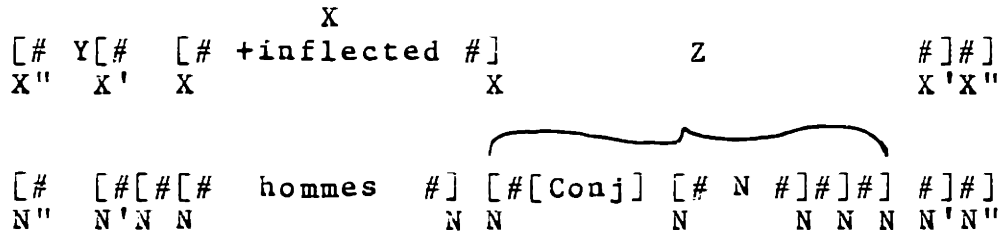
and one would expect there to be automatic liaison between the left conjunct and the conjunction particle.

Since only inflected nouns, verbs and adjectives enter into liaison contexts in conjunctions, it would seem reasonable to attempt to have the X-Comp Rule account for these contexts. But do conjoined phrases meet the structural description of the X-Comp Rule? Indeed, if the conjoined elements are the lexical categories Noun, Verb, or Adjective, conjunctions can be operated on by the X-Comp Rule, if a minor modification is made in the

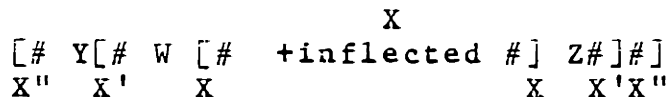
structural description. Take, for example, the phrase hommes et femmes and assume it has the surface structure below:



Compare the structural description of the X-Comp Rule with the labelled bracketing of the conjoined phrase:



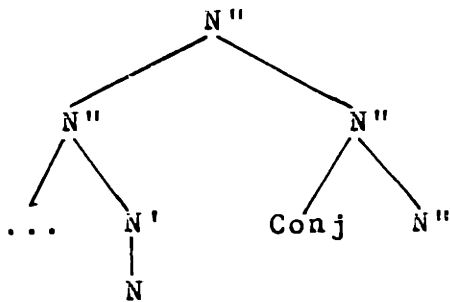
The only part of the latter labelled bracketing that doesn't match the structural description of the X-Comp Rule is the extra $\left[\# \right]$ between $\left[\# \right]$ and $\left[\# \left[\begin{array}{c} N \\ +\text{inflected} \end{array} \right] \# \right]$. So if a variable were put at that place in the structural description, giving



then the X-Comp Rule would remove the $\#$ and create the appropriate liaison context in a conjoined phrase with inflected nouns, verbs, or adjectives.

On the other hand, if the conjoined elements are the phrase

nodes N'', V'' or A'', appearing in structures like the following



the structural description of the X-Comp Rule could be met (if it were modified slightly) but the rule would not succeed in deleting all the #'s which would have to be deleted in order for there to be a liaison context created. Between the conjunction particle and a preceding inflected noun there would be at least this many #'s:

$$\dots \left[\begin{array}{c} N \\ +\text{inflected} \end{array} \right] \# \# \# \left[\begin{array}{c} \# \\ \text{Conj} \end{array} \right] \dots$$

NN'N'' N''

The X-Comp Rule will delete only the left-most #, the one in #],
N
 and the rest would simply be analyzed as part of the variable Z.

It's quite likely, then, that it will be necessary to write a special readjustment rule for conjunctions, one which will permit the creation of liaison contexts regardless of whether the conjoined categories are X, X'', or X'.

5.2.2 Pronominal, non-clitic noun phrases

A certain class of quantifiers or degree modifiers (including plus, moins, beaucoup, trop, assez, autant and tout) can serve in the capacity of pronouns, occupying the place of noun phrases in the tree. They can be the heads of relative clauses:

Il a { plus
moins } à perdre que toi.
 { autant }

Je lui ai donné { assez
beaucoup } à faire.
 { trop }

Il y a tout à refaire.

They can be the subject of the sentence:

{ Assez
Beaucoup } ont été tués.
{ Trop }

{ Plus
Moins } a été fait par les français que par les américains.
{ Autant }

Tout ici me remplit d'admiration.

or the direct object:

Il dit tout à l'envers.

On donne { moins
plus } à Paul qu'à Marie.
 { autant }

Elle enseignait beaucoup à Mariane.

These same words can occupy the surface structure position of adverbs: before a past participle,

Il a beaucoup appris

On a { assez } écrit sur ce sujet.
 { trop }

Elle a { plus } étudié que Jeanne.
 { moins }

Il a tout écrit de sa main.

Elle a tant appris que.....

between a matrix verb and an infinitive,

Il faut trop attendre.

Il a fallu tout enlever.

J'aime moins y aller.

Elle veut beaucoup étudier.

The syntactic behavior of these words is obviously quite flexible, and this must undoubtedly be attributable to their status as Quantifiers or "Q", in some respects resembling adjectives (hence adverbs) and in some respects resembling nouns.

What's significant is that in every one of these syntactic positions the Q-pronouns are in a liaison context. (The liaison is not obligatory and so is not really found in conversation familière.) In all the positions where the words stand for noun phrases, "real" noun phrases will not be in liaison contexts, not even in the plural. The input to the phonological rules of the phrases with Q's would be either

$[\#[\# \dots [\# [Q] \#] [\# [\dots \grave{a} V \dots]]] \#] \#$ (head of relative clause),
 $\begin{matrix} N''N'' & N'' S' \end{matrix}$

$[\#[\# \dots [\# [\dots \#] [\# [Q] \#] [\# \dots]]] \#] \#$ (direct object), or
 $\begin{matrix} S'S & V''V & V N'' & N'' X'' & SS' \end{matrix}$

$[\#[\# [Q] \#] [\# \dots] \#] \#$ (subject). In all of these environments
 $\begin{matrix} S'S & N'' & N'' V'' & V'' SS' \end{matrix}$

the Q is bounded by a # which "belongs" to the noun phrase directly dominating Q. This intervening # could be eliminated by (optionally) cliticizing the Q to whatever followed it (relative clause, indirect object, verb, adverb), or by having a special word boundary readjustment rule which removed #'s from $[\# [Q] \#]$,
 $\begin{matrix} N'' & N'' \end{matrix}$
 yielding $[\begin{matrix} [Q] \\ N'' \end{matrix}]$. (A similar rule in English removes #'s from

the noun phrase dominating a personal pronoun.) The latter is

the simpler solution and probably the correct one, for stylistic liaisons have in all other cases been the result of word boundary deletion rules, and it seems unlikely that among these stylistic rules there figures a unique stylistic clitic rule.

The negative word rien has many of the same distributional properties as the Q words, and the same liaison properties as well:

Il n'y a rien[^]à faire.

On ne donne rien[^]à Paul.³⁰

Elle n'a rien[^]appris.

Il ne faut rien[^]acheter.

Je ne peux rien[^]en faire.

Perhaps rien should be thought of as a Q word.³¹

6. The Stylistic Approach

I am indebted to Fouché (1959) for the stylistic framework in which this analysis of liaison is couched. He made an important step beyond other grammarians like Martinon, Grammont, Delattre and Langlard (who wrote an entire monograph (1928) on liaison). These latter scholars make distinctions between obligatory, prohibited, and optional liaison contexts, always adding remarks to the effect that the more elevated the style, the more frequently the optional liaisons are made. Fouché was much more strict in his observations and claimed that most so-called optional liaisons never appear in familiar conversation and furthermore, for example, that certain other optional liaisons (the ones

with plural nouns and inflected verbs, in particular) are never made until the quite elevated "style soutenu", the style of le discours or la lecture à haute voix. It should also be noted that, as Martinon said, school teachers, professors and actors, those who are more conscious of their good education, tend to make liaison more than other kinds of people, and also that people attempting to "speak well" will make hyper-corrections, creating "incorrect" liaisons.

The basic issue is whether a liaison readjustment rule is optional in a variety of styles or whether a readjustment rule is present in the grammar of some style(s) (and therefore "obligatory" in that style) and absent in others (where it would be "prohibited"). The Style I versus Style II-Style III distinction makes the assertion that the Lexical Specifier Rule (in its most general form) and the X-Comp Rule do not apply, even "optionally", in Style I. There is no real disagreement on this point. These rules are therefore not present in the grammar of Style I, conversation familière. The thorny questions arise in considering la conversation soignée (Style II) and le discours (Style III). The claim made in this study is that the Lexical Specifier Rule operates in both Style II and Style III, but that the X-Comp Rule operates just in Style III. If one could only establish that these rules "tend" (in a majority of cases) to apply in this fashion, the claim would still be supported.

A prediction also made by this approach is that if a person is consistently speaking in a particular style, there will be

certain "co-occurrences" of liaison contexts. In a sentence containing a plural noun in liaison with its complement one would expect to find the inflected verb in liaison with its complement, too, as in

Les dirigeants[^]américains leur offraient[^]une solution
inacceptable.

Or, one would expect lexical specifiers throughout a sentence to be in liaison contexts at the same time, e.g.,

Ils[^]ont toujours[^]été extrêmement[^]aimables.

These claims require empirical support which should, I think, be based on some sort of sociolinguistic study. It is not sufficient to ask informants what they would do when speaking in a certain style, for what is interesting in this domain is what people do when they are speaking in a particular style but are not immediately conscious of how they are speaking.

The syntactic analysis I've given here is quite independent of stylistic considerations, however. The readjustment rules and the universal conventions on word boundaries embody the correct syntactic generalizations about liaison in French. The liaison contexts in any style are describable by this small set of rules and conventions. The stylistic approach to French has brought to light the essential fact that the phrase structure domain of liaison contexts expands, in a very precisely conceived way, as the style becomes more elevated, while the phrase structures which the grammars of the various styles must refer to are rather abstract.

Footnotes to Chapter III

1. By "all the occurrences" I mean all the productive, systematic occurrences of liaison. Liaison in frozen idiomatic expressions is not my concern in this study, and consequently I will not be discussing the liaison in phrases like

de mieux ^{en} mieux	les Arts ^{et} Métiers
tant ^{et} plus	avant ^{hier}
de pied ^{en} cap	un fait ^{accompli}
tout ^à fait	le pot ^{au} -feu
Mesdames ^{et} Messieurs	

2. Ont is the only monosyllabic form of avoir which makes liaison. The other monosyllabic forms are (j')ai, (tu) as, and (elle) a; the first is vowel-final and the second two probably lose their final consonants by a rule deleting the singular inflectional consonants after a low back unrounded vowel (usually /ə/). For more details on this Singular Person Deletion rule see Chapter IV, §4.3.

3. There is a definite difference between the liaison possibilities of mono- and poly-syllabic auxiliaries in Style I. (For sentences with polysyllables see the examples in (8).) The monosyllables most definitely do make liaison in conversation familière, while others most likely don't. In speaking about the

liaison of the monosyllabic auxiliary, Langlard said that it was "intermediary" between obligatory and optional, since it was very frequent, but not "required", in familiar speech. And with est and sont he felt it bordered on the downright obligatory.

Martinson said that liaison with the auxiliaries est, sont and ont was "necessary", and Fouché says these forms make liaison in conversation courante (or familière). This is not to deny that there is a "tendency" away from liaison of the auxiliary in Style I. There definitely is beginning to be a breakdown in the similarity of behavior of these auxiliaries to the non-lexical specifier elements of the adjective phrase (and, as will be seen, noun phrases and prepositional phrases). It will probably have to be described by a rule assigning #'s to monosyllabic auxiliaries as well as to polysyllabic ones. (See below for a rule of this sort.)

4. Some say that the form es makes liaison very infrequently--precisely because it is only in familiar speech that the pronoun tu and its verb forms are employed.

5. Kayne (1969) argues that clitics form a unit with the verb, but does not choose between the two structures displayed in the text that satisfy this condition.

6. Jakobson (1956) pointed out that the Russian prepositions fall into two classes--autonomous and inseparable prepositions. Autonomous prepositions are for the most part polysyllabic. In a

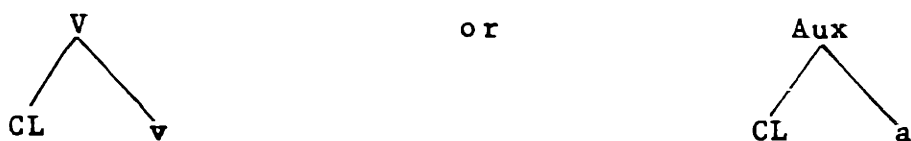
prepositional phrase they maintain their own word stress and, according to a general rule of Russian, the word-final consonant devoices: *против него* [pròt'if n'ivó], *вокруг ручья* [vakrùk ručjáj]. Inseparable prepositions, on the other hand, form a unit with the object noun in such a way that (a) that unit receives only one stress and (b) the final consonant of the preposition is not devoiced if the noun begins with a voiced consonant: *под руку* [pód ruku], *под рукой* [pəd rukój]. Inseparable prepositions are for the most part monosyllabic. They are phonologically and, most probably, syntactically more closely tied to the following noun than the polysyllabic autonomous prepositions.

7. In Italian one finds

Me lo danno.	'they give it to me'
Te li danno.	'they give them to you'
Lo daremo loro.	'we shall give it to them'

Loro can never occupy the clitic position preceding the verb. My thanks to J.R. Vergnaud for pointing this out to me.

8. Kayne is of the opinion that there is another possible type of derived structure produced by clitic-attachment, one where the clitic is sister-adjoined to the terminal symbol itself:



He doesn't choose between this sort of adjunction and the Chomsky-adjunction producing the derived structure in the text. Yet I don't believe the derived structure immediately above deserves

serious consideration. It has two drawbacks. First, this structure represents a serious loss of information. It is no longer possible to know that v is a verb and a is an auxiliary. Second, it is not clear to me that it is formally possible to sister-adjoin an element to a terminal string. Only the category symbols V or Aux can figure in the proper analysis of a transformation.

9. I am assuming that French has a rule destressing monosyllabic non-lexical items just as English does. A glance at Fouché's section on accentuation will reveal that this is most likely the case. And I will argue this myself in a study of French phrase stress (Selkirk, forthcoming (a)).

If it were the case that subject pronouns were not adjoined to the verb but had a surface structure position in the subject noun phrase, [$\begin{matrix} [+PRO] \\ N'' \end{matrix}$], then the appearance of the strong form pronouns eux, elles, lui, toi, moi (instead of ils, elles, elle, il, tu, je) would have to be seen as a result of stress, i.e., the suppletion would be triggered by stress. At first glance, this corresponds to the facts. The strong form appears in just those contexts where in English the Monosyllable Rule could not have applied:

Jean et $\left\{ \begin{matrix} *il \\ lui \end{matrix} \right\}$ partiront. (Kayne)

$\left\{ \begin{matrix} *ils \\ eux \end{matrix} \right\}$ tous partiront bientôt (Kayne)

$\left\{ \begin{matrix} *il \\ lui \end{matrix} \right\}$ paraît-il est fou. (Kayne)

This would be an interesting line to pursue in an attempt to understand the mechanism of pronoun suppletion in French.

10. Delattre (1947) says that liaison is possible in

Allons-nous[^] à la gare?

Mettez-vous[^] à table.

but not in

Songent-ils/à l'avenir?

Font-elles/un pas en avant?

Mangeait-on/un canard?

These intuitions are not at all consistent, and my impression is that Delattre is making a mistake in assuming that the [z] heard in the liaison in the first sentences "belongs" to the pronouns nous and vous. There happen to be certain kinds of false liaisons that arise in French. One set of these, called les velours, involves putting a [z] where it doesn't belong. So, for example, in "popular" speech one might hear donnez-moi-z-en for donnez-m'en, where the z has most likely "jumped" from donnez to between moi and en. (Martinon (1913), p. 373 gives this explanation.) J.R. Vergnaud pointed out to me that the [z] heard in Delattre's cases might well be a false liaison of the same sort. It is the final z of allons and mettez that is being sounded. This is why one doesn't hear [z] with elles or ils--because their verb forms end in [t]. Furthermore, J.R. Vergnaud observes, the locutions with a false liaison in t,

Songent-ils-t-à l'avenir?

Font-elles-t-un pas en avant?

would be on the same level as Delattre's liaison cases. (The false liaisons where t is added are called les cuirs; leather is hard, velvet is soft.)

11. The sequence (T), $\begin{matrix} [\# & [& \text{Aux} &] & [\text{CL}] & \#] \\ \text{Aux} & \text{Aux} & & \text{Aux} & & \text{Aux} \end{matrix}$, will never be in a liaison context because it doesn't meet the structural description of any of the liaison readjustment rules in French. Remember that #'s are added to polysyllabic auxiliaries by the Poly NLC rule in Style I. The Poly NLC rule does not operate in Style II, as will be seen below, and so polysyllabic auxiliaries, lacking #'s, will make liaison then. But (T) is unaffected by all this. Its #'s are the result of a universal convention, and some rule of French would be required to remove them if (T) were to be in a liaison context. No such rule exists. (The Lexical Specifier Rule operative in Style II would not affect (T).)

12. For a discussion of liaison in conjunctions see §5.2.1.

13. A further fact which also escapes a purely syntactic explanation is the non-occurrence of liaison between a monosyllabic auxiliary and an adverb in conversation familière. In the (a) sentences, liaison occurs in Style I, but in the (b) sentences it doesn't:

a) Elie et Yolande ont[^]accueilli leurs petits enfants.

b) Elie et Yolande ont/affectueusement accueilli

a) Ils ont[^]accusé de complot tous les étudiants de Première.

b) Ils ont/arbitrairement accusé

a) Jeanne s'est[^] exprimée devant toutes ses camarades.

b) Jeanne s'est/ardemment exprimée

One might say that an auxiliary has a close relation to its verb, and for this reason is in a liaison environment with it. When an adverb intervenes, the unit is, in some sense, broken, and the Aux does not make liaison with the adverb, even though the SPE conventions provide a surface structure like

[#	[ont]	[#	[arbitrairement]	#]	[#	[accusé]	...	#]
V"	Aux		Aux	A"	A'	A		AA'	A"	V'	V		V	V"

It may be that since the liaison of auxiliaries in the verb phrase is beginning to be less obligatory in Style I (cf. fn. 2), the necessity of the Aux's being in a liaison environment is reduced, and the intrusion of an adverbial into the unit Aux-Verb is sufficient to "destroy" the liaison environment of the Aux.

14. In these sentences below, the adverbs are not ambiguous and the possible intonation differences may be manifested more clearly:

SA: Elles ont appar^uemment quitté les lieux il y a plus d'une semaine.

Le problème n'est évidemment pas résolu.

Jean était probablement parti avant votre arrivée.

Marceline a certainement été incarcérée.

MA: Ils ont soigneusement préparé ce repas somptueux.

Paul a lentement traversé la clairière ensoleillée.

Yolande et Elie ont affectueusement accueilli leurs petits enfants.

Elle lui a brusquement ordonné de partir tout de suite.

The sentence adverb may have a rising intonation in the center, but the manner adverb will not:

probablement

affectueusement

15. Another interesting aspect of liaison in the verb phrase within conversation soignée is the fact that forms of the so-called "semi-auxiliaries", vouloir, devoir, pouvoir, falloir, aller, are in liaison environments. Not until the level of Style III do regular verbs make liaison with what follows, so these semi-auxiliaries do indeed occupy an intermediary position between the real auxiliaries avoir and être and the real verbs. In Style II one finds

Jean doit[^]être en retard.

Les autres vont[^]arriver bientôt.

Paul peut[^]acheter le pain en revenant.

Mariane veut[^]aller rendre visite à ses camarades.

Dans la bonne société il faut[^]utiliser des fourchettes.

Il faut[^]envoyer immédiatement cette lettre.

Fouché says that monosyllabic semi-auxiliaries are unstressed, providing further evidence that, phonologically, these verbs behave like auxiliaries. Moreover, in the French spoken only 300 years ago, the clitics of the sentence bypassed the verb embedded below the semi-auxiliaries and attached to the semi-auxiliaries themselves, just as in present-day French the clitics attach to the auxiliaries avoir and être:

Je la dois voir. On le veut faire.

Paul lui peut donner la clef.

16. By inflected item I mean an item with a non-null inflectional morpheme.

17. If there is liaison in the singular prêt^h à partir, prêt^h à vous aider, etc., it is only because prêt^h à has become in some sense a "frozen" construction. The liaison in this case is the exception to the rule, and an analysis motivated for the general case should not seek to explain it.

18. Further discussion of possible deep structures for the sentences in (57) will appear in the sections on the verb phrase. In particular, the possibility that (58) is derived from (59) by EQUI will be considered.

19. There is one extremely interesting set of facts that cannot be correctly described until the analysis of the "Tough Movement" adjectival construction is available. It happens that the sentence (p) without liaison in the adjective phrase is ambiguous:

(p) Les poulets sont bons/à manger.

It can mean either that "it is good (for people) to eat chickens" or that "chickens are good eating (they taste good)". When there is liaison, however, as in (q),

(q) Les poulets sont très bons^h à manger.

the sentence has only the latter interpretation. Similarly, in the sentence (r), the adjective is also predicative of the subject:

(r) Ces outils sont très pratiques^h à manier.

"These tools are very handy to use." The sentence (s) with no liaison,

(s) Ces outils seraient très pratiques/à employer, même s'ils sont un peu trop grand pour vos mains.

"It would be very practical (for you) to use these tools, even if they are a little big for your hands." The sentence (s) and one of the sentences underlying (p) are the classic Tough Movement sentences. They are of the form

N" est Adj à Verb

and have a regular paraphrase relation to sentences of the form

il est Adj de Verb N"

In these sentences, then, the adjective is not being predicated of the N" but of the proposition Verb N". In the sentences (q) and (r), however, the adjectives are predicative. The adjective has the same meaning in (q) and (r) as it does in (q') and (r'):

(q') Les poulets sont bons.

(r') Ces outils sont très pratiques.

I don't know what the syntactic analysis of these various adjectival constructions should be. It does seem quite possible that the two sentences underlying (p) have distinct syntactic derivations and thus predictably different liaison properties.

20. [1] There is no liaison between the past participle or infinitive of the verb and what follows in the verbal complement:

Tu as pris/une pomme. Il s'est mis/à travailler.

Ils ont fait/une erreur. On va commencer/à manger.

Marie va nous envoyer/une lettre bientôt.

Il veut arriver/à la gare à l'heure.

The past participle of the verb is supposedly inflected for number and gender. The inflectional signs are preserved in the orthography, but they are never pronounced when the participle is the main verb of the sentence:

Ils sont allés/à la gare.

Nous sommes arrivés/en Inde 3 mois après.

When the participle acts as an adjectival modifier, though, it is most definitely inflected (in agreement with the noun), and may be in a liaison context with what follows in its complement:

Ces grands changements produits[^]avec lenteur

Deux chanteuses adossées[^]au mur du cimetière

Avec d'étroites planchettes de bois clouées[^]en zigzag.

[2] Certain verb endings appear to make liaison less readily than others. For example, the t of the 3rd person indicative plural ending -ent is less likely than others to be in a liaison context (except in inversion with a pronoun, where the t is pronounced obligatorily in this ending as in others). The reason is quite likely phonological. The /t/ here is preceded by /ə/, and consonant endings preceded by low back unrounded vowels have been dropping out of French for quite a while (cf. Chapter IV, §4.3 on Singular Person Deletion).

21. The sentence nous vivons[^]à Paris should be contrasted with nous dormons/à Paris ce soir. The latter sentence's PP would not be in the verb phrase, but the first one's would. Note that this

distinction in liaison provides support for Chomsky's contention in Aspects that the PP of John lived in England is a verb phrase adverb while that in John died in England is not. In English, a noun phrase in a verb phrase PP may sometimes be passivized, e.g., England was lived in by many people, but the noun phrase of a PP located outside the verb phrase never will: *England was died in by many people.

22. In terms of relative grammaticality, liaison between a verb and its complement is more acceptable if the noun phrase which was removed from between the verb and the other complement is one removed by the transformation of Clitic Formation. Thus, (78) is more acceptable than (75), (76), and (77) where the transformations leaving traces behind are those of Relative Clause Formation, Question Formation and Clefting. The reader should keep this in mind; for some reason, not yet explained, traces left behind by Clitic Formation are "less strong" or less inhibitory to liaison.

23. The works of Gross (1968, 1969a, 1969b) on verb complementation provided me with essential information in my research on liaison in the verb phrase. These excellent studies offer a richly detailed account of the syntax of the French verb.

24. The sentences

Il faisait acheter des livres à Paul.

Nous ferons envoyer des cartes postales à Marie.

Nous lui ferons envoyer des cartes postales.

are ambiguous, à Paul, à Marie and lui having the status of either the indirect object or the (postposed) subject of the embedded verb. In the examples in (129) and (135) it is the interpretation of these noun phrases as underlying subjects that is at play.

25. Vergnaud (1971) gives a number of arguments, some drawn from Kayne (1969), which show (a) that in sentences

faire Verb ((à)N") par N"

no N" can have intervened between faire and Verb, and (b) that in the structure

faire Verb ((à)N")

the sequence Verb X is "passive", just as in the English sentence

They had her arrested.

the underlined sequence is "passive", arrested being the participial form normally produced by the presence of a passive marker in the tree.

26. These sentences, and the deep structure (136) posited for them are parallel to sentences discussed in the section on adjective complements whose adjectives never appeared with anything but verb phrase complements in surface structure. Adjectives of this sort are prêt, bon (bon à faire des maths), sujet, apte, etc.

27. There is no basis for motivating an à-clitic transformation in French parallel to the to-clitic transformation in English. English has sentences like

They hafta do it, and you hafta, too.

where the to is encliticized and reduced and isn't followed by

the verb it was associated with in deep structure. French does not have comparable sentences:

*Ils ont à le faire et vous avez à, aussi.

Furthermore, there is a whole host of liaison phenomena with the verb that can't be explained by à-clitic and for which an entirely different mechanism must be proposed. The verb enters into liaison contexts with noun phrases, prepositional phrases, adjective phrases and other à-less verb phrases. No clitic rule can explain the liaison with them, while the X-Comp Rule can. Since the X-Comp Rule does have such a general application it would be entirely superfluous to add a à-clitic rule which would do only part of its job for it. Moreover, the independently motivated traces can account for the lack of liaison with à.

28. And only in Style III do you find

de forts et vigoureux athlètes

In less elevated styles, one has

de forts/et vigoureux athlètes

These examples again show that the Adjective-Noun Rule correctly accounts for the liaison of prenominal adjectives. Here what happens within the conjoined A" is pretty independent of the fact that A" is in the specifier of the noun phrase. Yet the last adjective of A" must be in a liaison context with the noun.

29. Langlard assumes that there is no underlying /t/ in et since, he says, it hasn't been pronounced since the 17th century.

30. Rien can occupy the subject position, e.g., Rien n'a été fait, but no information about the liaison here can be obtained because the negative particle ne may always be present. And thus it's not possible to know who the pronounced [n] belongs to--rien or ne.

31. The other negative particles pas, point, and jamais wouldn't fall into this category, although historically pas and point were quantifier words. None of them can occupy noun phrase positions, although they all occupy adverb positions and are in (optional) liaison contexts there:

J'ai jamais[^]été si fatiguée.

Jeanne n'a pas[^]écrit la dernière strophe.

On n'a point[^]appris grand-chose dans ce cours.

In post-verbal positions, these negative words may be in liaison context, too:

Je ne vais { jamais }[^] à New York.
 { pas }

Il ne faut { jamais }[^] accepter.
 { pas }
 { point }

Presumably some special rule will be needed to describe this liaison.

Chapter IV

The Phonology of Liaison

In the preceding chapter of this study I argued that the phenomena of phrase phonology in French could be explained by re-adjusting the number and location of the word boundaries in the surface structure strings which are the input to the phonological component. This readjustment is accomplished by the universal conventions on word boundaries enunciated in SPE, in conjunction with certain phrase structure-governed "liaison" rules which are particular to the French language. This chapter will be devoted to an investigation of the phonological rules which operate in contexts of liaison.

What is being called liaison is actually a relationship between words in a string represented by the single '#' appearing between the two relevant words. Thus the term "liaison" is not identified with the operation of any particular phonological rule. This conception of liaison is not the traditional one, for most often liaison has been characterized as a blocking of what would be a normal application of final consonant deletion, as in Fouché (1959, p.434): "La liaison consiste ... à prononcer devant un mot commençant par voyelle une consonne finale, muette en dehors de cette condition." or as a condition on that rule, as in Schane (1968, p.13):

Rule for final consonant deletion (revised)

Delete a word final consonant

1. obligatorily,
 - a. in phrase final position
 - b. in a singular noun
2. optionally, in a plural noun¹

The appearance of a consonant which would otherwise have been deleted is surely the most salient feature of the phonetic content of words in liaison. But since still other phonological processes are at play in the context of liaison, it is misleading to identify liaison with the rule of consonant deletion alone. The rules deleting final consonant(s) in a word will be discussed before all others in this chapter. The discussion will help bring out many of the details that need to be touched on concerning conventions on rule application.

1. Truncation and Final Consonant Deletion

1.1 Their Environments

Allow me to show how the analysis which posits a single word boundary between two words in liaison accounts for consonant deletion. There are two environments for this deletion. In a liaison context, a word-final consonant will delete if the next word begins with a consonant. Take the phrases

[#[ses][#[[bons]]]#[amis]]#]

and

[#[des][#[cadeaux]]#].

The final /z/ in ses and des will drop, but the final /z/ in bons will not. The environment for the deletion with the first two is

thus ' #C'. The other kind of deletion takes place everywhere in non-liaison contexts; so, for example, in

[# . . . [# [achetait#] [# [des] [# [cadeaux]]#] . . .
 S'
 [# [pour] [# [ses] [# [bons]]] [# [amis]]]]]#]#]
 S'

the final consonants in achetait, cadeaux, and amis are automatically deleted--without regard to the nature of the segment beginning the next word (if there is one). In this style, even if achetait preceded a vowel-initial word, its final /t/ would delete. The pronunciation of achetait un cadeau is [aʃtɛ œ̃ kado]. The environment for this latter type of deletion could be represented as ' ##'. I will consider that these two deletions are accomplished by two separate rules, the first TRUNCATION, and the second FINAL CONSONANT DELETION.² The reasons for postulating two separate rules will become clear in the course of this section. (See §1.3 and also §2.3.)

What I want to discuss for now is the possibility that TRUNCATION (TRUNC) and FINAL CONSONANT DELETION (FCDEL) are cyclic rules of French. Consider that TRUNC and FCDEL are formulated as $C \rightarrow \emptyset / \text{__}\#C$ and $C \rightarrow \emptyset / \text{__}\#\#$, respectively. They will operate on the sentence Marie achetait des cadeaux as follows:

[#[#[[[mari]]#] #[[aštet#] #[dεz] #[kadoz]]]]#]#]
 S'S N''N'N NN'N'' V''V'V V N''D D N'N NN'N''V'V'' S S'

Cycle:

N, V, Det:	--	--	--	--
N':	--			--
N'':				
TRUNC			dε	
V':				
FCDEL		aštet		
S:				
FCDEL				kado

Output: [mari aštet dε kado]

Quite appropriately, TRUNC cannot operate on the cycle on the Determiner des because the environment of the rule is not complete. It is only on the cycle on N'' that the structural description of the rule is met: /dεz#kadoz/. The effect of the lack of a right-hand word boundary within the labelled bracketing of the word in these cases is to delay the application of a rule deleting a final consonant until the higher cycle, where information about the following word is available.³ FCDEL must also wait until higher cycles to apply as long as its environment is formulated as '___##'--because the SPE Conventions I and II assure that two word boundaries will be found together only in the contexts

[#[#, #]#] or #] [#.
 S' S'

If FCDEL were formulated with the environment ___#], though, it could apply at an earlier level. So let FCDEL be written instead

FCDEL

$C \rightarrow \emptyset / _ _ \#]$

Notice that any liaison context,] [# , is still free from the

application of FCDEL.

One could just as well say, given the data available, that TRUNC and FCDEL do not apply cyclically at all. Labelled bracketing could be ignored and it could be considered that these rules apply to strings which are simply sequences of segments and word boundaries. In this case, FCDEL would have to be formulated as having the environment __##. TRUNC would be in either case

TRUNC

$C \rightarrow \emptyset / \text{__}\#C$

Everything would work fine with no cycle:

mari ## aštet ## dez # kadoz

TRUNC

\emptyset

FCDEL

\emptyset

\emptyset

Output: [mari ašte de kado]

The question of the cyclical application of TRUNC and FCDEL will be discussed again below. At this point I would like to go on to describe other contexts of the TRUNC rule.

TRUNC is the rule responsible for deletion of morpheme-final consonants "word-internally" as well as in liaison environments. It has the following environments within the word:

(a) Prefix + Stem

[# dés # X #]

[# més # X #]

[# sous # X #]

(b) Verb + Person Marker[# viv # {^s_t} #][# dorm # {^s_t} #].
.
.(c) Adjective + Plural MarkerNoun

[# petit # s #]

[# estomac # s #]

.
.
.

Assume for the moment that # is the boundary between the morphemes in the word-internal cases. In this way the relation between morphemes inside a word is the same as between morphemes in liaison.

The prefixes dés-, més-, and sous- show the alternations [de]/[dez], [me]/[mez], [su]/[suz] in their phonetic forms, according to whether the stems to which they are attached begin with a consonant or a vowel:

débloquer	désassambler
décroiser	désinfecter
défavoriser	désorienter
méfait	mésaventure
mécompte	mésestimer
médire	mésintelligence
souligner	sousestimer
soulever	sous-alimenté
soutenir	sous-officier
sous-développé	sous-emploi

Naturally, if given the common underlying representations /dez/, /mez/, /suz/, the final shape of the prefixes in these words can

be attributed to the application of TRUNC:

	[# dez # favɔrizer #]	[# dez # ɔrjante #]
TRUNC	∅	-----
.		
.	[defavɔrize]	[dezɔrjãte]

Schane (1968) explained the forms of certain classes of verbs with the TRUNC rule as well. He pointed out that the stem-final consonant of some verb forms appears only in the plural forms (where the inflectional morphemes are all vowel-initial):

<u>Singular</u>	<u>Plural</u>
vit	vivons
dort	dormons
mets	mettons
combats	combattons
vaincs	vainquons

This he attributes to the juxtaposition of the stem-final consonant and the singular person marker. Here TRUNC will operate to delete that consonant, but not in the plural form:

	[#viv#t#]	[#mɛt#s#]	[#viv#õs#]	[#mɛt#õs#]
TRUNC	∅	∅	---	---
FCDEL	∅	∅	∅	∅
Output:	[vi]	[mɛ]	[vivõ]	[mɛtõ]

FCDEL need not apply in these forms, though, for in some styles there may be liaison between the verb and what follows. In this case the final consonant doesn't delete; the sentences il vit en France and mets un pas en avant may have the following derivations:

	[#il#viv#t]	[#ã#frãsə#]	[#mɛt#s]	[#œ #pas#]	[#ã#avãt#]
TRUNC	∅		∅		
FCDEL	---		---	∅	∅
Output:	[il vit ã frãs]		[mɛz œ pa ãnavã]		

But the stem-final consonant will always delete, because, in the singular forms, the environment for TRUNC is always met. The plural noun and adjective cases are simply parallel to those with the verbs. The final consonant of a word is never pronounced when the word is in the plural (except when a schwa "protects" the consonant from TRUNC or when the word is exceptional, cf. §1.3):

	[#pətɪt#z#]	[#tas#z#]	[#ɛstɔmak#z#]	[#galɔp#z#]
TRUNC	∅	∅	∅	∅
FCDEL	∅	∅	∅	∅
Output:	[p(ə)ti]	[ta]	[ɛstɔma]	[galo]

These words petits, tas, estomacs, and galops alternate with morphologically related words where the stem-final consonant is present: petite, entasser, estomaquer, and galoper, respectively. Again, FCDEL won't apply if the word is in a liaison environment. FCDEL will never apply to the /z/ of petits in des petits ennuis, and it will be blocked from applying to the /z/ of galops in des galops effrenés in Style III. (In either case, TRUNC could apply, if the following word began with a consonant.) The derivations would be:

	[#dez#pətɪt#z#ãnyɪ#z#]	[#dez#galɔp#z#ɛfrene#z#]
TRUNC	∅ ∅	∅ ∅
FCDEL	∅	∅
Output:	[dɛp(ə)tɪzãnyɪ]	[dɛgalɔzɛfrene]

The final consonant of the word preceding the plural marker will always delete by the TRUNC rule.

These examples are designed to show that TRUNC can be taken to be responsible for word-internal morpheme-final consonant deletions: these deletions all take place at the end of a morpheme when it is followed by a consonant. Since the boundary in liaison is '#', TRUNC was formulated as $C \rightarrow \emptyset / __\#C$. I thus assumed provisionally that '#' characterized the boundary between morphemes within the word. I would now like to show that in at least two of these cases the word-internal boundaries must be a morpheme boundary '+' and consequently that TRUNC must be formulated as $C \rightarrow \emptyset / __\text{[-seg]} C$.

In earlier stages of French, a rule which I'll call L-VOCALIZATION (L-VOC) had a very general application in the language. It was responsible for switching /l/ to /w/ and then to /u/, when that /l/ preceded a consonant. Because modern grammarians, beginning in the seventeenth century, began putting false restraints on the natural phonological inclinations of the language, L-VOC does not enjoy complete freedom of application. Learned Latinate words like falsifier, altitude, sulfurique and culpabilité, or words like bals, quels, superficiels (whose singulars are bai, quel, superficiel) do not undergo the rule. But alongside of these forms one finds faux/fausse, haut/haute, soufre, and coupable as well as maux and locaux (whose singulars are mal and local). Here L-VOC does indeed apply. Schane has argued (1968, p.81) that the present singular forms of the verbs falloir and valoir, which are faut, vaut, etc., are also derived by this rule. So Schane proposed a formulation for this rule

vocalizing /l/:

L-VOC

$l \rightarrow u / __C$

L-VOC is then followed by a rule of O-CONVERSION whereby
/au/ → /o/.⁴

Notice that L-VOC accounts for alternations between the singular and plural forms of a fair number of words, e.g.,

journal-journaux	amiral-amiraux
cheval-chevaux	amical-amicaux
principal-principaux	spécial-spéciaux
vassal-vassaux	horizontal-horizontaux
capital-capitaux	général-généraux
bestial-bestiaux	original-originaux
travail-travaux	ciel-cieux
aieul-aieux	

If the plural marker were indeed preceded by a '#', one would want to formulate L-VOC as

$l \rightarrow u / __(\#)C$

But this formulation of the rule would give the wrong results where /l/ precedes a '#' followed by a consonant-initial word in liaison contexts. One finds le principal défaut pronounced [lə prɛsɪpal defo], not [lə prɛsɪpo defo]. The same goes for un très original projet d'irrigation, un très cordial rendezvous, etc. L-VOC must be left as Schane originally formulated it.⁵

But then it must be a morpheme boundary which separates the plural marker from the stem. And furthermore, if faut and vaut are to be derived by L-VOC, the singular person marker can also be preceded only by a '+':

	[#val+t#]	[#val+ɔns#]
L-VOC	u	----
O-CONV	o	----
Output:	[vo]	[valɔ̃]

I conclude that TRUNC must be formulated as

TRUNC⁶
 $C \rightarrow \emptyset / __[-\text{seg}] C.$

1.2 On Halle's Suggestion for a New Notational Convention

To recapitulate then, FINAL CONSONANT DELETION is formulated as

FCDEL
 $C \rightarrow \emptyset / __ \#]$

if it applies in a cyclic fashion, or as

$C \rightarrow \emptyset / __ \#\#$

if it is not a cyclic rule. TRUNCATION is formulated as

$C \rightarrow \emptyset / __[-\text{seg}] C.$

These rules can be collapsed. Given the usual conventions, an abbreviatory schema incorporating these two rules would take the form

$$C \rightarrow \emptyset / __ \left\{ \begin{array}{l} [-\text{seg}] C \\ \#] \end{array} \right\} \quad \text{or} \quad C \rightarrow \emptyset / __ \left\{ \begin{array}{l} [-\text{seg}] C \\ \#\# \end{array} \right\}$$

where the braces notation is interpreted as indicating a conjunctive ordering of the two rules it collapses. This conjunctive ordering of TRUNC and FCDEL would give the right result for petits:

[#pətɪt+z#]

TRUNC ∅

ECDEL ∅

Output: [p(∅)tɪ]

Recently, however, Halle (1971a) has proposed that phonological rules which apply within a word be expressed with a variable. In this way, rules formerly written as

(a') B → C / ___ A

and

(b') B → C / A ___

would now be written

(a'') B → C / [#X ___ A Y #]

and

(b'') B → C / [# Y A ___ X #],

respectively. The rules formerly expressed as

(c') B → C / ___ #

and

(d') B → C / # ___

would now be represented as

(c'') B → C / [# X ___ #]

and

(d'') B → C / [# ___ X #]

respectively. The use of the variable in these rules is crucial, for it permits (a'') to be collapsed with (c'') (and (b'') to be collapsed with (d'')) by means of the parenthesis notation:

$$(a'' - c'') \quad B \rightarrow C / [\# X _ (A Y) \#]$$

$$(b'' - d'') \quad B \rightarrow C / [\# (Y A) _ X \#].$$

The collapsing of, for example, (a') and (c') as (a' - c')

$$(a' - c') \quad B \rightarrow C / _ \left\{ \begin{array}{c} A \\ \# \end{array} \right\}$$

has been taken to suggest that the environment A shares some properties with word boundaries. Halle maintains that this is the wrong generalization, and claims that a schema such as (a'' - c'') permits the expression of the proper generalization:

It is not that word boundary functions on a par with any particular class of phonemes, but rather that initial word boundary functions on a par with any environment that must be located to the left of the segment subject to the rule, whereas final word boundary functions on a par with any environment located to the right of the segment undergoing the rule. This fact is captured by the parenthesis convention which allows us to combine [such environments into one rule.--eos] (p.540)

TRUNC/FCDEL can indeed be combined as Halle suggests:

$$C \rightarrow \emptyset / [\# X _ ([-seg] C X) \#].$$

But to do so will give the wrong result. According to the convention on parentheses, the rules collapsed in this way are disjunctively ordered when the value of the variable within the parentheses is zero. When $X = 0$, of the two rules schematized,

$$C \rightarrow \emptyset / [\# X _ [-seg] C \#]$$

and

$$C \rightarrow \emptyset / [\# X _ \#],$$

the first one must apply first, if its environment is met. If the environment of the first ("more specific") rule is not met, then the second rule applies. This being so, petits cannot be

derived:

[#pətɪt+z#]

TRUNC/ ∅
FCDEL

Output: *[p(ə)tɪz]

Given that TRUNC and FCDEL are disjunctively ordered here, final /z/ will not be deleted. If there were no other way to formulate the rules for TRUNC and FCDEL, they would provide very serious opposition to the claim that phonological rules of this type should be expressed with a variable and collapsed with the parenthesis notation.⁷ In French, there would have to co-exist two rules, conjunctively ordered, which go counter to this claim. It is relevant to note here that in Late Old French and in Middle French, up to the middle of the seventeenth century, only the first of the two rules, that is TRUNC, was at play. A phrase- or "word"-final consonant was still pronounced. In the language of the period, one encounters such locutions as

<u>le petit prince</u>	with [p(ə)ti]
<u>ils sont petits</u>	with [p(ə)tɪz]
<u>il est petit</u>	with [p(ə)tɪt]

The modern pronunciation of some of the words for numbers is an artifact of that older time. One finds today, for example,

<u>il en a six</u>	with [sis]
<u>il a six livres</u>	with [si]

Halle's claim is that the first rule would generalize to include the word-boundary as an environment, i.e., that the historical

change should be describable simply by adding a pair of parentheses to the environment of the original rule (which included variables). But it could be that French had simply added a phrase- or "word"-final deletion rule without collapsing them in Halle's proposed fashion.

It is possible, however, to prevent this decisive blow from being levied against such an interesting formalism. The salvation of Halle's claim resides in two facts. First of all, both TRUNC and FCDEL must be modified to allow for the deletion of such final consonant clusters as are found in words like respect, [rɛspɛ], aspect, [aspɛ] and instinct, [ɛ̃stɛ̃] (which alternate with respecter [rɛspɛkte], aspectuel [aspɛktɥɛl] and instinctif [ɛ̃stɛ̃ktif]). An additional provision for 'C₀' must be made in the environment of each rule,

TRUNC: C → ∅ / [# X ___ C₀ [-seg] C X #]

FCDEL: C → ∅ / [# X ___ C₀ #]

in order to derive mes respects amicaux [mɛ rɛspɛzamikɔ] and son respect [sɔ̃ rɛspɛ] from [#mɛz#rɛspɛkt+z#amikal+z#] and [#sɔ̃n#rɛspɛkt#], respectively.⁸ Moreover, Halle (personal communication) pointed out (the second fact) that the TRUNCATION rule could be formulated just as well by adding a vowel to its environment:

TRUNC: C → ∅ / [# X ___ C₀ [-seg] C₁ V X #]

Now the collapsed version of the two rules, which looks like

TRUNC / FCDEL: C → ∅ / [# X ___ C₀ ([-seg] C₁ V X) #],

will allow derivation of petits. The version of the rule with

"cycle" may be restricted to the N" and V" of a sentence. In this instance there is not much gained by saying that there is a cycle.

1.3 Exceptions to TRUNC and FCDEL

A small number of words in French are exceptions to FCDEL. Among these, there are some nouns os [ɔs], oeuf [œf], and boeuf [bœf] along with a few others, which retain their final consonant everywhere in the singular, but nevertheless drop it in the plural. Underlying /ɔs+z/, /œv+z/⁹ and /bœv+z/ are pronounced [o], [ø]¹⁰ and [bø], respectively. (Of course the plural morpheme /z/ may be pronounced in a liaison context.) Quite obviously these words are exceptions to FCDEL, but not to TRUNC. So presumably oeuf should be marked [-FCDEL] in its lexical representation. But this raises a problem for the Halle formulation of TRUNC and FCDEL. Recall that since the environment of the rule became reformulated as [# X __ C₀ ([-seg] C₁ V X) #], the presence of V prevented the TRUNC, or more specific, part of the rule from applying to final consonant sequences, and if oeuf is marked [-FCDEL] then how can the /f/ have been deleted in oeufs by the second half of the rule, as it must have been. The /f/ seems only to be an exception to deletion in pre-# position. Some way will have to be found to express this fact.

Let me simply point out that here is a case where a word may be an exception to only one part of a schema of disjunctively ordered rules. This shows that two rules so collapsed nevertheless have some "independent" existence in spite of their tight

connection.

Let us now turn to another set of exceptions to FCDEL. In these words, the final consonants are always pronounced in "phrase-final" position. In liaison contexts the final consonant does delete before '#C' but not before '#V'. This shows that these forms, too, though exceptions to FCDEL, are not exceptions to TRUNC.¹¹

j'en ai plus		[plüs]
il l'est plus que Paul		"
Boston fait plus ville que Cambridge		"
elle est plus méchante que lui		[plü]
elle est plus intelligente que lui		[plüz]
il en a { dix }		[dis], [sis]
	{ six }	
le groupe de { dix }	va arriver	" "
	{ six }	
Marie faisait { dix }	discours en une semaine	
	{ six }	[di], [si]
Marie faisait { dix }	essais en une semaine	
	{ six }	[diz], [siz]

An example which illustrates particularly well the parallelism between liaison contexts and inter-morpheme contexts is provided by the adjective fat 'vain, stupid'. This word is an exception to FCDEL:

ce type est fat	[fat]
ce type tout fat sera bientôt fini	"

but the final consonant deletes before consonants preceded by '+', or by '#' in liaison, that is, it deletes by TRUNC:

ce fat personnage [fa]
ils sont fats "

We have seen that words which are exceptions to FCDEL are not necessarily exceptions to TRUNC, but the converse is not true. Words which are exceptions to TRUNC are always exceptions to FCDEL:

cap	[kap]	caps	[cap] ¹²
cep	[sɛp]	ceps	[sɛp]
mec	[mɛk]	mecs	[mɛk]
flic	[flik]	flics	[flik]
yaourt	[jaurt]	yaourts	[jaurt]
kermès	[kɛrmɛs]	kermès	[kɛrmɛs]
sphinx	[sfɛks]	sphinx	[sfɛks]
fief	[fjɛf]	fiefs	[fjɛf]

elle en a	$\left. \begin{array}{l} \text{huit} \\ \text{cinq} \\ \text{neuf} \\ \text{sept} \end{array} \right\}$	[ɥit]
		[sɛ̃k]
		[nœf]
		[sɛt]

elle a	$\left. \begin{array}{l} \text{huit} \\ \text{cinq} \\ \text{neuf} \\ \text{sept} \end{array} \right\}$	oranges	[ɥit]
			[sɛ̃k]
			[nœf] ¹³
			[sɛt]

elle a	$\left. \begin{array}{l} \text{huit} \\ \text{cinq} \\ \text{neuf} \\ \text{sept} \end{array} \right\}$	raisins	[ɥit] ¹⁴
			[sɛ̃k]
			[nœf]
			[sɛt]

Schane (1968) noticed that exceptionality to TRUNC coincided with exceptionality to FCDEL and proposed a redundancy rule to the effect that $[-\text{TRUNC}] \rightarrow [-\text{FCDEL}]$. Supplied with such a rule, the grammar need only mark words like mec, flic, sept, etc., as exceptions to one rule. I reemphasize though that there are words which are exceptions only to FCDEL, and so the two consonant deletion processes must be independent. Below (§2.3) this fact is adduced in arguing against François Dell's conflation of TRUNC and FCDEL as $C \rightarrow \emptyset / _ C_0 \#$.

2. Dell on Liaison and Truncation/Final Consonant Deletion

2.1 Introduction

François Dell (1970) sees liaison as a rule performing an operation of metathesis:

LIAISON (LIAIS):

$$\begin{array}{ccccccc} [-\text{syll}] & \# & [+ \text{syll}] & & & & \\ 1 & 2 & 3 & \Rightarrow & 2 & 1 & 3 \end{array}$$

Adopting the suggestion in Milner (1967), Dell proposes that the presence of one # indicates an environment in which the LIAIS rule takes place, where syntactic considerations determine whether it is # or ## that separates two words. With this I, of course, agree. He explains that with such a LIAISON rule as this, the formulation of all final consonant deletions (Truncation and Final Consonant Deletion) can simply be written as

TRUNCATION (TR):

$$C \rightarrow \emptyset / _ C_0 \#$$

By way of illustration of the derivations now possible, Dell

offers:

	<u>petit ami</u>	<u>petits amis</u>	<u>ils sont petits</u>	<u>respect</u>
	pətɪt#ami	pətɪt+z#ami+z	pətɪt+z! ¹⁵	rɛspɛkt!
LIAIS	pəti#tami	pətɪt#zami+z	-----	-----
TR	-----	pəti #zami	pəti	rɛspɛ
Output:	[p(ə)tɪtami]	[p(ə)tɪzami]	[p(ə)tɪ]	[rɛspɛ]

And he goes on to remark that

Bref, la troncation n'est plus un phénomène qui naît du contact de deux mots ou de deux morphèmes, mais une affaire interne à un mot donné, sans référence à ce qui le suit. (p.70)

I agree that Truncation so formulated has an appealing simplicity, and, as will become clear throughout this chapter, it seems entirely correct to limit certain phonological processes to the interior of words, even in the context of liaison. But I don't think that Truncation is one of those rules which can ignore material in the next word. In effect, the LIAIS rule is doing the job for TR. The LIAIS rule works to save the final consonant from the clutches of the TR rule in just that case where TR shouldn't apply, i.e., where a vowel follows the word boundary. This consideration aside, just on empirical grounds the LIAISON and TRUNCATION pair in this analysis is inadequate. The two rules cannot derive the proper phonetic form of mon circonspect ami, which is [mɔ̃ sirkɔ̃spɛkt ami]. The rules would apply just as they did for petits amis.

sirkɔ̃nspekt#ami

(NASAL) ɔ̃

LIAIS sirkɔ̃spɛk#tami

Output: * $[sirkɔ̃spɛtami]$

In this case the /k/ is lost through TR because only one consonant metathesizes with # under LIAISON. If two consonants were allowed to metathesize, as would be required in this case to preserve the cluster /kt/, then petits amis $[p(ə)tizami]$ could not be derived. Instead, $[p(ə)titzami]$ would be derived. It is the phonetic form of petites amies, but not of petits amis.

Evidently, the two assumptions, (1) that there exists a rule of LIAISON metathesis and (2) that Truncation and Final Consonant Deletion can be collapsed as Dell's TR, don't hold up together. I want to show that these assumptions each have serious drawbacks quite on their own, and so must be rejected even without regard to the rules' inability to operate together to obtain circonspect ami. The LIAISON rule will be taken up in §2.2; Dell's TR will be the subject of §2.3.

2.2 Liaison as Metathesis

The effect of the LIAISON-metathesis rule is to put formerly penultimate segments into word-final position. Once there, these segments are subject to rules containing the environment '___#'. It was seen just above that given such a LIAIS rule, most but, crucially, not all of the appropriate consonant deletions could be obtained by formulating Truncation and Final Consonant Deletion

together as TR, $C \rightarrow \emptyset / _ C_0 \#$. In this section I will show that liaison metathesis creates environments where two rules, O-SWITCH (O-SW) and FINAL VOWEL SHORTENING (FVS), must operate. Yet, when they do operate, the wrong phonetic forms are derived.

O-SWITCH

The vowel /ɔ/ turns into the non-low [o] when it is word-final. Quite a variety of related words show this alternation, e.g.,

[ɔ]	[ɔ]	[o]
ossifier	os (sing.)	os (plur.)
sangloter	sanglote	sanglot
galoper	galope	galop
roter	rote	rot
sottise	sotte	sot
idiotie	idiote	idiot
	vieillotte	vieillot
	fiérote	fierot
	bellotte	bellot

In final position, after the operation of Truncation, [o] is indeed in an open syllable, yet the words of the left column, where [ɔ] is in the context 'CV', show that the openness of the syllable in which /ɔ/ is located cannot alone account for its switch to [o]. It must have to do with being in open syllable in final position. This condition is just what part¹⁶ of Schane's (1968) rule for the alternation expresses:

$$\left[\begin{array}{c} V \\ +\text{round} \end{array} \right] \rightarrow [-\text{low}] / _ \#$$

Sample derivations with this rule would be:

	<u>sottise</u>	<u>sotte</u>	<u>sot</u>
	[#sɔt+izə#]	[#sɔt+ə#]	[#sɔt#]
TRUNC/ FCDEL	----	---	∅
O-SW	----	---	so
Output:	[sɔtiz]	[sɔt]	[so]

Let us look at what happens to words like sot or idiot under conditions of liaison:¹⁷

le sot enfant	[lə sɔt ǎfǎ]
mon idiot ami	[mɔ̃n idjɔt ami]
ce sot film	[sə so film]
cet idiot personnage	[sɛt idjo pɛrsɔnaz]

When the masculine forms sot and idiot precede nouns beginning with a vowel, their final /t/ are not deleted, and the vowel is pronounced as in sotte. When they precede a consonant-initial noun, however, the final consonant is deleted, and the underlying /ɔ/ changes to [o].

Notice that an analysis whereby LIAIS metathesizes the final consonant and # cannot generate the correct phonetic shape for sot and idiot in these liaison contexts. None of the three possible orderings of LIAIS and Truncation with respect to /ɔ/-SWITCH will yield the right result. (In Dell's system, LIAIS must precede Truncation).

	sɔt#ami	sɔt#film
O-SW	----	-----
LIAIS	sɔ#tami	-----
TRunc	-----	so#film
Output:	[sɔtami]	*[sɔfilm]

	sɔt#ami	sɔt#film
LIAIS	sɔ#tami	-----
O-SW	so#tami	-----
TR	-----	*[sɔ#film]
Output:	*[sɔtami]	*[sɔfilm]

	sɔt#ami	sɔt#film
LIAIS	sɔ#tami	-----
TR	----	sɔ#film
O-SW	so#tami	so#film
Output:	*[sɔtami]	[so film]

In the last two derivations of sot ami, LIAIS operates and removes the /t/ from final position in the first word. But the effect of this metathesis of # and consonant is to place the vowel /ɔ/ in a position before # where it is susceptible to the /ɔ/ → [o] rule. And this is precisely what must not happen.

My analysis of liaison has no real problem with these cases, however. Presuming that the rule converting /ɔ/ to [o] must operate after the final consonant has been deleted, the

derivation--up to the point where O-SWITCH applies--would be

#lə#sɔt##ami# #sə#sɔt##film

Liaison

Readj.: Ø# Ø#
 Adj_N

TRUNC/ ----- #sə#sɔ#film#
 FCDEL

Intermed.

Rep.: #lə#sɔt##ami #sə#sɔ#film

The representation on the left is virtually the phonetic representation. In the representation on the right, [so] must be derived from /sɔ/. The O-SWITCH rule can simply be taken to apply in the environment '___#'. Using the Halle formalism, I will write it as

O-SWITCH ɔ → o / [# X ___ (# Y) #]

Apply this rule to the righthand derivation above and the proper phonetic result will be obtained.

FINAL VOWEL SHORTENING (FVS)

Nasalization produces long vowels--[ẽ:], [ã:], [õ:], [œ:]--and so do the rules deriving [o:] from underlying /a/ and /s/. Just why this happens will be explained in detail in this chapter, §3.3. What interests us here are the rules which then shorten these vowels in certain environments. It is only the stressed vowels, which appear in the last syllable of the word (with optional final [ə], of course) which can remain long.¹⁸ But, even a stressed long vowel will shorten if it is in an open syllable:

FVS (provisional) V → [-long] / ___ #

Such a rule accounts for the alternations:

<u>V:</u>	<u>V</u>
haute	haut
fausse	faux
chaude	chaud
longue	long
seconde	second
savante	savant
sainte	saint
ardente	ardent
prompte	prompt
véhémente	véhément

In the environment of liaison the words on the right exhibit the following phonetic shapes:

<u>V:</u>	<u>V</u>
un haut intérêt	un haut respect
un faux ami	un faux probleme
le long été	le long discours
le second ennui	le second violon
un savant anglais	un savant chinois

Again, the vowels of the adjectives on the left are [+long], while those on the right are [-long]. (It is also the case that the final consonants of the adjectives on the right have been deleted by TRUNC.)

Within the analysis being defended in this study, making a step parallel to that for O-SWITCH, one can modify the rule of FVS:

$$V \rightarrow [-\text{long}] / [\# X _ (\# Y) \#]$$

With this rule, the proper phonetic forms of savant anglais and savant chinois can be derived:

	#savant##anglez#	#savant##šinwaz#
Liaison		
Readj.:	∅#	∅#
NASAL	ã: ã:	ã:
TRUNC/ FCDEL	----- ∅	∅ ∅
FVS	-----	ã
Output:	[savã:tãglɛ]	[savãšinwa]

Dell's LIAIS metathesis would give the same sorts of incorrect results here that it did with /ɔ/-SWITCH. I will just mention that FVS must operate after TR in his system (a rule which, besides, is preceded by LIAIS), because of certain exceptions to TR like distinct [distẽ:kt], sens [sã:s]. But in Dell's framework, after the operation of TR there is no way of distinguishing between savant anglais and savant chinois, whose representations are /savã:#tãglɛ/ and /savã:#šinwa/ before FVS applies. Both nasal vowels would be shortened.

2.3 Truncation and the Traits of Exceptional Final Consonants

Recall that above in the last part of §1 I pointed out that there was support for two separate rules for deleting morpheme-final consonants, TRUNC and FCDEL. The argument rested on the fact that there are words which are exceptions to FCDEL but which are not exceptions to TRUNC:

No FCDEL

il l'est <u>plus</u> qu'elle	[plüs]
il y en a <u>six</u>	[sis]
il est <u>fat</u> comme tout	[fat]

TRUNC

il est <u>plus</u> jaloux	[plü]
il y a <u>six</u> fusils	[si]
c'est un <u>fat</u> personnage	[fa]

The point of Dell's Truncation rule, TR, is to treat Truncation and Final Consonant Deletion as one and the same process. Thus no distinction can be made between the exceptional cases above. Either the rule TR, $C \rightarrow \emptyset / _ C_0 \#$, applies to the representations in both groups, in which case the derivation of il y en a six would yield the incorrect phonetic [si], or it applies to neither, allowing [sis] to appear in the phonetic representation of il y a six fusils. With Dell's analysis there is no possible way of getting deletion in one case and not in the other.

In his discussion of Truncation, Dell dismisses Schane's idea that final consonants may be exceptions to deletion rules, preferring instead to give such forms as sec, chef, avec, sept, and sens an underlying final schwa (which would protect the consonant from truncation). It's a reasonable idea inasmuch as there are also many other words in French pronounced with a single final consonant for which the orthography provides a final e, and where one is inclined to posit an underlying /ə/. Putting

underlying /ə/ on sec and chef, then, may seem to be simply overcoming a false division in the consonant-final words which has been created by the spelling. I will show however that the spelling does reflect a division in the vocabulary and that consonant-final words which are also consonant-final in the spelling must be regarded as underlyingly consonant-final and thus exceptions to either TRUNC or FCDEL.

Notice that Dell's solution of positing underlying final /ə/ is quite unworkable for words like oeuf, boeuf, fat, six, dix, plus, etc., which in some contexts lose their final consonants. In the plurals os, oeufs, fats, and the phrases six parties, dix réponses, and plus conservateur there is no final consonant. If an underlying schwa terminated the stem, the wrong pronunciations would be derived:

	#ʝsə+z#	#sisə#parti+z#
TR	∅	∅
Final /ə/ Deletion	∅	∅
Output:	*[ʝs]	*[sis parti]

The correct forms of os in the singular and of isolated six could be derived, however:

	#ʝsə#	#sisə#
TR	---	---
Final / / Deletion	∅	∅
Output:	[ʝs]	[sis]

Evidently it is impossible to posit final /ə/ for those words I

have discussed before as being exceptions to Final Consonant Deletion only.

Reasons can be found for turning down as well the option of putting final /ə/ in the underlying representations of chef, cing, sec, etc., the forms I've called exceptions to both TRUNC and FCDEL. There is one instance in which a final schwa which is normally obligatorily deleted in the context 'VC __ #' does appear-- in liaison contexts before h aspiré. For une housse and grande hache the pronunciation is [ünə us] and [grādə aʃ], not the forms [ün us] and [grād as] generable by the normal application of final schwa deletion. Suffice it to say here that an underlying schwa, otherwise dormant, will rise to the surface before h aspiré in these contexts. In une and grande, for which there are the corresponding masculine forms un and grand, the underlying schwa is the feminine marker. In such words as mince, étrange, onze, fantastique, chouette, vide, etc., which are identical in the masculine and the feminine, an underlying schwa can be motivated as well. Preceding an h aspiré the /ə/ appears:

<u>mince</u> hourd	<u>étrange</u> houx	<u>fantastique</u> heurt
<u>chouette</u> hêtre	<u>onze</u> harts	<u>mince</u> haie

Yet a schwa never appears in the phonetic string when the h-initial word is preceded by sept, cing, avec, net, chic, bref, répulsif, etc.:

<u>avec</u> houte	<u>répulsif</u> harle	<u>bref</u> heurt
<u>chic</u> heaume	<u>cing</u> harts	<u>sept</u> haies (vs. <u>cette</u> haie)

This gives good cause to doubt that the words I called exceptions to TRUNC and FCDEL both retain their underlying final consonants in the phonetic string because of an underlying final schwa.

One further advantage is obtained from the assumption that pronounced final consonants may be word-final in underlying representation, namely the possibility of making statements about the class of final consonants (as opposed to the class of consonants which are phonetically final but precede a schwa in the underlying representations). It will be shown that all final consonants in underlying representations of "non-foreign" words are voiceless. This is not true of pre-schwa "final" consonants which may be either voiced or voiceless. Look first at the adjective pairs neuf/neuve, bref/brève, répulsif/répulsive. I would like to propose a rule to account for these alternations:

DEVOICING (DEVOIC)

$$C \rightarrow [-\text{voice}] / [\# X _ \# X \#]^{19}$$

This rule will operate prior to the deletion of final schwa in neuve, brève, etc. One might want to propose that, instead, consonants are voiced intervocalically, before a '+' perhaps. But a vast number of examples would go counter to this claim-- sec/sèche/séchoir, concept/conceptuel, sirop/sirupeux, coup/couper, brut/brutal, gros/grosse, roux/rousse, ... By no means do consonants become voiced in the environment '_+V'.

The DEVOIC rule can now explain the pronunciations of long, grand, profond, etc., in liaison contexts:

un long hiver [lɔ̃:k]
 un grand ami [grɑ̃:t]
 un profond ennui [prɔ̃fɔ̃:t]

Feminine forms of the adjectives and derived nominals contain a voiced stop:

longue	longueur
grande	grandeur
profonde	profondeur

So one must say that long and profond are underlyingly provided with voiced stops. They become devoiced by DEVOIC in liaison:

	#lɔ̃g#ivɛr#	#prɔ̃fɔ̃nd#ãnyɪ#
DEVOIC	k	t
Output:	[lɔ̃:k ivɛr]	[prɔ̃fɔ̃:t ãnyɪ]

The dental spirant /s/ does not work in the same way, though. Although it is always voiceless finally if in non-liaison contexts, it is voiced under liaison. The voicelessness in the former case can be explained by DEVOIC, but a special rule of /s/ voicing will have to operate in liaison:

S-VOICE
 s → [+voice] / [# X ___ #V X #].

For the sentences il en a vu plus and il est plus insolent there are the following derivations:

	##il#ãñ#a#vü##plüs##	##il#ɛt#plüs#insɔlãnt##
DEVOIC	----	---
S-VOICE	----	z
Output:	[il ãñ a vü plüa]	[il ɛ plüz ɛsɔlã]

For gros enfant and doux ami one has:

#grɔs#enfant#

#dus#ami#

S-VOICE z

z

Output: [groz afa]

[duz ami]

with the /s/ voicing to /z/. The final spirant /v/ is devoiced to /f/ in liaison environments, and so is affected only by DEVOIC. (The phrases neuf heures and neuf ans are the only cases where /v/ does not become [f] in liaison contexts. Call them lexicalized exceptions.)

In all, DEVOIC expresses a very widespread redundancy in the language, of which the cases discussed with bref, long, plus, grand, etc., are but interesting reflections. The overwhelming majority of final consonants in words for which no final schwa can be motivated are voiceless. I refer the reader to the more complete lists of words available in Juilland (1965) and Fouché (1959) for verification of this point. Here I include representative examples of words with final consonants:

<u>p</u>	<u>k</u>	<u>t</u>	<u>s</u>	<u>f</u>
cap	sac	but	plus	sauf
cep	mec	net	tous	boeuf
bichop	roc	yaourt	Agnès	nef
Gap	flic	concept	index	fief
	avec	strict	kermès	soif
	caduc	luth	sens	relief
	chic	fat	filis	veuf
	duc	mat	iris	chef
	echec	granit	six	naif
	pic	sept	pelvis	juif
	grec	huit	os	<u>-if</u> Adjectives:
	bloc	brut	calvados	massif
	coq	abrupt	mars	pensif
			mœurs	tardif
				affectif
				.
				.
				.

In general, the voiced final consonants that do appear are foreign or Biblical words, e.g.,

<u>b</u>	<u>g</u>	<u>d</u>	<u>z</u>	<u>v</u>
snob	whig	oued	fez	∅
club	zigzag	talmud		
Maghreb	thug	lloyd		
Pendjab	Reichstag	Carlsbad		

They will be marked as exceptions to DEVOIC, perhaps by virtue of a feature [+foreign]. For a few words with voiced final consonants it would be inappropriate to label them [+foreign]: sud, bled, zinc (pronounced [zɛ̃g]), joug, gaz, and a variety of place names, Semnoz, St. Jean de Luz... Again, these would simply be marked as exceptions to DEVOIC. They constitute a very small class of exceptions.

To summarize, DEVOIC could not be stated if a /ə/ were to terminate these words. That a schwa cannot terminate the words is shown by the h aspiré examples and the variant pronunciations of such words as os, oeuf(s), plus. So these final consonants must be marked as exceptions to deletion. Since Dell has only one rule for deletion, TR, his analysis cannot explain why the final consonants of six, os, oeuf, fat, plus, etc., are sometimes deleted by the rule and sometimes not. I take this to mean that it is incorrect to regard the deletion of final consonants as a single process, and that instead there must be two rules, one for the environment '___[-seg] C' and the other for '___#]' or '___##'.

2.4 Certain Theoretical Drawbacks

I would like to maintain that the analysis of liaison and the consonant deletion processes that I am presenting here is the more attractive one from the point of view of grammatical theory. It's hard to say what's better for the theory; claims in this domain are so often reflections of mere opinion or taste. But let me review the case. Dell employs a two-step process in liaison. First, following Milner's analysis, he assumes that all liaison environments contain only a single word boundary. This would be accomplished by some syntactic readjustment rule, presumably. That single # identifies the environment for the second half of the process, the metathesis rule of LIAISON, which I repeat:

$$\begin{array}{ccccccc} [-\text{syll}] & \# & [+ \text{syll}] & & & & \\ 1 & 2 & 3 & \Rightarrow & 2 & 1 & 3 \end{array}$$

This liaison readjustment rule makes appeal to the phonological make-up of the segments in the liaison environment. This is the significant difference between our analyses. The force of my account, however, is that liaison is not phonologically conditioned; it is an automatic consequence of a syntactic relationship between two words. On the basis of my account, one could try to constrain the class of readjustment rules, hypothesizing that rules which rearrange boundaries take no heed of the phonological nature of the words enclosed by such boundaries. In this way, these "rearranging" rules are syntactic processes. The new phonological word is a purely syntactically-determined entity.

Notice that Dell's metathesis of final consonant and # permits certain subsequent rules to operate within the confines of #. (Though not all the rules in his system are restricted in this way.) The metathesis is a mechanism which allows later phonological rules to avoid looking to the right of #. Instead, it is the LIAISON metathesis rule itself which looks to the right of #. I am saying that the phonological rules in question can look to the right of the boundary. Some rules don't look beyond; some do. This is a property of the rules themselves.

Our analyses also have quite different impacts on the description of the process of nasalization in French. It will be seen in the immediately following section how François Dell's description of nasalization phenomena employs two rules and that the LIAIS readjustment rule intercalates between these rules in some cases. With my analysis, however, it is possible to eliminate this situation, where a readjustment rule is said to follow a phonological rule, a situation where moreover the ordering of two phonological rules is said to vary according to the syntactic characteristics of the words affected. Furthermore, in the description I give Nasalization is seen as a single phonological rule, a result which I will argue in §3.3 is theoretically advantageous.

3. Nasalization, ER-Conversion, and Transformational Machinery in Phonology

3.1 Nasalization

Perhaps the next most renowned phonological process which

operates in liaison contexts is Nasalization. In French nasal vowels alternate with sequences of vowel plus nasal consonant. Words with nasal vowels often have morphologically related forms without a nasalized vowel and which sport a nasal consonant as well:

bon	[bɔ̃]	bonne	[bɔ̃n]
bonté	[bɔ̃te]	bonheur	[bɔ̃œr]
fin	[fɛ̃]	fine	[fin]
		finesse	[fines]
serein	[səʁɛ̃]	sérène	[səʁɛn]
		sérénité	[serenite]
plan	[plɑ̃]	planification	[planifikasjɔ̃]

Some words with nasal vowels have no non-nasal alternants:

monter	[mɔ̃te]
mince	[mɛ̃:s]
chanter	[ʃɑ̃te]
banque	[bɑ̃:k]
.	.

These examples demonstrate quite clearly that the nasal vowel appears (and the nasal consonant concomitantly disappears) either before a consonant or at the end of a word. Now if one looks at the pronunciation of words with underlying final nasal consonants in the appropriate liaison environments, it becomes apparent that the nasalization alternations depend on the presence or absence of an initial consonant in the following word:

le bon ami [bɔ̃n ami] le prochain avion [prɔʃɛ̃n avjɔ̃]
 le bon café [bɔ̃ kafe] le prochain vol [prɔʃɛ̃ vɔl]
 il est bon [bɔ̃] il est le prochain [prɔʃɛ̃]

When the next word begins with a vowel, the combination vowel plus nasal consonant does not convert to a nasal vowel. But when a consonant begins the following word, nasalization takes place. It seems therefore that the facts about nasalization in liaison context parallel exactly the facts about nasalization inside the word. The nasalization rule for word-internal as well as liaison contexts can be written as

NASALIZATION (NAS)

$$\begin{array}{ccccccc}
 \text{[\# Y V N ((\#) C X) \#]} & & & & & & \\
 \text{1 2 3 4} & & & & \Rightarrow & \text{1} & \left[\begin{array}{c} \text{2} \\ \text{+nas} \end{array} \right] & \emptyset & \text{4}
 \end{array}$$

The following derivations are typical:

	<u>bon</u>	<u>bonté</u>	<u>bonne</u>	bonheur
	#bɔ̃n#	#bɔ̃nte#	#bɔ̃n+ə#	#bɔ̃n+œr#
NAS	ɔ̃	ɔ̃	---	---
Output:	[bɔ̃]	[bɔ̃te]	[bɔ̃n]	[bɔ̃nœr]

	<u>le bon ami</u>	<u>le bon café</u>	<u>il est bon</u>
	#lə#bɔ̃n#ami#	#lə#bɔ̃n#kafe#	#il#ɛt#bɔ̃n#
NAS	---	ɔ̃	ɔ̃
Output:	[lə bɔ̃n ami]	[lə bɔ̃ kafe]	[il ɛ bɔ̃]

As far as the formalism of this rule is concerned, the notation

$$\text{[\# ((\#) C X) \#]}$$

is drawn from Halle (1971a) and was discussed above (§1.2) in relation to TRUNC and FCDEL. What is controversial about the rule

is (a) its representation with a transformational mechanism and (b) the assumption (embodied precisely by this "transformational" approach) that NASALIZATION is a single phonological process, which is not to be conceived of as a sequence of two rules, one nasalizing the vowel and the second deleting the nasal consonant. It will be argued below in §3.3 that this formalism is desirable as a means of describing that class of phonological processes where two segments become one and where that single segment is comprised of phonological features contributed by both parent segments. In this section, it will be shown that this formulation of NASALIZATION captures quite neatly the relevant facts in French.

This idea about treating NASALIZATION as one rule is not new. Schane wrote the rule as

$$VN \rightarrow \tilde{V} / _ \left\{ \begin{array}{l} \# \\ C \end{array} \right\}$$

in a 1968 article. Though there is no discussion of why he changed from the way he wrote it in French Phonology and Morphology (1968),

$$V \rightarrow \tilde{V} / _ N \left\{ \begin{array}{l} C \\ \# \end{array} \right\}$$

$$N \rightarrow \emptyset / \tilde{V} _$$

As far as Schane is concerned, it seems not to have mattered much which way the nasalization process works. But for François Dell's description, it is crucial that there be two different rules.

One he calls Nasalization (NASAL),

NASAL

$$V \rightarrow [+nasal] / _ [+nasal] \left\{ \begin{array}{l} [-syll] \\ \# \end{array} \right\}$$

and the other Nasal Deletion (NASDEL):

NASDEL

$$\begin{bmatrix} +\text{cons} \\ +\text{nas} \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} \text{V} \\ +\text{nas} \end{bmatrix} \text{ ---}$$

In the case of isolated words these derivations are typical:

	<u>bon</u>	<u>bonté</u>	<u>bonne</u>	<u>bonheur</u>
	#bɔ̃n#	#bɔ̃nte#	#bɔ̃ntə#	#bɔ̃ntœr#
NASAL	bɔ̃n	bɔ̃nte	----	----
NASDEL	bɔ̃	bɔ̃te	----	----
Output:	[bɔ̃]	[bɔ̃te]	[bɔ̃n]	[bɔ̃ntœr]

As will be seen, Dell's conception of nasalization and his metathesis rule for LIAISON are intimately connected. Recall that LIAISON is formulated roughly as $C \# V \Rightarrow \# C V$. In his system LIAIS is ordered after NASAL and before NASDEL. Such an ordering will permit the derivation of such phonetic strings as [sɔ̃n oto] for son auto, [ã̃n alʒeri] for en Algérie, [ɔ̃n i va] for on y va:

	#sɔ̃n#oto#	#an#alʒeri#	#ɔ̃n#i#va+t#
NASAL	sɔ̃n#oto	ã̃n#alʒeri	ɔ̃n#i#va+t
LIAIS	sɔ̃#noto	ã̃#nalʒeri	ɔ̃#ni#va+t
NASDEL	----	---	---

Output: as above

Notice that here both a nasalized vowel and a nasal consonant appear phonetically in liaison context before a vowel. There are eight words in French which behave this way: son, mon, ton, on, un, en, rien, and bien all exhibit $\tilde{V}N$ in liaison with a vowel-initial word:

[sɔ̃n atitüd]	son attitude	[mɔ̃n ide]	mon idée
[tɔ̃n espwar]	ton espoir	[ɔ̃n i va]	on y va
[ã̃n alʒeri]	en Algérie	[œ̃n ami]	un ami
[bjɛ̃n emabl]	bien aimable	[rʒɛ̃n a mɑ̃ʒe]	rien à manger

Dell takes the appearance of $\tilde{V}N$ to be the normal case for nasalization under conditions of liaison and thus the ordering of the NASAL and LIAIS rules to be the normal ordering for French.

In order to describe such liaison cases as bon ami [bɔ̃n ami] and prochain avenir [prɔ̃ʃɛ̃n avnir] where the vowel is not nasalized, he proposes that there be an (exceptional) reverse ordering of LIAISON and NASAL, restricted to the syntactic environment Adjective_Noun. In this way the following derivations are possible:

	#bɔ̃n#ami#	#prɔ̃ʃɛ̃n#avnir#
LIAIS	bɔ̃#nami	prɔ̃ʃɛ̃#navnir
NASAL	----	----
NASDEL	----	----
Output:	[bɔ̃n ami]	[prɔ̃ʃɛ̃n avnir]

It was extremely helpful for Dell to have pointed out the existence of two differently behaving sets of nasal final words in the context of liaison. But I don't agree with the way in which he depicts these two sets. I think that the adjectives are the normal case in French, and that words like en, un, son, bien, etc., are the exceptions. The phoneticians Martinet, Grammont, Fouché and Martinon point to real equivocations in the pronunciation of mon, ton, son, and bien in liaison environments before

a vowel:²⁰ the vowel may be nasalized or not. No such equivocation is reported for adjectives where the vowels are always non-nasal preceding a nasal consonant followed by a vowel in liaison. I would like to propose thus that the adjectives are lexically represented with a non-nasal underlying vowel and are thus subject to the rule of NASALIZATION being presented here. I suggest that on, en, son, bien, etc., on the other hand, are represented with underlying nasal vowels, i.e., /õn/, /ãn/, /sõn/, /bjẽn/, etc. I will prevent NAS from ever applying to these latter words by specifying that the vowel in the structural description of NAS be [-nasal]. This means that the deletion of the nasal consonant must be accomplished by some other means when the words are in a liaison context where the following word begins with a consonant. This deletion of the nasal consonant can be done by TRUNC/FCDEL which, quite independently, needs to be able to delete nasal consonants. François Dell has given the examples which show that nasals are among the consonants effaced by Truncation and Final Consonant Deletion:

hiver	[ivɛr]	hiverner	[iverne]
jour	[ʒur]	journée	[ʒurne]
dort-il	[dɔrt il]	dormons-nous	[dɔrmõ nu]
chair	[šɛr]	charnel	[šarnɛl]
four	[fur]	fourneau	[furno]

The underlying final nasal consonants are deleted from the words in the column on the left.²¹ (It is worth noting here that /r/ and /l/ cannot be deleted by Truncation or Final Consonant

Deletion.) The essence of Dell's modification of his TR rule, translated into the terms of TRUNC/FCDEL is

$$\left[\begin{array}{c} C \\ \alpha \text{sonorant} \\ \alpha \text{nasal} \end{array} \right] \rightarrow \emptyset / [\# X _ _ ([-\text{seg}] C_1 V X) \#]$$

This rule will (correctly) delete obstruents and nasal sonorants, but not glides or liquids. Equipped with NAS and this revised version of TRUNC/FCDEL we can give the following derivations:

	<u>en</u> <u>Chine</u>	<u>bien</u> <u>pénible</u>	<u>bien</u>	<u>on</u>
	#ã#šin #	#bjẽn#peniblə#	#bjẽn#	#õn#
NAS	----	----	----	---
TRUNC	#ã#šin#	#bjẽ#peniblə#	----	---
FCDEL	-----	-----	#bjẽ#	#õ#
Output:	[ã šin]	[bjẽ penibl]	[bjẽ]	[õ]

So the exceptionality of one set of nasal final words can be expressed in their lexical representations. The rules of NAS and TRUNC/FCDEL, always applying in the same regular fashion, will do the rest of the work. This is presumably preferable to having an exceptional reversal of the ordering of phonological rules in a particular syntactic environment. Notice also that if Dell's LIAISON is to be considered a readjustment rule, inasmuch as it plays around with boundaries, and if it is considered desirable to have all the readjustment rules precede all the phonological rules in a grammar, then Dell's ordering of NASAL before the readjustment rule of LIAISON (for the cases en, on, bien, etc.) is tantamount to saying that NASAL in these cases is a lexical rule, or simply that these vowels are underlyingly nasalized.

In summary, it's been shown that an analysis of French which has a Nasalization rule like

NAS

$$\begin{array}{ccccccc}
 \text{[\# X V N ((\#) C X) \#]} & & & & & & \\
 \text{1 2 3} & & \underbrace{\hspace{2cm}} & \text{4} & \Rightarrow & \text{1} & \begin{bmatrix} \text{2} \\ \text{+nas} \end{bmatrix} & \emptyset & \text{4}
 \end{array}$$

and assumes underlying nasal vowels for the words en, on, un, son, mon, ton, bien, and rien can derive all the proper phonetic strings. This analysis requires no special orderings of rules.

3.2 ER-Conversion

In liaison context, there is another rule which behaves in a fashion quite parallel to that of nasalization. This is the rule which gives the pronunciation [e] to the segments orthographically represented as -er in word final position.²² The paradigm below reflects the similarity between the rules:

<p>[e]</p> <p>—</p> <p>il est singulier c'est particulier!</p> <p>c'est un singulier fromage!!! c'est un particulier cretin!!!</p> <p>[ɛr]</p> <p>—</p> <p>elle est singulière une expérience particulière</p> <p>c'est un singulier ami!!! c'est un particulier avantage!!!</p>	<p>[ɔ̃]</p> <p>—</p> <p>il est bon</p> <p>un bon balai</p> <p>[ɔ̃n]</p> <p>—</p> <p>elle est bonne</p> <p>un bon ennui</p>
--	--

I will show that it is a rule of the same formal character as NASALIZATION which accounts for these alternations. The rule

taking /ɛr/ to [e] is written as

ER-CONVERSION

$$\begin{array}{ccccccc}
 \text{[\# X } \epsilon \text{ r (\# C X) \#]} & & & & & & \\
 \text{1 2 3} & \underbrace{\hspace{2em}} & \text{4} & \Rightarrow & \text{1} & \begin{bmatrix} 2 \\ -\text{low} \end{bmatrix} & \emptyset & \text{4}
 \end{array}$$

(Notice that unlike NAS this rule contains an obligatory specification of '#' in its environment. This is necessary in order to limit the rule to word-final environments: perdre [pɛrdr(ə)] "to lose" is not switched to [pedr(ə)] by ER-CONVERSION. But NAS can operate anywhere, e.g., pendre [pãdr(ə)] "to hang" comes from underlying /pandrə/.)

In order to establish that the rule of ER-CONV is the proper rule to account for the alternations between [ɛr] and [e] in the lists above I will first show that the underlying final vowel of words like particulier is /ɛ/, and, secondly, I'll argue that the rule deriving [e] from /ɛr/ must be represented in this very form.

From the analysis of words like complet, procès and plein (see this chapter, §5), it is known that a rule operates at a very early point in the grammar to convert final underlying /eC/ into /ɛC/. Since there's no obvious reason to exclude particulier and singulier from the domain of this rule, other evidence is needed in order to establish unequivocally that the underlying forms of final -er words like these contain final /ɛr/ and therefore that the rule describing the [ɛr]-[e] alternations must have the force of ER-CONV.

In fact, there are quite good reasons for positing the underlying vowel in -er as /ɛ/. I think one can argue this for

virtually every instance of the ending -er in French. That is, I will show that, for almost all cases of orthographic final -er in French, there must be a rule changing underlying /ɛr/ to phonetic [e]. The major classes of words ending in -er are represented by the following examples:

- I. manger, nommer, trainer,...--the first conjugation infinitive ending.
- II. pâtissier, laitier, boucher,...---er designating a male pursuing a profession or occupation related to the "concept" designated by the stem. The feminine form is in -ère: pâtissière, laitière, bouchère,...
- III. rosier, pommier, oranger,...--here, -er added to the word for a fruit or flower forms a word designating the tree or bush which bears it.
- IV. particulier, singulier, grossier, léger, premier, dernier, régulier, familier,...---er is simply a masculine adjectival suffix, corresponding to the feminine -ère.

The way one can tell that the vowel is /ɛ/ is by looking at morphologically related words where the vowel is in non-final position. In this position, one of two rules may affect /ɛ/ but not /e/. The first rule to be discussed, call it E-REDUCTION, is relevant for the classes I-III:

E-REDUCTION (E-RED)²³

ɛ + ə / ___ C¹ V

Notice these contrastive pairs:

céder	[sede]	mener	[məne]	[mne]
cède	[sɛd]	mène	[mɛn]	

Mener is underlying /mɛner/ and céder is underlying /seder/.

Closed Syllable Adjustment (see §5) is responsible for [sɛd],

while it is E-RED that produces [məne]. Schwa deletion can go

on to derive [mne], optionally. E-RED operates when the -er endings in I-III turn up in the pre-tonic syllable. From this we conclude that final -er (phonetic [e]) in I, II and III is underlying /ɛr/.

The first conjugation infinitive ending -er [e] appears as [əɾ] in pre-tonic position in the future forms:

respecter	[rɛspɛkte]	respectera	[rɛspɛktərə]
fixer	[fikse]	fixera	[fiksərə]

If the /ə/ is preceded by only one consonant it may undergo schwa deletion:

loger	[lɔʒe]	logera	[lɔʒra]
coller	[kɔle]	collera	[kɔlra]

This sort of behavior would be impossible if the pre-tonic vowel were underlying [e]: the passé simple of insérer is inséra [ɛsɛra], not *insera *[ɛsra].

The examples from II and III are to be assigned final vowel /ɛ/ for the same reason--the alternation with /ə/, which may then delete:

Group II

a) pâtissier	[patɪsjɛ]	pâtisserie	[patɪsɪri]
laitier	[lɛtjɛ]	laiterie	[lɛtri]
b) mercier	[mɛrsjɛ]	mercerie	[mɛrsəri]
berger	[bɛʒɛ] ²⁴	bergerie	[bɛʒəri]

The [j] in the phonetic representation of the words on the left crops up as a result of the minor rule of Diphthongization which converts /ɛ/ to [jɛ] in certain morphemes under stress. (Contrary

to what Schane implies (1968, pp.20-45), Diphthongization has very limited scope in French. For more details, see Selkirk (forthcomingb.) Because [jɛ] derives from /ɛ/ only in a stressed syllable, the [j] doesn't appear in the words on the right. Here, E-RED has produced [ə]. This schwa is deleted pre-tonically after a single consonant, as in pâtisserie and laiterie, but not after two (mercerie, bergerie).

Some comment on the morphology of these related forms is required here. My discussion has assumed that the same underlying form /patiser/ is involved in both pâtissier and pâtisserie, i.e., that this last word has the underlying representation /patiser+i/. This assumption is contestable in that there exists in French a suffix -erie as well. (For evidence that both suffixes are "alive" in modern French, see Dubois (1962).) Nyrop (1936, Vol. III, p. 190) reports that in Old French to be sure the suffix -ie was added to nouns like pâtissier, chevalier, trésorier, ... to form pâtisserie, chevalerie, trésorerie, ..., but he discounts the possibility that any new words are currently formed with -ie. Instead, he says, new formations seem to be based on the more recent suffix -erie (japonaiserie, diablerie, cochonnerie, orfèvrerie, ...). Yet there is still such a large number of words ending in -ie in current use (bourgeoisie, hypocrisie, frénésie, stéréotypie, xénophobie, mégalo manie, ...), one must conclude that -ie is available in the repertoire of suffixes in the language. Still, I have not shown that -ie and not -erie must underlie pâtisserie, and I cannot.

There is no doubt, however, that in III the noun on the left is included in the underlying representation of the noun on the right:

Group III

a) rosier	[rozje]	roseraie	[rozrɛ]
noisier	[nwazje]	noiseraie	[nwazrɛ]
oranger	[ɔrãʒe] ²⁵	orangeraiie	[ɔrãʒrɛ]
pêcher	[pɛʃe]	pêcheraie	[pɛʃrɛ]
b) palmier	[palmje]	palmeraie	[palmɛrɛ]
châtaignier	[ʃatɛɲe]	châtaigneraie	[satɛɲɔrɛ]

The words on the left are names of bushes or trees, and those on the right are words designating a collection or plantation (or orchard) of those trees. The suffix -aie adds the meaning of "group" or "plantation" onto the words for bushes or trees. It is also found tacked onto non--ier tree names: saulaie, chênaie, ormaiie, frênaie. An independent suffix -eraie cannot be said to exist. When /ɛ/ is unstressed, being pre-tonic before -aie, it turns to schwa and deletes if it can.

And finally, with Group IV, we come to the second rule which affects non-final /ɛ/, but not /e/. The rule is:

E-BACKING (E-BACK)

$$\epsilon \rightarrow a / _ _ _ C + \left[\begin{array}{c} v \\ +high \end{array} \right]^{26}$$

It is responsible for the pairs

particulier	particularité
régulier	régulariser
singulier	singularité

(Diphthongization giving -ier) as well as for

populaire	popularité
prolétaire ²⁷	prolétariat
formel	formaliste
individuel	individualisme

These are just a few examples of an alternation that is very widespread in French.

Unfortunately not all of the adjectives in Group IV have morphological variants which reveal their underlying character. The forms in the second column

grossier	grossièreté
léger	légèreté

reveal nothing. They are instances of a derivational subregularity where the feminine of an adjective is joined with -(i)té²⁸ to form a nominalization, cf. ancienneté, naïveté. Since closed syllables are defined after word-internal schwa deletion, the [ɛ] of légèreté [lezɛrte] could be a result of the operation of the rule of Closed Syllable Adjustment (see §5) on underlying /e/. There is no way of knowing whether it is underlying /e/ or /ɛ/. The same goes for dernier and premier which exhibit no alternations at all.²⁹

For all final -er words in French, except for grossier, léger, premier, dernier, and a few others, morphological evidence has been found which shows /ɛr/ to underlie that phonetic [e] which the letters -er represent. Accepting now that /ɛr/ becomes [e], how is this process to be characterized? It would not be unthinkable to posit a special truncation rule for /r/:

$$r \rightarrow \emptyset / \epsilon _ \#$$

(The rule would have to precede final schwa deletion, the schwa protecting the final /r/ of particulière, for example, from this truncation.) A rule like this would require the existence of a separate rule, $\epsilon \rightarrow e / _ \#$, in order to derive particulier:

[#partikülɛr#]

Diphth. partiküljɛr

$r \rightarrow \emptyset$ partiküljɛ

$\epsilon \rightarrow e$ [partiküljɛ] (Output)

But this last rule would give the wrong results for words like

ormaie	Mai
baie	balai
roseraie	quai
essai	délai

which have final underlying /ɛ/ as well as phonetic final [ɛ].

The /r/ evidently conditions (and indeed is part and parcel of) the change from /ɛ/ to [e]. Suppose then that there were a rule

$\epsilon \rightarrow e / _ r \#$

that operated before schwa deletion (therefore not affecting particulière). It would be followed by

$r \rightarrow \emptyset / e _ \#$

Of course, this /e/ in the environment of the latter rule is exclusively the output of the first rule. Thus the rule deleting /r/ is not at all general. It operates only in the environment of a segment which is the output of a prior rule. In the section following this one, I will argue that two rules which have this intricate relation should be expressed as a single process, using "transformational" rules. ER-CONVERSION is not a

and /æ/ from /au/ and /ai/.

<u>Vowel Contraction:</u>	S.D.:	$\begin{bmatrix} +\text{voc} \\ -\text{cons} \\ -\text{high} \\ +\text{back} \\ -\text{round} \end{bmatrix}$	$\begin{bmatrix} -\text{cons} \\ +\text{high} \\ \alpha\text{back} \end{bmatrix}$				
		1	2				
	S.C.:	1	2	→	$\begin{bmatrix} 1 \\ \alpha\text{back} \\ \alpha\text{round} \end{bmatrix}$	2	∅

They remark:

We have here a phenomenon familiar from many languages--eg. guṇa in Sanskrit--where a sequence of two vowels is contracted to a third vowel which keeps the lowness of the first vowel and the backness of the second vowel. (p. 360)

Contraction rules have been proposed for a variety of other languages, among them Old High German (Venneman, 1971) and French (Schane, 1968: also, see above, §1.1). Essentially, the processes in both these languages take /ai/ and /au/ and turn them into /ē/ and /ō/. So these contractions are different from Kasem in that (a) the resulting vowel's height is not that of the first segment /a/, and (b) the resulting vowel is [+long]. In order to discuss this first difference, I must first give the distinctive feature representations of /a/, /i/, /u/, /e/, and /o/ in terms of the system proposed in Chomsky and Halle (1968):

<u>a</u>	<u>i</u>	<u>u</u>	<u>e</u>	<u>o</u>
+syll	+syll	+syll	+syll	+syll
-cons	-cons	-cons	-cons	-cons
-high	+high	+high	-high	-high
+low	-low	-low	-low	-low
-round	-round	+round	-round	+round
+back	-back	+back	-back	+back

Following the Kasem-type formulation, then, the rules for contraction in Old High German and French would be:

$$\begin{array}{l}
 \text{S.D.:} \quad \left[\begin{array}{l} +\text{syll} \\ -\text{cons} \\ -\text{high} \\ +\text{low} \\ -\text{round} \\ +\text{back} \end{array} \right] \quad \left[\begin{array}{l} +\text{syll} \\ -\text{cons} \\ +\text{high} \\ \alpha\text{back} \\ \beta\text{low} \end{array} \right] \\
 \qquad \qquad \qquad 1 \qquad \qquad \qquad 2 \\
 \\
 \text{S.C.:} \quad 1, 2 \rightarrow \left[\begin{array}{l} 1 \\ -\text{high} \\ \beta\text{low} \\ \alpha\text{back} \\ \alpha\text{round} \\ +\text{long} \end{array} \right] \quad \left[\begin{array}{l} 2 \\ \emptyset \end{array} \right]
 \end{array}$$

I feel that this formulation of the rule for French and Old High German is wrong--and I come now to the second difference--precisely because the resulting vowel is [+long]. It is no accident that the vowel is long, for it is derived from two short ones. In order for the feature [+long] to be a normal consequence of contraction I would instead like to represent the Structural Change as

$$\text{S.C.:} \quad 1, 2 \rightarrow \left[\begin{array}{l} 1 \\ \alpha\text{back} \\ \alpha\text{round} \\ \beta\text{low} \end{array} \right] \quad \left[\begin{array}{l} 2 \\ -\text{high} \end{array} \right]$$

The result of the contraction is that 1 and 2 are not identical segments--there has been a trade of features so to speak.³⁰ By not positing the deletion of a segment in the contraction rule for French and Old High German, one explains why the contracted vowel has the feature [+long] by analyzing it as a sequence of two segments. So what I want to add to the theory of

transformational devices in phonology is the possibility of a rule $XABY \rightarrow XCCY$, alongside of rules of the type $XABY \rightarrow XCY$. Which one is chosen depends of course on the language,³¹ and the particular phonological problem.

I think by now the utility of transformational devices in the description of processes making one vowel out of two must be quite evident. What I am proposing now is the use of such devices to describe cases where a vowel-sonorant sequence becomes a single segment--a vowel. Halle (1971b) first proposed such a rule for Russian. He showed that a rule was needed which changed a vowel plus nasal consonant into /a/, and gave it the provisional formulation (12):

$$(12) \# X [+syll] [+nasal] (\underbrace{[-syll] Y}) \#$$

1 2 3 4 \Rightarrow

1, 2 \rightarrow /a/, 3 \rightarrow \emptyset , 4

The examples below illustrate the alternations which provide the motivation for this rule:

<u>Nouns</u>	<u>Verbs</u>
vr,em,-en-i; vr,em,-a	žim-u; žala; žat,
im,-en-i; im,-a	mín-u; m,ala; m,at,
znam,-en-i; znam,-a	načín-u; načala; na-ča-t,

Halle goes on to remark that the rule proposed above could be represented by a pair of rules

$$(13) \left. \begin{array}{l} \text{a) } [+syll] \rightarrow a / \# X _ [+nas] \\ \text{b) } [+nas] \rightarrow \emptyset / \# X _ \end{array} \right\} ([-syll] Y) \#$$

But he dismisses this possibility, saying that

There is, however, no particularly strong argument for doing this, and one can adduce at least one fact against the proposal, namely, that words which are exceptions to (13a) are also exceptions to (13b), which suggests that we are dealing here with a single process and not two separate processes, and that (12) is a more appropriate description than (13). (p.15)

The issue I am confronting here is precisely whether or not the description I've given of the French rules of NASALIZATION:

$$\begin{array}{ccccccc}
 \text{[\# X [+syll] [+nas] ((\#) [-syll] Y) \#]} & & & & & & \\
 \text{1} & \text{2} & \text{3} & \text{4} & \Rightarrow & \text{1} & \left[\begin{array}{c} \text{2} \\ \text{+nas} \end{array} \right] & \emptyset & \text{4}
 \end{array}$$

and ER-CONVERSION:

$$\begin{array}{ccccccc}
 \text{[\# X [\epsilon] [r] (\# [-syll] Y) \#]} & & & & & & \\
 \text{1} & \text{2} & \text{3} & \text{4} & \Rightarrow & \text{1} & \left[\begin{array}{c} \text{2} \\ \text{-low} \end{array} \right] & \emptyset & \text{4}
 \end{array}$$

should not be replaced by the pairs

$$\left. \begin{array}{l}
 \text{a) } V \rightarrow \text{[+nas]} / \# X \text{ ___ } \text{[+nas]} \\
 \text{b) } \text{[+nas]} \rightarrow \emptyset / \# X \text{ ___ }
 \end{array} \right\} ((\#) [-syll] Y) \#$$

and

$$\left. \begin{array}{l}
 \text{a) } [\epsilon] \rightarrow [e] / \# X \text{ ___ } [r] \\
 \text{b) } [r] \rightarrow \emptyset / \# [e] \text{ ___ }
 \end{array} \right\} (\# [-syll]) \#$$

respectively.

Notice that neither rule of either pair has any sort of independent existence in the language. One operation is always accompanied by the other; the first one entails the second. There never exists in the language a sequence which is the result of only the first operation. Nor do there exist sequences in the language upon which the second rule could operate without the

first already having done so. Furthermore, no other rule of the phonology ever intercalates between them. Thus, there is nothing specific to French which would militate against collapsing the pairs as "transformational" rules.

Once the existence of transformational rules in phonology is accepted as normal a single transformational rule will not be presumed to be any more costly than a single "rewrite" rule (i.e., one of the type $A \rightarrow B / X _ Y$). Then, certainly, a grammar containing a single transformational rule which derives XCY from XABY will be more highly valued than a grammar containing two rules which must operate to obtain XCY from XABY. The evaluation metric would select as optimal for French the grammar containing transformational rules for NASALIZATION and ER-CONVERSION.

Moreover, I feel that in languages where XABY always becomes XCY (e.g., where vowel nasalization is always accompanied by the loss of the nasal consonant) the transformational mechanism has greater potential for reflecting the nature of the phonological process at play. A rule of the form, e.g.,

$$X \begin{bmatrix} +A \\ +R \end{bmatrix} \begin{bmatrix} +B \\ -S \end{bmatrix} Y \Rightarrow X \begin{bmatrix} +A \\ +B \\ +R \\ -S \end{bmatrix} Y$$

formally expresses what is the substantive character of the phonological process: the coalescence of two segments.³² The rules otherwise required by the grammar, e.g.,

$$\begin{bmatrix} +A \\ +R \end{bmatrix} \rightarrow \begin{bmatrix} +B \\ -S \end{bmatrix} / X _ Y$$

$$\begin{bmatrix} +B \\ -S \end{bmatrix} \rightarrow \emptyset / X \begin{bmatrix} +A \\ +R \\ +B \\ -S \end{bmatrix} \text{ --- } Y$$

(an assimilation and a subsequent deletion rule) express this coalescence only indirectly. Furthermore, a rule of the form $XABY \rightarrow XCCY$, i.e.,

$$X \begin{bmatrix} +A \\ +R \end{bmatrix} \begin{bmatrix} +B \\ -S \end{bmatrix} Y \Rightarrow X \begin{bmatrix} +A \\ +R \\ +B \\ -S \end{bmatrix} \begin{bmatrix} +A \\ +R \\ +B \\ -S \end{bmatrix} Y$$

expresses the fact that there has been a simultaneous trade-off of features between two segments, giving rise to two identical segments.

I suggested earlier that if a transformational rule were to account for monophthongization in Old High German and French then it should have the form $XABY \rightarrow XCCY$, in order to automatically account for the length of the vowel produced. An automatic explanation for the length of nasal vowels in French can also be given if NASALIZATION is formulated as $XVNY \rightarrow X\tilde{V}\tilde{N}Y$, i.e.,

$$\begin{array}{ccccccc} \# & X & \begin{bmatrix} \beta\text{round} \\ \alpha\text{back} \\ +\text{syll} \\ \gamma\text{high} \end{bmatrix} & [+nasal] & (\#) & [-\text{syll}] & Y) \# \\ 1 & & 2 & & 3 & & 4 & \Rightarrow \\ & & & & & & & \\ 1 & & \begin{bmatrix} 2 \\ +nasal \end{bmatrix} & & \begin{bmatrix} 3 \\ +\text{syll} \\ -\text{cons} \\ \alpha\text{back} \\ \beta\text{round} \\ \gamma\text{high} \end{bmatrix} & & 4 & \end{array}$$

A transformation device like $XABY \rightarrow XCCY$ will obviate the need

for any statement of "compensatory lengthening" in French,³³ and in other languages.³⁴

4. Harmony, Singular Person Deletion and the Derived Structure of Inverted Questions

4.1 Harmony

A rather interesting rule of French is one which I shall call Vowel Harmony. It is this rule which is responsible for making a phonetic [e] out of an underlying /ε/ in a word where the next vowel in the string is [-low]. It produces the following sorts of sets:³⁵

<u>e</u>	<u>ε</u>
ac <u>q</u> uies <u>c</u> er	ac <u>q</u> uies <u>ç</u> ons
int <u>é</u> ress <u>é</u>	int <u>é</u> ressant
tr <u>a</u> in <u>e</u> r	tr <u>a</u> in <u>e</u> au
pr <u>e</u> ss <u>e</u> r	pr <u>e</u> ssage
écl <u>a</u> ir <u>e</u> r	écl <u>a</u> ir <u>e</u> ur, écl <u>a</u> ir <u>o</u> ns
ai <u>g</u> ri	ai <u>g</u> reur
enl <u>a</u> id <u>i</u>	l <u>a</u> id <u>e</u> ur
t <u>ê</u> tu	t <u>ê</u> tard
f <u>ê</u> ter	f <u>ê</u> tard
gr <u>ê</u> ler	gr <u>ê</u> leux, gr <u>ê</u> lait, gr <u>ê</u> lon
bec <u>q</u> u <u>e</u> e	bec <u>q</u> u <u>e</u> ter
vi <u>n</u> a <u>i</u> gr <u>e</u> r	vi <u>n</u> a <u>i</u> gr <u>e</u> tte, vi <u>n</u> a <u>i</u> gr <u>e</u> rie
p <u>é</u> nible	p <u>e</u> ine

In the left-hand column, underlying /ε/ switches to [e], the following vowels in the words of the column being [e], [i], [u]. On the right, the underlying /ε/ shows up, for it is followed by [ε], [a], [ɔ], [œ]. The Harmony rule does not cause underlying /e/ to become [+low] when it precedes a [+low] vowel, however. The non-low vowel /e/ can precede a low vowel:

il inséra
 nous complétons
 légal
 allégresse
émotteur
 rénovateur
écrevisse
 béton
 conférence

It is only underlying / ϵ / which is susceptible to harmonic variation.

Notice, furthermore, that the operation of Harmony is blocked by a consonant cluster between the two vowels:

é
 persil
 pérdition
 pérdu
 afféction
 affectéueux
 maniféster
 trimestériel

The sequence consonant-liquid does not qualify as a consonant cluster, though, cf. aigri. The rule of Harmony may be written:

HARMONY

$$\begin{bmatrix} \text{v} \\ -\text{back} \\ +\text{low} \end{bmatrix} \rightarrow [-\text{low}] / _ \text{C (L)} \begin{bmatrix} \text{v} \\ -\text{low} \end{bmatrix}^{36}$$

In the examples given above it was said that the first vowel in fêter was underlying / ϵ / and that in this word the / ϵ / became [e] because it was followed by the [-low] vowel [e].

That latter [e] is of course derived from underlying / ϵ r/ by ER-CONVERSION. Therefore ER-CONV must precede HARMONY. If ER-CONV had been blocked the HARMONY wouldn't have taken place. (ER-CONV can be blocked in a liaison context where the following word is vowel-initial.) The sentences below show this:

ils aiment fê^{ter} à mi-temps [fɛtɛr a mitã]

ils aiment fêter // à mi-temps. [fete a mitã]

Admittedly, it is only in an extremely elevated style that one finds a sentence pronounced like the first one, but the point about the necessary ordering of ER-CONV and HARMONY holds nevertheless.

There is no HARMONY between words in a liaison environment. No matter what the height of the vowels which begin the second word, the final vowel of the first word remains [ɛ]:

<u>ɛ</u>	<u>Initial vowel</u>
très <u>u</u> tile	[ü]
très <u>ou</u> verte	[u]
très <u>é</u> loigné	[e]
mes <u>i</u> nnovations	[i]
les <u>i</u> doles	[i]
les <u>a</u> utels	[o]
après <u>u</u> ne expérience pareille	[ü]
le chef <u>é</u> crit	[e]
un complet <u>i</u> diot	[i]
un bel <u>u</u> sage	[ü]
tu <u>e</u> s <u>é</u> mu	[e]
tu <u>e</u> s <u>i</u> gnorant	[i]
il <u>e</u> st <u>é</u> mu	[e]
il <u>e</u> st <u>i</u> gnorant	[i]
tu t' <u>e</u> s <u>é</u> loigné	[e]
il les <u>i</u> magine	[i]

The phoneticians are careful to point out the one case which constitutes an exception to the generalization that there is no HARMONY in liaison contexts.³⁷ When in questions there is subject clitic inversion and the pronoun subject postposed around the Verb (or Aux) has a high vowel (i.e., is either il or tu), the final /ε/ of the Verb or Aux will become [e]:

est-il	[etɪl]	vs. il est	[ilɛ]
es-tu	[etü]	" tu es	[tüɛ]
avait-il	[avetɪl]	" il avait	[ilave]
allais-tu	[aletü]	" tu allais	[tüaleɛ]
l'avais-tu lu	[lavetülü]	" tu l'avais lu	[tü lavelü]
s'en est-il éloigné	[sänetilelwaɲe]		
vs. il s'en est éloigné	[ilsänetelwaɲe]		

4.2 The Derived Structure of Subject-Clitic Inversion

There must be a difference between the internal structure of the liaison environment, which I've said is ..] [#.., and the derived structure produced by the Subject Clitic Inversion transformation. Otherwise, the presence of HARMONY in inverted questions and its absence in other liaison contexts couldn't be predictable. Recall that I argued above in the chapters on the syntax of liaison and phrase stress that the subject clitic transformation adjoined the clitic to the verb or auxiliary, producing a tree like

the case of the Verb-Clitic construction like that of the Aux-Clitic, it will be necessary to delete that internal word boundary in the verb construction. Let there be a readjustment rule performing just that operation:

$$\begin{array}{cccc} \text{[# [X #] Y #]} & \Rightarrow & \text{[# [X] Y #]} \\ \text{V V V V} & & \text{V V V V} \end{array}$$

Call this the V-Readjustment Rule.

My claim, then, is that no word boundary separates a Verb or Aux from the following clitic, and that this is why the final vowel of the Verb or Aux may harmonize with the clitic vowel:

	<u>es-tu</u>	<u>avait-il</u>	<u>écrivais-tu</u>
	[#εs+tü#]	[#avεt+il#]	[#εkrives+tü#]
TRUNC/ FCD	∅	---	∅
HARMONY	e	e	e
Output:	[etü]	[avetil]	[εkrivetü]

The final formulation of HARMONY should therefore be

HARMONY

$$/\epsilon/ \rightarrow [e] / \text{[# X __ C (L) } \begin{bmatrix} \text{V} \\ \text{-low} \end{bmatrix} \text{ X #]}$$

4.3 Singular Person Deletion

Further support for the V-Readjustment Rule solution to the nature of the boundaries in the subject clitic construction is given by a morphological rule which Schane calls Singular Person Deletion. In order to understand the rule one must understand something of the morphology of the French verb. One of the contributions that Schane made to the understanding of the morphology

of the verb in French is the idea that there are thematic vowels associated with the various conjugations, and that only in the first conjugation--otherwise known as the -er conjugation, containing the verbs arriver, démontrer, marcher, etc.--is the thematic vowel present in the underlying phonological representation of the unmarked aspect. (The unmarked aspect is a morphological sub-group including the present, imperfect, present subjunctive, and present participle.) The underlying forms of first conjugation verbs in unmarked aspect contain Stem + thematic vowel + tense marker + person marker. It is the present tense that will interest us in this section; the underlying form of the verb arriver in the present tense third person singular is /ariv + a + -- + t/. (The thematic vowel /a/ is stressless and lax; it turns into /ə/. The tense marker is empty in the present singular.) The underlying representation of the third conjugation verb vivre in the same aspect, person, tense and number is /viv + -- + -- + t/--no thematic vowel, and as above no tense marker for the present. It is precisely the presence of the thematic vowel which explains the differences in the pronunciation of these words:

il arrive	[il ariv]
-----------	-----------

il vit	[il vi]
--------	---------

These sentences can be derived as follows:

	[#1l+ariv+ə+t#]	[#1l+viv+t#]
TRUNC	-	∅
FCD	∅	∅
/ə/ Delet.	∅	
Output:	as above	

In the first sentence, the thematic vowel /ə/ prevents the application of TRUNCATION to the final consonant of the stem. This is generally true of first conjugation verbs in the present. They are the only ones to retain their stem final consonants.

Looking now in the environments where the verb may enter into liaison, we find that the third person singular marker /-t/ appears in both contexts (a) and (b) when attached to vivre, but only in (a) when attached to arriver:

(a)	arrive-t-il en France	[arivtil ãfrãs]
	vit-il en France	[vitil ãfrãs]
(b)	Il arrive en France	[il ariv ãfrãs]
	Il vit en France	[il vit ãfrãs]

Under no circumstances will the singular person markers on the first conjugation verbs be pronounced in the (b) context, though the plural person markers can appear:

j'arrive en France	*j'arrive-z-en France
tu arrives en France	*tu arrives-z-en France

But:

nous arrivons-z-en France
vous arrivez-z-en France
ils arrivent-t-en France

Schane's solution, which seems correct to me, is to attribute the

The conclusion is that Singular Person Deletion must take place at a word boundary.

Removing # from $\begin{matrix} \# & \# & \dots & \# \\ \text{V} & \text{V} & & \text{V} \end{matrix} [] \#$ by the V-Readjustment Rule

has permitted the most succinct statements of HARMONY (which can't apply across a word boundary) and Singular Person Deletion (which must apply at a word boundary):

HARMONY

$/\epsilon/ \rightarrow [e] / [\# X _ C (L) \begin{matrix} [V] \\ [-low] \end{matrix} X \#]$

Singular Person Deletion

$/s,t/ \rightarrow \emptyset / [\# X \emptyset + _ (\# X) \#]$

5. Closed Syllable Adjustment

A very general rule of French is that of Closed Syllable Adjustment. By this rule, the front non-low vowel /e/ is converted to [ɛ] in a closed syllable. I will wait for a moment before formalizing the rule with conventional notation because there is some difficulty here in defining the notion 'closed syllable'. It is clear that the environment '/ _ CC' is a locus of the change from /e/ to [ɛ]:

<u>Infinitive</u>	<u>Nominalization</u>	<u>1st plur. pres. indic.</u>
protéger [e]	protection [ɛ]	protégeons [e]
insérer "	insertion "	insérons "
gérer "	gestion "	gérons "

That the vowel is underlying /e/ is shown by the third column examples where the vowel following [e] is [+low].

If HARMONY were responsible for the [e] of the first column,

where the following vowel is [-low], then the putative underlying /ɛ/ would have shown up as [ɛ] in the third column. This type of proof that the vowel is underlying /e/ will be used often in the pages to follow. In the future, however, I will simply list the appropriate examples, assuming them to be self-evident.

So, in the center column above, the phonetic [ɛ] has been derived from underlying /e/. In these cases the derivational morphology adds /t/ to the verb stem in the formation of nominalizations and this extra consonant occasions the lowering of the front vowel /e/ to [ɛ].³⁸

Looking now at the closed syllable as it is defined at the end of the word, the following examples are the relevant ones:

<u>[e]</u>	<u>[ɛ]</u>
protégeons	protège
insérons	insère
cédons	cède
cancéreux	cancer
prophétesse	prophète
complétons	complète
séchons	sec

Since in Schane's analysis of French verbs, the first conjugation verb paradigm includes a /ə/ following the stem (orthographically represented as e, as in cède, insère, protège), and since some of the other examples also require a final /ə/ in the underlying representation in order to protect the last consonant from deletion, if the word-final closed syllable is to be defined by the symbols ' ___ C #', then the rule making appeal to the notion 'closed syllable' must apply after final schwa deletion.

Interestingly enough, there are instances where phonetic [ɛ] appears instead of [e] even though the vowel, which must be underlying /e/, is in an open syllable phonetically:

complet	[kɔ̃plɛ]	pet	[pɛ]
complète	[kɔ̃plɛt]	pête	[pɛt]
compléter	[kɔ̃plete]	péter	[petɛ]
complétons	[kɔ̃pletɔ̃]	pétons	[petɔ̃]
compléta	[kɔ̃pleta]	pétard	[petar]
complétais	[kɔ̃pletɛ]	pétarade	[petarad]

The last three examples in each column show that the rule of HARMONY is not what accounts for the presence of [ɛ], for in these examples, the following vowel is [+low]. Thus, these words must have underlying /e/. But how then to account for the [ɛ] in final position in pet and complet? It is certainly not the case that final /e/ systematically becomes [ɛ]. One has only to look at the numerous forms ending in -é and -ée to see that this can't be true. A verb like créer, whose stem ends in /e/, will always be pronounced [e]: elle crée, elles créent [kre]. And the past participle of first conjugation verbs is always in [e]: arrivé, lutté.

The clue to the solution is in the spelling. The word complet is underlying /kɔ̃nplet/, i.e., it is underlyingly consonant-final.

Quite a bit of evidence can be amassed to show that words which terminate in an underlying sequence [# ... e C #] are

always phonetically [..ε]. To the examples of pet and complet may be added:

	[ε]	[e]
	—	—
I.	procès accès succès excès	procédons accédons succédons excédons
	inquiet fret reflet décret secret serein plein frein	inquiétons fréteur reflêtons décrétons secrétaire sérénade plénâtre refrénons
	[ε]	[ε]
	—	—
II.	mauvais hollandais pauvret désuet jeunet après très	mauvaise hollandaise pauvrette désuète jeunette après une heure très aimable
III.	béret gourmet surfaix . .	

Group I contains [ε]-final words and the words morphologically related to them which show that this [ε] derives from an underlying /e/ which was followed by an underlying consonant. Group II contains [ε]-final words for which there is no evidence that the vowel is underlying /e/, but whose alternations in other contexts show that they are underlyingly consonant-final. For Group III, there is no evidence that the consonant represented

by the orthography has any phonological status which could contribute to an explanation of the appearance of [ɛ]. Thus only with the examples from Group I is there evidence that a phonological rule(s) relates underlying /XeC/ to [Xɛ]. If there were such a rule, it could be used to explain why Group II words end in [ɛ], and if Group III words are assigned underlying final consonants, the rule would explain their phonetic form, too.

Suppose, then, that a rule changing /e/ to [ɛ] operates on underlying forms before TRUNC or FCDEL has a chance to operate. The derivation of complet [kɔ̃plɛ] would be:

```

      [# kɔ̃nplet #]
e → ɛ    kɔ̃nplet
NAS      kɔ̃plet
FCDEL    kɔ̃plɛ

```

But this analysis as such cannot hold, because such an ordering of the e to ɛ rule and TRUNC/FCDEL will not derive the correct forms of complète [kɔ̃plet] and cède [sɛd] since final schwa deletion must operate after TRUNC/FCDEL:

```

                [#kɔ̃nplet+ə#]      [#sed+ə#]
e → ɛ          ---                ---
NAS            kɔ̃plet+ə          ---
TRUNC          ---                ---
/ə/ Delet.    kɔ̃plet            sed
Output:        *[kɔ̃plet]         *[sed]

```

It is possible that final /ə/ is irrelevant in deciding whether a final syllable is closed or open. If the rule were

formulated

$$e \rightarrow \epsilon / _ \left\{ \begin{array}{l} CC \\ C(\partial)\# \end{array} \right\} \quad \text{or} \quad / _ C \left\{ \begin{array}{l} C \\ (\partial)\# \end{array} \right\}$$

then it could be ordered before TRUNC/FCDEL and all of the forms could be obtained. This formulation does have the disadvantage that it cannot be so elegantly represented with the formalism proposed by Halle (1971a). In Halle's framework the rule

$$e \rightarrow \epsilon / [\# X _ C (C X) \#]$$

would have to be modified to allow for an optional schwa:

$$e \rightarrow \epsilon / [\# X _ C (C X) (\partial) \#].$$

But, elegance aside, the fact that the vowel /ə/ can be ignored in the definition of a closed syllable should not be too disturbing, for it is not a full-fledged vowel as far as the word stress rule of French is concerned, either:

$$V \rightarrow [+stress] / [\# X _ C_0 (\partial) \#]$$

(Schwa never receives word stress unless it is the only vowel in the word.) Even more convincing, though, is that there is a fact which shows that the rule of Closed Syllable Adjustment must permit an optional final schwa in its structural description, i.e., its formulation is the one immediately above. Final schwa deletion is blocked in liaison contexts where the following word begins with h aspiré:

une complète housse	[ün kɔ̃plɛtə us]
une sereine horde	[ün sərəɛnə ɔrd]
une inquiète hase	[ün ɛ̃kjɛtə az]

And, nevertheless, the underlying /e/ becomes phonetic [ɛ]. The

presence of /ə/ doesn't prevent the rule from regarding 'C(ə) #' as a closed syllable.

Before discussing in particular detail these examples of /ə/ and h aspiré in liaison context, I will describe in general the operation of Closed Syllable Adjustment in liaison context. It will be shown that initial "h" itself has nothing to do with the definition of closed syllable; it is simply responsible for the maintaining of /ə/. This point will become clearer below.

In liaison environments, segments from adjacent words are juxtaposed and so conceivably could be involved in the defining of open and closed syllables--for the purposes of Closed Syllable Adjustment, for example. But we find that the phonological make-up of the following word is irrelevant; the notion open/closed syllable is defined within the word, not throughout the liaison phrase:

le révé ^é psychologue	[lə reve ^é psikɔlɔg]
la regret ^{tée} stakhanoviste	[la rəgre ^{tée} stakanɔvist]
l'infortun ^é speaker	[lɛ̃fɔrt ^ü spikɛr]
une compl ^{ète} entente	[ün kɔ̃plɛt ɛ̃tɛ̃t]
en pleine amiti ^é	[ɛ̃ plɛn amit ^t je]

In the first set, a final /e/ does not become [ɛ] when followed by two consonants. In the second, /e/ does become [ɛ] preceding a final consonant, even when that consonant is followed by a vowel (belonging to the following word). For the purposes of Closed Syllable Adjustment the /e/ of révé^é is in an open

syllable, and the /e/ of complète is in a closed one. This is just what one expects if the underlying representation of these phrases is, e.g.,

[# [lə] [# revere] [# psikɔlɔgə] #]

[# [ünə] [#kɔnplet+ə] [# antantə] #]

and if the formulation of Closed Syllable Adjustment is

CLOSED SYLLABLE ADJUSTMENT (CSA):

$$e \rightarrow \epsilon / [\# _ C (\left\{ \begin{array}{c} C \\ (\emptyset) \# \end{array} \right\} X) \#]$$

then the above phrases would be derived as follows:

#lə#revere#psikɔlɔgə#

CSA	---		
TRUNC/FCDEL	----	-----	
/ə/ Delet.			∅

#ünə#kɔnplet+ə#antantə#

CSA		ε		
(NAS)		õ	ã	ã
TRUNC/FCDEL		---	----	
/ə/ Delet.	∅	∅	∅	∅

The rule which prevents /ə/ from dropping before an h aspiré (call it H-EX and understand it to cause tensing of a pre-"h" schwa) operates, needless to say, before the operation of the rule of final schwa deletion. Below are representative derivations showing that CSA precedes final schwa deletion:

	<u>une complète housse</u>		<u>une inquiète hase</u>	
	#ünə#kɔ̃nplet+ə#Husə#		#unə#inkjet+ə#Hazə#	
CSA		ε		ε
NAS, etc.		õ		ẽ
TRUNC/FCDEL		---	---	---
H-EX		[ə] [+tns]		[ə] [+tns]
/ə/ Delet.	∅	---	∅	∅
H Delet.		∅		∅
Output:	[ün kɔ̃pletə us]		[ünẽkjetə az]	

As can be seen, if CSA were ordered after final /ə/ deletion (and H-EX) (as it would have to be if closed syllable were defined as $\left. \begin{array}{c} \{CC\} \\ \{C\# \} \end{array} \right\}$) then one could derive *[ün kɔ̃pletəus], *[ün ẽkjetə az].

6. A Review of the Rules

6.1 Their Domains

The work of J. Bresnan (1971a, 1972a) on phrase stress in English has given evidence to show that the English Nuclear Stress Rule is cyclic, and, more specifically, that it operates at the end of each transformational cycle. This hypothesis about the cyclic nature of the Nuclear Stress Rule (NSR) she calls the Ordering Hypothesis. In discussing some of the implications of the Ordering Hypothesis in her (1971a) paper she remarks that "because prosodic stress rules like the NSR require prior assignment

of word stress, the latter must occur either on deep structure or in the lexicon" (p. 269). Elaborating on this remark in a footnote, she says:

Since the ordering hypothesis entails that some phonological rules apply in deep structure or the lexicon, it is natural to ask whether all phonological rules so apply. It is clear that the rules of 'external sandhi' in some languages, affecting segments across word boundaries, must apply on surface structure, for two words which have separate locations in deep structure may be contiguous in surface structure and undergo sandhi. Such rules of 'external' phonological phenomena are analogous to the post-cyclic or last-cyclic syntactic rules, in that both apply after the cyclic rules. Prosodic rules, such as the NSR, are analogous to cyclic transformations in a way that the ordering hypothesis makes clear. Word-internal rules affecting stress or segmental phonology (see Chomsky and Halle [SPE]) are analogous to rules of derivational morphology and doubtless interact with them. (p. 269)

Clearly, a number of the rules of French phonology mentioned in this chapter must operate on surface structure. They are rules of "external sandhi", and are formulated so as to be able to apply across a single word boundary in liaison environments:

TRUNCATION/FINAL CONSONANT DELETION

$$C \rightarrow \emptyset / [\# X _ C_0 ([\text{-seg}] C_1 V X) \#]$$

NASALIZATION

$$[\# X V N \underbrace{((\#) C X)} \#] \\ 1 \quad 2 \quad 3 \quad \quad 4 \quad \Rightarrow \quad 1 \quad \tilde{V} \quad \tilde{V} \quad 4$$

ER-CONVERSION

$$[\# X \epsilon r \underbrace{(\# C X)} \#] \\ 1 \quad 2 \quad 3 \quad \quad 4 \quad \Rightarrow \quad 1 [e] 4$$

S-VOICE

$$s \rightarrow [+voice] / [\# X _ \# V X \#]$$

Furthermore, the rules of HARMONY and SINGULAR PERSON DELETION must operate on the surface structure because they apply within the units Verb-Clitic and Aux-Clitic created by the syntax:

HARMONY

$$\epsilon \rightarrow e / [\# X _ C (L) \left[\begin{array}{c} V \\ -low \end{array} \right] X \#]$$

SINGULAR PERSON DELETION

$$\left\{ \begin{array}{c} s \\ t \end{array} \right\} \rightarrow \emptyset / [\# X \emptyset + _ (\# X) \#]$$

Finally, there are two other rules which must operate on surface structure, simply because they must follow the application of TRUNCATION.

O-SWITCH

$$\circ \rightarrow o / [\# X _ (\# X) \#]$$

FINAL VOWEL SHORTENING

$$V \rightarrow [-long] / [\# X _ (\# X) \#]$$

In addition to these rules, I have discussed a variety of other rules in this chapter. It is not essential for any of these rules to operate on surface structure:

PREFIX NASAL DELETION

$$\left[\begin{array}{c} +cons \\ +nas \end{array} \right] \rightarrow \emptyset / [\# X _ = [+sonorant] Y \#]$$

L-VOCALIZATION

$$l \rightarrow u / [\# X _ C Y \#]$$

O-CONVERSION

$$[\# X a u Y \#]$$

$$1 \quad 2 \quad 3 \quad 4 \quad \Rightarrow \quad 1 \quad [o] \quad 4$$

DEVOICE

$$C \rightarrow [-voice] / [\# X _ (\# X) \#]$$

E-REDUCTION

$$\epsilon \rightarrow \emptyset / [\# X _ C^1 (L) \hat{V} Y \#]$$

E-BACKING

$$\epsilon \rightarrow a / [\# X _ C + \left[\begin{array}{c} V \\ +high \end{array} \right] Y \#]$$

CLOSED SYLLABLE ADJUSTMENT

$$e \rightarrow \epsilon / [\# X _ C (\left\{ \begin{array}{c} C \\ (\emptyset) \end{array} \right\} X) \#]$$

Conceivably these latter rules could be the rules of the lexicon (or of the morphology) in Bresnan's schema.

Notice that though the environments of S-VOICE, TRUNCATION/FINAL CONSONANT DELETION, NASALIZATION and ER-CONVERSION unequivocally identify these rules as rules of "external sandhi" (they contain information about what follows the # terminating a word), the environments of, e.g., HARMONY, O-SWITCH, DEVOICE and CLOSED SYLLABLE ADJUSTMENT do not themselves permit a distinction between external sandhi surface structure rules and word-internal rules of the lexicon. The domains of all these rules are delimited by the end of the word, $_ \#$. Yet the latter two could well be lexical rules, while the former two must be surface structure rules. HARMONY is a surface structure rule only by virtue of the existence of the VERB READJUSTMENT RULE:

$$\begin{array}{ccccccc} [\# [\# \text{Verb} \#] Y \#] & \Rightarrow & [\# [\# \text{Verb}] Y \#] \\ \underset{V}{V} & & \underset{V}{V} & \underset{V}{V} & & \underset{V}{V} & \underset{V}{V} \end{array}$$

which converts a sequence $\epsilon C \# \left[\begin{array}{c} V \\ -low \end{array} \right]$ into a sequence

$\epsilon C + \left[\begin{array}{c} V \\ -low \end{array} \right]$, to which HARMONY can, and does, apply. O-SWITCH

is a surface structure rule only because it follows TRUNCATION, which, looking beyond to the next word, may create the final open

syllable in which O-SWITCH can operate. DEVOICE and CLOSED SYLLABLE ADJUSTMENT could be permitted the status of lexical rules simply because they can be ordered before all rules which must operate on surface structure.

The evidence from French thus shows that surface structure phonological rules are not all rules which operate "between words", i.e., across word boundaries, or at the end of phrases. So there is no formal way of excluding a rule from the set of surface structure rules, though obviously rules like S-VOICE can be excluded from the lexicon on formal grounds.

Any attempt to divide phonological rules into two components--phonological rules of the lexicon and phonological rules of surface structure--will have to take heed of the facts of French.

6.2 Their Form and Manner of Application

In nothing that has been discussed in this chapter has there emerged a necessity for a cyclic application of phonological rules on surface structure. The information contained in labelled bracketings is not required by any of the phonological rules operating on surface structures. What is essential is only the information about how many #'s separate two words in surface structure, and, with that, all that's necessary is a distinction between one and two word boundaries, # vs. ##. In sum, a string consisting of sequences of segments and one or two #'s provides all the information required by the phonological rules.

In §1.2 of this chapter I understood the Halle (1971a)

formalism to require paired brackets delimiting the end of the domain of phonological rules. The rule for NASALIZATION, for example, was formulated as

$$[\# X V N ((\#) C X) \#]$$

Halle did not in fact require the presence of brackets, and since there is no need for them in French, this rule could equally well be written as

$$(i-a) \ \#\# \ Y \ V \ N \ ((\#) \ C \ X) \ \#\#$$

with pairs of $\#\#$ delimiting the domain of the rule instead of pairs of brackets. Thus, all of the segmental rules of the phrase in French could be written in this way without brackets. Perhaps it is only suprasegmental rules that require the information contained in brackets and operate according to the cycle.

In my mind the question is still open about whether segmental rules should be expressed with a variable, as Halle suggests. Following his suggestion, the environments in the rule for NASALIZATION, which in its most redundant form is expressible as (i-b)

$$(i-b) \ V \ \bar{N} \ \left\{ \begin{array}{l} C \\ \#C \\ \#\# \end{array} \right\}$$

should be collapsed as above in (i-a). But existing conventions would also allow it to be collapsed as (i-c) or (i-d):

$$(i-c) \ V \ N \ \left\{ \begin{array}{ll} (\#) & C \\ \# & \# \end{array} \right\}$$

$$(i-d) \ V \ N \ \left\{ \begin{array}{ll} C & \\ \# & \{C\} \\ & \#\# \end{array} \right\}$$

Similarly, the rules for TRUNCATION/FINAL CONSONANT DELETION and ER-CONVERSION, which I have written in the text as (ii-a) and (iii-a), respectively,

(ii-a) $## X C_0 (\left\{ \begin{matrix} + \\ \# \end{matrix} \right\} C X$

(iii-a) $## X \in r (\# C X) \#$

have environments most redundan

(ii-b) $C_0 \left\{ \begin{matrix} +C \\ \#C \\ \#\# \end{matrix} \right\}$

(iii-b) $\in r \left\{ \begin{matrix} \#C \\ \#\# \end{matrix} \right\}$

Again according to existing con

be schematized as (ii-c) or (ii

(ii-c) $C_0 \left\{ \left\{ \begin{matrix} + \\ \# \end{matrix} \right\} C \right\} \left\{ \begin{matrix} \# \\ \#\# \end{matrix} \right\}$

(ii-d) $C_0 \left\{ \begin{matrix} +C \\ \# \end{matrix} \left\{ \begin{matrix} C \\ \# \end{matrix} \right\} \right\}$

(iii-d) $\in r \# \left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$

I don't feel that I am in a pos

these formulations.

Footnotes to Chapter IV

1. In general students of French, Schane among them, have made inadequate statements about the syntactic environments of liaison.
2. Schane (1968), too, employed two rules to describe these deletions--his Truncation and "final consonant deletion". The important difference between our accounts is the treatment of boundaries. Schane posits a single word boundary between pre-nominal adjective and noun as well as between postnominal adjective and noun, e.g., des camarades anglais is #dɛS#kamaradə+S #ãglɛz+S#. This requires that awkward (and incomplete) account of Final Consonant Deletion:

- Delete a word final consonant
 1. obligatorily,
 - a. in phrase final position
 - b. in a singular noun
 2. optionally, in a plural noun

Remember that in my account the X-Comp Rule will, in certain styles, delete one # after a plural noun. This destroys the "phrase-final" environment, and so it is TRUNC that will automatically apply to that string. Thus, in my account, no special conditions are needed on the phonological rules.

Another difference between Schane's Truncation and the TRUNC rule being presented here is that his rule is intended to delete

both vowels and consonants. It is formulated very elegantly as:

At a boundary:

$$\left[\begin{array}{c} \text{cons} \\ -\alpha\text{vocalic} \\ -\alpha\text{stress} \end{array} \right] \rightarrow \emptyset / _ _ [\alpha\text{cons}]$$

Yet the only vowel deleted by this rule is the mute e, /ə/, the only vowel which is stressless at a boundary (the word stress rule being $V \rightarrow [+stress] / _ _ C_0 (\emptyset) \#$). I choose to state schwa deletion and consonant deletion as separate processes. François Dell (1970) has already shown the multitude of disadvantages encountered by collapsing them into one: a phonological cycle is required simply in order to delete /ə/ by Truncation on a second cycle (cf. Schane 1968, p. 14-15); the rules of Truncation and Final Consonant Deletion, similar in so many respects, cannot be collapsed. The facts that /ə/ deletes before a vowel when any number of word boundaries intervenes, and that /ə/ also deletes after vowels show the /ə/ deletion principles to be different from the consonant deletion principles.

3. It was Noam Chomsky who pointed out to me that deleting the lefthand # from the sequence #][# would delay the cyclic application of rules and also that such a state of affairs didn't violate the principle of strict cyclicity (cf. Chomsky (1971), Kean (1971)) because the environment of the rule is not completed until the higher cycle.

4. If one were to accept Schane's analysis of the 1st person singular future morpheme -ai [e], as in je voudrai, one would

have a generalization of the monophthongization rule from /au/ → [o] to /ai/ → [e]. The rules could be collapsed with the appropriate notation.

What Schane says is that in the future, the 1st person singular marker /s/ changes to /i/, and then the /a/ of the future marker and the /i/ combine to form [e]. This is his explanation for the irregular paradigm with the person markers:

j'arriverai
tu arriveras
il arrivera

In the other tenses, both 1st and 2nd person have an /s/ as person marker.

5. There are some forms in French where a /l/ is "vocalized" in word-final position but appears as [l] in related forms:

chapeau	chapellerie	chapelier
tonneau	tonnellerie	tonnelier
bateau	batellerie	batelier
boisseau	boissellerie	boisselier
couteau	coutellerie	coutelier
peau	pellicule	

The vocalization of /l/ in word-final environment is without a doubt quite a minor rule. It may also be in some way responsible for the suppletive forms in

bel ami	beau type	il est beau
vieil homme	vieux quartier	il est vieux
nouvel an	nouveau journal	il est nouveau

as well as for the alternations folle/fou, molle/mou.

6. This section has shown that TRUNCATION performs consonant deletions at formative boundaries as well as in contexts of liaison, where a single word boundary is located. The rule has

been stated in its most general form, with [-segment] intended as an abbreviation for "either '+' or '#'". I will continue to use the formulation of the rule which includes the designation [-seg]--for simplicity's sake, though the use of [-seg] makes the rule too general. There is in French a set of prefixes which do not lose their final consonants through TRUNC. Thus, the boundary separating these prefixes from their stems should block TRUNC; yet all boundaries are [-seg]. Consequently, TRUNC, as I have formulated it in the text, would incorrectly apply to these prefixes.

Quite a variety of prefixes terminate in a consonant which should normally be subject to TRUNC (dis-, ex-, abs-, post-, trans-, ...) but which does not delete when it precedes a consonant-initial stem:

(i) abstenir	[abstənir]	exproprier	[eksprɔprije]
disproportion	[disprɔpɔrsjɔ̃]	submerger	[submɛrʒe]
discontinuer	[diskɔ̃tinɥe]	subdiviser	[subdivide]
disjonction	[disʒɔ̃ksjɔ̃]	transposer	[trãzpozɛ]
expatrier	[ekspatrije]	transmuable	[trãzmɥabl]
exclure	[eksklür]	transmigrer	[trãzmigre]
expliquer	[eksplike]	translation	[trãzlasjɔ̃]

One might simply say that these prefixes are exceptions to TRUNC, and mark them as such with the feature [-TRUNC]. But the failure of the operation of TRUNC is only one of the phonological peculiarities of these Latinate prefixes (and stems), and, as will be seen, more is to be gained by assuming that a prefix boundary

'=' separates prefix from stem in these words and that it is the presence of '=' (as opposed to '+' or '#') which is responsible for the phonological peculiarities of these words.

When the stems from list (i) are preceded by prefixes ending in a nasal consonant, the vowel-nasal consonant sequence becomes a nasal vowel if the stem begins with an obstruent:

contenir	[kõtair]	inclure	[ẽklür]
compliquer	[kõplike]	imposer	[ẽpɔze]
composer	[kõpɔze]	injonction	[ẽʒõksjõ]
·		·	
·		·	
·		·	

Thus the rule for Nasalization (NAS) which is written below (§3.1) will have to be modified to

$$[# X V N ((\{ \# \}) C X) \#] \Rightarrow [# X \tilde{V} \emptyset ((\{ \# \}) C X) \#]$$

with the addition of '=' in its environment. Strangely enough, the rule of nasalization does not operate when the stem begins with a nasal consonant itself:

immigrer	[imigre]	connotation	[kɔnɔtasjõ]
immuable	[imyabl]	commémoratif	[kɔmemɔratif]
immerger	[imerʒe]	commutatif	[kɔmütatif]

This could be taken to mean that a nasal consonant does not qualify as a "real" consonant in the environment of the NAS rule and therefore that the rule should perhaps be modified so that '[-sonorant]' replaced 'C'. But look now at the forms where a liquid begins the stem:

illégal	[ilegal]	collaborer	[kɔlabɔre]
illisible	[ilizibl]	collusion	[kɔlüzjɔ̃]
irréconciliable	[irekɔ̃siljabl]	correspond	[kɔrɛspɔ̃dr]
irrévérent	[ireverã]	corruption	[kɔrypsɔ̃]

Here there is no trace of the underlying nasality at all--no nasal vowel, no nasal consonant. Allow me to propose, as an explanation, that there is a rule of

PREFIX NASAL DELETION

$$\begin{bmatrix} +\text{cons} \\ +\text{nas} \end{bmatrix} \rightarrow \emptyset / _ = [+son]$$

This rule will delete prefix-final nasal consonants before '=' and either a liquid or a nasal consonant. If this rule precedes NAS, then the latter rule may be retained in its most general form, having simply 'C' in the environment. The derivations of immigrer and commémoratif will be:

	#iN=migrɛr#	#kɔN=memɔrativ#
Prefix		
Nas.	∅	∅
NAS	---	---

Output: as above

Now it can be shown that a boundary '=' is required in order to differentiate between two classes of forms which begin with the prefix in-. Contrast with the above lists the following words:

immangeable	[ẽmãʒabl]
inlacérable	[ẽlaserabl]
inracontable	[ẽrakɔ̃tabl]

etc.

If in these words it is either a '+' or a '#' which separates in- from the stem then the nasal consonant in the prefix will not be deleted by the Prefix Nasal Deletion rule, and the VN sequence of the prefix will become \tilde{V} . In sum, the behavior of the prefixes in- and con- with respect to Nasalization supports the contention that there exists a special boundary '=' in French.

French also exhibits that contrast between voiced and voiceless s after prefixes that appears in English and was one of the primary motivations for the positing of '=' in English words (cf. SPE, p. 95).

<u>English</u>		<u>French</u>	
consist	resist	consister	résister
consign	resign	consigner	résigner
conserve	reserve	conserver	réserver

vs.

<u>English</u>	<u>French</u>
re-serve	resservir
re-sign	résigner

If the voicing rule is ordered before NAS then it can be expressed quite simply as

'=' Voicing $s \rightarrow z / [\# X V = _ Y \#]$

The derivations of réserver [rezɛrvɛ] and conserver [kɔ̃sɛrvɛ] would be:

	#re=server#	#kɔ̃n=server#
'=' Voicing	z	---
NAS	----	̃

Output: as above

Assuming now that the '=' accounts for the lack of TRUNC in the prefixes of the words in (i), how is this to be reflected in the formulation of the TRUNC rule? There must be some way of distinguishing '=' from '+' and '#'. Clearly, [-seg] (an abbreviation of [-segment]) designates the set containing all three of these boundaries. Some feature must be proposed to characterize '=' and not the others. Call this feature [Prefix Boundary]. Assume another feature [Word Boundary]. These two features allow for the following distinctions:

	PB	WB
Morpheme Boundary: '+'	-	-
Word Boundary: '#'	-	+
Prefix Boundary: '='	+	-
?	+	+

According to these features, '+' and '#' (and not '=') may form a natural class, [-PB]; and '+' and '=' (and not '#') may form a natural class, [-WB], but '#' and '=' alone will never form a natural class.

The TRUNC rule is accurately expressed as

$$C \rightarrow \emptyset / \text{---} \begin{bmatrix} \text{-PB} \\ \text{-seg} \end{bmatrix} C.$$

The NAS rule may operate across '#' or '=', and it also operates across '+', so it may be formulated with [-seg] substituted for $\{\# \}$.

7. Lightner (1971) has presented a quite different sort of objection to the proposal by Halle (1971a). He feels that boundaries act (only) as consonants and should have feature representations, e.g., [-voice], [-glottal], etc., in order to explain the word-final phonological behavior of consonants as well as their word-internal behavior in a "natural" way. He says that pre-consonantal processes generalize to word-final environments because of the phonological similarities between consonants and #'s, and that Halle's proposal ignores such important facts about language. So he sees the new notation as unable to capture significant generalizations in phonological descriptions and thereby undesirable.

But in his article Halle specifically counters claims like Lightner's. He mentions cases from Southern Paiute (cf. SPE, p. 346) and Latvian (cf. Halle and Zeps (1966)) where a rule like the following is at play:

$$[-syl] \rightarrow \emptyset / _ \left\{ \begin{array}{l} +V \\ \# \end{array} \right\}$$

Here it is vowels that function on a par with word boundaries. Obviously, a word boundary cannot be considered as inherently consonantal.

8. Schane (1968, p. 87) proposed instead an additional rule of Pre-final Consonant Deletion, $C \rightarrow \emptyset / _ C \#$, in order to delete the second to the last consonant in respect and in the underlying representation he gives to the 2nd person plural morpheme -ez, /-EtS/. His Truncation and Final Consonant Deletion rules

deleted only the final consonant. He says that support for this additional rule is given by the pronunciation of sept [sɛt] where the final consonant is an exception of the Truncation and F.C.D. rules, though the pre-final consonant is deleted. The question is whether or not there was ever a /p/ in the first place in underlying representation. This /p/ shows up in no alternation in standard French.

9. I will show later in this section that there is a rule which redundantly characterizes final consonants as [-voice]. This explains the pronunciation of oeuf and boeuf, which are morphologically related to ovule and bovin.

10. In final open syllable, the front rounded vowel /œ/ becomes phonetic [ϕ].

11. In fact, these forms are simply relics of that earlier period in the history of French when there was no FCDEL, but TRUNC took place within a phrase.

12. Notice that in the plurals caps, ceps, etc., the plural morpheme -s does indeed delete by FCD. This is interesting, because the words cap, cep, etc., must be marked in the lexicon with the [-FCD], and Chomsky and Halle (1968, p. 374) propose a convention to the effect that "All nonphonological features of a given lexical item are distributed to every [segmental] unit of this item." According to this convention, if the plural morpheme -s were attached to these exceptional nouns in the lexicon, then

it would (erroneously) be marked [-FCD]. So either the plural morpheme is not present in the lexicon (in French), or some convention must be invented to prevent the exception features of the words from spreading out to it.

13. The normal pronunciation of the labio-dental spirant [ɸ/v] in liaison is [f]. There are two expressions only where the spirant is voiced: neuf ans, as in elle a neuf ans, and neuf heures, as in il est neuf heures. With any other vowel-initial noun this consonant is pronounced [-voice]. I conclude then that these examples are exceptional. See §2.3 below for details on the voicelessness of consonants in liaison.

14. There is some variation in the pronunciation of huit and cinq, which may be pronounced either with or without the final consonant in liaison context. Apparently, the treatment of these two number words is vacillating between that of six, dix, and that of neuf, sept.

15. The symbol '!' is a boundary used by Dell to indicate phrase-final position.

16. Schane's complete rule reads

$$\left[\begin{array}{c} \text{V} \\ +\text{round} \end{array} \right] \rightarrow [-\text{low}] / _ \left\{ \begin{array}{c} \# \\ \text{z} \end{array} \right\}$$

I exclude mention of the /z/ in the text primarily because it is irrelevant, but also because Schane's mention of /z/ in the rule is purely by way of description. It is true that only [o],

and not [ɔ̃], appears before [z], but this is, I think, due to the lengthening effect of the /z/. A /z/ causes any vowel to lengthen (cf. Delattre (1939)). Yet, I do not understand at present why long /ɔ̃/ becomes [o] in French.

17. Sot and idiot are not normally pre-nominal adjectives, though stylistic variation does permit some of the post-nominal adjectives to be used pre-nominally. So imagine an exasperated and most emphatic speaker muttering

Ce sot film!!!!*!
Mon idiot ami!!!!*!!

This remark is relevant to other adjective-noun combinations that will follow in the text. They may not all be normal, but they are possible.

18. The unstressed vowels of French will all be affected by the rule

$$\left[\begin{array}{c} \text{V} \\ \text{-str} \end{array} \right] \rightarrow [-\text{long}]$$

19. Final devoicing is a very old rule of French. M.K. Pope (1934) reports that in later Gallo-Roman

all voiced plosives and fricatives brought into final position by the effacement of final unstressed e, i, o, u, were unvoiced and thus final g > k, d > t, z > θ, z > s, v > f, b > p. (p. 98)

20. Martinon (1913, p. 388, cited by Martinet (1945)) recommends a denasalized form of mon, ton, and son in pre-vowel liaison environments, while Martinet (1945, p. 145) says that in these words "La prononciation nasale paraît être une innovation."

This new tendency in pronunciation of mon, ton and son is confirmed by Fouché (1959, p. 435) who says that either the nasalized or denasalized version is possible, but that the nasalized pronunciation is preferable.

As for bien, Grammont (1961 (9th ed. of 1916 publication), p. 134) equivocates on whether or not it should be denasalized--as, he says, all other /ẽ/ are--in a pre-vowel liaison environment.

These phoneticians are quite unanimous, however, in their acknowledgement of the denasalization of the final nasal vowels of adjectives in pre-vowel liaison contexts.

It is perhaps relevant that none of the exceptional nasal words has a feminine form. Given French morphology, it would be impossible for the preposition en, the adverb bien, and the negative particle rien to have feminines. The pronoun on is impersonal and therefore masculine (or genderless). As for the determiners mon, ton and son, it is only chance that is responsible for their having the suppletive feminine forms ma, ta and sa instead of *monne, *tonne and *sonne. Finally, I am considering that un and une are suppletive forms in present-day French. The feminine une is invariably pronounced [ün], but the masculine un is rapidly acquiring the pronunciation [ẽ], losing the older form [ã]. (cf. Martinet (1945)). No phonological rule of French can account for the present-day [ün]-[ẽ] alternation. So I conclude that there is a relation of suppletion between une and un in present-day French. In older French, however, the pair [ün]-[ã] was

quite regular, the lowering of the vowel of the second form being the automatic consequence of nasalization.

21. One could conceivably argue in the case of hiver, jour, chair and four that the n appearing in the derived forms is simply a morphological "increment" which crops up in derivational morphology, but is not present in the underlying forms for jour, chair, etc. In this case, one could not argue that TRUNC had applied.

Yet, it is fairly obvious that the underlying stem in all forms of dormir is /dɔrm-/ and that there must be a deletion of the nasal in il dort and dort-il. I am assuming that this deletion is accomplished by TRUNC, formulated as below. It could also be done by a rule $N \rightarrow \emptyset / r _ C$.

22. (a) Quite generally, the rule being described in this section does not apply in monosyllables:

air	[ɛr]	fier	[fjɛr]
fer	[fɛr]	mer	[mɛr]
clair	[klɛr]	hier	[jɛr]
ver	[vɛr]	cher	[ʃɛr]

This situation is probably a reflex of the fact that historically many monosyllables were prevented from losing their final consonants. A glance at §2.3 above will satisfy the reader that the vast majority of consonants which are exceptions to final deletion are located at the end of monosyllables.

(b) In French Phonology and Morphology Schane points out (p. 11) that forms such as gentil (underlying representation: /ʒantij/, phonetic representation: [ʒãti]), soûl (UR: /sul/, PR: [su]), and étranger (UR: /etranʒɛr/, PR: [etrãʒɛ]) are apparent counterexamples to the generalization that liquids and glides do not delete at the end of the word. In these, he remarks, "the deletion of the liquid or glide is attributable to the phonetic character of the preceding vowel." (p. 11), but he says no more about these special deletion rules. I agree that there is a special ER-CONVERSION rule of great generality which would affect étranger, but allow me to point out that cases like gentil and soûl are very isolated in the lexicon (in Juilland (1965), at any rate). So not too much importance should be assigned to them. I will not write rules for them, even though in liaison environments one finds:

mon soûl camarade	[su]	vs.	mon soûl ami	[sul]
mon gentil camarade	[ʒãti]	vs.	mon gentil ami	[ʒãtij]

23. Notice the differences between this rule and Schane's pretonic adjustment rule (1968, p. 26): (1) The rule in this text affects only /ɛ/, (2) The rule operates only in directly pre-tonic position. This latter constraint allows one to account for the alternations:

hôtel	[otɛl]	
hôtelier	[otɛlje]	(/ə/ does not delete / __ Cj.)
hôtellerie	[otɛlri]	

The rule could also be used to describe alternations among verbs, especially the future of verbs like mener, harceler:

present indicative sing.	mène	[mɛn]	harcèle	[arsɛl]
infinitive	mener	[m(ə)ne]	harceler	[arsəle]
future, 3rd sing.	mènera	[mɛnra]	harcèlera	[arsɛlra]

The derivation of the future forms would be as in:

	<u>harcèlera</u>	démènera
	[arsɛlɛra]	[demɛnɛra]
ɛ → ə	- ə	- ə
ə → ∅	∅	∅
Output:	[arsɛlra]	[demɛnra]

Just to convince those who might suppose that the /ɛ/ in the root of démener and harceler fails to reduce to /ə/ because it is followed by two consonants (after deletion of /ə/ in the infinitive ending) I offer the forms from the conditional:

2nd plural	harcèleriez	[arsɛlɔrje]
	démèneriez	[demɛnɔrje]

The /ə/ remains here because it can't delete before __ Cj (cf. hôtelier); the root vowel thus precedes only one consonant, and it remains /ɛ/. If the rule /ɛ/ → /ə/ affected any pre-tonic /ɛ/ followed by but one consonant, one should find *[demnɔrje] (from supposed /demənɔrje/) instead of [demɛnɔrje] for démèneriez.

I must add here that in French a rule affecting a vowel in the environment __ CV will also affect a vowel in the environment __ C_bLV (where C_b is an obstruent and L is a liquid). A stop-liquid sequence behaves as if it were a single consonant.

Consequently, one finds a pre-tonic [ə] in a verb like sevrer [səvʁe] which alternates with a tonic or ante-pretonic [ɛ]: je sèvre [ʒə sevr], nous sevrions [nu sevrjɔ̃]. Notice that, unlike the stop-liquid sequences, a liquid-liquid sequence behaves like a CC sequence, and blocks the rule of E-RED: perler is [pɛʁle], not *[pəʁle].

24. Diphthongization does not operate after palatal consonants, which explains why the familiar names of professions, boucher and boulangier, do not sport an i in their spelling (or a [j] in their phonetic representations). There are only two exceptions that I know of: fichier, pistachier.

25. Again, as with berger or boucher, the absence of the diphthongal [j] in oranger and pêcher is due to the lack of diphthongization after palatal consonants.

26. Readers who are acquainted with Schane (1968) will notice that the rule

$$/ɛ/ \rightarrow [a] / _ C + \left[\begin{array}{c} V \\ +high \end{array} \right]$$

which I will call Backing, performs an operation which is the reverse of what Schane proposed with his Fronting:

$$\left[\begin{array}{c} V \\ +stress \\ +low \end{array} \right] \rightarrow [+front]$$

Schane posited underlying /a/ and /ɔ/ for such forms with [ɛ] and [œ] as main, clair, formel, populaire, fleur, seul, heure. According to him, the underlying vowel shows up in unstressed

position, e.g., in manuel, clarté, formalité, popularité, floral, solitude, horaire, respectively. In my system, the front vowels /ɛ/ and /œ/ underlie the back alternants. The switch to /a/ and /ɔ/ is occasioned by a high vowel in the suffix. Not all forms show this high vowel phonetically, e.g., clarté, floral, horaire. In these cases I would argue that the high vowel is a diacritic, present in order to trigger the alternation. Unfortunately, there is not the time or space here to give this question of Backing vs. Fronting the attention that it deserves. It is an important question, one that is a part of that much larger question about what the major vocalic alternations of modern-day French are.

Notice anyway that for the purposes of my exposition in this section, whether it is underlying /a/ or /ɛ/ makes no difference. In neither system could the vowel preceding /r/ be /e/.

27. Diphthongization is evidently a minor rule, and affects only a subset of all words containing stressed /ɛ/. Particulier and the others will be marked as undergoing diphthongization, while prolétaire and its fellows will not be.

28. Guillet (1971) argues quite effectively that the underlying form of the suffix -té must be /ite/. This being so, the form clarté cited in the previous footnote has an underlying suffix /ite/ and thus the Backing rule can take /klɛr+ite/ to /klar+ite/ with no problem. The subsequent deletion of the /i/ would give [klarte].

29. Through the operation of Closed Syllable Adjustment, to be discussed in §5, words ending in /eC(ə)/ in underlying representation become /ɛC(ə)/ at quite an early stage in the phonological derivation. The adjectives léger and légère are quite likely affected by this rule. Since I will show that Closed Syllable Adjustment precedes a rule like ER-CONV, ER-CONV most indubitably applies only to the sequence /ɛr/ to yield [e]. This explains why a word like particulier or léger which terminates with [e] in isolation always alternates with [ɛr] in liaison environment, and why you never get [er], i.e., *[partikuljer ami].

30. Dick Demers has suggested to me the possibility that the transformation of contraction could still delete the second element of the Structural Change, while reduplicating the first element:

$$1, 2 \quad \rightarrow \quad 1, 1, \begin{bmatrix} 2 \\ \emptyset \end{bmatrix}$$

This is a very reasonable proposal, and might very well be the way in which the Structural Change should be represented. But I see no real way of choosing between this and the suggestion I made in the text.

31. It is worth noting here a very interesting example brought up by Will Leben (1971). He describes a case in Thai where a complex tone HL or LH on a long vowel is simplified to a Mid tone when the vowel is shortened. (This shortening takes place in compounds.) Leben suggests that the long vowels be considered as a sequence of two short vowels. A long vowel with a tone of HL, for

example, will have two components, each with a tone specification. He explains, then, that the "molding of two tones into one", that is, where HL or LH \rightarrow Mid, is a result of shortening. In this case certainly the rule would be of the form XABY \rightarrow XCY, perhaps

$$X \begin{bmatrix} \alpha\text{High} \\ -\alpha\text{Low} \end{bmatrix} \begin{bmatrix} -\alpha\text{High} \\ \alpha\text{Low} \end{bmatrix} Y \rightarrow X \begin{bmatrix} -\text{High} \\ -\text{long} \\ -\text{Low} \end{bmatrix} Y$$

As a result of being forced together by shortening the tones seem to have cancelled each other out.

32. Sapir (1938) discusses segments in Navaho, Nootka and Kwakiutl which he shows are derived through the coalescence of two adjacent segments. In particular, he demonstrates that the glottalized continuants of Nootka and Kwakiutl are the result of the merging of a glottal stop with the various continuants. He compares these glottalized consonants to "the nasalized vowels of so many languages, the n or m originally following a vowel becoming absorbed in the vowel, whence a new set of phonemes results." (p. 244), and goes on to remark that

The methodologically interesting point is suggested by cases of this sort that if a language has two sets of phonemes, one of which, B, can be reasonably defined as identical with the other, A, except for a definite qualitative plus which linguistic experience shows to be relatively infrequent, then the set B may be suspected, certainly not assumed, to have emerged from some type of absorption in the set A of, or from modification of the set A by, a phoneme (or group of phonemes) having something of the character of the qualitative plus. Entirely new phonemic categories such as nasalization, glottalization, aspiration, rounding, palatalization, laryngealizing, emphasis, tonal distinctions, may thus arise as absorption products. (p. 244)

Perhaps transformational rules in phonology provide the mechanism appropriate to the description of all these absorption or coalescence processes.

33. Of course, there is another way to lengthen such vowels. For example, the rule of NASALIZATION could be preceded by a rule of Lengthening:

$$V \rightarrow [+long] / _ [+nas] \left\{ \begin{array}{l} C \\ \# \end{array} \right\}$$

But this rule only repeats the conditions on NAS. Alternatively, there could be a rule of Nasal Vowel Lengthening:

$$\tilde{V} \rightarrow [+long]$$

This rule would be joined in the grammar by rules lengthening the [o] derived from /au/ (i.e., from underlying /al/) and the [o], [a] and [ɛ] from the words spelled with a circumflex on the vowel, e.g., côte, pâte, fête. These latter are words which contained an /s/ after the vowel which was dropped in an earlier historical period.

But having a separate lengthening rule for the separate vowels derived in these various ways is not a desirable consequence. Schane (1968, p. 54) sought to overcome this by a general statement stipulating that "Within a word, whenever a non-final consonant segment is deleted the preceding vowel becomes lengthened..." This statement is none other than an appeal to the notion of "compensatory lengthening", which, as stated, is a condition on the grammar of French, not a condition on any particular rule in that grammar. In my opinion, conditions on grammars of this sort

should be avoided, for there is no obvious constraint on the form or content of these conditions. They provide absolutely no explanation for why there should exist a phenomenon which, on a certain level, is describable in this way.

If, however, one accepts a transformational rule of the form $XABY \rightarrow XCCY$ for the processes $VN \rightarrow \tilde{V}$:, $\underline{au} \rightarrow \underline{o}$:, and $V\underline{s} \rightarrow V$: then the lengthening is automatically explained by the very form of the rule. It may seem bizarre for there to be a rule converting the sequence vowel plus s into a long vowel. According to what I've proposed, the s segment of pâte, fête, etc. would be completely deprived of all its consonantal qualities, becoming a copy of the vowel that precedes it. Then, again, further research may show that it's not all that bizarre.

34. In an article entitled "Why and How does Vowel Nasalization Take Place?", Lightner describes certain characteristics of vowel nasalization in Lithuanian. He demonstrates conclusively, I think, that the underlying sequence VN must be converted into \tilde{V} : by the twin processes of vowel nasalization and conversion of the nasal consonant into a vowel, i.e., by processes converting the string XVN \tilde{Y} into the string X $\tilde{V}\tilde{V}$ Y. He thus rejects a grammar which would contain the rules

- (i) $V \rightarrow \begin{bmatrix} +nas \\ +long \end{bmatrix} / _ \text{NZ}$
(ii) $N \rightarrow \emptyset / \tilde{V} _$.

In Lithuanian, short stressed vowels have high pitch. Long vowels or diphthongs that are stressed may have either rising or

falling pitch contours, and "mixed" diphthongs formed of vowel-nasal or vowel-liquid sequences will also, when stressed, have either a rising contour (ántis 'breast') or falling contour (ǎntis 'duck'). According to Lightner, a "reasonable way" of accounting for these suprasegmental phenomena is to assume that

- (a) long vowels are sequences of two short vowels
- (b) in that a short stressed vowel has high pitch, the rising or falling contours in long vowels are attributable to the juxtaposition of a short stressed vowel with a short stressless vowel. The sequence $\overset{+}{V}V$ (where $\overset{+}{V}$ represents the presence of high pitch on a vowel) represents a "long vowel" with a falling contour, while $V\overset{+}{V}$ represents the rising contour
- (c) the nasal and liquid consonants may be the locus of high pitch in the mixed diphthongs, e.g., $V\overset{+}{N}$ (ántis 'breast'), or may follow a vowel with high pitch, e.g., $\overset{+}{V}N$ (ǎntis 'duck').

Lightner continues:

Now consider the 3 past and inf pairs brénto, bręsti; brędo, bręsti. The underlying representations (after dental assibilation) are bręnt⁺to, bręns⁺ti and bręnd⁺to, bręns⁺ti. The past forms are immediately interpreted as brénto and brędo. But in the inf forms, vowel nasalization takes place because en is followed by a member of Z. [Z = the set {j, v, l, r, m, n, s, z, š, ž}. -eos]. (p. (186)

He points out that if the rules for nasalization in Lithuanian are (i) and (ii),

Bre⁺nsti is now incorrectly realized as *bre⁺sti, with a short nasal vowel and loss of all suprasegmental information. Similarly, bre⁺nsti is incorrectly realized as *bre⁺sti, with a short high-pitch nasal vowel. If rule (i) is changed to derive a long nasal vowel, then bre⁺nsti is realized as *bre⁺sti, with a long high-pitched nasal vowel instead of a long nasal vowel with a rising contour. The problem in the two inf forms is to have the derivation start with en, en and end with ee, ee, resp, ie. with long nasal vowels having a falling and rising contour, resp. This can be done by means of the following two rules:

$$\begin{array}{l} (V \sim \tilde{V}) \quad V \rightarrow [+nasal] / _ \text{NZ} \\ (N \sim \tilde{V}) \quad N \rightarrow [\alpha\text{features}] / [\alpha\text{features}] _ \end{array}$$

(p. 186-187)

It can also be done by means of a transformational rule:

$$\begin{array}{ccc} \left[\begin{array}{c} V \\ \alpha\text{features} \end{array} \right] & \left[\begin{array}{c} +nasal \\ \end{array} \right] & Z \\ 1 & 2 & 3 \end{array} \Rightarrow \begin{array}{cc} \left[\begin{array}{c} 1 \\ +nasal \end{array} \right] & \left[\begin{array}{c} 2 \\ \alpha\text{features} \end{array} \right] & Z \end{array}$$

Lightner pointed out that in the assimilation (or "trade-off") of features, accent or pitch features cannot be assimilated, and he thus assumed that "the theory of phonology explicitly interprets rules like (N ~ \tilde{V}) as not referring to suprasegmental features; such a requirement is presumably indicative of a general

split between segmental and suprasegmental phonology."

I might note that Lithuanian has a later rule which de-nasalizes nasal vowels, so the above verb forms actually exhibit an alternation between XVNY and XV:Z.

35. I owe these examples to Fouché (1959) and Grammont (1954).

36. [1] I note again that when the segments intervening between the vowels are CL, that C must be a stop and may not be another liquid. For example, as F.C. Dell pointed out to me, perlé is pronounced [pɛrle], not *[perle]. Whenever a rule of French phonology contains the environment __ C(L)V, the expansion CL must be a stop plus liquid, so in fact the environment is most accurately described as

$$\text{---} \left\{ \begin{array}{l} [+cons] \\ [-sonorant] \left[\begin{array}{l} +cons \\ +sonorant \\ +continuant \end{array} \right] \end{array} \right\} V$$

[2] This rule of HARMONY is a late-level phonetic rule which must operate after the rules involved in Glide Formation, for one finds: pressions [prɛsjɔ̃], empêtrions [ãpetrijɔ̃] in the imperfect. The high glide in the former case does not cause the /ɛ/ to become [e]. Evidently, the processes determining the shape of the imperfect ending must precede HARMONY.

37. Fouché and Grammont both cite est-il [etil] and es-tu [etü].

38. Word-internal consonant clusters may be derived by the deletion of word-internal schwa, thereby creating the environment for Closed Syllable Adjustment. Examine the pairs:

prévenir	[prɛvnir]	prévient	[prevjɛ̃]
démener	[dɛmne]	démène	[demɛn]
élever	[ɛlve]	élève	[elɛv]

The second vowel in these examples is an underlying /ɛ/ which changes to /ə/ through the operation of the rule $\epsilon \rightarrow \text{ə} / _ \text{C}^1 \text{V}$ (cf. above). And the /ə/ is subsequently eliminated by a rule of schwa deletion:

	#elɛvɛr#	#elɛv+ə#
Stress	elɛvɛr	elɛv+ə
$\epsilon \rightarrow \text{ə}$	eləvɛr	----
/ə/ Delet.	∅	---
CSA	ɛlvɛr	---
Output:	[ɛlve]	[elɛv]

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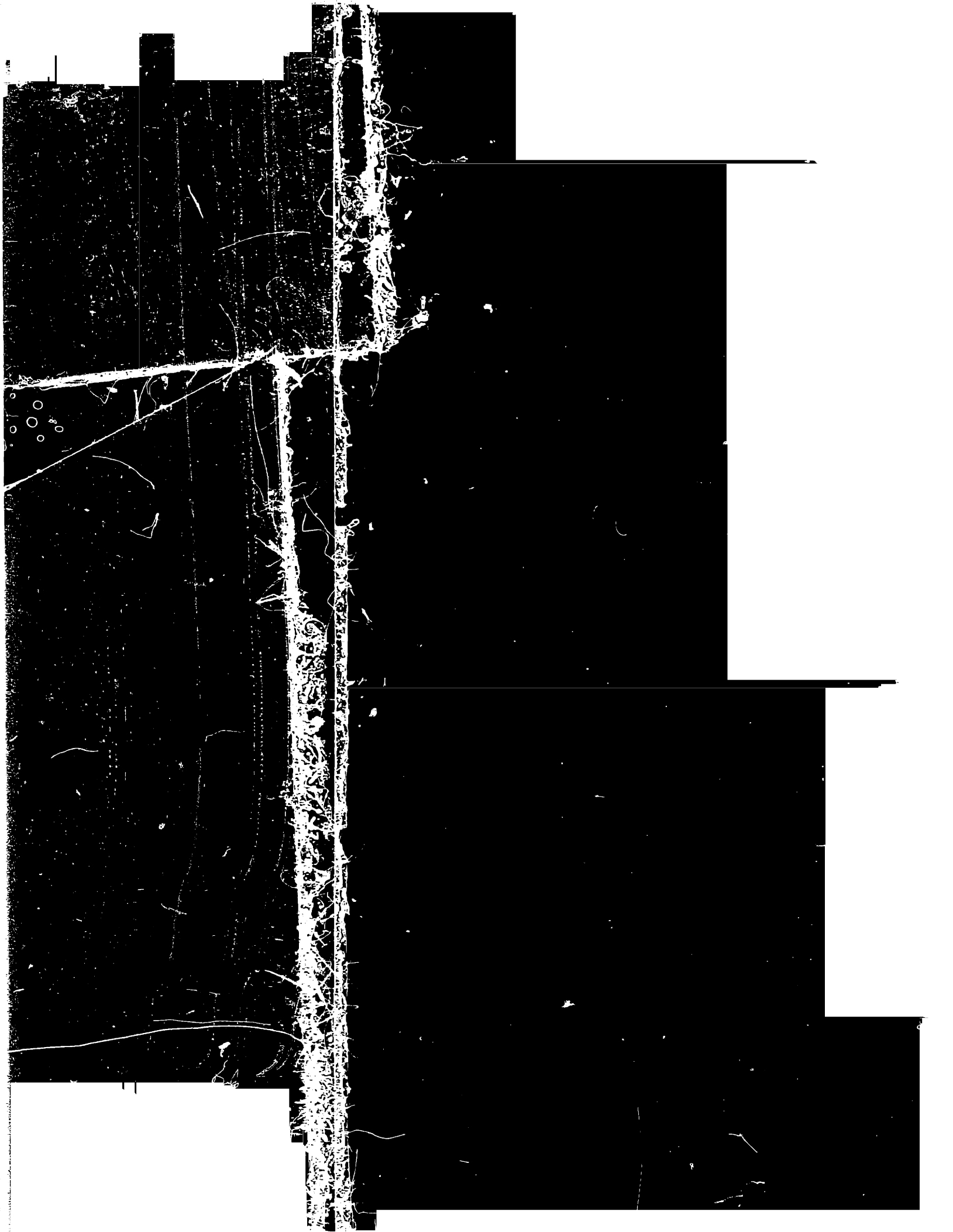
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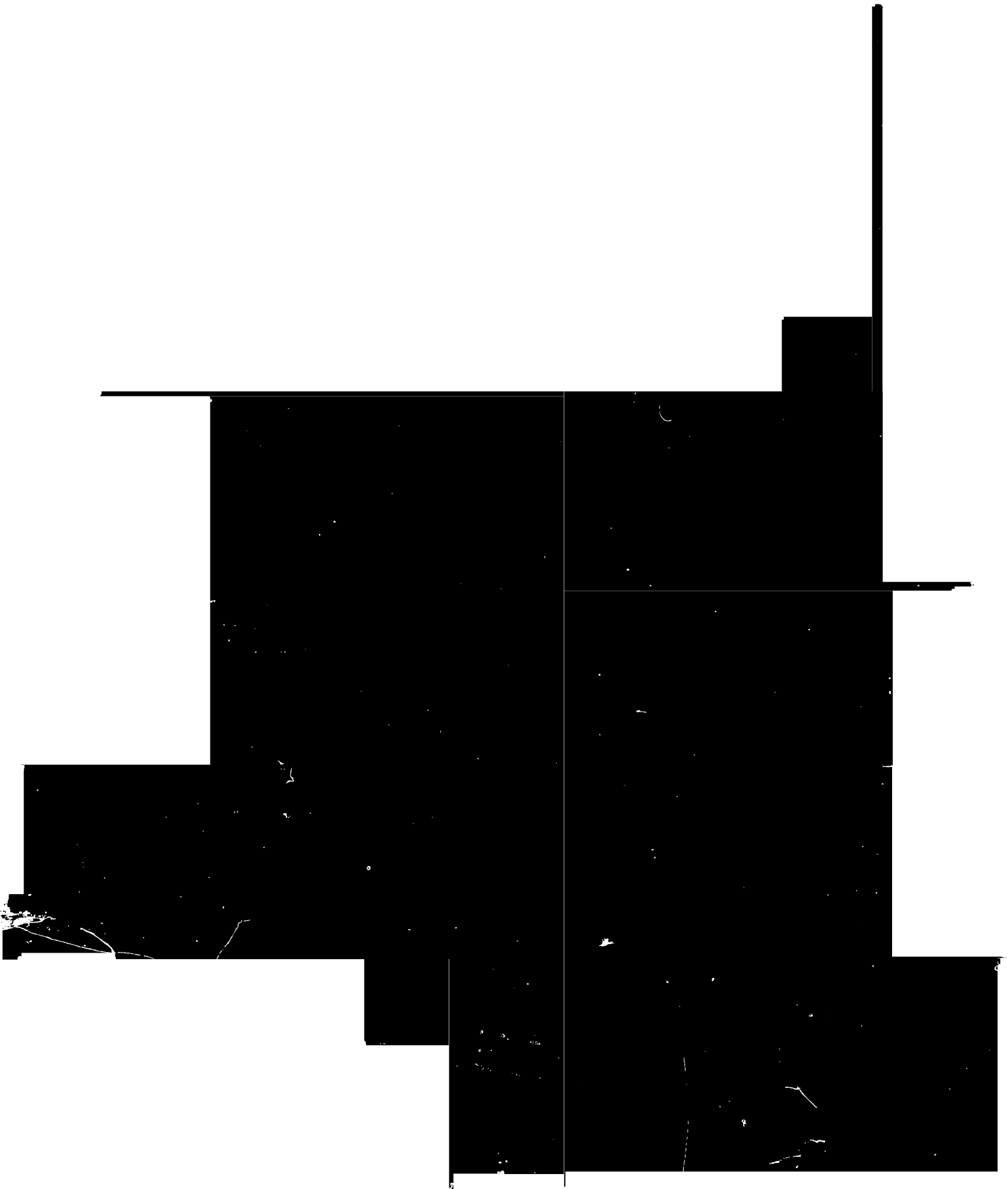
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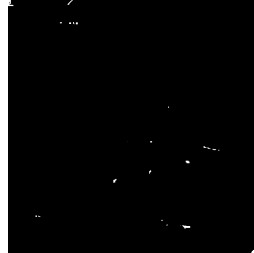
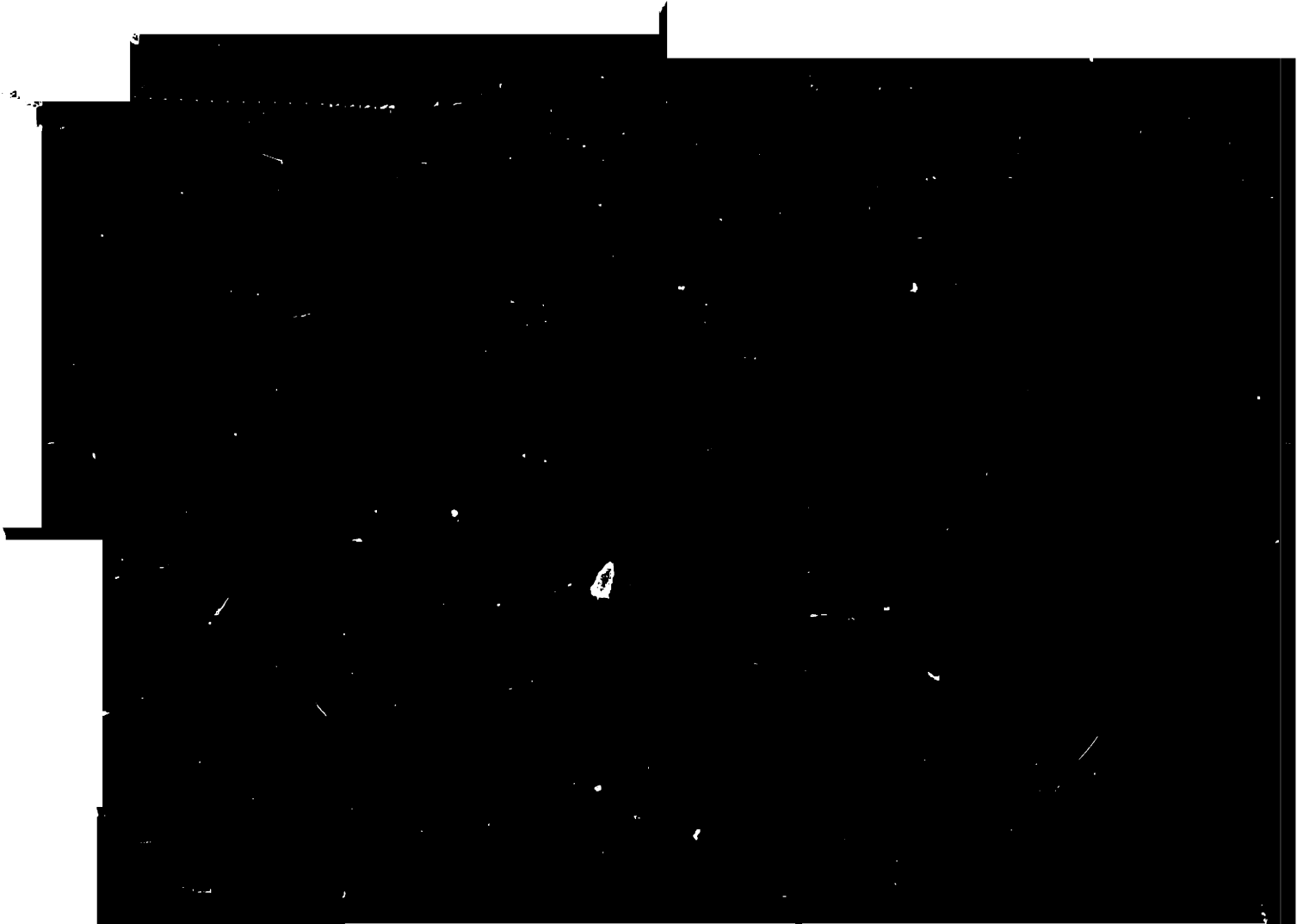
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